

**THE IMPACT OF THE PROPOSED NEW CAPITAL ADEQUACY FRAMEWORK
ON CREDIT RISK MANAGEMENT PRACTICES OF SOUTH AFRICAN BANKS**

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TABLE OF CONTENTS

CHAPTER 1	IDENTIFICATION OF THE PROBLEM AND FRAMEWORK.....	1
1.1	INTRODUCTION	1
1.2	IDENTIFICATION OF THE PROBLEM	6
1.3	OBJECTIVES	9
1.4	RESEARCH METHODOLOGY	10
1.5	OUTLAY OF STUDY	12
CHAPTER 2:	ASPECTS REGARDING THE MEANING, MEASUREMENT AND MANAGEMENT OF CREDIT RISK.....	15
2.1	INTRODUCTION	15
2.2	THE CONCEPTUAL MEANING OF CREDIT RISK	17
2.2.1	Components of credit risk	19
2.2.1.1	Exposure	19
2.2.1.2	Probability of default (PD)	22
2.2.1.3	Loss given default (LGD).....	22
2.2.1.4	Expected loss (EL).....	24
2.2.1.5	Unexpected loss (UL).....	24
2.2.2	Broad classes of exposure as indication of relative credit risk.....	25
2.3	APPROACHES TO CREDIT RISK MEASUREMENT.....	26
2.4	EVOLUTION OF CREDIT RISK MANAGEMENT APPROACHES.....	29
2.4.1	A greater emphasis on quantification	33
2.4.2	The application of portfolio theory to credit risk management.....	35
2.5	THE SEVEN STAGES OF CREDIT RISK MANAGEMENT	41
2.6	CREDIT RISK MITIGATION TECHNIQUES.....	43
2.6.1	Position limits	44
2.6.2	Credit guarantees and collateral	45
2.6.3	Covenants	46
2.6.4	Diversification	47
2.6.5	Netting arrangements.....	48
2.6.6	Periodic settlement	49
2.7	BEST PRACTICES IN CREDIT RISK MANAGEMENT	51

2.7.1	Establishing an appropriate credit risk environment	52
2.7.2	Operating under a sound credit-granting process	55
2.7.3	Maintaining an appropriate credit administration, measurement and monitoring process	59
2.7.4	Ensuring adequate controls over credit risk	62
2.7.5	The role of supervisors	64
2.8	BEST PRACTICES FOR CREDIT RISK DISCLOSURE	65
2.9	CREDIT DERIVATIVES AS CREDIT RISK MANAGEMENT TOOLS	69
2.9.1	Definition of credit derivatives.....	70
2.9.2	Advantages of using credit derivatives as a credit risk management technique	72
2.9.3	Basic credit derivative structures and applications.....	74
2.9.3.1	Credit (default) swaps.....	74
2.9.3.2	Total (rate of) return swaps	75
2.9.3.3	Other credit derivatives	76
2.9.4	Risks arising from the use of credit derivatives	77
2.9.5	Risk mitigation tools applicable to credit derivatives	84
2.9.5.1	Margin and collateral requirements	84
2.9.5.2	Netting arrangements.....	86
2.9.5.3	Credit triggers	87
2.10	CONCLUSION	88
CHAPTER 3: THE USE OF INTERNAL CREDIT RISK RATINGS AND CREDIT RISK MODELS IN CREDIT RISK MANAGEMENT		
92		
3.1	INTRODUCTION	92
3.2	INTERNAL CREDIT RISK RATINGS	95
3.2.1	Definition of credit ratings systems.....	95
3.2.2	Quantification of loss concepts.....	98
3.2.2.1	Data limitations	98
3.2.2.2	Mapping ratings to external data and problems caused by inconsistent architectures	99
3.2.2.3	Credit scoring models.....	101
3.2.3	The administration process for assigning and monitoring ratings.....	104
3.2.3.1	Obligor ratings (OR) and facility ratings (FR)	104

3.2.3.2	Risk factors considered in the assigning of internal ratings	105
3.2.4	Methodological approaches to calculating internal risk ratings	109
3.2.4.1	Statistical-based processes.....	110
3.2.4.2	Constrained expert judgement-based processes	111
3.2.4.3	Processes based on expert judgement.....	112
3.2.5	The operating design of rating systems	112
3.2.5.1	Structure of the rating system.....	112
3.2.6	Sound practices in the function and design of internal rating systems.....	116
3.2.6.1	The role of judgement in assigning risk ratings	116
3.2.6.2	Accuracy and consistency of internal ratings	118
3.2.6.3	Disclosure of rating practices	119
3.2.6.4	Review functions	119
3.2.6.5	Sound practices in the management application of risk ratings	120
3.2.6.6	Implications of the use of internal risk ratings for regulatory use.....	123
3.3	CREDIT RISK MODELING	125
3.3.1	Conceptual approaches to credit risk modeling.....	127
3.3.1.1	Probability density functions	127
3.3.1.2	Basic steps of portfolio credit risk modeling.....	129
3.3.1.3	Single exposure and portfolio credit risk models	130
3.3.1.4	Mark-to-market (MTM) and default mode (DM) paradigm	131
3.3.2	A framework for the classification of available credit risk models.....	133
3.3.2.1	The structural approach to credit risk modeling.....	135
3.3.2.2	Reduced-form models.....	138
3.3.3	Parameter specification and estimation	139
3.3.3.1	Estimation of EDFs/rating transition matrices	139
3.3.3.2	Measuring correlations between credit events.....	140
3.3.3.3	Approaches to credit risk aggregation: Top-down and bottom-up approaches	142
3.3.4	Overview of publicly available credit risk models.....	143
3.3.4.1	CreditMetrics	143
3.3.4.2	CreditRisk+.....	145
3.3.4.3	CreditPortfolioView	148
3.3.4.4	CreditMonitor (KMV Corporation).....	150

3.3.4.5	The Wilson approach.....	152
3.3.5	Application of risk ratings and credit risk models to credit risk analysis and management	153
3.3.5.1	Loan approval.....	154
3.3.5.2	Reporting to management on credit risk profile of the portfolio.....	155
3.3.5.3	Reserving policies	155
3.3.5.4	Allocation of capital	155
3.3.5.5	Profitability analysis, pricing guidelines, and compensation	156
3.3.5.6	Using ratings to trigger administrative actions.....	156
3.3.6	Validation of internal risk measurement methods.....	157
3.3.6.1	Validation of internal credit risk ratings.....	157
3.3.6.2	Validation of credit risk models	160
3.3.7	Weaknesses of credit risk models.....	173
3.3.7.1	Risks omitted and “data blanks”.....	174
3.3.7.2	Parameterization by judgment.....	175
3.3.8	Empirical evidence on the accuracy of credit risk models	178
3.4	CONCLUSION	180
CHAPTER 4: FINANCIAL REGULATION, THE REGULATORY HANDLING OF CREDIT RISK AND THE PROPOSED NEW BASEL ACCORD		185
4.1	INTRODUCTION	185
4.2	OBJECTIVES OF FINANCIAL REGULATION	188
4.3	THE JUSTIFICATION OF FINANCIAL REGULATION.....	191
4.4	PRUDENTIAL REGULATION AND SUPERVISION: THE FINANCIAL SAFETY NET	195
4.5	APPROACHES TO REGULATION	202
4.6	FINANCIAL DEREGULATION.....	206
4.6.1	The 1988 Basel Accord	208
4.7	THE PROPOSED NEW CAPITAL ADEQUACY FRAMEWORK.....	215
4.7.1	Objectives of the new framework.....	217
4.7.1.1	Overall capital.....	219
4.7.2	Pillar 1: minimum capital requirements	224
4.7.2.1	The revised standardized approach.....	225
4.7.2.2	The internal ratings based approach (IRB).....	235

4.7.3	Pillar 2: supervisory review	252
4.7.3.1	Challenges: supervisory approach	255
4.7.4	Pillar 3: market discipline.....	258
4.7.4.1	Disclosure	262
4.7.4.2	Prerequisites for effective market discipline	268
4.7.4.3	Proposals to encourage market discipline	272
4.7.5	General criticism on the proposed new accord.....	276
4.8	CONCLUSION	288
CHAPTER 5: AN EMPIRICAL EVALUATION OF THE CHALLENGES FACING SOUTH AFRICAN BANKS AND SUPERVISORS IN THE IMPLEMENTATION OF THE NEW BASEL ACCORD		
292		
5.1	INTRODUCTION	292
5.2	AIM OF THE EMPIRICAL STUDY.....	295
5.3	RESEARCH METHOD	295
5.3.1	Data collection.....	295
5.3.2	Target population.....	297
5.3.3	Sampling.....	298
5.4	CONTENTS OF THE SURVEY	298
5.4.1	Contents of the questionnaire	300
5.5	A PROFILE OF THE SOUTH AFRICAN BANKING SECTOR.....	306
5.5.1	A credit risk profile of South African banks	312
5.5.2	Prudential requirements.....	314
5.5.2.1	Large exposure and loan classification requirements.....	314
5.5.2.2	Minimum capital requirements.....	315
5.5.3	The efficiency of bank supervision in South Africa.....	317
5.6	A SURVEY ON SPECIFIC CHALLENGES IN IMPLEMENTING THE PROPOSED NEW BASEL ACCORD FOR SOUTH AFRICAN BANKS	323
5.6.1	Results of the survey based on the questionnaire	323
5.6.1.1	General factors regarding credit risk management.....	323
5.6.1.2	Data collection and quantification of loss concepts	334
5.6.1.3	Operating design features of internal credit risk rating systems	343
5.6.1.4	Structure and operating design of internal credit risk rating systems	350
5.6.1.5	Applications/uses of ratings	364

5.6.1.6	System development and enhancement.....	369
5.6.1.7	Review of rating systems and assigned rating grades	371
5.6.1.8	Validation of credit risk rating systems.....	376
5.6.1.9	Specific aspects regarding preparation for the implementation of the proposed new Basel Accord.....	378
5.7	MARKET DISCIPLINE AND DISCLOSURE OF FINANCIAL INFORMATION IN THE SOUTH AFRICAN BANKING SECTOR.....	388
5.7.1	Private monitoring of banks in the current South African financial environment	389
5.7.2	Current disclosure practices of South African banks	390
5.8	CONCLUSION	399
CHAPTER 6: CONCLUSION		406
APPENDICES		418
APPENDIX ONE: Measures of supervision efficiency		418
APPENDIX TWO: List of registered South African banks - locally controlled.....		426
APPENDIX THREE: QUESTIONNAIRE		428
APPENDIX FOUR: Issues raised in a non-scheduled interview with representatives from the Bank Supervision Department of the South African Reserve Bank.....		447
BIBLIOGRAPHY.....		449
KEY WORDS		490
ABSTRACT		491

LIST OF TABLES

Table 2.1	Data input requirements of portfolio credit risk models and simulation-based models	83
Table 4.1	Risk weights for exposures to sovereigns	226
Table 4.2	Risk-weights for exposures to corporates.....	226
Table 4.3	Representative values for benchmark risk-weights	241
Table 4.4	Determination of LGD under the foundation IRB approach.....	242

Table 5.1:	Total deposits and market share of South African banks (as at end December 2001)	308
Table 5.2	International comparison of banks (Values for top 5 banks per country)	310
Table 5.3	Banks' responses with regard to resources and skills for credit risk management and credit risk in the training program.....	324
Table 5.4	Banks' responses with regard to corporate cultures and values	325
Table 5.5	Banks' responses with regard to the use of credit scoring techniques in approving loan applications	327
Table 5.6	Banks' responses with regard to approach to profitability analysis and pricing	328
Table 5.7	Banks' responses with regard to the relation between price loan terms and non-price loan terms and obligor risk	329
Table 5.8	Banks' responses with regard to questions on the pricing of credit risk ...	330
Table 5.9	Banks' responses with regard to confidence with regard to credit policies and processes, information systems and analytical techniques.....	331
Table 5.10	Banks' responses with regard to approaches to measuring credit risk	333
Table 5.11	Banks' responses with regard to a rating history for each borrower	334
Table 5.12	Banks' responses with regard to elements included in rating history	335
Table 5.13	Banks' responses with regard to the computation of long-run average probability of default rates	336
Table 5.14	Banks' responses with regard to the length of the underlying historical observation period used for the computation of long-run average probability of default rates	336
Table 5.15	Banks' responses with regard to the methods used for the calculation of PD rates	336
Table 5.16	Banks' responses with regard to a history of estimated PDS and realized defaults associated with each grade	339
Table 5.17	History of estimated and realized PDs	339
Table 5.18	Banks' responses with regard to the computation of LGD rates.....	340
Table 5.19	Banks' responses with regard to approaches to the estimation of LGD....	341
Table 5.20	Banks' responses with regard to the length of the underlying historical observation period in the estimation of LGD.....	341

Table 5.21	Banks’ responses with regard to the approximate percentage of total loans that has an internal credit rating	344
Table 5.22	Banks’ responses with regard to the approximate percentage of corporate loans that has an internal credit rating.....	344
Table 5.23	Banks’ responses with regard to the approximate percentage of retail loans that has an internal credit rating	344
Table 5.24	Banks’ responses with regard to the factors on which the decision to rate/not to rate depends.....	345
Table 5.25	Banks’ responses with regard to the most accurate description of their credit rating systems.....	346
Table 5.26	Banks’ responses with regard to the methodological approach to assigning ratings	347
Table 5.27	Banks’ response with regard to the loss concept underpinning the rating .	349
Table 5.28	Banks’ responses with regard to two-dimensional versus one-dimensional rating systems.....	351
Table 5.29	Banks’ responses with regard to combining PD and LGD ratings to form an overall indicator of expected risk.....	351
Table 5.30	Banks’ responses with regard to the number of ratings assigned.....	354
Table 5.31	Banks’ responses with regard to the number of ratings for non-pass grades ..	354
Table 5.32	Banks’ responses with regard to “watch grades”	354
Table 5.33	Banks’ responses with regard to the classification of “watch grades”	355
Table 5.34	Bank’s responses in terms of concentration of exposures in largest grade	357
Table 5.35	Banks’ responses with regard to reliance on rating scale that mirrors that of the ratings agencies	358
Table 5.36	Banks’ responses with regard to development of criteria that mirror that of the ratings agencies	358
Table 5.37	Banks’ responses with regard to point in time versus through the cycle approach	359
Table 5.38	Banks’ response with regard to the factors they take into account when assigning ratings.....	360
Table 5.39	Banks’ responses with regard to formal written description of the internal credit rating classification system	362

Table 5.40	Banks' responses with regard to elements included in a rating history.....	362
Table 5.41	Banks' responses with regard to criteria for risk grades that is explicitly included in credit risk policies	363
Table 5.42	Administrative uses of ratings	365
Table 5.43	Analytic uses of ratings	365
Table 5.44	Banks' responses with regard to elements included in reports to senior management	367
Table 5.45	Banks' responses with regard to confidence that management reports are specific enough to allow third party assessments.....	368
Table 5.46	Banks' responses with regard to development of credit risk rating systems... ..	369
Table 5.47	Banks' responses with regard to recent changes in their credit risk rating systems	370
Table 5.48	Banks' responses with regard to rating assessment tools to assist staff in rating determinations.....	370
Table 5.49	Banks' responses with regard to control measures applicable to their rating systems	372
Table 5.50	Banks' responses with regard to review and monitoring measures used ..	373
Table 5.51	Banks' responses with regard to aspects addressed as part of the ratings review process	374
Table 5.52	Banks' responses with regard to measures used to ensure the accuracy and integrity of data inputs in the rating system	375
Table 5.53	Banks' responses with regard to implications of a poor credit ratings review	376
Table 5.54	Banks' responses with regard to backtesting.....	377
Table 5.55	Banks' responses with regard to approaches to validation.....	377
Table 5.56	Banks' responses with regard to the likely impact of the new Basel Accord on the levels of regulatory capital	379
Table 5.57	Banks' responses with regard to the biggest perceived obstacles in the implementation of the new Basel Accord	381
Table 5.58	Banks' responses with regard to the assessment of current risk information.. ..	382
Table 5.59	Banks' responses with regard to Basel II projects.....	383

Table 5.60	Banks' responses with regard to the phase of the Basel II project.....	383
Table 5.61	Banks' responses with regard to cost-benefit analysis	385
Table 5.62	Banks' responses with regard to familiarity with the new Basel Accord's qualitative requirements regarding risk-rating systems	385
Table 5.63	Banks' responses with regard to compliance with qualitative standards as a major challenge	386
Table 5.64	Banks' responses with regard to the use of consultants	386
Table 5.65	Banks' responses with regard to experiencing any difficulty in obtaining buy-in from senior executives and business heads.....	387
Table 5.66	Banks' responses with regard to cultural and organizational challenges in bringing Basel II center stage in the way the organization is managed going forward ..	387
Table 5.67	Capital structure.....	392
Table 5.68	Capital adequacy.....	393
Table 5.69	Internal and external ratings	394
Table 5.70	Credit risk modeling	395
Table 5.71	Credit risk allowances	396
Table 5.72	Geographic and business line diversification	397
Table 5.73	Accounting policies	398

LIST OF CHARTS

Chart 3.1	Risk rating processes.....	96
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LIST OF FIGURES

Figure 3.1	Probability density function	127
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CHAPTER 1 IDENTIFICATION OF THE PROBLEM AND FRAMEWORK

1.1 INTRODUCTION

Finance and risk are inseparable. The business of financial services is, in essence, the business of bearing risk for a price. Therefore, bank management's understanding and strategic management of risk is an important competitive advantage. Aggressively pursuing the right kind of risk provides a powerful means of both defense and offense in today's competitive marketplace for financial services. Those financial institutions who manage risk well will dominate those who do not.

The need for sound risk management was highlighted by a number of high-profile risk management disasters in the early 1990s. Risk may be defined as danger, volatility of outcomes or simply uncertainty - the possibility that events may turn out differently from what is expected. (Beaver and Parker 1995:5). Risk in the banking industry can arise from credit risk, market risk, liquidity risk, currency risk and capital risk. This study focuses on credit risk. Credit risk is often regarded as the primary risk in banking and therefore, the effective management of credit risk is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking organization.

Credit risk can be formally defined as the possible decrease in the present value of future cash flows from financial transactions, which result from both counterparties' default and the increased possibility of future default. The potential impact of credit risk includes loan losses, bad debts and ultimately bank failures. Bank failures can potentially lead to systemic risk, as it is widely accepted that banks are vulnerable to contagious collapse (Santomero 1997:10).

This potential link between credit risk and contagious bank failures provides the basis for risk-adjusted capital requirements. Such capital requirements foster the safety and soundness of banks by limiting leverage and by providing a buffer against unexpected losses. The current capital adequacy rules focus mainly on credit risk and do not explicitly account for

certain risks, such as interest rate risk and operational risk. Although credit risk is still thought by many to be the dominant banking risk, the nature of credit risk, as well as the interrelationship between credit risk and other types of banking risks, has significantly changed over the past decade (Oliver Wyman report 1999a:5).

Risk in financial services is larger in scope and scale than ever before. The new risks of doing business in the financial services industry is frequently nontraditional in nature. Interest rate changes erode asset value. Furthermore, the growing acceptance of hybrid products such as credit derivatives had important effects on the credit risk profiles of many banks. Although providing a new tool to hedge credit risk, the use of such products has created uncertain and market-sensitive counterparty exposures, as well as increasing operational and legal risks. Such interrelationships between different types of risk make the line between the different risk elements less clear, creating an increased need for more sophisticated risk management techniques to manage these risks more efficiently.

Furthermore, the development of capital markets and easy access to information have created significant challenges for the banking industry. More and more financial transactions can be performed outside the banking industry, leading to increased disintermediation, lower earnings and ever-narrowing spreads. This implies formidable challenges: banks are losing some of their past monopolies and comparative advantages which have underpinned their dominant position in the financial system. In particular, as entry barriers into banking services are eroded, banks are increasingly facing competition from a wider range of actual and potential suppliers of banking services.

Against a background of falling underlying profitability, banks have begun to place greater focus than ever before on the maintenance of shareholder return and the potential for improved risk measurement and management practices to enhance performance through better portfolio selection and management. This include a new approach to credit management: evaluating credit decisions in an integrated risk /return framework and actively managing credit risk in a portfolio context. An important aspect of a portfolio approach to credit risk measurement and management is the use of credit risk portfolio models. Analogous to trading account Value-at-Risk (VaR) models, internal credit risk models are used in estimating the economic capital needed to support a bank's credit activities. Such a

credit risk model enables a company to consolidate credit risk across its entire organization, and provides a statement of Value-at-Risk (VaR) due to credit caused by upgrades, downgrades and defaults.

The quantification that a model entails implies a greater awareness and transparency of risks within a bank. More precise and concise risk information may enhance internal communication, contributing to an improvement in a bank's overall credit culture. By design, these systems create strong incentives for managers to economize on a bank's most expensive funding source, namely equity capital. Internal capital allocations are the basis for estimating the risk-adjusted profitability of various bank activities which, in turn, are used in evaluations of managerial performance and in determination of managerial compensation. Credit risk models and economic capital allocations have been incorporated into risk management processes, including risk-based pricing models, the setting of portfolio concentration and exposure limits and day-to-day credit risk management (Federal Reserve Bank of Chicago 1998:5).

In principle, the inputs of a bank's internal risk measurement system could provide valuable information for use in prudential assessments of bank capital adequacy. Potentially, such assessments could be made more incentive-compatible and risk-focused. From a regulatory perspective, the flexibility of models in responding to changes in the economic environment and innovations in financial products may reduce the incentive for banks to engage in regulatory capital arbitrage. Furthermore, a models-based approach may also bring capital requirements into closer alignment with the perceived riskiness of underlying assets, and may produce estimates of credit risk that better reflect the composition of each bank's loan portfolio.

In the light of these developments, as well as the widely recognized limitations of the current capital adequacy framework (Basel Committee 1988), several institutions made proposals for the use of credit risk modeling in the supervisory oversight of banking organizations. However, before a portfolio modeling approach could be used in the formal process of setting regulatory capital requirements, regulators should have to be confident that models are not only well integrated with banks' day-to-day credit risk management, but are also conceptually sound, empirically validated, and produce capital requirements that are

comparable across institutions. At this time, significant hurdles, principally concerning data limitations and weaknesses in model validation still need to be cleared before these objectives can be met. Consequently, the Basel Committee decided not to use credit risk models in this regard. Instead, the Committee's New Capital Adequacy Framework paper (Basel Committee 2001a) suggests the use of internal credit ratings as an instrument to achieve the goal of closer alignment between bank's risk profiles and credit requirements.

The Basel Committee released a proposal for a new capital adequacy framework in June 1999. On 16 January 2001, the Basel Committee on Bank Supervision followed up this first consultative document by presenting its second consultative document. The new capital adequacy framework is a matter of immense significance for the international financial system, since the 1988 Accord became accepted as the *de facto* international standard for assessing bank's capital adequacy. While both the 1988 Accord and the proposed new capital adequacy framework share the same objectives of promoting safety and soundness in the financial system and enhancing competitive equality among them, the new Accord represents a significant departure from the 1988 Accord in terms of the principles it embraces and the methods it employs.

The proposed new Basel Accord can be considered as an example of a process-oriented approach to bank regulation. Whereas the original Accord laid down a series of simple rules in order to develop a common metric for setting capital requirements (rules-based approach), the new capital framework envisages an approach in which supervisors will become less involved in determining the precise rules of calculating capital adequacy. Instead, supervisors will concentrate on ensuring that a bank's internal risk management procedures are adequate. It contained three fundamental innovations, each designed to introduce greater risk sensitivity into the Accord. The most significant innovation of the new proposals is that they move away from sole reliance on capital adequacy ratios and adopt a "three-pillared" approach, with a risk-sensitive capital framework being reinforced by supervisory review and enhanced disclosure, for ensuring bank solvency. The proposed multi-track approach to prudential oversight was motivated by trade-offs between more detailed supervision and regulation, on the one hand, and moral hazard and the smothering of innovation and competitive response, on the other hand in a financial industry landscape fundamentally transformed by globalization of markets and constantly increasing competitive pressures. In this

environment, risks in the financial industry are larger in scale and scope than ever before. Closer ties on a global basis between bank supervisors and increased reliance on market discipline are essential for effective supervision. Two of the innovations concern refinements of the existing risk measurement framework. These involve permitting banks to use credit rating supplied by external agencies (such as Moody's), known as the standardized approach or their own internal systems for evaluating credit risk, known as "internal ratings" to classify their exposures into risk buckets.

Whereas credit risk models are a relatively new development, rating systems have long been a critical "traditional" element of evaluating risk and maintaining internal credit discipline. However, the changing nature of rating systems and the general trend towards greater quantification and more sophisticated credit risk measurement techniques are also impacting on rating systems. Many banks are upgrading their risk rating systems beyond traditional limits to enhance the rigor and objectivity of ratings analyses, to distinguish more finely among degrees of riskiness.

Credit risk ratings both shape and reflect the nature of credit decisions that banks make daily. Such rating systems are an important element in several key areas of the risk management process. This includes assessing the riskiness of a portfolio by examining the distribution of loans by risk ratings and changes in that distribution. Moreover, rating systems are also utilized in establishing an appropriate level for the allowance for loan and lease losses, conducting internal bank analysis of loan and customer relationship profitability, assessing capital adequacy, and performance-based compensation. Understanding how rating systems are conceptualized, designed, operated, and used in risk management is thus essential to understanding how banks perform their business lending function and how they choose to control risk exposures.

In principle, an approach for setting capital requirements based on internal ratings creates a direct link between the regulation of capital requirements and banks' internal structures of assessing, pricing and monitoring credit risk. Consequently, it should ensure that regulatory capital charges more closely reflect a bank's risk profile and contribute to greater alignment of regulatory and economic capital. The integration of internal credit risk ratings into the capital adequacy rules holds the promise to benefit both regulators and institutions. However,

the application of credit risk ratings-based capital adequacy rules will require major restructuring and poses significant challenges to banks and regulators alike.

1.2 IDENTIFICATION OF THE PROBLEM

It was indicated in the previous section that banks are professional risk managers. Indeed, the whole nature of banking is that of taking risk and nothing leads more clearly to success in banking than the ability to assess risk accurately and set prices accordingly. The past decade's rapid financial, institutional and technological changes brought dramatic changes in risk exposure. For many firms, the entire philosophy of risk management requires rethinking and restructuring.

Keeping pace with the changes in the risk environment, as well as the latest developments in risk management practices, pose significant challenges to regulators and banks alike. For supervisors, the most important challenge involves developing an approach to capital regulation that works in a world of diversity and constant change. Financial institutions face the challenge of implementing advances in risk modeling in a coherent and systematic fashion and coping with conceptual difficulties regarding model specification and data limitations. The new capital adequacy framework proposed by the Basel Committee is an attempt to address these challenges. However, implementation of the proposed accord creates additional challenges, especially in an emerging market context. These challenges create a substantial agenda for research on the impact of the proposed new Basel Accord on credit risk management practices of South African banks.

The problem that will be studied in this research is the challenges posed by the implementation of the proposed new capital adequacy framework to South African banks and bank supervisors and the preparedness for these challenges. This problem will be evaluated against the background of general implementation challenges of the proposed new Basel Accord, relevant to both industrialized and emerging market countries, implementation challenges specifically related to emerging market countries, as well as implementation challenges specific to South African banks and regulators. The latter includes aspects such as possible weaknesses in the current supervisory framework in South Africa, as well as resource and training implications of the new accord for South African bank supervisors.

The shift in emphasis from rules- to process-regulation involves foregoing the verifiability and comparability of capital ratios across banks and banking systems to the extent that there would be a greater reliance on internal risk measurement and control systems. As mentioned, the application of credit risk ratings-based capital adequacy rules will require major restructuring and poses significant challenges to banks and regulators alike.

Banks would need to demonstrate the strength of their rating systems and the accuracy and consistency of their risk measurement. The role of supervisors in this regard will be a critical component to the substance and the credibility of an internal ratings approach. Furthermore, the difficulty of ensuring their accurate and consistent application within and across national borders should not be underestimated.

The formal recognition of internal risk ratings as a basis for calculating regulatory capital requirements makes aspects such as the conceptual meaning of internal credit ratings, understanding of loss concepts, implication of use of judgement in the ratings process, as well as validation of internal ratings increasingly important. Greater supervisory reliance on internal credit risk ratings requires that supervisors be confident of the integrity and rigor of internal rating systems.

The inclusion of internal risk ratings as an explicit element in the evaluation of capital adequacy introduces new stresses on internal rating systems. That is, incentives would arise to grade optimistically and to alter the rating system to produce more fine-grained distinctions of risk. Such conflicts could overwhelm the checks and balances currently provided by internal review functions. Even in the absence of such incentive conflicts, the degree of accuracy and consistency in rating assignments by the Basel Committee might be greater than that required internally. This necessitates external reviews and validation of the rating systems. In addition, banks and supervisors should both be aware that the additional stress imposed by external uses, if not properly controlled, could impair the effectiveness of internal rating systems as a tool for managing a bank's credit risk.

Although one of the possible advantages of the modeling approach to credit risk management is the recognition of each institution's unique risk profile, this does not easily translate into a

consistent capital adequacy framework across a wide variety of banks, operating in numerous nations. It is unrealistic to expect that internationally applicable risk-weighting can be established that accurately reflects banks' risks at all times under all circumstances. Compromises in this respect are inevitable.

Furthermore, the proposed three pillars are critically interdependent and the success of the new capital adequacy framework hinges on ensuring the proper functioning of all three of them. However, the Basel Committee recognizes that in certain jurisdictions it is not at present possible to implement all three pillars fully. Ensuring that the supervisory review pillar functions effectively will also require substantial investment in the human capital of supervisors in the developed world, and even more obviously in developing countries. Market discipline may also perform a limited function under the new framework. Disclosure alone is not enough to secure market discipline. An array of governance structures, including proper accounting standards, incentive-compatible safety net and good corporate governance are also equally vital prerequisites. Inappropriate accounting standards and reporting systems, improper classification of non-performing loans, and under-provisioning of reserves against credit losses are the most important of these inadequacies. In addition, a deficient legal framework, unable to enforce supervisory actions when a bank's performance is deemed faulty, seriously undermines the efficiency of both supervisory review (pillar two) and bank capital ratios (pillar one).

Furthermore, according to several academics, it is likely that the new Accord will have significant, and broadly negative, repercussions for the developing world, both internationally and domestically (for example, Griffith-Jones and Spratt 2001, Rojas-Suarez 2001a and Danielson et al 2001). This is due mainly to the impact of the new Accord on the lending environment, as well as its impact on competitive equality in the banking sector.

This leads to the hypothesis of this research, that the rapid financial, institutional and technological changes over the past decade compelled banks to redefine and restructure the way in which they manage credit risk. Any reversal of the trend toward increasingly complex and interdependent financial markets is highly unlikely. This highlights the need for continuous enhancements to risk management practices. This is recognized by the new capital adequacy proposals. However, challenges remain. These challenges are especially

relevant in an emerging market context.

1.3 OBJECTIVES

The main objective of the study is to investigate the challenges facing South African banks and regulators in the credit risk arena, especially relating to the implementation of the Basel Committee's proposed new capital adequacy framework. In order to achieve this objective, it is necessary to investigate the problems relating to the measurement and management of credit risk by banks and regulators alike.

The specific objectives of this study are as follows:

- To establish the importance of credit risk management and to investigate the problems relating to the measurement and management of credit risk by banks and regulators alike. It is necessary to show the impact of recent financial innovations on credit risk measurement and management and on how credit risk fits within the overall risk management framework.
- To give a historical overview of credit risk philosophy and to show how credit risk was handled in the past. This evaluation will highlight the weaknesses and limitations in the traditional approach.
- To explicate current statistical models that are used to monitor and manage credit risk. Potential benefits of these techniques, possible risk management applications, as well as practical and conceptual problems relating to credit risk modeling will be discussed.
- To explain how credit ratings both shape and reflect the nature of credit decisions that banks make daily.
- To explain the factors that determine how informative and reliable credit risk ratings are in describing the risk of loss associated with a certain borrower or exposure.
- To identify conditions that appear to place stress on a bank's risk rating systems, specifically the inclusion of internal credit risk ratings as an explicit element in the evaluation of capital adequacy.
- To explain the regulatory handling of credit risk in South Africa and the rest of the world. The nature of the current capital adequacy regulations (Basel Accord 1988), as well as the limitations of these rules, given the current financial market environment and new approaches to risk management, will be discussed. Proposals regarding the possible reform of this regulatory framework will also be discussed. This will entail an examination of documents,

such as *A new capital adequacy framework: consultative paper issued by the Basel Committee on banking supervision* (June 1999 and January 2001) and *Credit risk modeling: current practices and applications*, Basel Committee on banking supervision (June 1999) as well as the response of several organizations on the Basel documents. The emphasis will fall on the content of the former document, concentrating on the following objectives:

- To give a critical analysis of the three pillars upon which the new capital adequacy framework is built.
- To identify challenges associated with each of the three pillars and recommendations on how they might be overcome.
- To identify preconditions for the successful implementation of the proposed new Basel Accord, and to evaluate the extent to which these preconditions are met in an emerging market context in general, and specifically in the South African context.
- To evaluate the probable impact of the implementation of the proposed new Basel Accord on financial sector stability world-wide and especially in an emerging market context.
- To give a comparative analysis of credit risk measurement and management techniques employed in the South African financial system and to establish how well prepared South African financial institutions and supervisors are for the requirements of the new capital adequacy framework.

1.4 RESEARCH METHODOLOGY

This study entails a literature study and empirical research. The main aim of the literature study is to explain the meaning of the concept of credit risk within the context of overall risk management. The literature study will also cover aspects such as the application of internal risk ratings and credit risk models to credit risk analysis and management. A conceptual framework for assessing the major reorientation in bank capital adequacy regulation is also developed. The literature study also includes a critical analysis of the three pillars upon which the new capital adequacy framework is built.

This study should enable the researcher to identify the key challenges posed by the implementation of the proposed new capital adequacy framework for South African banks and bank supervisors.

All the most important sources will be used to get a good theoretical background. Up-to-date information will be retrieved from the best journals and working papers available in this field. This solid theoretical basis will be the foundation for the empirical study. Specific attention will be given to the current design and application of credit risk ratings by South African financial institutions. This includes aspects such as the design of rating systems, the use of judgement in assigning ratings and the credit risk management applications of ratings. Furthermore, challenges posed by the implementation of the new Basel Accord in an emerging market context will also be addressed.

This theoretical basis will be the foundation for the empirical study. Secondary data sources will be used in the first part of the empirical study in order to identify implementation challenges posed by the macro environment in which South African banks operate, evaluating the extent to which preconditions for the successful implementation of important components of the new Basel Accord are met in the South African context.

Primary data will be used in the second part of the empirical study in order to evaluate the preparedness of South African banks for the implementation of the proposed new Basel Accord on a micro level (bank specific). For the purposes of data collection, the cooperation and inputs of senior officers responsible for credit risk management in the major South African banks, as well as members of the Department of Banking Supervision of the South African Reserve Bank will be elicited.

Face-to-face interviews and questionnaires will be used to gather the required data. The questionnaires address issues such as the credit risk philosophy used by the institutions, the practical day-to-day risk management and their views on appropriate regulation. Experts in the field of credit risk management at the four biggest South African banks (ABSA, First National Bank, Standard Bank and Nedcor) are targeted. Furthermore, some smaller banks will also be incorporated in the sample. These banks are identified with the cooperation of the Department of Banking Supervision of the South African Reserve Bank in order to ensure a good representation of the South African banking sector, in terms of aspects such as market share and client profile.

1.5 OUTLAY OF STUDY

Chapter two introduces and defines the concept of credit risk. Against the background of recent changes in the credit risk environment, the history and evolution of credit risk management practices is discussed. The relative importance of credit risk in the banking environment, as well as the interrelationships between credit risk and other types of risk form an important part of this chapter. Different approaches to the process of credit risk management will be discussed. Recent changes in the credit risk environment, that fundamentally changed the nature of credit risk, especially the growing acceptance of credit derivatives and securitization, will also be discussed. Risk management techniques as well as risk management processes are described. The second chapter will serve as a basic introduction to the risk environment that give rise to credit risk and risk management. This includes a discussion of the history and evolution of credit risk management practices. Traditional approaches to credit risk mitigation will be discussed, as well as newer and more sophisticated approaches such as portfolio credit modeling and the use of credit derivatives as a credit risk management and mitigation technique. The practicality of the different approaches to credit risk management will be evaluated.

Chapter three gives an overview of the basic concepts underlying both internal risk ratings and credit risk models. The discussion recognizes that sophisticated internal risk ratings and credit risk models can only contribute to sound risk management and should be embedded in it. The success of a model depends as much on the way the model itself is used as it does on the environment in which the model operates, especially given many credit models' considerable complexity. Indeed, too much focus has been placed on the sophistication and precision of risk estimation models, and not enough on the more important managerial and judgmental elements of a strong risk management framework.

The first part of the chapter deals with internal risk ratings. The chapter starts with a definition of internal risk ratings. This is followed by a review of the administrative process for assigning and monitoring internal risk ratings. Key issues in the operating design of ratings systems, including sound practices in this regard, are then discussed.

The second part of the chapter provides an overview of the conceptual and practical issues

regarding portfolio credit risk models. This includes the conceptual approaches to credit risk modeling, as well as issues regarding parameter specification. This is followed by an overview of some of the publicly available credit risk models, including the advantages and disadvantages of each of these models. The application of internal risk ratings and credit risk models to credit risk analysis and management is also analyzed. This is followed by a discussion of the validation of internal credit risk measurement methods, in the context of both internal risk ratings and credit risk models. This is followed by a discussion of the conceptual and statistical difficulties in calibrating credit risk models. The chapter concludes with the implications of these weaknesses for the application of credit risk models in credit risk measurement and management.

Chapter four discusses credit risk from the regulator's point of view. The necessity for regulation will be determined by looking at the dangers of credit risk to the financial market. The vulnerability of banks and other financial institutions to even the hint of distress makes the avoidance of large downside risks particularly attractive. The chapter starts with a discussion of the objectives of financial regulation. The rationale of bank regulation, which centers around the special role banks play in the economy, as well as the relationship between bank solvency and the integrity of the payments system, is also discussed. Factors behind the international convergence of bank capital regulation with the 1988 Basel Accord is also examined. This is followed by a review of key features of the 1988 Accord, as well as the reasons motivating the Committee's proposal to revise it.

A conceptual framework for assessing the major reorientation in bank capital adequacy regulation is also developed. Both the 1988 Accord and the New Capital Adequacy Framework can be grounded in this conceptual framework which rests on two intersecting dimensions- regulatory versus economic capital, and rules-based versus process-oriented capital regulation. Within this framework, the potential advantages of the new framework over the 1998 Accord are discussed.

The discussion then turns to a critical analysis of the three pillars upon which the new capital adequacy framework is built. The chapter concludes with the identification of challenges associated with each of the three pillars and recommendations on how they might be overcome.

Chapter five consists of an empirical study, evaluating the possible impact of the implementation of the Accord on the South African banking system in the context of the general financial environment in which South African banks operate. In this way, the extent to which preconditions for the successful implementation of the Basel Accord is met in the South African context, is investigated. Against the background of South Africa's sophisticated and efficient financial markets and its vulnerability as an emerging market country, an overview of the structure of the South African banking sector is given. So too, the supervisory approach of the South African Reserve Bank is outlined.

The structure of the questionnaire will be explained to ascertain the information required from the banks. The questionnaire is divided into three different sections to provide a more meaningful analysis. In the first section, the credit risk management and measurement processes of the banks are analyzed. The second part of the questionnaire covers specific aspects regarding the internal credit risk rating systems of South African banks. The purpose of this section is to compare current internal credit rating system practices with requirements set by the Basel Committee for adoption of the internal ratings based (IRB) approach. The last part of the questionnaire addresses specific issues regarding the implementation of the new Basel Accord. This includes aspects such as the South African banks' preferred approach for the calculation of regulatory capital requirements for credit risk, as well as perceptions regarding the biggest challenges posed by the implementation of the new Basel Capital Accord. The questionnaires address issues such as the credit risk philosophy used by the institutions, the practical day-to-day risk management and their views on the proposed new Basel Accord.

CHAPTER 2: ASPECTS REGARDING THE MEANING, MEASUREMENT AND MANAGEMENT OF CREDIT RISK

2.1 INTRODUCTION

Credit risk management is often cited as one of the great challenges in risk management for banks. Despite benign default conditions in many economies of the world in recent years, the financial community has promoted credit risk management to center stage in their efforts to understand and profit from credit events and products. Several large financial institutions have developed elaborate models of analysis of credit instruments, primarily corporate bonds and loans, to promote efficient management and the trading of these assets and their derivatives (Altman and Suggit 2000:230). This trend, combined with greater industry competition, industry consolidation and advances in technology are adding to the pressure to improve credit risk management throughout the financial industry. Regulatory changes making capital charges more responsive to a bank's actual risk exposure (see chapter 4) also contribute to this trend.

Credit risk has historically been attributed with the most advanced level of risk management techniques (Ernst and Young 2000a:10). However, according to the Basel Committee, the major cause of serious banking problems world-wide continues to be directly related to credit risk exposure (Basel Committee 2000g:4). Factors contributing to credit risk-related banking problems include lax credit standards for borrowers and counter parties and poor portfolio risk management. The majority of respondents to a survey conducted by the Global Association of Risk Professionals (1999:2) perceived credit risk management systems and processes to be inadequate. This opinion is also reflected in the 2000 CSFI (Centre for the Study of Financial Innovation) report. Concerns regarding asset quality and thus potential credit risk is apparent in this report on risk management in banking.

This apparent inadequacy of credit risk management techniques and systems can be partly attributed to recent changes in the credit risk environment. Technological, financial and

institutional factors, fundamentally changed the nature, scope and scale of the risk banks need to manage. A recognition that the increasing volume and complexity of financial instruments and products require that better ways be found to measure associated risks. Against a background of falling underlying profitability, banks have begun to place greater focus than ever before on the maintenance of shareholder return. The potential for improved risk measurement and management practices to enhance performance through better portfolio selection and management can play an important role in this regard.

Traditionally, the main objective of credit risk management has been to avoid losses (Jarrow and Van Deventer 1998:2). Credit losses were viewed as a lapse of judgement, rather than as a predictable part of assuming risk, so the system was designed to prevent lapses from occurring. This was achieved with risk management techniques such as due diligence in lending decisions so that the expected risk of borrowers is both accurately assessed and priced, diversifying across borrowers so that credit losses are not concentrated in time and purchasing third party guarantees. However, changes in the credit risk environment led to a redefined goal of credit risk management - to maximise a bank's adjusted rate of return by maintaining credit risk exposure within acceptable parameters. Credit risk management requires banks to identify, measure, monitor and control credit risk, as well as to determine that they hold adequate capital against these risks and that they are adequately compensated for risks incurred. Furthermore, banks need to manage the risk in individual credits or transactions, credit risk inherent in the entire portfolio as well as also considering the relationships between credit risk and other risks.

The growing demand for more accurate risk management tools also led to the increasing displacement of older but simpler approaches in favour of more complex ones (Oliver Wyman report 1999a:5). This include a significant increase in the use and range of techniques for mitigating or hedging credit risk. In this regard, credit derivatives play an especially important role. The use of such instruments, combined with increasing liquidity in loan markets are providing banks with new tools for actively managing the loan portfolio *ex post*. This has enabled bank treasurers to manage their credit risks actively, eliminating credit risk "hot spots" in their portfolios and altering their risk exposure as the economic cycle or the bank's financial well

Advances in risk management technology, which facilitate more accurate risk measurement and management, further enhanced the use of more quantitative approaches in the traditionally qualitative loan market. Responding to increased domestic and international competition and the greater complexity of their credit portfolios, many of the largest banks have developed sophisticated methods for measuring credit risk, analogous to trading account VaR (Value-at-Risk) models.

Some of these models allow a portfolio approach to credit risk modeling, enabling a company to consolidate credit risk across its entire organization, and provides a statement of Value-at-Risk (VaR) due to credit upgrades, downgrades, and defaults. The portfolio context allows banks to analyse marginal and absolute contributions to risk, and reflect concentration risk within a portfolio. In a portfolio context, the risk-return trade-off of concentrated lending activity can be evaluated and systematically reflected in pricing and credit extension decisions (Garside, Stoot and Stevens 1999:1).

This chapter provides an overview of the evolution of credit risk management approaches and techniques to adapt to the changing credit risk environment. The chapter starts with a discussion of the conceptual meaning of credit risk. That is followed by an overview of credit risk mitigation techniques, as well as an overview of the Basel Committee's *Best Practices in Credit Risk Management Guidelines*. The role of credit risk disclosure in this regard is also discussed. This is followed by a discussion of the evolution of credit risk management practices, including the recent greater emphasis on quantification and the application of portfolio theory to credit risk management. The chapter concludes with a discussion of the credit risk management applications of credit derivatives. This includes an overview of the opportunities for active credit risk management provided by these tools, as well as challenges posed by their use as credit risk mitigation techniques.

2.2 THE CONCEPTUAL MEANING OF CREDIT RISK

The erosion of value due to simple default or nonpayment by the borrower is often cited as the most basic of all product market risks in a bank (Beaver and Parker 1995:5). As such, credit risk refers to the degree of uncertainty surrounding a counterparty's ability to fulfill its contractual obligations. It encompasses both the probability of loss and the probable size of

the loss net of recoveries and collateral (Sobehart and Keenan 2001:S31).

Credit risk is most simply defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. For most banks, loans are the largest and most obvious source of credit risk. However, other sources of credit risk exist throughout the activities of a bank, including in the banking book and in the trading book, and both on and off the balance sheet. Banks are increasingly facing credit risk (or counterparty risk) in various financial instruments other than loans, interbank transactions, trade financing, foreign exchange transactions, financial derivative contracts and in the extension of commitments and guarantees, and the settlement of transactions. Additionally, credit risk includes changes in counterparties' creditworthiness caused by movements in the financial markets. These changes in creditworthiness are reflected in the prices of assets issued by these banks (Counterparty Risk Management Policy Group 1999:3).

Formally, credit risk can be defined as the possible decrease in the present value of future cash flows from financial transactions (Oda and Muranga 1997:28). This can result from both counterparties' defaults and the increased possibility of future defaults. Default usually means that a counterparty is breaking the original contract, or that the payment of interest and principal is not in accordance to the original contract. To clarify the meaning of credit risk, it can be divided into two parts—type I and type II credit risk. Type I credit risk is defined as the possible decrease in the present value of future cash flows from financial transactions, resulting from counterparties' defaults. As such, it does not take into consideration any future change of the default probability. No default thus means no realization of type I credit risk (Jackson and Perraudin 1999:129).

On the other hand, type II credit risk is defined as the remaining risk that is calculated by subtracting type I credit risk from total credit risk. Type II credit risk results from the possibility of an increase in the counterparties' default probabilities in the future. Type II credit risk thus includes counterparty risk - the risks that may arise if the bank's counterparty does not honor its obligations. This is especially relevant in the context of the purchase and sale of securities or other traded items such as OTC derivatives.

2.2.1 Components of credit risk

Credit risk can be classified into the following main components (Dowd 1998:175 and Berenguer and Davies 1999:1):

-The probability of default (PD). The probability that the counterparty or borrower will fail to service its obligations.

-Credit exposure. The potential loss amount in the case of default.

-Recovery rate. The proportion of exposure recovered in the event of counterparty default.

-The credit' Expected loss (EL) which is a function of the probability of default (PD) and refers to the amount a firm can expect to lose in an average year on a transaction or portfolio over a period of time.

-The unexpected loss (UL) associated with these, that is, a measure of the range of possible losses on a contract or portfolio beyond the expected loss.

The above components refer to type I credit risk only. In the case of type II credit risk, credit migration is also considered. Migration risk refers to the probability and value impact of changes in default probability (reflected in a credit rating migration or a change in creditworthiness). In the case of calculating portfolio risk, default correlations or the degree to which the default risks of the borrowers and counterparties in the portfolio are related, must also be considered. Estimation of credit risk in the portfolio context will be discussed in section 2.4.2.

A more detailed explanation of these loss concepts, as well as methods typically employed to quantify these loss concepts will be discussed in the next section. Conceptual and practical difficulties in this regard, will also be discussed. In the light of the proposed internal ratings based (IRB) approach to the determination of regulatory capital requirements, quantification of these loss concepts becomes increasingly important (see section 4.7.2.3.1).

2.2.1.1 Exposure

As mentioned, credit exposure is the maximum amount that a bank risks losing due to a

default, depending on the nature of the transaction. In the case of conventional loans, exposure is simply tied to the loan amount (Kern and Rudolph 2001:4). In the case of more complex financial instruments, the estimation of exposure is less straight-forward. For example, for many types of credit instruments, a bank's exposure is not known with certainty, but rather may depend on the occurrence of future random events. One example of such "credit-related optionality" is a committed line of credit where, for a fixed period of time, a bank agrees to advance funds, up to a predefined limit, at the customers' discretion. The relevant credit exposure measure in this regard is loan equivalent exposure (LEQ). This is defined as the portion of a credit line's undrawn commitment that is likely to be drawn down by the borrower in the event of default. A study by Araten and Jacobs (2001: 35) shows that LEQs are influenced both by rating category and time-to-default. LEQs show a highly significant increase relative to time-to-default across all ratings categories and generally decrease as credit quality worsens.

Another example of a product with an uncertain exposure is a derivative contract (Dowd 1998:167). Estimating the current exposure of derivative instruments requires sophisticated models since it depends on the "in-the-moneyness" of the contract, which is determined by prevailing market conditions. Credit exposures are also affected by legal and contractual provisions governing the respective rights and obligations of both parties (Berenguer and Davies 1999:1).

As noted in the Group of Thirty's 1993 report, *Derivatives: practices and principles*, the generally prevailing market practice for measuring credit exposure related to OTC derivatives contracts starts with the use of two exposure measures: current exposure and potential exposure. Current exposure is the current market value of a derivative payable or receivable and is generally regarded as the current replacement cost. Potential exposure is an estimate of the future replacement cost. As such, potential exposure (PE) is an estimate of the future credit exposure of derivative transactions using statistical analysis based upon broad confidence intervals over the remaining terms of the transactions (Aziz and Charupat 1998:31).

While the current exposure definition itself is self-explanatory, there is an important issue related to the concept: current exposure does not equal true replacement cost. Contract

replacement cost in declining or illiquid markets will usually be materially different from measured current exposure. Position replacement cost and collateral values should be measured both at current market prices and at the prices that a bank anticipates receiving in the case of liquidation of its positions and collateral with the counterparty. Liquidation value should reflect both the adverse price movement which may occur with respect to positions and collateral during the period until the decision to liquidate is taken, as well as the market impact of liquidating the specific positions and collateral involved. For any counterparty, a comparison of market and liquidation calculations yields useful information with respect to the sensitivity of a bank's exposure to that counterparty to adverse market price movements and the liquidity characteristics of the underlying positions and collateral.

Two measures of potential exposure are typically estimated. One is expected exposure, which is an estimate of the average of market values over the (remaining) life of the transaction. The other is peak exposure, which is an estimate of the maximum future exposure over the (remaining) life of the transaction, using statistical analysis based on pre-determined confidence intervals. Determination of the appropriate confidence level used in the measurement of future exposures is an institution specific decision that will encapsulate the institution's philosophy on credit risk management. Measuring potential exposure at too low a confidence level may provide a false sense of security in that it can portray unrealistically low risk levels, whereas measuring potential exposure using too high a confidence level can cause management to reduce the business levels to protect the bank from very bad, but highly improbable outcomes (see also section 2.9.3.3. for a discussion of exposure measure in the credit derivative context). Where multiple transactions exist with the same counterparty, and where a binding and enforceable netting agreement is in place, the transactions are typically aggregated into a portfolio and netted, with netted estimates of the exposure measures calculated (Algotmics 2001b:16).

A number of complex risk management issues are raised by the application of these exposure measurement techniques to large, multi-counterparty credit portfolios, particularly during market turmoil such as the 1998 emerging market crisis. First, in some circumstances, current (net of collateral) exposure measures do not represent a realistic estimate of the replacement value of the contract (or the liquidation value of the collateral), due to the impact that the size and illiquidity of the contract (and collateral) would have on market prices if immediate

replacement (liquidation) had to occur. Second, peak exposure methods may be generally unreliable, if they do not take adequate account of the extreme size of stress market moves or the ability to receive collateral. Measurement errors caused by increased correlation between, for example market and credit risk, during market turmoil is a problem shared by all risk measurement methodologies (see also section 2.9.4. for a discussion of this issue).

2.2.1.2 Probability of default (PD)

Default risk is the uncertainty surrounding a firm's ability to service its debts and obligations. Prior to default, there is no way to discriminate unambiguously between firms that will default and those that will not. Estimating the expected relative frequency of a credit event thus involves probabilistic assessments of the likelihood of default (Kealhofer 2000:4). Such assessments are complicated by scarcity of data. This is due to the fact that default is a very rare event. For a typical firm the probability to default in any year is around 2%. High rated firms (AAA or Aaa) even exhibit average default rates not exceeding 0.02%. In addition to that the causes for default and its technicalities are very diverse and hard to grasp. They do not only depend on quantitative but also on qualitative variables such as legal provisions, bankruptcy laws and other country specific circumstances (Knoch and Rachev 2001a:1).

A key issue in the estimation of PD is to define what is considered to be a default event. Financial institutions rely on a variety of definitions of a default event, for example, loan loss provision, or failure to pay interest, or principal, over a specified time span. The difficulty to pool PD-data across banks without a harmonization of default definitions, has led to suggestions that the industry works towards a common definition of PD (Skora 1998:14). Such a common definition is even more important in the light of the internal ratings based (IRB) approach envisaged under the New Capital Adequacy Framework (see section 4.7.2.2).

2.2.1.3 Loss given default (LGD)

The credit risk of a loan or other exposure over a given period involves both the probability of default (PD) and the fraction of the loan's value that is likely to be lost in the event of

default (LGD). The value of LDG changes as time progresses from default through workout and can vary from zero to 100 percent (Knoch and Rachev 2001a:5).

Banks in general appear to have greater difficulty in attributing LGD estimates to their exposures than in assessing the PD of the counterparty. LGDs are usually assumed to depend on a limited set of variables characterizing the structure of a particular credit facility. These variables may include the type of product (e.g. business loan or credit card loan), its seniority, collateral and country of origination (Treacy and Carey 2000:172).

The sophistication of estimation methods varies considerably across banks. While some banks appear to rely almost exclusively on LGD parameters set intuitively, a small number of institutions appear to have developed a separate LGD rating which explicitly evaluates empirically based likely recovery rates for each transaction in the event of default. Even in the latter case, however, data limitations and other issues generally necessitates to some degree, the use of subjective judgement and the pooling of quantitative information from several sources. These sources include internal data on the bank's own historical LGD by risk segment, loss data from trade association reports and publicly available regulatory reports; consultant's proprietary data on client LGDs; and published rating agency data on the historical LGDs of corporate bonds (Kern and Rudolph 2001:4).

Data quality is also affected by the fact that the process of default is protracted and complex and involves many supplementary costs. Its financial effects can spread over a number of years. Meanwhile, the loss statistics can become complicated by the application of discounts to cashflows associated with the position the swapping of debt for equity during workout, and many other issues. As the position evolves, LGD-related information is often dispersed between bank divisions further complicating the collection of LGD data (Treacy and Carey 2000:2).

Recognizing the shortcomings in available LGD information, the internal ratings based (IRB) framework will include supervisory LGD assumptions that can be used by banks in lieu of internal or external empirically based data (see section 4.7.2.2.3.). Supervisory LGD treatment is relatively conservative, including only a few different categories of LGD (Mark and Crouhy 2001:2). This has considerable implications for bank data gathering and systems

initiatives, suggesting that many banks need to start building robust internal records of loss given default, so that they can shift to the “advanced IRB” approach (using internal data on risk factors such as LGD, discussed in chapter 4) .

2.2.1.4 Expected loss (EL)

In its simplest form, expected loss is equal to the probability of loss times the exposure net of recovery (Krahnert and Weber 2001:6). The expected loss calculation is, in one sense, the most straightforward aspect of portfolio theory. That is, the ability to estimate credit quality and the expected size of losses given changes in credit quality, allows the risk manager to price, and reserve for, expected loss. Because the expected losses can be anticipated, they should be regarded as a cost of doing business and not as a financial risk.

Expected loss in this instance has a statistical meaning, i.e. ratings do not represent predictions of actual losses for particular loans, instead ratings are indicators of the credit losses likely to arise on average over similar time periods from large numbers of loans that display similar characteristics.

If there were no further uncertainty relating to possible credit losses, that would be the extent of the risk management problem: predictable credit losses year after year would be no more than a budgeted expense (Kealhofer 2000:13).

2.2.1.5 Unexpected loss (UL)

Risk, however, entails not just an estimated possibility of loss, but also the uncertainty of loss. There is substantial volatility around the level of expected loss. The distribution of losses around their expected value is an important measure of unexpected risk (Kern and Rudolph 2001:8).

Credit analysis reveals that not only are credit-related losses uncertain, the distribution of outcomes is heavily skewed. It is not uncommon for meaningful probabilities of loss in a

credit portfolio to occur many standard deviations distant from the mean. This reveals the inadequacy of an analysis that goes only so far as to characterize expected portfolio values without addressing the uncertainty of those values (VaR).

Empirical uncertainty about the dimensions of credit risk exists among policymakers because relatively few publicly available studies exist and because most such studies have used one of the existing credit risk models to produce evidence (Carey 2000:2). While significant advances have been made in interpreting credit risks, there is a relative paucity of empirical studies that investigate the sources of credit risks using observable economic factors.

2.2.2 Broad classes of exposure as indication of relative credit risk

Broad classes of exposure are often seen as an indication of relative credit risk. For example, corporate exposures are often perceived to be more risky than sovereign exposures (in the sense of higher probability of default, for instance). However, empirical evidence in this regard is mixed. Relatively few studies have examined the relative riskiness of different credit exposures. Carey (2000) calculates risk measures for portfolios of public bonds by applying bootstrap methods to a large data set of Moody's rating histories (Kiesel, Perraudin and Taylor 2001:9). Several recent papers have looked at the riskiness of credit exposures in the context of evaluating credit risk models proposed by the finance industry. Gordy (2000) and Crouhy, Galai and Mark (2000) implement credit risk models and calculate levels of capital for particular portfolios. Nickell, Perraudin and Varotto (2001) evaluate the performance of credit risk models out of sample, while Lopez and Saidenberg (2000) discuss cross-sectional evaluation of credit risk models (Kiesel, Perraudin and Taylor 2001:10). For a discussion of the results of these studies, see section 3.3.8.

Research to date indicates that there is a strong maturity structure to credit risk, although some studies indicate that the positive dependence on maturity is less pronounced for lower quality credits. There is some evidence that the riskiness of exposures to borrowers with the same rating varies according to country of domicile but the effect does not appear to be particularly strong (Jackson and Perraudin 1999:139).

Likewise, there is no clear message on the differences between the riskiness of sovereign and corporate exposures. Ratings seem to be more stable for sovereigns than for industrials but data on bond market spreads indicate that the market perceives exposures to BBB and BB sovereigns to be rather riskier than exposures to industrials, perhaps because dealing with problems is more complex and outcomes are less certain (Jackson and Perraudin 1999:139).

A review of the available empirical evidence suggests that the pricing of exposures and the probability of changes in credit standing are broadly similar in the bond and loan markets. However, there have been too few comparative studies of liquid and illiquid exposures for one to be confident of these conclusions and more research in this area is needed.

The interest rate spread on traded instruments is another indication of relative credit risk (Rowlands 1999:1). Spreads are not, however, an ideal measure of relative credit risk because the relative yields on two marketable instruments such as a bond will also be affected by issues such as market liquidity for each bond (Jackson and Perraudin 1999:130). Kiesel, Perraudin and Taylor (2001:10) attempt to quantify the riskiness of different kinds of credit exposure, looking both at credit quality and maturity dimensions. They also examine the composition of credit risk, in particular the relative importance of risks associated with ratings transitions, recovery rates and changes in spreads for different ratings categories. They conclude that spread risk is important for relatively high-quality debt and that the dependence of VaRs on maturity depends very much on whether the exposures are low or high quality credit. Low quality credit exposures are quite insensitive to maturity because recovery risk is a substantial fraction of total risk. For high quality credit exposures, spread risk is more important and this leads to a strong positive dependence on maturity.

Effective credit risk management requires precise estimates of the different loss concepts discussed in section 2.2.1. Different approaches that can be used in the quantification of such loss concepts will consequently be discussed.

2.3 APPROACHES TO CREDIT RISK MEASUREMENT

Comprehensive and accurate credit risk modeling requires the combination of complex and highly quantitative risk estimation which captures the broad range of potential value

outcomes in a portfolio with in-depth counterparty credit analysis which measures the probability of credit deterioration and default. Furthermore, credit risk is driven by both unsystematic and systematic components. Unsystematic credit risk covers the probability of a borrower's default caused by circumstances that are essentially unique to the individual, whereas systematic credit risk can be defined as the probability of a borrower's default caused by more general economic fundamentals. Counterparty default may arise as a consequence of poor management and/or bad luck. However, it also may arise in the wider context of economic recessions, financial market crashes and political turmoil. Thus, credit risk entails a potentially "catastrophic" systemic component and it has, conceptually, much in common with other types of risks where an accumulation of losses may also arise as a consequence of market-wide phenomena.

Because of these difficulties and challenges, no universally accepted approach to counterparty credit risk modeling has been developed to date. There are a number of policy initiatives addressing the various credit risk modeling alternatives, including the Basel Committee on Banking Supervision's April 1999 paper entitled, *Credit Risk Modeling: Current Practices and Applications* and the Counterparty Risk Management Policy Group's 1999 document entitled *Improving Counterparty Risk Management Practices*.

These documents recognize that there are several ways to measure credit risk. One approach to the classification of different credit risk management techniques is to distinguish between transaction and portfolio methods (Knoch and Rachev 2001a:3). In the case of transaction methods, total credit risk with a counterparty is simply the sum of current and potential exposure of each transaction with the counterparty in the firm's portfolio. In contrast, portfolio methods compute the potential exposure of all the firm's transactions with a counterparty at once, considering correlations between potential exposures of multiple transactions with the counterparty as well as netting arrangements. Firms pursuing "industry best practice" either have adopted or hope to adopt a portfolio approach to measuring credit risk. Portfolio methods of measuring potential credit risk exposure are conceptually close to methods of calculating Value-at-Risk (VaR) to measure market risk, with the additional complication of identifying each transaction's counterparty and netting status.

Another approach to the classification of credit risk methodologies is that of the Counterparty

Risk Management Policy Group (1999:21), distinguishing between risk utilization and capital allocation. Although different, these two processes are not competing. Credit risk measurement and management processes have evolved partly as a function of the type of business executed by a financial institution. For example, institutions with a historical trading emphasis have tended to focus on “worst case” potential future exposure (PFE) combined with individual counterparty credit analysis as their primary risk measurement tool. Such firms engage in risk utilization, that is, they allocate capital based on measures of trading risk, set potential exposure (PE) limits according to a counterparty’s creditworthiness, and measure risk based on PE to the counterparty. Institutions that have historically emphasized direct lending (and its associated regulatory and capital requirements), in contrast, have tended to focus on the risk characteristics of the aggregate portfolio of exposures across different products. Such firms engage in capital allocation, that is, they manage exposure by allocating capital to business units and then charge for the capital according to the creditworthiness of a counterparty and how well the transaction fits in with the existing portfolio. Financial institutions using risk utilization have tended to focus on credit risk from a counterparty perspective while institutions using capital allocation have focused on credit risk from a firmwide portfolio perspective.

Both risk utilization and capital utilization are rigorous and widely used methods of credit risk measurement although neither should be considered fully comprehensive on a stand-alone basis. Because of its counterparty focus, the risk utilization method does not readily facilitate comparability of exposure measures or aggregation of exposures on a firmwide portfolio basis, as the capital allocation model does. (Counterparty Risk Management Policy Group 1999:5). Nor does it facilitate profitability analysis. However, risk utilization’s intense focus on trade and counterparty specifics makes the model valuable in its ability to identify potential large exposures and protect firms against catastrophic loss, while providing a framework for risk utilization and management.

Choosing the “best approach” involves balancing the strengths and weaknesses of each process against the needs of a specific bank’s broad range of credit requirements. Firms should make a continuing effort to combine the best practices of both processes into their credit risk modeling systems. However, credit risk measurement is only one aspect of credit risk management. Several other aspects regarding credit risk management, including the use

of credit risk mitigation techniques and the evolution of credit risk management practices over time, are discussed in the next section.

2.4 EVOLUTION OF CREDIT RISK MANAGEMENT APPROACHES

Credit risk management practices are currently undergoing revolutionary changes in strategic approaches, technology infrastructure and risk mitigants (Prybylski 2000:72). Traditionally the overriding objective of credit risk management has been to avoid loss. Losses were viewed as lapse in judgment, rather than as a predictable part of assuming risk. The linchpin of the traditional credit assessment was a rigorous, “four-eyes” approach to credit evaluation and approval (Oliver Wyman report 1999a:1). Both loan originators and credit analysts were responsible for evaluating lending propositions, with the latter having the authority for making “yes/no” approval decisions. This approach to risk assessment, based on in-house judgment and experience, relied mainly on subjective and intuitive analysis to assess the credit risk. Essentially, such banker “expert” systems utilise information on various borrower characteristics, such as borrower character (reputation), capital (leverage), capacity (volatility of earnings) and collateral, the so-called “4 C’s” of credit, to reach a largely subjective judgement as to whether or not to grant a loan (Altman and Saunders 1998:1723).

The underlying business philosophy was “buy and hold” origination (Prybylski 2000:72). Once a loan was made, it was expected to stay on the books until maturity or default. Consequently, *ex ante* credit approval/renewal was seen as the most important part of the credit process. *Ex post* risk management and ongoing attempts to steer the risk/return performance of the portfolio received little attention. In traditional models credit decision making was segregated from pricing and relationship management. This separation was deemed necessary to prevent moral hazard, given that loan originators were mostly focused on, and rewarded for volume (Oliver Wyman report 1999a:2). Consequently, the benefits of integrated risk-return decision making was foregone. Furthermore, the extensive credit analysis and duplication of functions made credit a major cost block in most lending businesses. Other shortcomings of the “traditional” credit risk management model include the following (Oliver Wyman report 1999a:2):

-A lack of written credit policies. Instead, underwriting standards are locked away within the heads of senior management and passed on through apprenticeship style structures long

outgrown by the size and complexity of the institutions.

-Multi-level approval structures designed to avoid fraud failed to support sufficient attention to detail.

-Infrequent and reactive monitoring of accounts.

Furthermore, empirical studies indicate that objective systems, such as multi-variate credit scoring systems (see section 2.4.1.) tend to outperform such “banker expert” systems. Consequently, over the past few years, credit risk measurement and management methodologies have evolved dramatically (Altman and Saunders 1998:1720). This includes sophisticated quantitative approaches to credit assessment and credit pricing, as well as a new approach to credit management: evaluating credit decisions in an integrated risk-return framework and actively managing credits in a portfolio context (Garside, Stoot and Stevens 1999:1). Credit approval and monitoring processes are being automated, with widespread use of risk grading systems. A more recent trend has been the emergence of centralized and independent risk management groups that seek to assess, in an integrated fashion, all risks faced by a banking group (such as credit, market, operational, and legal) (Garside, Stoot and Stevens 1999:1).

These fundamental changes in credit risk management strategies are driven by numerous critical factors, including (Altman and Saunders 1998: 1722, and Tierny and Misra 2001: S22):

-A world-wide structural increase in the number of bankruptcies. This resulted in heavy credit losses during the 1980's and 1990's. Repeated earnings shocks due to credit losses forced industry management to strive for better risk management strategies (avoidance, mitigation and optimization).

-Increased shareholder awareness of credit risk, heightened by defaults, such as the collapse of Barings Bank and, more recently, by the general decline in the global economy culminating in the steep decline in Russian markets. Shareholders are no longer satisfied with projections of a company's expected returns. They are looking for sound risk management frameworks, including techniques for measuring credit risk.

-A trend towards disintermediation by the highest quality and largest borrowers. An increasingly varied array of institutions is intermediating and extending credit. Global credit markets have experienced a significant inflow of funds from mutual funds, pension plans,

hedge funds, and other non-bank institutional investors. In the large corporate sector, for example, increasing liquidity is attracting new investors who are taking on credit risk directly at substantially lower credit costs than traditional banks.

-The recognition that traditional binary classification of credits in “good” credits and “bad” credits is not sufficient. A precondition for managing credit risk at the portfolio level is the recognition that all credits can potentially become “bad” over time given a particular economic scenario.

-Growing regulatory pressures. Critical to this revision is the movement towards using internal credit risk models for evaluating capital adequacy. Through their consultative papers, targeted examinations and research papers, the global bank supervisors are supporting banks to continually re-evaluate their credit risk management techniques. Equally important is the supervisor’s desire to enhance transparency of the risk in credit portfolios (Prybylski 2000:72).

-More competitive margins on loans. Credit spreads across the credit spectrum have become compressed on both an absolute basis and relative to most historical comparisons. Consequently, institutions are increasingly vulnerable to default-related losses, as well as mark-to-market losses caused by a reversion in credit spreads towards historical levels.

-Declining value of real assets (and thus collateral) in many markets.

-The declining profitability of traditional credit products imply little room for errors in terms of the selection and pricing of both individual transactions, and portfolio decisions.

At the same time, there has been a proliferation of credit enhancement mechanisms, including third-party guarantees, credit derivatives, posted collateral, margin arrangements, and netting. Improved market liquidity across the credit spectrum, reflected in rising volumes in loan sales, syndication and trading are widening the windows on the secondary markets. Combined with the growth of credit derivatives, these windows are providing banks with new tools for actively managing and rebalancing the loan portfolio *ex post*. Banks will increasingly have the ability to choose whether to act as passive hold-to-maturity investors or as proactive, return-on-capital driven originators. This enables banks to adopt a more proactive approach to trading and managing credit exposures with a corresponding decline in the typical holding period for loans (Prybylski 2000:72).

On the one hand, these new instruments enhanced the credit risk management capabilities of

banks. For example, it has enabled banks to manage their credit risks actively, eliminating credit risk “hot spots” in their portfolios and altering their risk exposures as the economic cycle or the bank’s own financial well-being evolve (Masters 1998:296).

On the other hand, they created new risk management challenges. Credit instruments explicitly derive value from correlation risk or credit events such as upgrades, downgrades or default. Such risks are best understood in the context of a portfolio model that also explicitly accounts for credit quality migrations. Moreover, the proliferation of complex financial instruments has created uncertain and market-sensitive counterparty exposures that are significantly more challenging to manage than traditional instruments such as bonds (Dowd 1998:197).

In today’s credit market, valuation is becoming more complicated because instruments are becoming increasingly complex, with more instances of embedded credit options. For instance, in the syndicated loan market, loan facilities regularly include the prepayment option, performance-based pricing resets (grid pricing), term-out provisions, detailed covenants, the drawdown option, and multi-instrument option features. These complex structures are also migrating into middle-market lending. Consequently, as credit exposures have multiplied and become more complex, the need for more sophisticated risk measurement and management techniques for credit risk has also increased. This trend towards better risk management is reinforced by shareholder pressure in terms of return on economic capital (Prybylski 2000:74).

Of course, more active credit risk management could be achieved by more rigorous enforcement of traditional credit processes such as stringent underwriting standards, limit enforcement, and counterparty monitoring. Increasingly, however, risk managers are also seeking to quantify and integrate overall credit risk within benchmark Value-at-Risk statements that treat exposure to both market and credit risks consistently.

In response to these forces academics and practitioners alike have responded by developing new and more sophisticated techniques for the measurement and evaluation of credit transactions in the context of specific portfolios.

2.4.1 A greater emphasis on quantification

In the evolution of quantitative approaches for the risk management of financial institutions, the major focus until recently has been on the treatment of market risk. As a result, market participants seem to have reached a consensus on the effectiveness of Value-at-Risk (VaR) as the aggregate measure of the market risk of a trading portfolio. With respect to credit risk, until recently the methods in practice have been mostly qualitative rather than quantitative (Oda and Muranaga 1997: 2). However, advances in risk management technology, facilitating more accurate risk measurement and management, has led to the use of more quantitative approaches in the traditionally qualitative loan market (Berenguer and Davies 1999:1). In this regard, the emergence of loans as tradable, securitizable and hedgeable underlying assets has further motivated the search for more precise estimates of risks (Altman and Suggit 2000: 231).

In terms of credit assessment, it implies increased reliance on objective risk assessment, such as statistical credit scoring models, external ratings, and market prices. The use of reliable models can offer a cost-effective means of expediting the credit approval process, provide monitoring functions over different divisions within an institution and help in the implementation of portfolio-wide credit risk management systems (Sobehart and Keenan 2001:S31). In certain circumstances, it can displace the need for expensive manual review of loan applications. At a minimum, models can be used as a filter to sort loans based on risk so that the effort of experienced credit officers can be more effectively targeted toward high-risk loans (Prybylski 2000:73).

In the context of credit risk measurement, quantitative techniques include the following (Aguais and Forest 2000:26):

-Sophisticated, empirical default models used in establishing credit risk ratings. Altman and Saunders (1998:1724 -1731) compare four methodologies for credit scoring: (1) the linear probability models, (2) the logit model, (3) the probit model, and (4) the discriminant analysis model. The logit model assumes that the default probability is logistically distributed, and uses a few accounting variables to predict the default probability. The linear probability model is based on a linear regression model, and makes use of a number of

accounting variables to try to predict the probability of default. The multiple discriminant analysis (MDA), proposed and advocated by Altman is based on finding a linear function of both accounting and market-based variables that best discriminates between two groups: firms that actually defaulted, and firms that did not default. A well known example is the z-score proposed by Edward Altman. Altman regressed historical default experience on a set of accounting variables in order to determine an optimal separating function between issuers that defaulted later on and those that survived.

-Risk-adjusted performance measurement tools, such as risk-adjusted return on capital (RAROC) which was introduced by Bankers Trust in 1994. Under the RAROC approach decisions are made using the firm's weighted-average cost of capital as the hurdle rate for investment decisions. RAROC controls for differences in risk across projects/investments through a decision rule that allocates capital to projects/investments according to their risk.

The implementation of RAROC models can potentially address inefficient credit pricing by calculating risk-adjusted profitability by sub-portfolios and then using these measures to create risk-adjusted loan pricing tools (Deutsche Bank, Annual Report 1998:106-107). However, implementation difficulties, including decision-support analytics, can be substantial (Aguais and Forest 2000:26, and Jameson 2001b:4). A further caveat is the approach taken in negotiating loans in an increasingly competitive domestic loan market. Most participants in the large corporate market focus primarily on the credit spread and fees offered and less on the other, more subtle structural features of a loan. Because of this, bankers often ask why they need a pricing model when banks are effectively price-takers. Furthermore, it is difficult to build some factors, such as the long-term value of a customer relationship, into the model (Jameson 2001b:4). Other potential limitations of the RAROC approach is that it typically disregards the state contingency of the cash flows of most complex credit agreements. Especially for high-risk loans, this can lead to large valuation errors (Aguais and Forest 2000:28). According to Jameson (2001b:1) a more rigorous form of RAROC calculation is now emerging, improving on "rule-of-thumb" RAROC models. True RAROC feeds off a bank's underlying risk models and data. Consequently, as banks have invested more heavily in their risk infrastructure, it has become more worthwhile to improve on existing RAROC models.

-Portfolio management models used in measuring systematic portfolio concentrations with the assistance of correlation analysis. The evolution of risk measurement techniques is, in

essence, the search for increasingly precise delineation of the distribution of future returns (or values) of a given portfolio. Understanding the range of possible variations and the probability of each is equivalent to capturing the risk profile of that portfolio. This can be done by translating VaR concepts into the realm of credit risk (Aguais and Forest 2000:27). For a discussion of portfolio credit risk models, see chapter 3.

-In the context of credit risk management, credit derivatives have the potential to fundamentally change the way banks price, manage, transact, originate, distribute and account for risk (Masters 1998:294).

These advances in quantification of credit risk in recent years have substantially enhanced the ability of senior management to monitor and control a bank's aggregate risk profile. These quantitative measures, however, cannot be expected to encompass every risk facing the firm and there are a myriad operational, theoretical, and practical issues related to the use of credit risk measurement approaches. This includes systems and complexity risk. For example, the introduction of new products can be difficult operationally and theoretically. From an operational standpoint, the integration of additional back office systems increases the risk that information is not captured or displayed in a manner that can be properly handled by the existing exposure calculation infrastructure. While most systems can identify unmodeled trades, they cannot point out incorrectly modeled trades. Also, limit setting and monitoring credit risk can be systems intensive and complex.

2.4.2 The application of portfolio theory to credit risk management

Since the work of Markowitz (1959), the traditional objectives of maximising returns for given levels of risk have guided efforts to achieve efficient diversification of portfolios. Analogous to the use of portfolio theory in stock portfolios, credit risk models may be used to estimate an efficient portfolio "frontier". Such a frontier shows efficient combinations of the mean and variance of portfolio rate of return - that is, for a given mean, the lowest achievable variance (and by implication risk). By comparing this frontier with the mean and variance of the actual portfolio, risk managers are able to develop strategies for altering the current portfolio to achieve a more preferred risk/return profile. In the credit risk context, this might be accomplished, for example, by modifying the pattern of new loan originations, by

buying/selling loans in secondary markets, or by undertaking credit derivative transactions to lay off (or acquire) various credit exposures.

Several commercially available portfolio credit risk models were introduced in 1997. These models have helped to make credit Value-at-Risk (VaR) a practical possibility to assess likely portfolio credit losses. Credit exposures are measured on a portfolio basis using VaR, Monte Carlo simulation and a variety of other analytical methods to quantify credit risk in probability terms. The result is “credit Value-at-Risk” (JP Morgan 1997:11). Analogous to market risk VaR methodologies, a credit VaR number indicates the maximum loss in a credit portfolio over a specified period, to a given confidence level. ¹

A portfolio approach to credit risk analysis has two aspects (Masters 1998:305):

Firstly, credit risks to each obligor across the whole portfolio are restated on an equivalent basis in order to be treated consistently, regardless of the underlying asset class. Secondly, correlations of credit quality moves across obligors are taken into account. Consequently, portfolio effects, namely the benefits of diversification and costs of concentrations can be properly quantified.

Active portfolio risk management also allows institutions to continuously evaluate transactions and portfolios against regulatory guidelines, balancing the various trade-offs among client demands, regulatory capital requirements and risk-adjusted returns (Andrews, Haubenstock and Vinci 2000:2).

In particular, these methods enable the bank to assess (Kealhofer 2001:24):

- the overall frequency distribution of loss associated with its portfolio;
- the risk and return contribution of individual assets or groups of assets;
- the risk/return characteristics of its existing portfolio and how to improve it;
- overall economic capital adequacy;

¹A discussion of the available portfolio credit risk models can be found in chapter three. The discussion in this section focuses on the general approach of a portfolio approach to credit risk management.

- the economic capital required for new and existing assets; and
- how to maximize diversification and minimize the use of economic capital.

Another important reason to take a portfolio view of credit risk is to more rationally and accountably evaluate and prioritize credit extension decisions and risk-mitigating actions (Masters 1998:311). Decisions to buy, sell or hold an exposure should be made in the context of an existing portfolio. The relevant calculation is then not the stand-alone risk of that exposure but the *marginal* increase to the portfolio risk that would be created by adding that exposure to it. Marginal risk refers to the difference between the total portfolio risk before and after the marginal transaction. If the new transaction adds to an already over-concentrated portion of the portfolio, then the marginal risk is likely to be high. If the new transaction is diversifying (or in the extreme is actually hedging a position), then the marginal risk may be quite small or even negative. The importance of calculating the marginal risk is that it captures the specific characteristics of a particular portfolio. It would not be unusual for a given credit to be considered risky in one institution's portfolio but of considerably lower risk in another institution's portfolio. Thus, marginal credit Value-at-Risk analysis may be used to direct and prioritize risk-mitigating actions, and as such it is a useful tool for identifying opportunities for the use of credit derivatives to restructure a portfolio (Tierny and Misra 2001:S23).

□'s composition

This is especially relevant in the context of the increasingly competitive bank lending marketplace where good customer relationships have often become synonymous with heavily concentrated exposures. Consequently, banks are often caught in a paradoxical trap of their own making whereby those customers with whom they have developed the most valued relationships are precisely the customers to whom they have the least capacity to take incremental risk. The contribution of a portfolio model in this regard is that it allows the portfolio manager to quantify (in units of undercompensated risk) exactly the extent of envisaged investment in relationship development.

The use of portfolio models also allows banks to set credit limits according to the absolute contribution to portfolio risk. This can potentially prevent the addition to the portfolio of any exposure that increase portfolio risk by more than a given amount. This is in contrast to the early approaches to concentration risk analysis where fixed exposure limits is arbitrary set.

Although such tactics limit and control risk, they are unsatisfactory in that they prevent banks from exploiting lucrative and profitable opportunities (Altman and Saunders 1998:1727).

In addition to allowing more rationally and accountably evaluation and prioritizing credit extension decisions and risk-mitigating actions, the use of portfolio credit risk models also offer the following advantages (Masters 1998:305-311, Duffee and Zhou 1997:1-2 and JP Morgan 1997:10-11):

- Credit risk models provide management the flexibility to design a risk measurement and management tool that can be tailored to the specific risks inherent in a portfolio. These results can be easily aggregated across risk taking units and across financial institutions world-wide, providing a more accurate and comprehensive measure of the risk.

- A modeling approach provides a comprehensive measure of risk across a firm, measuring credit risk regardless of where it arises — traditional lending activity, bond and equity trading or explicit credit trading through credit derivatives (Global Association of Risk Professionals 1999:16).

- By providing a common measure of credit risk, management is able to make judgements about the relative risk and return of different types of activity. Also, a common yardstick is provided to allow trade-offs between risk tenor, exposure size and collateral protection to be made. Thus the relative risk of a one year R10 million loan, a 10-year R1 million bond and a 10-year partly collateralized swap with R10 million positive mark-to-market can be made (Kealhofer 2001:18).

- By design, models may be both influenced by, and be responsive to, shifts in business lines, credit quality, market variables and the economic environment. Consequently, modeling methodology holds out the possibility of providing a more responsive and informative tool for risk management.

- The use of credit risk models improves the transparency between the various credit risk activities: while management looks to limits, credit reserves and the allocation of economic capital as a means of controlling and managing risk, it is not readily apparent how the data elements of these activities are linked with one another. Integration of credit models into the daily risk management activities would make the link between these activities more readily apparent.

- It enables dynamic origination and softens the impact of credit down cycles. In the past, credit cycles had a significant impact on profitability of lending businesses. One reason for

substantial credit losses during down cycles are found in the rather procyclical behavior of banks when it comes to their origination behavior. With a booming economy, there is a tendency for banks to become overly comfortable with credit risk leading to a higher absorption of lower-quality credit risk and loosening credit. This type of procyclical behavior often leads to overextension of credit risk at the end of an economic cycle, at a time when it would be beneficial to do exactly the opposite. A sophisticated portfolio management approach, which stresses a rather anticyclical behavior, combined with effective distribution capabilities in secondary markets for credit risk may be valuable competitive weapons to successfully address these challenges (Hammes and Shapiro 2001:111).

-Help to better price credit risk. There is emerging evidence that sophisticated banks may achieve competitive advantage by extending their credit pricing mechanisms from transactional to portfolio based pricing. In this case, banks leverage marginal pricing capabilities to identify opportunities to out-price competitors (for example, in cases where an additional credit asset helps diversify the portfolio and constitutes a “free hedge” for the overall credit portfolio) (Hammes and Shapiro 2001:111).

Portfolio risk management techniques can enhance the quality of decision making, as well as coordinating the activities of various lending officers. Without this coordination, it is not possible to quantify and control concentration risk that arises from increased exposure to one obligor or groups of correlated obligors (JP Morgan 1997:11). In this regard, a portfolio approach allows quantifying and stress-testing concentrations along almost any dimension such as industry, rating category, country, or type of instrument. Breaking down the aggregate credit risk distribution to show the credit risk of each portfolio element allows risk concentration and hence diversification opportunities to be identified.

These properties of models may contribute to an improvement in a bank’s overall ability to identify, measure and manage risk and thus an improvement in a bank’s overall credit culture. From a supervisory perspective, the development of modeling methodology and the consequent improvements in the rigor and consistency of credit risk measurement hold significant appeal. Furthermore, a models-based approach may also bring capital requirements into closer alignment with the perceived riskiness of underlying assets, and may produce estimates of credit risk that better reflect the composition of each bank’s portfolio (International Swaps and Derivatives Association 1998:13).

Such developments in credit risk management have led to suggestions, such as by (International Swaps and Derivatives Association (1998), that bank regulators permit the use of credit risk models for determining the regulatory capital to be held against credit losses. However, the Basel Committee decided not to allow determination of regulatory capital charges based on the output of credit risk models. Instead, the objective of aligning capital requirements closer to risk exposure would be achieved via the internal ratings. Reasons for this decision are discussed in chapter 4.

Improving bank credit risk management through the utilization of portfolio approaches to credit risk requires a combination of better information, more sophisticated tools, redesigned processes, a focused credit organization and cultural change. Consequently, it is important to avoid the temptation to view the issue of improved risk management as essentially technical in nature. Labrecque (1998:239) referred to the challenges of improving risk management within a major bank in the following terms: “Improved risk management, therefore, requires significant cultural change to make it effective. Implementation creates a great deal of discomfort amongst bank staff because it requires people to move away from traditional ways of doing things, to ways that are more logical but nonetheless unfamiliar.” There is typically substantial resistance to such a process of change.

For example, introducing principles, such as more active pricing for risk regimes within their banks and “selling” the idea that an otherwise good exposure should not be accepted because a “technical” assessment shows that there is an imbalance between risk and expected return can be difficult in practice. It is an especially difficult message to convey to senior bank management when competitive pressures in the market are strong.

A portfolio model-based credit risk management system will raise unique organizational questions that cut across risk classes and business areas, for example (Hammes and Shapiro 2001:106):

-What is the relevant scope for portfolio optimization? Should the credit portfolio be managed as a single, global portfolio, or divided into sub-portfolios, each of which will be locally optimised?

-Which activities should be organised centrally, across business units (for example, product

structuring, credit derivatives) and which should be decentralized, within business units (for example origination)? Which should be treated as independent profit centers, and which as support for service functions?

-How can the change in responsibilities implied by the new portfolio model be achieved without demotivating existing account and credit officers?

There is no single “right” answer to these questions. Each institution will have to determine a “best fit” solution that is responsive to its business mix, market position, organization culture and competitive advantage. What constitutes best-practice portfolio management is an integrated approach which strives to implement top management’s (credit) strategy, risk appetite and return objectives, which reduces portfolio inefficiencies along the way (Hammes and Shapiro 2001:106-113).

These challenges and potential setbacks are illustrated in the following section, describing transformation in risk management approaches at the typical bank in seven stages.

2.5 THE SEVEN STAGES OF CREDIT RISK MANAGEMENT

While the underlying forces propelling the change in credit risk management approaches and practices are revolutionary in nature, experience suggests that the transformation of a credit risk management culture takes place through a series of evolutionary stages. Although the specific nature of the evolution varies from bank to bank, such a development path typically consists of seven stages. The following discussion highlights the key features of each of the seven stages (Oliver Wyman report 1999c:2-7):

-The first stage largely resembles the traditional approach to credit risk management, discussed in section 2.4. Management focuses on maximizing net income within an intuitively defined set of risk constraints. All key decisionmaking processes such as credit approval, monitoring and pricing are decentralized and judgmental. Credit approval is a “Yes/No” decision made intuitively - “good” loans are accepted, “bad” loans are rejected. Write-offs are attributed to bad judgements or changed circumstances.

-In stage two, the relative riskiness of different loans is formally recognized through the

introduction of a loan grading scale.

-In stage three, management begins to drive a ROE culture into the bank, as they believe that maximizing ROE will maximize shareholder value. This drive includes setting of an institution-wide hurdle rate ROE, measurement of ROE by line of business, and incentive compensation linked to their unit's ROE performance. Such an approach can potentially lead to an increase in the overall riskiness of the loan portfolio, since the best way to maximize short-term ROE is to originate a large volume of high yielding (and therefore high risk) assets. The easiest way to do this is to meet or beat competitors' prices for such assets.

-The fourth stage reflects a cultural recognition of the importance of the quantification of default probabilities. A congruent and reinforcing development is a commitment on the part of management to price for risk, that is to vary loan spreads in relation to estimated loss probabilities and volatilities. As this stage progresses, management increasingly recognizes the critical importance of assigning grades and quantifying credit risk accurately and consistently. This realization usually leads to one or more of the following actions: moving the responsibility for assigning the grade from line officers to credit officers, using a quantitative model as part of the grading process (or as an early risk detection tool) and employing a stricter process for auditing loan grades.

-In the fifth stage, bank management seeks to apply modern portfolio theory to the management of a loan book. A portfolio manager is typically appointed with responsibility for monitoring portfolio quality, estimating portfolio losses, setting sectoral exposure limits and measuring the risk/reward trade-offs in the portfolio.

-A refinement of the portfolio approach occurs in the sixth stage. The central recognition underpinning both the technical and management advances in this stage is that banks (like any other investor) must be paid a fair market price for absorbing volatility or they will detract from their shareholder's value. It also becomes evident that risk-adjusted loan prices can be compared readily to risk/return performance indices from other markets (for example, equity, bond and commodity prices).

-The improved information systems and analytical foundation developed in stage six guide a bank's portfolio management unit to the conclusion that diversification is paramount to

achieving risk/return efficiency. This leads inevitably to a strategic conflict with loan origination units, whose business economics benefit from larger transaction sizes, and increased industry and geographic specialization.

In stage seven, credit risk management has been transformed from a highly decentralized, paper-based and judgement-intensive process to a highly centralized function relying on sophisticated analytical techniques and advanced information technology which is highly specialized and narrowly focused.

2.6 CREDIT RISK MITIGATION TECHNIQUES

Commercial banks' management of credit risk is mainly based on individual experiences and procedures and is, therefore, often unstandardized and somewhat unstructured. The importance of credit business for the profit and risk situation of commercial banks and the question of regulatory requirements make analysis of these management techniques increasingly relevant (Prybylski 2000:75).

In the introduction, the goal of credit risk management was stated as maximizing a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters. In the context of the main components of credit risk, credit risk management can therefore be regarded as a set of techniques for reducing default probability and risk exposure, and increasing the recovery rate. There are a number of different ways institutions can achieve these ends. Traditional credit risk management methods have focused on loan underwriting standards and diversification. The officer would set limits on the size of the loan, establish a repayment schedule and require additional collateral for higher risk loans (Neal 1996:18). Management of credit risk also includes appropriate pricing of credit risk, as well as capital provisioning (Jackson and Perraudin 1999:129).

The regulatory treatment of credit risk mitigation has widely been acknowledged as needing substantial updating. Consequently, the proposed new Accord also includes new regulations and rules regarding credit risk mitigation techniques. The Basel Committee's aim is to reward institutions that make effective use of the techniques and instruments available, and to provide a strong incentive to others to improve their credit risk mitigation practices.

The Basel Committee (2000a:54) emphasizes the operational aspects of risk mitigation. Institutions must meet the following minimum operating requirements for risk mitigation to be recognized:

- Legal certainty. Supervisors will expect legal opinions to be sought and refreshed regularly and fully documented. This could be administratively burdensome.
- Low correlation with underlying exposure. It will not be acceptable to buy credit protection from the obligor or accept securities issued by them as collateral.

The proposed new Basel Accord establishes a framework for recognizing the various mitigation techniques of collateral, netting, guarantees and credit derivatives. Any valid hedge

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generally be a residual risk element, including an element of operational risk, which will attract a regulatory capital charge. To take account of this, the proposed new Basel Accord has introduced a capital floor, the “w-factor”. This controversial “w-factor” of 15% is applied to all credit derivative protection and to guarantees extended by any party other than a sovereign, central bank or bank. The banking industry criticized this proposed “w-factor”, as discussed in section 4.7.2.2.3.

The following section describes credit risk mitigation techniques mainly relevant to conventional loan portfolios, whereas mitigation techniques relevant to credit-related risks in the case of derivative products are discussed in section 2.9.5. The following section includes a general description of the different credit risk mitigation techniques, as well as a summary of the treatment of these risks as envisaged under the new Basel Accord.

2.6.1 Position limits

Placing position limits on their counterparties is one of the traditional credit risk mitigation techniques. Such limits might be based on both notional amounts and credit-at-risk figures. The latter limits would reflect measures of the total exposure to any given counterparty (e.g. maximum total exposure, given other relevant factors for example existing exposure to that industry, prospective risks and returns elsewhere) (Dowd 1998:178).

2.6.2 *Credit guarantees and collateral*

Collateral and guarantees appear to be the most widely used forms of credit risk mitigation. Guarantees from third parties mean that default on the contract can occur only if the counterparty and its guarantor default, and can sometimes lead to a major reduction in credit risk (Basel Committee 2000a:9).

There is a marked difference in the types of guarantees in different parts of banks' portfolios. For example, in the small and medium-sized enterprises (SME) sector, the provision of guarantees tends to be personal in nature. Collateral tends to be less liquid, typically taking the form of receivables and properties linked directly to the borrowing person and/or company. These forms of credit risk mitigation sometimes tend to be supplemented by the use of strict covenants. In contrast, where banks deal with financial institutions and large corporates, third-party guarantees are used more often and collateral tends to take the form of marketable financial instruments (Basel Committee 2000a:11).

A decision on whether or not to use collateral or guarantees is often taken as part of the overall credit process in, for example, extending a loan *ex ante*. On the other hand, a decision on the use of credit derivatives and on-balance sheet netting tends to be taken *ex post*, at a somewhat later stage in the life cycle of a credit exposure. For some banks, the use of a credit risk mitigation technique is not factored into the initial decision to extend credit, although such techniques may be used to manage the extent of a counterparty's credit line utilisation vis-à-vis the bank's internal credit limit (Counterparty Risk Management Policy Group 1999:10).

The Basel Committee (2000a:9) stresses that collateral cannot be a substitute for a comprehensive assessment of the borrower or counterparty, nor can it compensate for insufficient information. In addition, banks need to be mindful that the value of collateral may well be impaired by the same factors that have led to the diminished recoverability of the credit. Banks should have policies covering the acceptability of various forms of collateral, procedures for the ongoing valuation of such collateral, and a process to ensure that collateral

is, and continues to be, enforceable and realisable. With regard to guarantees, banks should evaluate the level of coverage being provided in relation to the credit quality and legal capacity of the guarantor.

In terms of the new Basel Accord, the range of eligible collateral is extended beyond cash and government securities to include investment grade securities and even unrated securities and equities, subject to conditions. Institutions may choose between a simple and a comprehensive approach to collateral, with the latter yielding greater savings at the expense of more onerous operating requirements. The simple approach applies a substitution approach similar to the current Accord but the risk-weight on the collateralized portion of any claim is, in general, subject to a 20% floor.

Under the comprehensive approach, eligible collateral is subject to no fewer than three standard haircuts to reflect the volatility of the underlying exposure, the volatility of the collateral taken and any currency mismatches. These haircuts, which are entirely new, assume that institutions mark-to-market and re-margin daily. Where this is not the case, the haircut is scaled up by a formula using the square root of time. Institutions that have VaR model approval for market risk may apply to use their own estimates of volatility for the haircuts (Basel Committee 2001a:31).

In contrast to collateral and guarantees, the use of credit derivatives and on-balance sheet netting is much more limited (Basel Committee 2000a:3). However, many banks expect the use of credit derivatives to grow significantly in the future (Masters 1998:294). The use of credit derivatives as a credit risk management tool is discussed in section 2.9.

2.6.3 Covenants

An important credit risk mitigation technique is the use of loan covenants. The weaker a counterparty's credit quality, the stricter the covenants required and the more likely another form of credit risk mitigation, such as collateral or a guarantee, will be sought. From a risk management perspective a trade-off between weaker covenants and a form of credit risk mitigation is not acceptable. Good collateral, for example, is no substitute for a weak credit

(Basel Committee 2000a:15).

2.6.4 Diversification

Diversification is one of the oldest and most widely used credit risk mitigation techniques. The recurrent nature of credit concentration problems, especially involving conventional credit concentrations, raises the issue of effectiveness of diversification and why banks allow concentrations to develop. For example, the Basel Committee identifies concentrations as probably the single most important cause of major credit problems.

Concentrations of risk can take many forms and can arise whenever a significant number of credits have similar risk characteristics. Concentrations occur when, among other things, a bank's portfolio contains a high level of direct or indirect credits to a single counterparty, a group of connected counterparties, a particular industry or economic sector, a geographic region, an individual foreign country or a group of countries whose economies are strongly interrelated, a type of credit facility, or a type of security. Concentrations also occur in credits with the same maturity.

Concentrations can also stem from more complex or subtle linkages among credits in the portfolio. Thus, credit concentrations can be grouped into two broad categories (Basel Committee 2000b:23):

- Conventional credit concentrations include concentrations of credits to single borrowers or counterparties, a group of connected counterparties, and sectors or industries, such as commercial real estate, oil, gas and the high technology sector.

- Concentrations based on common or correlated risk factors reflect subtler or more situation-specific factors (see also section 2.9.4.). An example is the recent disturbances in Asia and Russia. This illustrates how close linkages among emerging markets under stress conditions and previously undetected correlations between market and credit risks, as well as between those risks and liquidity risk, can produce widespread losses (Garside, Stoot and Stevens 1999:8).

In many instances, due to a bank's trade area, geographic location or lack of access to

economically diverse borrowers or counterparties, avoiding or reducing concentrations may be extremely difficult. Most banks face an inherent trade-off between choosing to specialise in a few key areas with the goal of achieving a market leadership position and diversifying their income streams. This trade-off has been exacerbated by intensified competition among banks and non-banks alike for traditional banking activities. A bank may also determine that it is being adequately compensated for incurring certain concentrations of risk (Winton 1999:29). Consequently, banks should not necessarily forego booking sound credits solely on the basis of concentration.

The credit problems that followed rapid diversification at many institutions during the 1980's, including Citicorp, Bank of America, Credit Lyonnais, and a number of major Japanese banks point to potential pitfalls of lending decisions made simply for the sake of diversification. Furthermore, if diversification involves expansion into sectors where the bank is lacking in expertise, then the relatively worse performance the bank faces in these new sectors can increase its overall chance of failure and weaken monitoring incentives throughout the institution (Winton 1999:30). Thus, diversification *per se* is not always to the benefit of the bank.

In addition to simple diversification, banks may need to make use of alternatives to reduce or mitigate concentrations. Such measures can include pricing for the additional risk, increased holdings of capital to compensate for the additional risks and making use of loan participations in order to reduce dependency on a particular sector of the economy or group of related borrowers. New possibilities to manage credit concentrations and other portfolio issues, including such mechanisms as loan sales, credit derivatives, and securitization programs. Banks deciding to utilize these mechanisms must analyze their effect carefully and need to have policies and procedures, as well as adequate controls, in place. Such an analysis is best done in the context of a portfolio approach, discussed in section 2.4.2.

2.6.5 Netting arrangements

Netting arrangements help to reduce credit exposures and are widely used in derivatives contracts. Netting arrangements stipulate that each party should be liable for the net amount,

rather than the gross amount they owe the other party.

Under the new Basel Accord, on-balance sheet netting will be fully recognized for the first time, subject to the following operational conditions (Basel Committee 2001a:54):

- an enforceable legal agreement is in place;
- all assets and liabilities subject to the netting agreement can be precisely determined at any time;
- exposures are monitored and controlled on a net basis;
- roll-off risk is monitored and controlled; and
- assets and liabilities are maturity matched and hedges meet the minimum 1 year residual maturity requirement.

Institutions that currently use deposit-netting agreements to cover their interbank transactions should note that the minimum maturity requirement means that regulatory capital relief is likely to be withdrawn. For a more complete discussion on the use of netting agreements as credit risk mitigation tool, see section 2.9.5.2.

2.6.6 Periodic settlement

Credit risk can also be reduced by agreeing to the periodic settlement of outstanding obligations at certain points during the lifetime of the contract (e.g. every quarter). Credit exposures are therefore periodically eliminated. An extreme version of periodic settlement is the daily marking-to-market that takes place on futures exchanges: gains or losses are realized in full at the end of each business day. Periodic settlement arrangements can be useful where counterparties are restricted in their ability to pledge assets or where there is legal uncertainty about the rights of collateral holders in bankruptcy. Alternatively, parties can simply agree to give each other options to terminate the contract early, provided outstanding obligations are settled (Dowd 1998:176).

However, these periodic settlement arrangements can also create liquidity problems. Firms that suffer adverse market moves will need to settle their losses quickly and there is the danger that the need to settle quickly will provoke a liquidity crisis. *Ex ante*, a firm is taking

on a potential liquidity risk when agreeing to such clauses. Management ought to take this risk into account and consider how they would meet these liquidity demands if called upon to do so.

The changes in the regulatory treatment of credit risk mitigation techniques as envisaged under the proposed new Basel Accord have widespread implications for banks, including the following:

- Institutions must review their credit risk mitigation strategies. The relative attractiveness of some forms of credit risk mitigation will change and firms may favor using different approaches.

- Institutions must ensure that they have a robust operational framework surrounding their credit risk mitigation operations, and that their contracts comply with regulators' requirements. This is a key issue, especially for credit derivatives, where many firms have inadequate infrastructure to support the complexity and volumes of business.

- Institutions should assess the impact of the wider recognition of collateral, taking into account the regulatory haircuts. Where daily mark-to-market and daily re-margining is not used, the impact of this on regulatory requirements should be assessed.

- Institutions need to assess their ability to meet the significant disclosure requirements for all forms of credit risk mitigation. Systems will need to accommodate this additional functionality and institutions will need to ensure that they can provide a standard of accuracy appropriate to public documents that will be subject to audit. This will require considerable work to ensure that data sources are consistent and up to date.

Banks generally consider a number of factors in selecting a particular credit risk mitigation technique. These factors include legal enforceability, price, liquidity, credit quality, the availability of the product and appropriate counterparties, historical recovery data, ease of structuring and regulatory treatment. For the majority of institutions, regulatory acknowledgment is of key importance in choosing an appropriate form of credit risk mitigation. However, for some, regulatory acknowledgment is a secondary consideration to internal economic capital effects (Counterparty Risk Management Policy Group 1999:23).

Furthermore, the extent to which credit risk mitigation techniques are used tend to vary with the size, business strategy, and level of sophistication of the banking institution. There are

also a number of distinct national characteristics (e.g. national accounting, regulatory, and legal treatments) that play a role in the frequency and use of certain forms of credit risk mitigation. For example, the legal and accounting framework in many countries is significantly more conducive to the use of collateral as opposed to other forms of credit risk mitigation.

The use of sophisticated credit risk mitigation tools alone are not sufficient to ensure effective credit risk management (Glasmann 2000:73). Disciplined application of sound credit risk management techniques on an ongoing basis is required. According to the Basel Committee (2000b:24) many credit problems reveal basic weaknesses in the credit granting and monitoring processes. This includes failure to monitor borrowers or collateral values (Altman and Saunders 1998:1731). This can result in failure to recognize early signs that asset quality was deteriorating. Consequently, opportunities to work with borrowers to stem their financial deterioration and to protect the bank's position can be missed.

A related problem is that many banks do not take sufficient account of business cycle effects in lending (Basel Committee 2000b:26). More generally, many underwriting problems reflect the absence of a thoughtful consideration of downside scenarios. In addition to the business cycle, borrowers may be vulnerable to changes in risk factors such as specific commodity prices, shifts in the competitive landscape and the uncertainty of success in business strategy or management direction. Consequently, credit analysis may incorporate overly optimistic assumptions (Labrecque 1998:238).

The above-mentioned possible weaknesses in the credit granting and monitoring processes point to the importance of "best practice" in credit risk management. The "best practice" use of credit risk mitigation techniques, as well as other principles for best practices in credit risk management, will be discussed in the following section.

2.7 BEST PRACTICES IN CREDIT RISK MANAGEMENT

In response to the growing complexity of the credit risk environment, as well as the Basel Committee's viewpoint that major banking crises can be related to lax credit risk management, the Committee issued a consultative paper, *Principles for the Management of*

Credit Risk. The paper outlines 17 basic principles to be followed in the credit risk management process and was originally released in September 1999, with a revised edition released in September 2000.

All but two of these principles are directly concerned with implementing a credit policy. The paper places much emphasis on the responsibility of senior management to formulate, agree and implement a structured credit policy. Some of the main areas covered by the paper concern credit approval processes, credit administration processes and procedures and the application of controls on problem areas. The paper also contains recommendations on how a bank should define its overall credit risk management strategy, which forms the starting point for a credit policy (Bedser 2000:2).

The sound practices set out in this document specifically address the following areas:

- Establishing an appropriate credit risk environment;
- Operating under a sound credit granting process;
- Maintaining an appropriate credit administration, measurement and monitoring process; and
- Ensuring adequate controls over credit risk.

Although specific credit risk management practices may differ among banks depending upon the nature and complexity of their credit activities, a comprehensive credit risk management program will address these four areas. The discussion regarding these four areas are divided into the following 17 principles in the consultative document (Basel Committee 2000f: 5 - 20):

2.7.1 Establishing an appropriate credit risk environment

Principle 1: The board of directors should have responsibility for approving and periodically reviewing the credit risk strategy and credit risk policies of the bank. The strategy should reflect the bank's tolerance for risk and the level of profitability the bank expects to achieve for incurring various credit risks.

The strategy should include a statement of the bank's willingness to grant credit based on

type (for example, commercial, consumer, real estate), economic sector, geographical location, currency, maturity and anticipated profitability. This would include the identification of target markets and the overall characteristics that the bank would want to achieve in its credit portfolio (including levels of diversification and concentration tolerances).

The goals of credit quality, earnings and growth should be recognized in the credit risk strategy. The credit risk strategy and policies should be effectively communicated throughout the banking organization. All relevant personnel should clearly understand the bank's approach to granting credit and should be held accountable for complying with established policies and procedures.

This principle implies the following responsibilities for the board of directors:

- Overseeing the credit-granting and credit risk management functions of the bank.
- Approve and periodically review the credit risk strategy, as well as significant credit risk policies.
- Ensure that senior management is fully capable of managing the credit activities conducted by the bank and that such activities are done within the risk strategy, policies and tolerances approved by the board.
- Approve the manner in which the bank will organize its credit-granting functions, including independent review of the credit function and the overall portfolio.
- Ensure that the bank's remuneration policies reflect its credit risk strategy. Remuneration policies that reward unacceptable behavior such as generating short-term profits while deviating from credit policies or exceeding established limits, weaken the bank's credit processes.

Principle 2: Senior management should have responsibility for implementing the credit risk strategy approved by the board of directors and for developing policies and procedures for identifying, measuring, monitoring and controlling credit risk. Such policies and procedures should address credit risk in all of the bank's activities and at both the individual credit and portfolio levels.

This include ensuring that the bank's credit-granting activities conform to the established

strategy, that written procedures are developed and implemented, and that loan approval and review responsibilities are clearly and properly assigned.

Policies and procedures that are properly developed and implemented enable the bank to: (1) maintain sound credit-granting standards; (2) monitor and control credit risk; (3) properly evaluate new business opportunities; and (4) identify and administer problem credits.

All banks have underwriting standards or risk acceptance criteria, but too often they reside undocumented in the heads of senior credit staff. Establishing credit policies requires, among other things, dissecting the bank's risk appetite into rules on portfolio concentration and individual risks (Gray 1998:65).

Credit policies establish the framework for lending and guide the credit-granting activities of the bank. It should address such topics as target markets, portfolio mix, price and non-price terms, the structure of limits, approval authorities and exception reporting. Such policies should be clearly defined, consistent with prudent banking practices and relevant regulatory requirements, and adequate for the nature and complexity of the bank's activities. The policies should be designed and implemented within the context of internal and external factors such as the bank's market position, trade area, staff capabilities and technology.

In order to be effective, credit policies must be communicated throughout the organization, implemented through appropriate procedures, and periodically revised to take into account changing internal and external circumstances. In addition, the policies should address equally the important functions of reviewing credits on an individual basis and ensuring appropriate diversification at the portfolio level. In particular, such policies should establish targets for portfolio mix as well as set exposure limits on single counterparties and groups of connected counterparties, particular industries or economic sectors, geographic regions and specific products.

Principle 3: Banks should identify and manage credit risk inherent in all products and activities. Banks should ensure that the risks of products and activities new to them are subject to adequate procedures and controls before being introduced or undertaken, and approved in advance by the board of directors or its appropriate committee.

This principle recognizes that the identification of existing and potential risks inherent in any product or activity is the basis for an effective credit risk management process. A clear understanding of the credit risks involved in more complex credit-granting activities (for example, asset securitization, customer-written options, credit derivatives, credit-linked notes) is particularly important because the credit risk involved, may be less obvious and require more analysis than the risk of more traditional credit-granting activities.

It is critical that senior management determines that the staff involved in any activity where there is borrower or counterparty credit risk, whether established or new, basic or more complex, be fully capable of conducting the activity to the highest standards and in compliance with the bank's policies and procedures.

2.7.2 Operating under a sound credit-granting process

Principle 4: Banks must operate under sound, well-defined credit-granting criteria. These criteria should include a thorough understanding of the borrower or counterparty, as well as the purpose and structure of the credit, and its source of repayment.

The criteria should set out who is eligible for credit and for how much, what types of credit are available, and under what terms and conditions the credits should be granted. Banks must receive sufficient information to enable a comprehensive assessment of the true risk profile of the borrower or counterparty. At a minimum, the factors to be considered and documented in approving credits must include:

- the purpose of the credit and source of repayment;
- the integrity and reputation of the borrower or counterparty;
- the current risk profile (including the nature and aggregate amount of risk) of the borrower or counterparty and its sensitivity to economic and market developments;
- the borrower's repayment history and current capacity to repay, based on historical financial trends and cash flow projections;
- a forward-looking analysis of the capacity to repay based on various scenarios;
- the legal capacity of the borrower or counterparty to assume the liability;

- for commercial credits, the borrower's business expertise and the status of the borrower's economic sector and its position within that sector;
- the proposed terms and conditions of the credit, including covenants designed to limit changes in the future risk profile of the borrower; and
- where applicable, the adequacy and enforceability of collateral or guarantees.

Prior to entering into any new credit relationship, a bank must be confident that they are dealing with an individual or organization of sound repute and creditworthiness. In particular, strict policies must be in place to avoid association with individuals involved in fraudulent activities and other crimes. This can be achieved through a number of ways, including asking for references from known parties, accessing credit registries, and becoming familiar with individuals responsible for managing a company and checking their personal references and financial condition.

The principle also requires banks to have procedures to identify situations where, in considering credits, it is appropriate to classify a group of obligors as connected counterparties and, thus, as a single obligor. This would include aggregating exposures to groups of accounts, corporate or non-corporate, under common ownership or control or with strong connecting links (for example, common management and family ties).

The risk/return relationship in any credit, as well as the overall profitability of the account relationship, should be assessed. Credits should be priced in such a way as to cover all of the imbedded costs and compensate the bank for the risks incurred, factoring in, to the greatest extent possible, price and non-price terms such as collateral and restrictive covenants.

Principle 5: Banks should establish overall credit limits at the level of individual borrowers and counterparties, and groups of connected counterparties that aggregate in a comparable and meaningful manner different types of exposures, both in the banking and trading book and on and off the balance sheet.

Such limits are usually based in part on the internal risk rating assigned to the borrower or counterparty, with counterparties assigned better risk ratings having potentially higher limits. Limits should also be established for particular industries or economic sectors, geographic

regions and specific products. In order to be effective, limits should generally be binding and not driven by customer demand.

Calculating accurate exposures against limits is of equal importance. A surprising number of banks set limits and hold them on spreadsheets, isolated from the exposure. Others may have a system to monitor limits and exposures, but continue to use the most basic methodologies to measure the exposures against their limits. For example, many banks still measure exposures against foreign exchange and derivative limits on the basis of the principal amounts involved, rather than of the replacement cost of each trade. This means the exposures may be incorrect, and that the limits set to accommodate these types of exposures will be far higher than they should be.

Effective measures of potential future exposure are essential for the establishment of meaningful limits. The results of stress testing taking into consideration economic cycles, interest rate and other market movements, and liquidity conditions, should also be considered in the overall limit setting and monitoring process.

Principle 6: Banks should have a clearly established process in place for approving new credits as well as the extension of existing credits. This includes the following requirements:

- A credit-granting process that coordinate the efforts of all of the various individuals involved in the credit-granting process, in order to ensure that sound credit decisions are made.
- There should be policies in place regarding the information and documentation needed to approve new credits, renew existing credits and/or change the terms and conditions of previously approved credits.
- A bank's credit-granting approval process should establish accountability for decisions taken and designate who has the authority to approve credits or changes in credit terms. A combination of individual signature authority, dual or joint authorities, and a credit approval group or committee can be utilized, depending upon the size and nature of the credit.

This principle recognizes that credit quality is the product of a long chain of interconnected processes: the day-to-day operations involved in producing a loan. Credit policies, even if aptly designed, are often not carried out perfectly, and this imperfect implementation

diminishes the credit quality of the loans, and increases the potential for the unexpected. Indeed, failing to control small operational risks can lead to major credit risk.

There are three basic types of errors that can occur in the credit granting process, resulting in credit risk-relating losses:

-Misinformation refers to the inputting of inaccurate data, either by oversight or intentionally. For example, the bank employee processing the loan might have typed in the income wrongly, or the applicant might themselves have entered the wrong information using an online form.

-Miscalculation is when the figures required for the proper approval of a loan are calculated incorrectly. For example, the loan officer might calculate the borrower's income using the wrong calculation methodology. The same type of error can happen when someone has to calculate the amount of funds needed for closing a loan, or when an officer of the bank has to carry out a loan-to-value calculation.

-Misapplication is when bank staff somewhere in the loan production chain do not apply the underwriting guidelines in the way they are supposed to be applied. For example, the underwriting guidelines might state that the borrower must have three months of reserves, but the loan officer might accept the application despite knowing that the borrower possesses only one month of reserves. Misapplication can occur even within an automated system for example, a missing requirement may be translated into an "at closing condition", but that requirement might then not be met at the time of closing.

Any of these three types of errors can result in a credit product that performs badly. In a consumer portfolio made up of many thousands of products, an isolated incidence represents a very low level of risk. But systematic errors in credit processes can give rise to entire portfolios of underperforming loans.

The difficulties of the South African microlender Unifer is a case in point. Evidence of the effect of such systematic errors in the credit process included information systems set up in such a way that they did not monitor repayments or arrears on new loans for the first three months after the loan was granted. The system for provisioning also did not recognise it when borrowers paid only part of the installment they owed. The computer programming therefore gave defaulters a three-month holiday, starting to provide for bad debts only in the fourth

month after a loan started to go bad and making full provision only at six months. Collection and administration systems also proved to be inadequate for the volume of loans which Unifer was granting. During 2001 Unifer decided to decentralize credit approval to some of the brokers, at a time when rapid growth in the loan book meant the head office of Unifer was not coping with processing applications. In this regard, Unifer relied on brokers, who sold the loans but also did the credit vetting and approved the loans. The brokers, who were paid commissions on the volume of loans they sold, were bound to lend irresponsibly (Joffe 2002e:6).

Principle 7: All extensions of credit must be made on an arms-length basis. In particular, credits to related companies and individuals must be monitored with particular care and other appropriate steps taken to control or mitigate the risks of connected lending.

2.7.3 Maintaining an appropriate credit administration, measurement and monitoring process

Principle 8: Banks should have in place a system for the ongoing administration of their various credit risk-bearing portfolios. Credit administration is a critical element in maintaining the safety and soundness of a bank. In developing their credit administration areas, banks should ensure:

- the efficiency and effectiveness of credit administration operations, including monitoring documentation, contractual requirements, legal covenants and collateral;
- the accuracy and timeliness of information provided to management information systems;
- the adequacy of controls over all “back office” procedures; and
- compliance with prescribed management policies and procedures as well as applicable laws and regulations.

For the various components of credit administration to function appropriately, senior management must understand and demonstrate that it recognizes the importance of this element of monitoring and controlling credit risk.

Some of these requirements pose significant challenges to banks. For example, providing

accurate and timely data to management information systems is an especially challenging task, since different parts of the bank often have very diverse business requirements. For example, in a commercial bank, management needs to have an overall view of the credit risk of its customer base as a whole, and more detailed information on the credit risk in the portfolio on both a business line and group level. On the other hand, the front office looks for greater granularity of information to better understand what is driving credit risk and capital charges. The project manager must also be able to push the implementation forward while building in enough flexibility to account for new developments.

Principle 9: Banks must have in place a system for monitoring the condition of individual credits, including determining the adequacy of provisions and reserves.

This includes the development and implementation of comprehensive procedures and information systems to monitor the condition of individual credits and single obligors, defining criteria for identifying and reporting potential problem credits as well as possible corrective action.

An effective credit monitoring system will include measures to: (1) ensure that the bank understands the current financial condition of the borrower or counterparty; (2) ensure that all credits are in compliance with existing covenants; (3) follow the use customers make of approved credit lines; (4) ensure that projected cash flows on major credits meet debt servicing requirements; (5) ensure that, where applicable, collateral provides adequate coverage relative to the obligor's current condition; and (6) identify and classify potential problem credits on a timely basis.

Principle 10: Banks should develop and utilise internal risk rating systems in managing credit risk. The rating system should be consistent with the nature, size and complexity of a bank's activities.

A well-structured internal risk rating system is a good means of differentiating the degree of credit risk in the different credit exposures of a bank. This will allow more accurate determination of the overall characteristics of the credit portfolio, concentrations, problem credits, and the adequacy of loan loss reserves. More detailed and sophisticated internal risk

rating systems can also be used to determine internal capital allocation, pricing of credits, and profitability of transactions and relationships. The conceptual meaning of internal credit risk ratings, the methods banks employ to calculate these ratings, as well as benefits and uses of such ratings are discussed in chapter 3.

Principle 11: Banks must have information systems and analytical techniques that enable management to measure the credit risk inherent in all on-and off-balance sheet activities. The management information system should provide adequate information on the composition of the credit portfolio, including identification of any concentrations of risk.

This require methodologies to quantify the risk involved in exposures to individual borrowers or counterparties, as well as analyzing credit risk at the portfolio level in order to identify any particular sensitivities or concentrations. The measurement of credit risk should take account of (1) the specific nature of the credit (for example loan, derivative, facility) and its contractual and financial conditions (for example maturity, reference rate); (2) the exposure profile until maturity in relation to potential market movements; (3) the existence of collateral or guarantees; and (4) the internal risk rating and its potential evolution during the duration of the exposure.

The effectiveness of a bank's credit risk measurement process is highly dependent on the quality of management information systems. The information generated from such systems enables the board and all levels of management to fulfil their respective oversight roles, including determining the adequate level of capital that the bank should be holding. Therefore, the quality, detail and timeliness of information are critical. In particular, information on the composition and quality of the various portfolios, including on a consolidated basis, should permit management to assess quickly and accurately the level of credit risk that the bank has incurred through its various activities and determine whether the bank's performance is meeting the credit risk strategy.

Principle 12: Banks must have in place a system for monitoring the overall composition and quality of the credit portfolio.

As mentioned, concentrations within the credit portfolio is a continuing source of credit-

related problems in banks. Banks have new possibilities to manage credit concentrations and other portfolio issues. These include such mechanisms as loan sales, credit derivatives and securitization programs. However, mechanisms to deal with portfolio concentration issues involve risks that must also be identified and managed. Consequently, when banks decide to utilize these mechanisms, they need to have policies and procedures, as well as adequate controls, in place.

Principle 13: Banks should take into consideration potential future changes in economic conditions when assessing individual credits and their credit portfolios, and should assess their credit risk exposures under stressful conditions. Scenario analysis and stress testing are useful ways of assessing areas of potential problems (see section 3.3.6.2). Stress testing should involve identifying possible events or future changes in economic conditions that could have unfavourable effects on a bank's credit exposures and assessing the bank's ability to withstand such changes. Three areas that banks could usefully examine are economic or industry downturns; market risk events; and liquidity conditions. Such an analysis should be done on a consolidated basis and should also include contingency plans regarding actions management might take given certain scenarios. The output of the tests should be reviewed periodically by senior management and appropriate action should be taken in cases where the results exceed agreed tolerances. The output should also be incorporated into the process for assigning and updating policies and limits.

2.7.4 Ensuring adequate controls over credit risk

Principle 14: Banks should establish a system of independent, ongoing credit review and the results of such reviews should be communicated directly to the board of directors and senior management.

Internal credit reviews can help evaluate the overall credit administration process, determine the accuracy of internal risk ratings and judge whether the account officer is properly monitoring individual credits.

Principle 15: Banks must ensure that the credit-granting function is being properly managed

and that credit exposures are within levels consistent with prudential standards and internal limits. Banks should establish and enforce internal controls and other practices to ensure that exceptions to policies, procedures and limits are reported in a timely manner to the appropriate level of management.

The goal of credit risk management is to maintain a bank's credit risk exposure within parameters set by the board of directors and senior management. The establishment and enforcement of internal controls, operating limits and other practices will help ensure that credit risk exposures do not exceed levels acceptable to the individual bank. Such a system will enable bank management to monitor adherence to the established credit policies.

Principle 16: Banks must have a system in place for managing problem credits and various other workout situations. A bank's credit risk policies should clearly set out how the bank will manage problem credits. Responsibility for such credits may be assigned to the originating business function, a specialized workout section, or a combination of the two, depending upon the size and nature of the credit and the reason for its problems.

Effective workout programs are critical to manage risk in the portfolio. When a bank has significant credit-related problems, it is important to segregate the workout function from the area that originated the credit. A workout section can help develop an effective strategy to rehabilitate a troubled credit or to increase the amount of repayment ultimately collected.

The key issue for most banks is how these principles should actually be put into practice (Bedser 2000:4). The ideal solution is a mixture of the right system, the right advice to help implement that system and the right people in the bank to get the best out of the system, in addition a coherent credit policy and clear procedures for its application.

While greater information availability and improved risk estimation tools will help, there is much more to risk management than improved data collection and risk measurement. A robust risk management process depends not only on the independence of the risk management function and the amount of information available to support their decisions, but on having the expertise necessary to analyze such information and to make informed recommendations to senior management (Counterparty Risk Management Policy Group

1999:17).

2.7.5 *The role of supervisors*

Principle 17: Supervisors should require that banks have an effective system in place to identify, measure, monitor and control credit risk as part of an overall approach to risk management. Supervisors should conduct an independent evaluation of a bank's strategies, policies, practices and procedures related to the granting of credit and the ongoing management of the portfolio.

Although the board of directors and senior management bear the ultimate responsibility for an effective system of credit risk management, supervisors should, as part of their ongoing supervisory activities, assess the system in place at individual banks to identify, measure, monitor and control credit risk. In addition, they should determine that the board of directors effectively oversees the credit risk management process of the bank and that management monitors risk positions, and compliance with and appropriateness of policies.

To evaluate the quality of credit risk management systems, supervisors can take a number of approaches. These are discussed in chapter 4. The chapter also includes a discussion of the envisaged role of supervisors under the New Capital Adequacy Framework.

Since exposure to credit risk continues to be the leading source of problems in banks worldwide, banks and their supervisors should be able to draw useful lessons from past experiences. Banks should now have a keen awareness of the need to identify, measure, monitor and control credit risk as well as to determine that they hold adequate capital against these risks and that they are adequately compensated for risks incurred. The Basel Committee issued this *Best Practice in Credit Risk Management* document in 2000 in order to encourage banking supervisors globally to promote sound practices for managing credit risk. Although the principles contained in this paper are most clearly applicable to the business of lending, they should be applied to all activities where credit risk is present.

The sound practices set out in this document specifically address the following areas: establishing an appropriate credit risk environment; operating under a sound credit-granting

process; maintaining an appropriate credit administration, measurement and monitoring process; and ensuring adequate controls over credit risk. Although specific credit risk management practices may differ among banks depending upon the nature and complexity of their credit activities, a comprehensive credit risk management program will address these four areas.

But while this document offers a broad framework for a best practice credit system, it does little to help practitioners through the minefield of devising an appropriate technology and data strategy through which to implement this system.

2.8 BEST PRACTICES FOR CREDIT RISK DISCLOSURE

According to the Basel Committee, meaningful and accurate information disclosed in a timely manner provides an important foundation for market discipline and public scrutiny of banks. Indeed, increased reliance on market discipline is one of the three pillars of the new Basel Capital Accord. For a discussion of the proposed role of financial disclosure in the new Accord, see chapter 4.

Since credit risk could be regarded as the prime risk of most banks, it has historically been attributed with the most advanced level of risk management techniques and disclosure. However, a number of fact-finding surveys conducted by the Basel Committee, identified substantial gaps in credit risk disclosure practices. These include information on credit derivatives, securitizations, internal credit risk ratings, as well as counterparty and the geographic distribution of credit exposures.

A risk management survey by Ernst and Young (2000a:5) found that, generally speaking, disclosure of current credit risk management, exposure and losses is quite extensive. However, the report includes the following recommendations that will improve the transparency, relevance and comparability of disclosure of credit risk-related information:

- Prospective information regarding doubtful and/ or non-performing loans and potential losses.
- A breakdown of portfolio quality based on ratings and/or internal credit risk indicators.
- Discussion and quantification of the impact of existing risk mitigation techniques.

Seemingly, this is also relevant to the disclosure practices of South African banks. The extent of South African banks' current compliance with these disclosure requirements will be discussed in chapter 5.

The Basel Committee published a best practices guidance paper to encourage disclosures that provide increased transparency and comparability (Basel Committee 2000f:6-7). According to the consultative paper, credit risk information should be:

- relevant and timely. Information should be provided with sufficient frequency and timeliness to give a meaningful picture of the institution's financial position and prospects. For instance, credit exposures in trading activities may deserve more frequent reporting than credit exposures in traditional banking activities, such as lending. Complex or innovative credit risk transactions, e.g. credit derivatives, may also require more frequent reporting.

- reliable. Typically, it is more difficult to obtain precise measurements of credit risk than market risk. This is because the estimation of default probabilities and recovery rates usually is less exact than the measurement of price movements on liquid markets. This is in turn due to such factors as limitations in statistical data, the illiquid and long-term nature of many credit exposures, and the need to take account of bankruptcy rules and the interpretation and enforceability of those rules. This implies that information on credit risk should include a reasonable degree of caution and reflect realistic and prudent measurements.

- comparable. Information should be comparable across institutions and countries, and over time. It is also important that banks use comparable terminology, for example for non-performing and past-due assets.

- material. Disclosures should be adapted to the size and nature of an institution's activities in accordance with the concept of materiality. Information is material if its omission or misstatement could change or influence the assessment or decision of a user relying on that information. Banks' financial reports should present each material item separately. This implies that larger, internationally active banks with complex operations would be expected to provide much more information than smaller and medium-sized domestic banks with simpler business activities.

The Committee has identified the following five broad areas in which banks should provide more detailed disclosures (Basel Committee 2000f:8):

- accounting policies and practices;

credit risk management; including a description of the credit risk management, organization and procedures, including the credit approval process and credit follow-up processes and methods;

- credit exposures;
- credit quality; and
- earnings.

The following discussion summarizes the disclosure requirements regarding credit risk management, credit exposures and credit quality.

Disclosure requirements on the management, structure and organization of its credit risk management function include the following (Basel Committee 2000f:11-13):

- A summary of policies for identifying, measuring, and managing credit risk on both an individual counterparty and portfolio basis. Such disclosures should include information on the methods used to limit or control overall credit exposures. This includes risk limits, (for example counterparty, pre-settlement and settlement), limits on concentrations of credit to single counterparties or classes of borrowers and limit monitoring.
- The processes and methods used to assess credit exposures on both an individual counterparty and portfolio basis, including a description of the internal credit rating classification system (e.g., what each rating means in terms of default probability, degrees of risk being distinguished, performance over time and ex-post evaluation).
- The mechanisms used to reduce and/or mitigate credit exposures, such as collateral, guarantees, covenants, bilateral and multilateral netting arrangements, and early termination agreements.
- The use of new or innovative instruments that transfer credit exposure, such as credit derivatives.
- Information on techniques and methods for managing past due and impaired assets, including procedures for credit quality classifications and its practices and procedures for evaluating the adequacy of credit loss provisions and credit loss allowances.

For banks that use innovative instruments such as credit derivatives, disclosures should include the following information (Basel Committee 2000f:12):

- Discussion of how instruments are used, including strategy and objectives.

- Notional amounts and fair value of instruments.
- Amount of credit risk bought and/or sold.
- Breakdown by type of instrument (e.g., total return swap, credit default swap, or other credit derivatives).
- Where instruments are recorded (i.e., trading vs. banking book).

A bank that securitizes assets should disclose both qualitative and quantitative information about these activities, including the bank's strategy and objectives for its securitization activities; the amount and types of assets securitized; and the amount of servicing retained. It should also disclose the amount of risk or assets retained, details on subordinated interests retained and general recourse provisions.

With regard to credit exposures, the Basel Committee requires disclosure of total credit exposures, including exposures arising from lending, trading, investment, liquidity/funding management and off-balance sheet activities. Such information should include current exposures (as of the financial report date) and, where appropriate, future potential exposures. In addition, maturity breakdowns should be provided (Basel Committee 2000f:13-14):

The disclosure requirements regarding credit quality include the following (Basel Committee 2000f:16-18):

- Summary information about its internal rating processes, explaining how internal ratings are used in the bank's internal capital allocation process.
- Summary information on the quality of its on-and off-balance sheet credit exposures. Such a disclosure might include a discussion of counterparty type and internal credit rating. A bank may also disclose information about credit exposures based on external ratings.
- Aggregate information about credit arrangements that have been restructured during the period. Such information should include the balance of the restructured loans, the magnitude of the restructuring activity, the impact of restructured credit arrangements on allowances and the present and future earnings, and the basic nature of concessions on all credit relationships that are restructured.

South African regulators also have recognized the need for increased disclosure. The Bank Supervision Department of the South African Reserve Bank has included a regulation on

public disclosure in the amended regulations relating to banks. The particular regulation prescribes minimum requirements for disclosure of, amongst other matters, a bank's capital adequacy (Bank Supervision Department of the South African Reserve Bank 2001a:1). For a comparison of South African banks' current disclosure practices with the disclosure requirements stipulated under Pillar three of the proposed new Basel Accord, see section 5.7.2.

2.9 CREDIT DERIVATIVES AS CREDIT RISK MANAGEMENT TOOLS

Confronted with conflicting pressures of increased risk exposure and the demands of the regulatory community for stronger defenses against risk, bankers in recent years have responded by developing and making use of a wide variety of risk management tools, including such devices as securitization of loans, loan sales, standby credit letters and credit derivatives (Rose 1999:278).

As explained in section 2.4.2, portfolio diversification techniques make it possible to alter a company's risk profile without fundamentally modifying its underlying business (Berenguer and Davies 1999:1). The development of these risk management tools implies that some of the traditional functions of banks can be more profitably unbundled (Thomas 1999:322). Particularly, the credit assessment and loan administration function is being separated from the funding function. However, sophisticated tools for trading credit risk are of limited use if not accompanied by a framework within which to evaluate the impact of such transactions on a portfolio basis. This conceptual framework is provided by portfolio credit risk models, enabling banks to identify and implement risk-mitigating strategies for portfolios of counterparty exposures. As explained, portfolio models make it possible to position institutions to take advantage of the increasing liquidity of the credit markets and to adopt a more active approach to credit portfolio management than was previously possible.

The evolution of better models for credit risk measurement and better tools for credit risk management are mutually reinforcing: with the tools to transfer credit risk, it is possible to properly respond to the recommendations of a portfolio model and to evaluate the contribution of credit derivatives to portfolio risk/return performance (Masters 1998:330). Such tools include securitization, loan sales and standby letters of credit (SLC). Securitizing

assets require a bank to set aside a group of income earning assets, such as mortgages or consumer loans and to sell securities (financial claims) against those assets in the open market. As the assets pay out (for example, as borrowing customers repay the interest and principal owed on their loans) that income flows to the holders of the securities. In effect, bank loans are transformed into publicly traded securities (Rose 1999:281). Thus, securitization refers to the transformation of illiquid, non-marketed assets into liquid, marketable assets, i.e. securities. Pooling loans through securitization helps to diversify a bank's credit risk exposure and reduces the need to monitor each individual loan's payment stream.

However, securitizations and loan sales are usually not feasible for groups of loans that do not have some common features, such as the same cash flow schedule or comparable risk exposures. In this regard, credit derivatives, financial contracts offering protection to the beneficiary in case of loan default, can be helpful in reducing a bank's exposure to credit risk. The first credit derivatives were traded in the early 1990's and their appeal has since expanded from a few leading banks, dealing among themselves, to encompass new sections of the financial markets and a wider range of uses (Duffee and Zhou 1997:2). Although lowering regulatory capital requirements was one of the main motivations for the initial use of credit derivatives, this regulatory arbitrage is giving way to the use of credit portfolio management to improve their risk-adjusted return across the portfolio (Iacono 1997:32).

2.9.1 Definition of credit derivatives

Credit derivatives are over-the-counter financial contracts that have payoffs contingent on changes in the credit quality of a specified firm or firms; the specified firm is typically not a party to the contract (Duffee and Zhou 1997:1). It involves bilateral financial contracts which isolate specific aspects of credit risk from an underlying instrument and transfer that risk between two parties. In so doing, credit derivatives separate the ownership and management of credit risk from other qualitative and quantitative aspects of ownership of financial assets. Thus, credit derivatives have the potential to achieve efficiency gains arising from disaggregating risk. This is best illustrated by imagining an auction process in which an auctioneer sells a number of risks, each to the highest bidder, as compared with selling a "job lot" of the same risks to the highest bidder for the entire package. In most cases the separate

auctions will yield a higher aggregate sale price than the job lot. By separating specific aspects of credit risk from other risks, credit derivatives allow even illiquid credit exposures to be transferred from portfolios that have, but do not want, the risk, to those that want, but do not have, that risk (Masters 1998:294).

The underlying instruments on which credit derivatives are written are typically corporate bonds, Brady bonds, or large leveraged bank loans. All of these instruments can be priced easily using dealer polls. To date, the market has not been extended to instruments for which pricing is more opaque, such as small and medium-sized bank loans. However, there is potential for future expansion in this regard, since such loan portfolios are typically concentrated across business sectors and geographic regions (Duffee and Zhou 1997:2).

Given that credit risk is one of the oldest and best-understood risks in finance, it is surprising that credit risk derivatives were not publicly introduced until 1992 at the International Swaps and Derivatives Association annual meeting in Paris. One plausible explanation is that many credit-sensitive instruments are also interest rate-sensitive, so the valuation of a credit derivative often requires more sophisticated models than for pure interest rate or foreign exchange derivatives (Iacono 1997:22). Another explanation is that modeling credit risk depends on discrete, not continuous events, so it is more difficult to model than other capital market phenomena. The use of credit derivatives to actively manage portfolio credit risk is also in conflict with banks' traditional approaches to credit risk and loan origination. For example, commercial banks traditionally separate risk decisions from pricing, rather than considering them as a pair. Moreover, banks do not always have the significant trading capacity necessary to successfully use credit derivatives as a risk management tool (Lando 1999:1).

In 1997, credit derivatives entered the mainstream of global structured finance as they were put to use for the first time in a number of large, high profile securitizations of assets which cannot as easily be managed using more traditional techniques (Masters 1998:320). By combining credit derivatives with traditional securitization tools, structures can be tailored to meet specific goals such as providing regulatory capital relief, preserving a low funding cost advantage, and maintaining borrower and market confidentiality. Thus, credit derivatives are stimulating the rapidly growing asset-backed securitization market by stripping out and

repackaging credit exposures from the vast pool of risks that do not naturally lend themselves to securitization. This can be either because the risks are unfunded (off-balance sheet), are not intrinsically transferable, or because their sale would be complicated by relationship concerns. In so doing, by enhancing liquidity and bringing new forms of credit risk to the capital markets, credit derivatives are opening new lines of distribution for the credit risk of bank loans and many other instruments into the institutional capital markets (Das1995:10).

2.9.2 Advantages of using credit derivatives as a credit risk management technique

As mentioned, the common denominator among all credit derivatives is their ability to separate certain aspects of credit risk from other risks. By enabling trade in credit risk, the use of credit derivatives can be to the advantage of both firms selling and buying such risks. Firms that sell their credit risk can benefit by freeing up credit lines to good customers and reducing their exposure to key or weak customers, thereby reducing their vulnerability to those customers defaulting. At the same time, firms buying credit risk might benefit from acquiring particular exposures or gain new exposures (for example, as part of a credit risk diversification strategy), or they may benefit from the higher yields obtained by accepting new credit risks.

The scope of application of credit derivatives thus go beyond the specific management of price and event risk to the strategic management of portfolio risk, including balance sheet growth, overall business performance, and thus shareholder value (Iacono 1997:35). More specifically, with regard to the customer relationship, credit derivatives offer several advantages above more traditional methods, such as loan insurance (Masters 1998:294-296 and Kim 1998:2).

Firstly, the reference entity, whose credit risk is being transferred, needs neither be a party to nor be aware of a credit derivative transaction. This confidentiality enables banks and corporate treasurers to manage their credit risks discreetly without interfering with important customer relationships. The absence of the reference entity at the negotiating table also means that the terms (tenor, seniority, compensation structure) of the credit derivative transaction can be customized to meet the needs of the buyer and seller of risk, rather than the particular

liquidity or term needs of a borrower. Moreover, because credit derivatives isolate credit risk from relationship and other aspects of asset ownership, they introduce discipline to pricing decisions. Credit derivatives provide an objective benchmark representing the true opportunity cost of a transaction. Increasingly, as liquidity and pricing technology improve, credit derivatives are defining credit spread forward curves and implied volatilities in a way that less liquid credit products never could. The availability and discipline of visible market pricing enables institutions to make pricing and relationship decisions more objectively. Credit derivatives can be an especially advantageous credit risk management tool in the situation of default. The use of credit derivatives allows the workout process to be structured to benefit a long-term relationship between bank and customer. This is in contrast to a situation where an insurance company providing loan insurance wants to take an active part in debt rescheduling and insolvency talks.

Secondly, credit derivatives provide a mechanism via which short sales of credit instruments can be executed with any reasonable liquidity. It is more or less impossible to short-sell a bank loan, but the economies of a short position can be achieved synthetically by purchasing credit protection using a credit derivative. This allows the user to reverse the “skewed” profile of credit risk (whereby one earns a small premium for the risk of a large loss) and instead pay a small premium for the possibility of a large gain upon credit deterioration. Consequently, portfolio managers can short specific credits or a broad index of credits, either as a hedge of existing exposures or simply to profit from a negative credit view. Similarly, the possibility of short sales opens up arbitrage opportunities. Global credit markets today display discrepancies in the pricing of the same credit risk across different asset classes, maturities, time zones, currencies, etc. These discrepancies persist because arbitrageurs have traditionally been unable to purchase cheap obligations against shorting expensive ones in order to extract arbitrage profits. As credit derivative liquidity improves, banks, borrowers and other credit players will exploit such opportunities, just as the evolution of interest rate derivatives prompted cross-market interest rate arbitrage activities in the 1980s. The natural consequence of this is that credit pricing discrepancies will gradually disappear as credit markets become more efficient.

Thirdly, credit derivatives, except when embedded in structured notes, are off-balance sheet instruments. As such, they offer considerable flexibility in terms of leverage. In fact, the user

can define the required degree of leverage, if any, in a credit investment. These advantages can be achieved through the use of various credit derivative structures. The most common and frequently used credit derivatives include the following (Masters 1998:296-305):

- Default swaps, in which one party makes periodic payments to another party in return for a promise of payment in the event of a default by some other party.
- Credit spread swaps, in which periodic payments are made in return for the promise of a spread-contingent payment.
- Total return swaps, in which parties swap bond payments.

The conceptual meaning, as well as possible application in risk management of each of the above three structures will be discussed in the following section.

2.9.3 Basic credit derivative structures and applications

2.9.3.1 Credit (default) swaps

Credit default swaps can be thought of as insurance against the default of some underlying instrument. Default swaps allow the holder of an exposure to a particular borrower to transfer the risk of that borrower's default to a third party. In a typical credit default swap, the party "selling" credit risk (or buying credit protection) makes periodic payments to the other party. This payment is calculated as a negotiated number of basis points multiplied by a notional principal. The party "buying" credit risk (or selling credit protection) makes no payment unless a specified reference credit defaults. In the event of default, the credit risk buyer pays the notional principal to the credit risk seller (Duffee and Zhou 1997:4).

Formally, the credit swap or (credit default swap) can be defined as a bilateral financial contract in which one counterparty (the protection buyer) pays a periodic fee in return for a contingent payment by the protection seller, following a credit event of a reference entity (Masters 1998:297).

A credit event is commonly defined as bankruptcy, insolvency, receivership, material adverse

restructuring of debt, or failure to meet payment obligations when due, coupled with a significant price deterioration. This latter requirement is known as a materiality clause and is designed to ensure that a credit event is not triggered by a technical (i.e. non credit-related) default, such as a disputed or late payment. The latter would not, presumably, be accompanied by a material price deterioration in the reference entity's obligations.

The definitions of a credit event and the settlement mechanism used to determine the contingent payment are flexible and determined by negotiation between the counterparties at the inception of the transaction. However, this flexibility can also lead to substantial legal uncertainty. To a large extent the evolution of increasingly standardised terms in the credit derivatives market has addressed this problem (Kim 1998:3).

2.9.3.2 Total (rate of) return swaps

A popular variation on the credit swap, namely a total return swap (TR swap) may involve a financial institution (dealer) that guarantees the swap parties a specific rate of return on their credit assets (Masters 1998:299). For example, a bank pays a guarantor institution a stream of income from its loans and investments, in exchange for a more certain income stream based upon a widely recognized interest rate such as the return on government bonds. There is no exchange of principal, and ownership and funding of the underlying asset is unchanged (Iacono 1997:25).

When entering into a TR swap on an asset residing in its portfolio, the TR payer has effectively removed all economic exposure to the underlying asset. This risk transfer is effected with confidentiality and without the need for a cash sale. Typically, the TR payer retains the servicing and voting rights to the underlying asset, although occasionally certain rights may be passed through to the TR receiver under the terms of the swap. The TR receiver has exposure to the underlying asset without the initial outlay required to purchase it (Masters 1998:296).

A TR swap is importantly distinct from the credit swap in that it exchanges the total economic performance of a specified asset for another cash flow. Payments between the

parties to a TR swap are based upon changes in the market valuation of a specific credit instrument, irrespective of whether a credit event has occurred. In contrast, a credit swap results in a contingent or floating payment only following a credit event (Masters 1998:299).

2.9.3.3 Other credit derivatives

Credit derivatives have already evolved into a multitude of structural variations (Masters 1998:304). Occasionally, credit events have been defined to include an additional requirement, such as a material movement in equity prices, commodity prices, or interest rates (a “hybrid credit derivative”). Alternatively, derivatives may be structured so that the credit event triggers a substitution of one asset for another rather than a cash payment (a “substitution option”). “Basket” credit swaps are triggered by a credit event not just of a single reference entity, but of, say, the first or second entity to experience a credit event among a basket of such entities. Credit spread forwards allow two parties to take opposing views on the level of a specified credit spread at a specified point in the future. A payment is made (in either direction) by one of the parties to the other, depending on the amount by which the spread is wider or narrower than a specified strike at maturity.

Credit options are put or call options on the price of floating rate bonds, loans or asset swaps, rather than options on credit spreads. A credit option on the price of a floating rate instrument is a “pure” credit derivative in which only credit spread risk is exchanged. However, options are also written on the price of fixed rate assets. These “fixed rate bond options” are hybrids of both credit and interest rate derivatives in which both risks change hands.

Credit-linked notes in which banking companies selling bonds or notes to raise money also sell an option to investors to reduce the bank’s borrowing costs in case too many of its loans turn into bad loans that will not pay out.

An important innovation in credit derivatives is the dynamic credit swap (or “credit intermediation swap”), which is a credit swap with the notional linked to the mark-to-market of a reference swap or portfolio of swaps. A dynamic credit swap avoids the need to allocate resources to a regular mark-to-market settlement or collateral agreements. Furthermore, it

provides an alternative to unwinding a risky position, which might be difficult for relationship reasons or due to underlying market illiquidity.

2.9.4 Risks arising from the use of credit derivatives

The use of credit derivatives lead to unique risk management and control requirements (Duffee and Zhou 1997:3). The complexity of derivative instruments raises concerns about the ability of managers, regulators, and market participants in general to understand the risk associated with their uses. This concern is justified in that these instruments and products present a significant challenge to existing regulatory, supervisory, accounting and legal frameworks. These frameworks are designed for a world of on-balance sheet finance, and are not well-suited to deal with rapid and frequent transformations of a firm's financial claims and obligations. In particular, traditional supervisory and regulatory structures focusing on periodic examinations of on-balance sheet transactions, are ill-equipped to deal with an environment where the intra-day on-and-off-balance sheet positions change so rapidly that end-of-day positions are no longer sufficient statistics for projecting the evolving risk profile of an institution (Hunter and Marshall 1999:1). As explained in chapter four, the proposed new Basel Accord recognizes this. The Accord also includes specific regulations regarding the use of credit derivatives.

Institutions will have to comply with strong operational requirements for both guarantees and credit derivatives. Protection must be direct, explicit, irrevocable and unconditional. Guarantees must meet operational requirements covering legal enforceability, documentation, coverage and the right to pursue the guarantor rather than the obligor on the default of the obligor.

The operational requirements for credit derivatives are more substantial, given the regulators' views on the complexity of these instruments. They set out the regulators' minimum expectations of credit derivative contracts. Together with the requirements on robust risk management processes, this represents a major challenge for institutions with credit derivative operations to which they will need to pay close attention. The infrastructure of some credit derivative businesses has not kept pace with the volume or the increasing

complexity of the product. The regulators are likely to take a close look at this area as part of the Pillar 2 supervisory review process.

Only credit default swaps and total return swaps are recognized for regulatory capital relief. There is no benefit from credit spread options. Furthermore, credit protection is only recognized if the guarantee or credit derivative is provided by a highly rated corporate (rated “A” or better) or by sovereigns, public sector entities and banks with a rating better than the underlying credit.

The protected element of an exposure is assigned a risk-weight that is the weighted average of the obligor/underlying risk-weight and the protection provider’s ~~weight~~ weight. Materiality thresholds on payments are treated akin to retained first loss positions and deducted from capital of the protection receiver.

In addition to these concerns, there is also a growing perception that these markets have become less transparent and more interconnected. That is, the derivatives business is unduly concentrated in a small group of dealer banks; and that these markets are prone to systemic disturbances. Such disturbances potentially threaten the real economy complicating (or at least fundamentally changing) the conduct of monetary policy and central banking.

Specifically, credit derivatives carry the following special forms of risk exposure for a bank (Dowd 1998:171):

-Counterparty risk. A bank’s partner in a credit swap or option may go bankrupt and fail to hold up its end of the contract, forcing the bank to find another partner and a new credit derivative contract, possibly on unfavorable terms.

-Legal risk. The contract that evidences a credit risk agreement may be invalidated by a court of law, once again forcing the parties to the contract to find credit risk protection from some other source.

Furthermore, hedging risks with the aid of credit derivatives does not always present a perfect hedge. In such cases, residual risks arise. Imperfect hedges can reduce credit risk and may therefore be desirable. At the same time, it is necessary to deal appropriately with the residual risks. Three types of residual risks will be addressed here (Basel Committee 2000a:7-10):

-Residual forward credit risk occurs in the case of a maturity mismatch, where the hedging instrument expires before the underlying asset. Mismatches in hedges are most commonly the result of the limitations of the current credit derivatives market, i.e. its relatively thin and illiquid nature. It is difficult for a protection buyer to match the maturity of portfolio credit derivatives to the maturities of individual assets, so mismatched hedges are employed as the best protection available. Mismatches also occur when the protection buyer has only a short-term concern with respect to a particular counterpart.

The duration of the mismatch and its start date (i.e. when the credit protection expires) are the primary considerations in assessing risks in maturity mismatches. The length of the mismatch is most often assessed relative to the length of the underlying position, rather than in absolute terms. Consideration is also sometimes given to other factors, such as the liquidity of the hedging instruments or the assets being hedged. Maturity mismatches tend to be factored into the overall assessment of the hedge. Thus, a maturity mismatch is generally not treated as a separate risk element, but tends to result in a partial disqualification of the hedge (e.g. through a discount applied to the value of the hedge).

-Basis risk arises where the exposure and/or the hedging instrument are subject to potential changes in market price that could create a shortfall in the value of the hedge.

-Asset mismatches occur in the context of credit derivatives when the hedged asset (often a loan or a bond) is not identical with the reference asset of the credit derivative. Specifically, an asset mismatch is the risk that the credit derivative does not pay out the expected amount (is not triggered) when the supposedly hedged exposure defaults, because the derivative is triggered by a credit event that differs from the default requirements of the underlying credit.

As mentioned, credit risks arising from credit derivatives are often less transparent and more difficult to assess than traditional credit risks. They are more difficult to assess for three main reasons (Dowd 1998:167):

-Notional amounts often give an inadequate indication of derivative credit exposures. With loans, the total exposure is closely related to the total gross amount loaned. However, with derivatives there are no simple rules to relate total credit exposure to the gross size of a

derivatives portfolio. For example, swap or forward contracts will usually have zero initial values, and yet both contracts can produce large losses if the underlying variables move strongly in the wrong direction. Hence, when an institution engages in a derivatives deal, it is often not immediately obvious how much credit risk it is really taking on.

-Risk arising from the use of credit derivatives is further complicated by portfolio effects. In general, it is not possible to get an accurate picture of overall credit exposure by adding up individual exposures, because the individual exposures may (and generally will) interact with each other (Spinner 1996:4). The use of transaction methods (see section 2.3.) can be problematic in this regard. As explained, such methods calculate total credit risk with a counterparty as simply the sum of current and potential exposure of each transaction with the counterparty in the firm's portfolio. Potential exposure for each transaction is computed as notional principal times a multiplier that reflects the transaction maturity, and the inherent riskiness of the transaction multipliers are calculated in advance for all combinations of transaction form, maturity, and riskiness of underlying to which the firm anticipates having exposures (Citigroup 2001:23). This is also the approach mandated by the Basel Committee for the purposes of capital requirements. Under the new proposals banks subject to the standardised and foundation IRB approaches would be subject to the existing methodology applicable to OTC derivative activities. More sophisticated techniques and methodologies to calculate credit exposures would only be permitted for banks for which the advanced approach has been approved (NVB 2001:25).

-The credit risks associated with derivatives positions can vary considerably and in complicated ways with movements in underlying prices. Thus, derivatives often involve market and liquidity-sensitive exposures. This pose special challenges to the credit processes at banks. For market-sensitive instruments, for example, increases in the volatility of price changes effectively increase potential exposures. Market-and liquidity-sensitive exposures can be correlated with the creditworthiness of the borrower. This is an important insight gained from the market turmoil in Asia, Russia and elsewhere in the course of 1997 and 1998. That is, the same factors that impact on the value of a market-or liquidity-sensitive instrument can also influence the borrower's financial health and future prospects.

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The following forces can be set in motion when market, credit and liquidity risk interact (Counterparty Risk Management Policy Group 1999:22):

-The distinction between market and credit risk blurs. That is, changes in market risk factors such as foreign exchange rates, equity prices, and spreads, as well as volatilities and correlations, become key determinants of how much a firm would lose if default occurs.

-Market liquidity is sharply reduced, or as in 1998's events, virtually eliminated. Once this occurs, the amplitude and predictability of the size of financial asset price changes become much more uncertain. Once seemingly adequate amounts of collateral and/or margin are quickly and substantially called into question, thus altering perceptions of both credit and liquidity risk and amplify the effects of leverage, if it has not been prudently managed (Counterparty Risk Management Policy Group 1999:22).

Such a situation where there is strong correlation between market rates and the solvency of counterparties, is often termed a "wrong way" trade. The collapse of the trouble that accompanied the defaults on Russian debt during the 1998 Russian crisis is an example of wrong way risk. Other general examples of wrong way trades include buying a put option on an emerging market bond from a sovereign or financial institution of the same country, or arranging a foreign exchange forward contract with a central bank or other financial institution of the same country. Wrong way features in trades can have an enormous impact on both expected exposure and loss. In such cases, conventional exposure estimation methods can lead to a gross underestimation of exposure and expected loss.

The contingent nature of the exposure in these instruments requires the bank to assess the probability distribution of the size of actual exposure in the future and its impact on both the borrower

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key element of that analysis (Sampson 2000:4). Effective stress testing can reveal the potential for large losses, which sound practice suggests should be disclosed to the customer. Banks have suffered significant losses when they have taken insufficient care to ensure that the customer fully understood the transaction at origination and subsequent large adverse price movements left the customer owing the bank a substantial amount.

Integrated risk assessment methodology seems apparent in this regard. According to Barnhill and Gleason (2001:4-5) financial environment simulation modeling combined with portfolio

theory offers a very promising integrated risk assessment approach. The Algo Portfolio Credit risk engine from Algorithmics is an example of a commercially available solution for the integrated measurement of market and credit risk. Such simulation-based credit exposure models are generally composed of four logical building blocks (Algorithmics 2001b:6):

- Scenario generation: Generation of a distribution of multi-step scenarios (paths) through time for all market risk factors that impact portfolio value.

- Forward valuation: Valuation of the aged portfolio under all scenarios.

- Exposure: Transformation of future values to future exposures by incorporating the impact of netting agreements, collateral and termination clauses.

- Risk measures: Post-processing of exposures across scenario and time to compute expected and worst case exposures.

In simulation-based credit exposure models, the choice of risk measures is decoupled from the underlying scenario generation and valuation analytics. This gives considerable flexibility in selecting the appropriate risk measure(s) for measuring and managing risk. For example, a bank may select a 95% worst-case gross and collateralised exposure over the entire life of the contracts as the appropriate measure for limits management. On the other hand, in order to treat capital for derivatives on equal footing with loans, the mean exposure over a one-year horizon may be chosen as the appropriate measure for calculating credit capital. The important point is that both measures can be supported with a common underlying framework, thereby promoting consistency and the alignment of regulatory and economic capital. Moreover, as regulators and banks learn more, the choice of a particular risk measure can be changed without costly changes (Algorithmics 2001b:6).

The calculation of a counterparty's exposure profile has some similarities to the calculation of VaR for market risk. The input data requirements for simulation-based credit exposure models are in fact much more similar to market risk models than to portfolio credit risk models (see table 2.1.).

Simulation-based credit exposure models do not require additional data over and above the data required for internal market risk models, with the exception of the terms and conditions of netting and collateral agreements, which are readily available (Algorithmics 2001b:4).

Table 2.1 Data input requirements of portfolio credit risk models and simulation-based models

	INPUTS FOR MARKET RISK MODELS	INPUTS FOR SIMULATION-BASED MODELS	INPUTS FOR PORTFOLIO CREDIT RISK MODELS
Transaction terms and conditions	Yes	Yes	Yes
Market data	Yes	Yes	Yes
Historical time series of market risk factors used to generate future distributions of risk factors	Yes	Yes	Depends on portfolio model
Netting and collateral agreement terms and conditions	No	Yes	Yes
Default data	No	No	Yes
Correlation on counterparty defaults, migrations	No	No	Yes
Recovery rates	No	No	Yes

Source: Algorithmics (2001b) p.4

Another common argument used against the allowance of portfolio credit risk models is that the models are difficult to back-test due to the infrequency of defaults. This is a legitimate issue for portfolio credit risk models but not for simulation-based credit exposure models. Simulation-based credit exposure models estimate the amount of loss if one or more counterparties were to default. Thus, the low frequency of actual defaults that creates difficulties for portfolio models does not matter. Exposure profiles are an observable quantity that can be readily back-tested on a weekly, monthly, or annual basis (Algorithmics 2001b:5).

In particular, simulation-based credit exposure models do not require difficult-to-obtain default frequencies and correlation data. Therefore, one cannot make the argument that simulation-based credit exposure models should be disallowed due to concerns regarding data availability (Algorithmics 2001b:4).

The essential difference between the two types of calculations is that the calculation of VaR typically assumes a static portfolio and a one or ten day simulated shock in market rates. In contrast, the simulation of a counterparty's exposure profile needs to be done over many future dates and must take into account how the counterparty's portfolio changes over time given the contractual setting of floating rates, the expiration of options and the settlement of cash flows. The calculation of the exposure profile must also take into account any legally enforceable risk mitigation agreements, such as netting (Citigroup 2001:23).

2.9.5 Risk mitigation tools applicable to credit derivatives

Banks can use the following credit mitigation techniques in the management of the above-mentioned risks arising from the use of derivative contracts (Dowd 1998: 173-175 and Counterparty Risk Management Policy Group 1999:25):

2.9.5.1 Margin and collateral requirements

Institutions can reduce their exposures by means of margin or collateral requirements. Collateral might be demanded upfront, for example, as with the margin requirements of organized exchanges and many derivatives brokers. This margin is usually set to cover a specified large adverse move in the underlying price over some horizon period. The margins could also be tailored to reflect the size of the position and the credit ratings of counterparties. The contract could then be mark-to-market, with collateral being returned if the market moves in favor of a particular party, and more collateral being demanded if the market moves against. This marking-to-market ensures that gains or losses are realized quickly and so prevents the build-up of large credit exposures. If these additional margin

demands were not met, the creditor party would have the right to close out the contract and so stop its credit exposure from rising any further. In other cases, there may be no initial margin requirement, but margin would be required if a contract's value reached a threshold level.

Haircuts (also referred to as initial collateral requirements) are the proportion of an underlying asset's value that a counterparty is required to commit in order to gain economic exposure to that asset through a transaction with a credit provider. Haircuts limit the amount of leverage a counterparty can obtain since they ultimately limit the value of the underlying assets, and hence losses, to which it can be exposed. Because they are set at the time a transaction is executed they would not appear to be sources of unexpected liquidity stress. However, different transactions have different rules affecting whether a credit provider can raise haircuts after the transaction has been executed.

The possibility that haircuts may be raised also affects the potential sources of liquidity. Unpledged assets are typically thought of as potential sources of liquidity because they could be sold for cash or borrowed against. In a stress market the assets' prices may have dropped, however, and credit providers may have increased the haircuts they require, reducing these assets' value as sources of funds whether sold or used as collateral for borrowing.

To mitigate this risk, institutions should consider entering into longer term secured financing arrangements with fixed haircuts for the term of the financing. In addition, they may wish to consider arranging back-up, secured financing facilities from high quality credit providers with predetermined haircuts on pre-specified collateral.

Credit providers recognize that trading with relatively risky counterparties without an initial commitment of their capital raises the provider's exposure to loss, particularly when financial markets are volatile. Under such conditions, variation collateral, that is, exchanging collateral as the transaction market value fluctuates, is very likely to be insufficient protection against losses. Initial collateral can be useful both to cover exposures created during the normal delay periods in delivering variation collateral and to cushion the effect of large market moves during periods of high volatility and declining liquidity.

Based on assessments of transaction riskiness and counterparty credit quality, credit providers

are increasingly requiring initial collateral, in addition to variation collateral. They are also developing guidelines for initial collateral requirements based not only on volatility but also on the size and liquidity of underlying instruments, as well as the creditworthiness of a trading counterparty. In cases where initial collateral is not judged essential, limits are being linked not just to potential exposure measures but also to liquidation estimates of exposure. Finally, where collateral thresholds are being employed to frame limits for unsecured exposure, firms are evaluating them in terms of estimates of potential liquidation cost, and not just current mark-to-market values.

2.9.5.2 Netting arrangements

Netting arrangements help to reduce credit exposures and are widely used in derivatives contracts. Netting arrangements stipulate that each party should be liable for the net, rather than the gross amount they owe the other party. Suppose there are two contracts between A and B, and the first contract has positive value to A and the second one has positive value to B. A netting arrangement means that A owes B only the difference between the values of the two contracts, if that is positive, or zero otherwise. Without netting, A would still be liable to pay B the whole of what it owes on the second contract, even if B defaults on the first. A netting arrangement protects the non-defaulting party from a situation where its counterparty defaults on one contract and yet simultaneously insists on the payment due on the other (Dowd 1998:175).

Netting arrangements can take several forms. Close-out netting combines offsetting credit exposures between two parties under a master agreement. Cross-product netting allows positive and negative mark-to-market values to offset each other across trades in different financial instruments. Collateral netting combines exposures subject to collateral under a master agreement. Payment netting is the process of reducing all payments due on the same date and in the same currency to a single net payment.

In general, the reduction in credit exposure created by netting will also be greater, the greater the number of deals outstanding with a counterparty and the more closely aligned the individual contracts are in terms of maturities and contract size. The scope and volume of on-

balance sheet netting (other than derivatives contracts covered by off-balance sheet netting arrangements) seems to be limited to a small number of countries. Furthermore, obtaining the merits of any expansion of on-balance sheet bilateral netting, could entail a large amount of operational risk and require significant investments in systems infrastructure, as well as changes in risk management frameworks, while the capital benefit would be relatively small (Basel Committee 2000a:20).

2.9.5.3 Credit triggers

Credit triggers are clauses that allow a contract to be terminated if the credit rating of the counterparty falls to some trigger level. These clauses are similar to the covenants often used in commercial lending that specify that the debtor must maintain minimum net worth or credit ratings. They are often used in long-term derivatives contracts and typically specify that a party have the right to have the contract immediately settled if the counterparty's rating falls below investment grade.

However, credit triggers can put considerable liquidity pressure on the losing party to a derivatives transaction. In fact, credit triggers go even further in that they hit the losing firm at a vulnerable time (i.e. when its cost of credit has risen and its access to credit has become more restricted).

Most financial authorities have specific regulatory requirements for the treatment of credit derivatives, as well as the recognition of the above-mentioned mitigation techniques. This is also the case in South Africa. In line with international trends, and as part of its supervisory program, the Bank Supervision Department investigated the extent of the current, as well as potential future use of credit derivatives in the South African market. Having analyzed the results of the above-mentioned investigation, the Department introduced guidelines for the capital-adequacy treatment of credit derivatives in 2001 (Bank Supervision Department of the South African Reserve Bank 2001a:5). The proposed new capital adequacy framework also includes proposals related to credit risk mitigation tools in the credit derivative context. For a discussion, see chapter 4.

2.10 CONCLUSION

The effective management of credit risk is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking organization. Credit risk is often regarded as the primary risk in banking and therefore has historically been attributed with the most advanced level of risk management techniques. This includes risk mitigation techniques such as netting, setting position limits and diversification.

However, the major cause of serious banking problems world-wide continues to be directly related to credit risk exposure. Severe credit losses in a banking system usually reflect simultaneous problems in several areas. This includes “traditional” areas of credit risk management, such as failures of due diligence and inadequate monitoring and credit concentrations.

In addition to problems in these “traditional” areas of credit risk, the banking sector is passing through a period of substantial structural change under the combined and inter-related pressures of internal competition, declining entry barriers, changes in regulation, new information, trading and delivery technology and global competitive pressures. This implies formidable challenges. Banks are losing some of their past monopolies and comparative advantages which have underpinned their dominant position in the financial system. In particular, as entry barriers into banking services are eroded, banks are increasingly facing competition from a wider range of actual and potential suppliers of banking services.

This technological, financial and institutional changes, fundamentally altered the environment in which banks operate, leading to a change in the nature, scope and scale of the risk they need to manage. In response to the increasing volume and complexity of financial instruments and products, credit risk measurement and management methodologies have evolved dramatically. This includes sophisticated quantitative approaches to credit assessment and credit pricing, as well as a new approach to credit management - evaluating credit decisions in an integrated risk/return framework and actively managing credit in a portfolio context. This trend towards better risk management is reinforced by shareholder pressure in terms of return on economic capital.

Traditionally, the main objective of credit risk management has been to avoid losses. Credit losses were viewed as a lapse of judgement, rather than as a predictable part of assuming risk, so the system was designed to prevent lapses from occurring. This was achieved with “traditional” risk management techniques such as due diligence in lending decisions. However, the afore-mentioned changes in the credit risk environment, led to a redefined goal of credit risk management. The goal is now to maximise a bank’s risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters.

Confronted with conflicting pressures of increased risk exposure and the demands of the regulatory community for stronger defenses against risk, bankers in recent years have responded by developing and making use of a wide variety of risk management tools, including such devices as securitization of loans, loan sales, standby credit letters and credit derivatives.

The use of credit derivatives has given banks more resources with which they can influence the level of exposure to credit risk that they are prepared to tolerate. Credit derivatives can offer considerable advantages over traditional credit risk management alternatives. Both as an asset class and a risk management tool, credit derivatives represent an important innovation for global financial markets that revolutionized the way that credit risk is originated, distributed, measured and managed.

However, sophisticated tools for trading credit risk are of limited use if not accompanied by a framework within which to evaluate the impact of such transactions on a portfolio basis. This conceptual framework is provided by portfolio credit risk models, enabling banks, to identify and implement risk-mitigating strategies for portfolios of counterparty exposures. Portfolio models make it possible to position institutions to take advantage of the increasing liquidity of the credit markets. Further advantages include the ability to evaluate the contribution of credit derivatives to portfolio risk-return performance and to adopt a more active approach to credit portfolio management than was previously possible.

These models allow a portfolio approach to credit risk modeling, enabling a company to consolidate credit risk across its entire organization, and provides a statement of Value-at-Risk (VaR) due to credit upgrades, downgrades, and defaults. The portfolio context allows

banks to analyse marginal and absolute contributions to risk, and reflect concentration risk within a portfolio. In a portfolio context, the risk-return trade-off of concentrated lending activity can be evaluated and systematically reflected in pricing and credit extension decisions.

On the one hand, these new instruments enhanced the credit risk management capabilities of banks. It has enabled banks to manage their credit risks actively, eliminating credit risk “hot spots” in their portfolios and altering their risk exposures as the economic cycle or the bank’s own financial well-being evolve. On the other hand, they created new risk management challenges. The complexity of derivative instruments raised concerns about the ability regulators and market participants to understand the risk associated with their use. Credit derivatives explicitly derive value from correlation risk or credit events such as upgrades, downgrades or default. Such risks are best understood in the context of a portfolio model that also explicitly accounts for credit quality migrations. Moreover, the proliferation of complex financial instruments has created uncertain and market-sensitive counterparty exposures that are significantly more challenging to manage than traditional instruments such as bonds.

While the use of sophisticated risk management tools and the transition to active portfolio management is likely to result in a more profitable, specialized, and risk-efficient business, banks will need to overcome considerable challenges along the way. This includes unique organizational questions that cut across risk classes and business areas, such as the relevant scope for portfolio optimization. Achieving the change in responsibilities implied by the new portfolio model without demotivating existing account and credit officers, represent another challenge. Each institution will have to determine a “best fit” solution that is responsive to its business mix, market position, organization culture and competitive advantage

Any reversal of the trend toward increasingly complex and interdependent financial markets is highly unlikely. Change and innovation are constant and healthy aspects of a market-based competitive financial system. With that innovation will come a reminder of the need for continuous enhancements to risk management practices, such that, in time, today’s emerging best practices will have to be reviewed and strengthened further. However, risk management is not simply a matter of better computer models to measure volatility and correlations more rapidly and precisely. Indeed, too much public focus has been placed on the sophistication

and precision of risk estimation models, and not enough on the more important managerial and judgmental elements of a strong risk management framework. In the end, experience, market knowledge, management discipline, internal risk transparency and strong internal controls will be the more important determinants of effective credit risk management.

CHAPTER 3: THE USE OF INTERNAL CREDIT RISK RATINGS AND CREDIT RISK MODELS IN CREDIT RISK MANAGEMENT

3.1 INTRODUCTION

As mentioned in chapter 2, techniques, practices, and tools for credit risk management are evolving rapidly, as are the challenges that banking organizations face in their business lending activities. The number and geographic dispersion of their borrowers make it increasingly difficult for banks to manage their loan portfolios simply by remaining closely attuned to the performance of each borrower (Treacy and Carey 2000:169). As a result, an increasingly important component of the systems for controlling credit risk at larger institutions is the identification of gradings in credit risk among their business loans, and assignment of internal credit risk ratings to loans that correspond to these ratings.

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that they summarize the risk of loss due to failure by a given borrower to pay as promised. In short, risk ratings are the primary summary indicator of risk for banks' individual credit exposures. They both shape and reflect the nature of daily credit decisions of banks (Krahnert and Weber 2001:3).

Ratings are used in several key areas of credit risk management. At one end of this range, ratings are primarily used to determine approval requirements and identify problem loans, while at the other end they are also an integral element of credit portfolio monitoring and management, capital allocation, pricing of credit, profitability analysis, and detailed analysis to support loan loss reserving.

As discussed in chapter 4, ratings are now formally recognized as a basis for calculating regulatory capital requirements. This makes aspects such as the conceptual meaning of internal credit ratings, understanding of loss concepts, implication of use of judgement in ratings process, as well as validation of internal ratings increasingly important.

The specific characteristics of internal rating system architecture and operation differ substantially across banks in terms of aspects such as the number of grades, the risk associated with each grade, as well as decisions about who assigns ratings and about the manner in which rating assignments are reviewed (Treacy and Carey, 2000:179).

To a considerable extent, such variations across banks are an example of form following function. For example, a bank that uses ratings mainly to identify deteriorating or problem loans to ensure proper monitoring may find that a rating scale with relatively few grades is adequate. In contrast, if ratings are used in computing internal profitability measures, a scale with a relatively large number of grades may be required to achieve fine distinctions of credit risk. However, regardless of the specific application of risk rating systems, all banks need to adhere to certain “sound practice” guidelines.

As explained in chapter 2, banks are becoming increasingly quantitative in their treatment of credit risk. The use of internal risk ratings and portfolio credit risk models play an integral role in this regard. Furthermore, there is an important relationship between internal credit ratings and credit risk models. Internal ratings are a proxy for default probabilities of individual borrowers and as such they are critical inputs in portfolio credit risk models.

The initial interest in credit risk models stemmed from the desire to develop more rigorous quantitative estimates of the amount of economic capital needed to support a bank’s risk-taking activities. The common purpose of credit risk models is to forecast the probability distribution function of losses that may arise from a bank’s credit portfolio. Credit risk models are designed to quantify credit risk on a portfolio basis, and thus have application in control of risk concentration, and more active management of credit portfolios (JP Morgan 1997:8). Also, models enable banks to allow for the effects of portfolio diversification and of trading of credit risks or hedging by means of credit derivatives.

The quantification that a model entails implies a greater awareness and transparency of risks within a bank. More precise and concise risk information will enhance internal communication, decision-making, and subsequent control of credit risk. The primary benefit, however, is that modeling efforts to date have furthered management’s understanding of the nature of credit risk inherent in their organization.

As summarized by the Federal Reserve System Task Force on Internal Credit Risk Models (1998:12) and the Basel Committee on Banking Supervision (1999b:33), there exist a wide variety of credit risk models that differ in their fundamental assumptions, such as their definitions of credit losses; i.e., default models define credit losses as loan defaults, while mark-to-market or multi-state models define credit losses as ratings migrations of any magnitude.

From a regulatory perspective, the flexibility of models in responding to changes in the economic environment and innovations in financial products holds significant appeal. As discussed in chapter 2, a models-based approach may also bring capital requirements into closer alignment with the perceived riskiness of underlying assets, and may produce estimates of credit risk that better reflect the composition of each bank's portfolio. The Basel Committee on Banking Supervision considered using credit risk models for the purpose of setting regulatory capital requirements.

However, at this time, significant hurdles, principally concerning data limitations and weaknesses in model validation, still need to be cleared before regulators can be confident that models are conceptually sound, empirically validated and produce capital requirements that are comparable across institutions. Credit risk models come with substantial statistical and conceptual difficulties (Basel Committee 1999b:51). The difficulties in the estimation of key parameters are exacerbated by the long time horizons used in credit risk models, which suggest that many years of data, spanning multiple credit cycles, may be needed to estimate the process of default. This has led the Basel Committee (1999b:54) to conclude that credit risk models cannot be adapted in regulatory applications in the near future.

This chapter gives an overview of the basic concepts underlying both internal risk ratings and credit risk models. The first part of the chapter deals with internal risk ratings. The chapter starts with a definition of internal risk ratings. This is followed by a review of the administration process for assigning and monitoring internal risk ratings. Key issues in the operating design of ratings systems, including sound practices in this regard, is then discussed. Balancing the use of subjective judgement on the one hand, and quantitative methods on the other hand, is one of the key issues in this regard.

The second part of the chapter provides an overview of the conceptual and practical issues regarding portfolio credit risk models. This includes the conceptual approaches to credit risk modeling, as well as issues regarding parameter specification. This is followed by an overview of some of the publicly available credit risk models, including the advantages and disadvantages of each of these models. The application of internal risk ratings and credit risk models to credit risk analysis and management is also discussed. This is followed by a discussion of the validation of internal credit risk measurement methods, in the context of both internal risk ratings and credit risk models. This is followed by a discussion of the conceptual and statistical difficulties in calibrating credit risk models.

The chapter concludes with the implications of these weaknesses for the application of credit risk models in credit risk measurement and management.

3.2 INTERNAL CREDIT RISK RATINGS

3.2.1 Definition of credit ratings systems

Rating systems have long been a critical “traditional” element of evaluating risk and maintaining internal credit discipline (Crouhy, Galai and Mark 2001:48). A rating system comprises all of the elements that play a role in the process of estimating and employing risk ratings, including the conceptual measure of loss underpinning the system, the methodology for evaluating the risk of an exposure, the responsibilities of key personnel, and the internal uses of rating information (Basel Committee 2000c:9). Chart 3.1 provides a summary of the risk rating process.

Chart 3.1

Uses of Ratings

Assignment of Ratings

Factors Considered In Rating
Financial Analysis
Industry Analysis
Quality of Financial Data
External Ratings
Analytical Tools/Models
Firm Size/Value
Management
Terms of Facility/LGD
Other Considerations

Ratings Criteria
Written/formal Elements
Subjective/ Informal Elements (Cultural)
Rater's Own Experience and Judgement

Preliminary Rating Proposed For Loan Approval Process
Relationship Manager and/or Credit Staff

Approval Process (Per Policy) Assigns Final Rating

Risk Rating

Risk Rating Processes

Quantitative Loss Characteristics	<ul style="list-style-type: none"> Portfolio Monitoring Loan Loss Reserve Analysis Loan/Business Line Pricing and Profitability Analysis Internal Capital Allocation Return on Capital Analysis
General Credit Quality Characteristics	<ul style="list-style-type: none"> Assessing Attractiveness of Customer Relationship Evaluation of Rater Effectiveness Administrative and Monitoring Requirements Frequency of Loan Review

Line/Credit Review

Watch Processes

Loan Review

<p>Ongoing review by Initial Rater</p> <p>Periodic review of each customer relationship</p> <p>Aimed at reviewing profitability/desirability as well as condition</p> <p>Generally conducted by same authorities that approve loans</p>

<p>Quarterly process focused on loans that exhibit current or prospective problems only</p> <p>Aimed at identifying best path to improve or exit credit at lowest cost</p> <p>Conducted by same authorities that approve loans, although others may participate as well (i.e., workout group)</p>

<p>Review of adequacy of underwriting and monitoring from random sample</p> <p>Sample weighted toward higher-risk loans</p> <p>Loan Review judgement is "final say"</p> <p>Negative consequences for initial rater if consistent disagreements</p>

Review Processes

Chart from Treacy, W and Carey, M (2000)
 "Credit Risk Rating at Large U.S. Banks,"
Journal of Banking and Finance. January.
 P. 170

As discussed in chapter 2, banks are upgrading their credit risk measurement and management systems. In the risk ratings context, this implies upgrading systems beyond traditional limits to enhance the rigor and objectivity of the rating analysis, to distinguish more finely among degrees of riskiness, and to move in the direction of better measurement and quantification of risk.

Internal ratings are a key summary indicator of the risk inherent in an individual credit. Ratings typically embody an assessment of the risk of loss due to the default of a counterparty, based on considerations of relevant quantitative and qualitative information (Carey and Hrycay 2001:198). Credit risk ratings are designed to reflect the quality of a loan or other credit exposure, and thus explicitly or implicitly, the loss characteristics of that loan or exposure.

Exposures in each internal grade are typically treated as having specific and measurable loss characteristics. Although approaches may vary, in general, these characteristics are (Basel Committee 2000c:9):

- The borrower's probability of default (PD); the probability that the counterparty or borrower will fail to service its obligations.
- The facility's loss given default, (LGD); the extent of the loss incurred in the event the borrower or counterparty defaults.
- The level of exposure at the time of default (EAD).
- The credit's expected loss (EL), which is a function of the above three variables.
- The unexpected loss (UL) associated with these.
- Migration risk, the probability and value impact of changes in default probability (reflected in a credit rating migration or a change in creditworthiness) over the planning horizon.
- The expected default frequency (EDF) can be interpreted as representing a loan's probability of migrating from its current internal rating grade to another credit rating, including default within a specific time period.

In the case of calculating portfolio risk, default correlations, the degree to which the default risks of the borrowers and counterparties in the portfolio are related, must also be considered. Estimation of credit risk in the portfolio context was discussed in section 2.3. Methods typically employed to estimate the above-mentioned loss concepts, as well as conceptual and

practical difficulties in this regard, was discussed in chapter 2.

Several methodological approaches can be utilized to arrive at a credit rating for a customer or facility, containing one or more of the following three elements: (1) the traditional “spreading of numbers” in which financial and other characteristics of the customer (e.g. country and business sector code) are incorporated into a relatively subjective approach to determining grades; (2) the use of vendor-supplied commercial credit scoring models; or (3) the use of internally developed credit scoring models (Basel Committee 2000c:17). Methods for estimating credit ratings are discussed in section 3.2.4.

3.2.2 Quantification of loss concepts

3.2.2.1 Data limitations

The availability and quality of loss data have emerged as a significant issue in measuring credit risk and estimating the above-mentioned loss concepts (Mark and Crouhy 2001:3). Obtaining robust information about rates of loss after a default event is one of the most intractable problems that many banks face in improving their credit risk management calculations. This is true despite the widely-held perception outside the banking industry that banks have excellent records of the amounts lost in any particular incidence of default. Surveys and other information suggest that even sophisticated banks in the Group of Ten countries often do not have reliable, empirically based LGD (loss given default) or EAD (exposure at default) data (Treacy 2001:2).

There is a clear consensus that banks need to enhance their data-collection efforts on their historical loss experiences by internal rating grades and other loss characteristics. In particular, banks should move to develop and warehouse their own historical loss experience data by borrower/facility grade, collateral type, and other key characteristics.

At a minimum, information on the performance of individual loans and their rating histories is required. Because rating criteria have changed over time at most large institutions,

information about borrower and loan characteristics is also required in order to assess the risk implications of different rating criteria. Historically, banks have retained performance data by loan type or by line of business in the aggregate, but not by risk grade. Furthermore, even at banks that have tracked performance by grade, mergers often cause upheaval in rating processes and data systems. This in particular, contributes to the loss or obsolescence of historical data (Mark and Crouhy 2001:2). Data limitations remain one of the biggest challenges in the implementation of the internal ratings based (IRB) approach to the determination of regulatory capital requirements, as proposed under the new Basel Accord (see also sections 5.6.1.2 and 5.6.1.7).

Thus, the obvious actuarial approach, computing long-run average default rates from the historical experience of borrowers in each internal grade, is not feasible in most cases. Consequently, other kinds of information must be used to proxy changes in value or credit standing. In this regard, most banks rely on indirect risk measures. This includes mapping to external data and the use of credit scoring models.

3.2.2.2 Mapping ratings to external data and problems caused by inconsistent architectures

Most institutions use one of two methods that are based on external data. The most popular such method involves mapping each internal grade to a grade on an external rating agency, such as Moody's or S&P scale (Treacy and Carey 2000:181). The long-run average default rate for the mapped agency grade is then used to quantify the internal grade. The popularity of the mapping method is popular due to its apparent simplicity, and because agency grades are familiar to most market participants. Furthermore, Moody's and S&P maintain databases with long histories of default experience for publicly issued bonds and regularly publish tables of historical average default rates, indicating that there is a strong negative correlation between credit ratings and default rates.

A key consideration in relying on such external data is the comparability of such data to a bank's own portfolio. This is an issue for a number of reasons, including differences in the composition of the bank's portfolio, and potential differences between the performance of

publicly traded bonds and that of loans and discrepancies between point-in-time and through-the-cycle ratings.

Most banks rate a borrower according to its current condition at the point in time the rating is assigned, whereas the agencies estimate a downside or stress scenario for the borrower and assign their ratings based on the borrower'

s projected

occurs (a "through-the-cycle" method) (Treacy and Carey 2000:185).

The difference in rating methods is likely to persist because the agencies' method is expensive to apply to many bank loans and because banks use internal ratings to guide the intensity of loan monitoring activity, which implies a continuing need for a point-in-time architecture.

The difference in rating philosophy potentially causes internal and agency grades to have different cyclical and other properties. Carey and Hrycay (2001:259) find evidence of through-the-cycle vs point-in-time instability that can materially affect the quality of mapping-based estimated default probabilities across the credit quality spectrum.

Furthermore, there are very important definitional issues in the measurement area that can seriously affect the value of historical loss and default information. In particular, banks need to demonstrate that PD and LGD data are calibrated as closely as possible to the same definition of what comprises a default event. Use of rating agency results to quantify the probability of default implicitly means that the bank is applying the agencies' definition of a default event. Similar issues arise in the context of the definition of loss (Mark and Crouhy 2001:3).

Ratings are usually recorded on an ordinal scale and thus are not directly usable measures of default probability. Thus, a crucial step in implementing portfolio credit risk models or capital allocation systems is estimation of the (natural) probability of default for counterparties assigned to each grade (Carey and Hrycay 2001:199).

Thus, to use rating agency data, a bank must develop or assume some correspondence between agency ratings and its own internal grades. Interviews suggest that the basis of such

mappings is threefold: (1) the internal grades assigned to borrowers who have also issued publicly rated bonds; (2) analysis of the “typical” financial characteristics of bank borrowers in each internal grade vis-à-vis the characteristics of the firms with bonds in each agency grade; and (3) subjective analysis.

3.2.2.3 Credit scoring models

Commercial credit scoring models are the basis for the second commonly used method of quantifying ratings. Scoring models produce estimated default probabilities (or other risk measures) for individual borrowers, typically using borrower financial ratios and other characteristics as predictors (Carey and Hrycay 2001:200).

As mentioned in chapter two, Altman and Saunders (1998:1724 -1731) provide a detailed survey of credit risk measurement approaches. They compare four methodologies for credit scoring: (1) the linear probability models, (2) the logit model, (3) the probit model, and (4) the discriminant analysis model.

The logit model assumes that the default probability is logistically distributed, and uses a few accounting variables to predict the default probability. The linear probability model is based on a linear regression model, and makes use of a number of accounting variables to try to predict the probability of default. The multiple discriminant analysis (MDA), proposed and advocated by Altman is based on finding a linear function of both accounting and market-based variables that best discriminates between two groups (firms that actually defaulted, and firms that did not default). It relies on a well-defined set of criteria, each of which is scored separately. The individual scores relating to the set of criteria are weighted and then added up, yielding the overall score. This score is translated in one of the rating classes. A well-known example is the z-score proposed by Edward Altman in 1977 (Altman and Saunders 1998:1726). Altman regressed historical default experience on a set of accounting variables (mostly balance sheet and P&L) in order to determine an optimal separating function between issuers that defaulted later on and those that survived. The weights of the estimated function are then used to predict default probability for an individual firm, called the z-score. This z-score may again be translated into a rating class.

Altman's procedures are reasonably good at discriminating between these types of firms, and can therefore be used to fine-tune predicted failure probabilities. However, they are not well suited to predict the failure rates of highly rated firms. Accordingly, the use of such methods should be limited to credit evaluation procedures on firms with lower credit ratings or no credit ratings at all (Carey and Hrycay 2001:201).

In spite of their popularity, the properties of mapping- and scoring model-based methods of rating quantification are not well understood. The empirical evidence of Carey and Hrycay (2001:265) implies that, while mapping- and scoring-model methods are each capable of delivering reasonably accurate estimates, apparently minor variations in method can cause material differences in results.

Their analysis identifies three potential sources of measurement errors, namely biasedness, stability, and gaming. Two kinds of biasedness specific to rating quantification may affect both mapping- and scoring model-based quantifications. A "noisy rating assignments bias" arises as a by-product of the bucketing process inherent in rating assignment. Using estimated individual borrower default probabilities to place borrowers in rating buckets tends to create a variant of selection bias, concentrating negative rating assignment probability errors in the safe grades and positive errors in the risky grades. When noise in rating assignment probabilities and rating quantification probabilities is correlated, actual default rates are likely to be higher than estimated by the method of quantification for the safe grades and lower than estimated for the risky grades.

An "informativeness" bias arises when the method of quantification produces individual borrower default probability estimates that do not perfectly distinguish relatively safe or risky borrowers from the average borrower (Carey and Hrycay 2001:200). Where such individual borrower probabilities are biased toward the portfolio mean probability, informativeness bias tends to make actual default rates smaller than estimated for the safe grades and larger than estimated for the risky grades. Thus, in many cases, noisy rating assignment bias and informativeness bias tend to offset each other.

Stability refers to the accuracy of ratings across time and borrowers (Krahn and Weber

2001:4). Quantifications are unstable if their accuracy depends materially on the point in time at which a mapping is done, on the sample period over which scoring-model parameters are estimated, or if scoring model- or mapping-based estimates of default probabilities are unreliable out-of-sample.

Gaming refers to deliberate distortions of ratings in order to make others believe the portfolio is less risky than is actually the case (Carey and Hrycay 2001:201). A bank might also game quantifications by altering its portfolio investment strategies to exploit limitations in the information set used by the quantification method. For example, investments might be focused in relatively high-risk loans that a scoring model fails to identify as high-risk, leading to an increase in actual portfolio risk but no increase in the bank's estimated capital allocations.

Carey and Hrycay (2001: 207) present evidence that such gaming can be material, raising actual default rates relative to estimates by a factor of two or more for each internal grade. However, gaming of median-based mappings appears to be controllable at relatively modest cost with appropriate monitoring.

Some of these issues regarding rating quantification are most applicable to credit risk measurement for commercial loan and other private debt portfolios. For speciality portfolios or portfolios of small consumer or business loans, the mapping method may be inappropriate because such loans may behave differently than large corporate loans. For rated bond portfolios, quantification is easier because the agencies' actuarial estimates of default probabilities by grade may be used. For portfolios of actively traded instruments, methods of credit risk analysis that extract information from spreads are appealing. However, satisfactory data is generally not available to support such methods even for portfolios of straight public debt, and moreover most bank counterparties are private firms (Crouhy, Galia and Mark 2001: 165).

The results of these empirical studies imply that parameterization of credit risk models using internal rating data involves many potential pitfalls. However, these risks are controllable by careful analysis and management. With attention to problems of bias, stability and gaming and with more research, reasonably good estimates of average default probabilities by grade

appear feasible (Carey and Hrycay 2001:260).

The following section describes the processes that are generally used to arrive at internal credit risk ratings, including the risk factors considered in assigning risk ratings.

3.2.3 The administration process for assigning and monitoring ratings

3.2.3.1 Obligor ratings (OR) and facility ratings (FR)

Banks may rely on either a one-dimensional rating system in which ratings are assigned to facilities, or a two dimensional system in which different elements of a transaction 's risk are graded separately (Krahn and Weber 2001:4). In a two-dimensional rating system, the riskiness of the borrowing entity (essentially default risk) is distinguished from the risks associated with a particular transaction or structure (more oriented to loss in event of default). The underlying counterparty could receive an overall borrower grade reflecting its risk of defaulting on any of its obligations, while each loan to a counterparty would receive a facility grade based on a combination of borrower and transaction characteristics (Mark and Crouhy 2001:4).

Thus, in two-dimensional systems, one grade (obligor rating, the borrower's general creditworthiness) typically reflects PD. The other grade reflects LGD (facility rating, the risk posed by individual exposures). These two measures can then be combined to form an indication of expected loss (EL) (Basel Committee 2000c:21). Banks with such systems usually first determine the borrower's grade (its PD) and then adjust the facility grade according to the structure of the facility. Assigning both a borrower and facility rating, requiring explicit analysis of both the loan's obligor and how the structure and terms of the particular loan being evaluated (i.e., collateral or guarantees) might strengthen or weaken the quality of the loan (Treacy and Carey 2001:2).

In this way, a two-dimensional system can promote precision and consistency in grading by separately recording a rater's judgments about PD and LGD rather than mixing them

together. In documenting their credit administration procedures, institutions should clearly identify whether risk ratings reflect the risk of the borrower or the risk of the specific transaction.

In contrast, with one-dimensional rating systems, ratings are assigned to facilities. Such facility ratings represent the expected loss of principal and/or interest on a credit facility. It combines the likelihood of default by a borrower and the conditional severity of loss, should default occur, from the credit facilities available to that borrower. In such systems, ratings approximate EL.

Thus, such single-grade systems might be characterized as having an ambiguous or mixed conceptual basis rather than as clearly measuring either PD or LGD. An ambiguous basis may pose no problems when ratings are used mainly for administrative and reporting purposes and when the nature of the bank's business is fairly stable over time. However, a clear conceptual foundation becomes more important as quantitative models of portfolio risk and profitability are used more heavily and during periods of rapid change. The Basel Committee requires that banks use a two-dimensional rating system in order to qualify for the IRB approach (see sections 5.4.1 and 5.6.1.4.)

3.2.3.2 Risk factors considered in the assigning of internal ratings

In the most general terms, "all relevant information" should be considered in assigning an internal credit rating. The rating should reflect the financial position and performance of the borrower and its ability to withstand possibly unexpected financial setbacks.

In the case of a corporate borrower, risk factors include the borrower's financial condition, size, industry, and position within the industry, the reliability of the borrower's financial statements and the quality of its management, elements of transaction structure (for example, collateral) and other miscellaneous factors.

The manner in which risk factors are considered in arriving at an overall borrower or facility/LGD grade determine how informative and reliable the rating is in describing the risk

of loss associated with a borrower or exposure. The issues arising in these areas are closely related to good underwriting practices more generally (Board of Governors of the Federal Reserve 1998:4).

From the above, it is clear that several qualitative as well as quantitative factors are considered in arriving at ratings (Treacy and Carey 2001:2). A criterion can be defined as quantitative, if its evaluation is based on published accounting data, as for instance cash flows, earnings, debt-equity ratio, short-term and long-term debt, and so forth. These criteria are typically backward looking. On the other hand, a criterion can be defined to be qualitative if its evaluation is based partly or entirely on non-published or subjective attributions; it is typically forward-looking. Examples comprise the general prospects of an industry, sales forecasts, liquidity planning, marketing strength and, most importantly, management quality and continuity, and the general evaluation of the customer relationship (Brunner, Krahnert and Weber 2000:7). The latter class is more subjective in nature, leaving judgmental discretion to the person in charge of the rating process. It comprises assessments of the present and future trends of the industry and the company itself. Most importantly, this class also includes evaluations of the management of the company being assessed. Typically, the information used here is “soft” and forward-looking (Brunner, Krahnert and Weber 2000:6).

Most banks formally consider both firm size (sales revenue or total assets) and the book or market dollar value of a firm’s equity in assigning ratings. Small firms usually have limited access to external finance and often have few or no assets that can be sold in an emergency without disrupting operations. In contrast, larger firms were characterized as having more ready access to alternative financing, more saleable assets, and a more firmly established market presence. For these reasons, many banks require that small borrowers be assigned relatively risky grades even if their financial characteristics might suggest a more favorable rating (Crouhy, Galai and Mark 2001:75).

The following steps might be involved in creating an obligor rating in a best-practice risk ratings system (Crouhy, Galai and Mark 2001:67-80, Treacy and Carey 2001:2-3 and Basel Committee 2000c:19-20):

Step 1: Financial assessment of borrower (initial obligor rating)

Financial statement analysis is central to appraising the likely adequacy of future cash flows and thus the ability of the borrower to service its debt. The focus of analysis is on the borrower's debt service capacity, taking account of its free cash flow, the liquidity of its balance sheet, and the firm's access to sources of finance other than the bank. Historical (and to a lesser extent, projected) earnings, operating cash flow, interest coverage, and leverage are typically analyzed. Exact definitions of financial ratios used in the analysis vary across banks and, in some cases, across borrowers or loan types. It might typically involve:

- earnings and cashflow ratios such as earnings before interest and tax/interest expense and earnings before interest, tax, depreciation and amortization/interest expense;
- leverage ratios such as current assets/current liabilities, and debt-to-net-worth ratios such as total liability/equity, or total liabilities and short-term debt versus equity; and
- various measures of financial size, financial flexibility and debt capacity.

The analysis yields an assessment of the difference between current or projected performance and liquidity on the one hand and projected debt service obligations on the other. The larger the cushion, in general, the more favorable the rating.

Step 2: Management capacity

Almost all internal rating systems cite the borrower's management as an important consideration in assigning the risk grade. Such assessments are necessarily subjective and may reveal weaknesses in a number of areas related to competence, experience, integrity, or succession plans. Vulnerability of management to the retirement or departure of key individuals is usually considered. Some institutions (similar to the ratings agencies) appear to give considerable weight to the appraisal of management's ability and willingness to manage the firm to achieve a high level of financial performance throughout the business cycle and to its attitude toward protecting the interests of lenders.

Step 3: Borrower

□s' absolute and relative position within i

As a context for financial statement analysis, the characteristics of a borrower's industry are often considered (such as cyclicity, general volatility, and trends in cash flow and profitability). Indeed, the financial analysis often includes a formal comparison of the

borrower's financial ratios to prevailing industry norms. Firms in declining industries are considered more risky, as are those in highly competitive industries, whereas firms with diversified lines of business are viewed as less risky. A related factor, the borrower's position in its industry, is also an important factor in determining ratings. Those borrowers with substantial market power or that are perceived to be "market leaders" in other respects are considered less risky because they are thought to be less vulnerable to competitive pressure.

The analysis of the competitive position and operating environment of a firm helps in assessing its general business risk profile. This leads to the calibration of the quantitative information drawn from the financial ratios for the firm, using industry benchmarks.

Step 4: Review of quality financial information

The bank must always be fully satisfied as to the quality, adequacy and reliability of the financial statement information. This include consideration of the size and capabilities of the accounting firm, compared to the size and complexities of the borrower and its financial statements.

Step 5: Review of country risk

The borrower's country of domicile or operations is an important determinant of the rating in some cases. Especially when transfer risk or political risk is substantial, general practice seems to be to employ a "sovereign ceiling" rule (where the rating of the counterparty cannot exceed the rating of the sovereign in which it is incorporated or has its principal place of business). Ratings may also be influenced by exposure to event risks, such as litigation, environmental liability, or changes in law or national policy.

As part of a distinct process, additional steps can then be followed to rate a specific credit facility. For example, the bank might examine third-party support, look at the maturity of a particular transaction, review how strongly the transaction is structured or assess the amount and type of collateral.

When facility characteristics are considered, most banks allow guarantees to affect the rating

by effectively transferring the risk to the guarantor. Alternatively, the more favorable of the borrower or guarantor rating is used. The quality and depth of security vary widely and will determine the extent of the benefit in reducing any loss. Considerable care and caution are necessary if ratings are to be improved because of the presence of a guarantor. In all cases, one must be convinced that the third party/owner is committed to ongoing support of the obligor. Collateral is generally also considered as an input in reducing the severity of the loss and thus in improving facility ratings, although in a few cases it reduces the exposure rather than altering the rating.

Applying all the steps to each rating in a consistent manner can help ensure that all credits are objectively rated using a consistent process and help eliminate some of the measurement errors described in section 3.2.2.3.

The requirements banks should meet in order to qualify for the IRB approach include a list of factors that banks should consider in assigning a rating grade (see section 5.4.1.). Factors considered by South African banks in this regard is discussed in section 5.6.1.4.

3.2.4 Methodological approaches to calculating internal risk ratings

From the above, it is clear that both quantitative and qualitative factors are considered in the rating process. In this regard, the Basel Committee (2000c:17-19) identified three main categories of rating processes: statistical-based processes, constrained expert judgement-based processes, and expert judgement-based processes. These categories can be viewed as different points along a continuum defined by the degree of reliance on quantitative techniques (such as scoring models), on the one hand, and reliance on the personal experience and expertise of loan and credit officers, on the other hand. Progressing along this continuum, different risk factors may be considered and different supporting controls and processes appear to be required to maintain the integrity of ratings.

The distinction between qualitative and quantitative risk factors, and their importance in each of these three categories, is not clear-cut in practice, suggesting different perceptions of what represents a qualitative versus quantitative factor. For example, a survey by the Basel

Committee (2000c:18) showed that factors which banks identified as “qualitative” were often in fact measurable quantities, e.g., payment history, management age/experience, industry sector, or geographic location.

Other reasons why distinctions between these three categories may be less precise, include the following (Treacy and Carey 2000:173): Even in systems in which models drive the assignment of ratings, personal experience plays a role, for example, in the ability of credit assessment or loan review officers to override the assigned ratings. Moreover, personal expertise was presumably a factor in developing and implementing these models, and in constructing their inputs. It also appears that banks often use a different mix of these techniques in different market segments (for example, corporate versus retail).

3.2.4.1 Statistical-based processes

A statistical-based process involves the use of a default probability model or another quantitative tool as essentially the sole basis for determining a rating for counterparties/exposures within certain portfolios. Such models may be developed internally or by vendors, and typically include both quantitative (for example, financial ratios) and some qualitative but standardised (for example, industry, payment history/credit report) factors (Treacy and Carey 2000:170).

Three types of statistical analyses are used in practice: logistic regression, discriminant analysis and neural networks. Logistic regression is used for a binary random variable (good credit/bad credit) and is used to determine the relationship between independent input variables (financial ratios) and the resulting credit state. This type of regression analysis allows for a nonlinear relationship between the input variables and the resulting credit state (Prybylski 2000:75). As the input values reach extreme values, the probability of bad credits increases in a nonlinear fashion. Discriminant analysis is a second regression approach that assumes that the regressors are normally distributed and like a logistic regression the output of the analysis is two states (good/bad credit). Finally, neural networks are artificial intelligence systems that are designed to mimic human thought and learning. Neural networks are applied to credit risk modeling by creating an algorithm using credit inputs as variables

that are weighted through a learning process and used to determine the output, that is, whether the counterpart is a good or bad credit. (Prybylski 2000:75).

An example of discriminant analysis is the use of credit scoring models (including “scorecards”, default models, and vendor or consultant models such as those used by KMV CreditMonitorTM) (Brunner, Krahn and Webber 2000:8). The use of credit scoring models were discussed in more detail in chapter 2. To construct such a model, a bank first identifies the financial variables that appear to provide information about probability of default. Using historical data, the bank estimates the influence of each of these variables on the incidence of default across a sample of loans. These estimated coefficients are then applied to data for current loans to arrive at a score that is indicative of the probability of default; the score is then converted into a rating grade. In general, it appears that the statistically-based approaches have a more prominent role in small corporate lending than for middle market or large corporates.

A key limitation of statistical models is that they analyze fixed sets of ratios and apply fixed weights to each indicator, whereas the appropriate approach to financial analysis depends on the borrower’s particulars. Moreover, banks appear to have limited data and techniques available to estimate loss characteristics. Consequently, judgmental factors often play a considerable role, even in “objective” methods (Brunner, Krahn and Webber 2000:10).

3.2.4.2 Constrained expert judgement-based processes

In contrast to a purely mechanical process, ratings are based primarily on statistical default/credit scoring models or specified objective financial analysis, but adjusting that rating to an explicitly limited degree based on judgmental factors is allowed. In one variant of this approach, a scorecard determines the grade but the final grade may be adjusted up or down by no more than one or two gradations based on judgement. In another variant, quantitative and judgmental factors are explicitly assigned a maximum number of “points”, thereby effectively limiting the influence of judgmental considerations on the final rating (English and Nelson 1998:13) .

3.2.4.3 Processes based on expert judgement

Ratings are assigned using considerable judgmental elements, where the relative importance given to such elements is not formally constrained. Nonetheless, the relative role of statistical models varied widely even across institutions using judgement-based methods. A few banks reported that they use no statistical models at all, while several others reported that such statistical models provide a “baseline” rating that can be overridden by raters. Still others reported that tools were only one consideration among many in assigning grades. In all cases based on unconstrained expert judgement, however, the person who assigns the rating has discretion to significantly deviate from statistical model indications in assigning a grade.

3.2.5 The operating design of rating systems

As mentioned, a consistent and meaningful internal risk rating system is a useful means of differentiating the degree of credit risk in loans and other sources of credit exposure. This consistency and meaning is rooted in the design of the risk grading system itself.

3.2.5.1 Structure of the rating system

A strong rating system begins with its structure, and how well it is designed to differentiate among the degrees of risk in a bank’s portfolio. The most obvious structural characteristic of a strong system is the number of grades, which, simply put, represents how hard a rating system is working to distinguish risk.

The Basel Committee (2001a:16) suggests that “qualifying risk rating systems must have a minimum of six to nine grades for performing borrowers and a minimum of two grades for non-performing borrowers”. The number of grades on internal scales varies considerably across banks. The typical large bank in the U.S. uses four or five “pass” grades. The “best” of these rating systems use 20 or more grades, including “+/-” modifiers (like those used by the ratings agencies) (see also sections 5.4.1. and 5.6.1.4).

Internal rating systems with larger numbers of grades are more costly to operate because of the extra work required to distinguish finer degrees of risk. Banks making heavy use of ratings in analytical activities are most likely to choose to bear these costs because fine distinctions are especially valuable in such activities. The proportion of grades used to distinguish among relatively low risk credits versus the proportion used to distinguish among the riskier pass credits tends to differ with the business mix of the bank.

Many current rating systems include grades intended solely to capture credits needing heightened administrative attention, such as so-called “watch” grades. Such systems contribute little or nothing to evaluate the bulk of loans in the portfolio, that is, loans for which no specific difficulties are present or foreseen. In some cases these institutions might also establish one or two risk grades for loans having very little perceived risk, such as those collateralized by cash or liquid securities or those to “blue-chip” private firms. The consequence of such systems is that the bulk of the loan portfolio falls into one or two remaining broad risk grades, representing “pass” loans that are neither extremely low-risk nor that are current or emerging problem credits, even though such grades may encompass many different levels of underlying credit risk (Treacy and Carey 2001:3).

The rating scale chosen should meaningfully distinguish gradations of risk within the institution’s portfolio, so that there is a clear linkage to loan quality (and/or loss characteristics), rather than just to levels of administrative attention. To do so, the rating system should be designed to address the range of risks typically encountered in the underlying businesses of the institutions (Prybylski 2000:74). One reflection of this degree of meaning is that there should be a fairly wide distribution of portfolio exposure across grades, unless the portfolio is genuinely homogenous. In this regard, regulatory requirements specify a “meaningful distribution of exposure across grades” and that each grade does not exceed a specified gross percentage of credit exposure (Mark and Crouhy 2001:4).

In choosing the architecture of its rating system, a bank must first consider the appropriate mix between objective and subjective methods. In this regard, the bank must balance the use of statistical-based methods to generate accurate and consistent ratings, yet also to allow professional judgment to significantly influence a rating where this is appropriate (Treacy and Carey 2000:173). Sound practices in this regard is discussed in section 3.2.6.

Furthermore, the bank must decide which loss concepts to employ, the number and meaning of grades on the rating scale corresponding to each loss concept, and whether to include “watch” and “regulatory” grades on such scales. In principle, banks must also decide whether to grade borrowers according to their current condition or their expected condition under stress. In a point-in-time process, an internal rating reflects an assessment of the borrower’s current condition and/or most likely future condition over the course of the chosen time horizon. As such, the internal rating changes as the borrower’s condition changes over the course of the credit/business cycle. Consequently, this method results in more frequent down grades of loans as they increase in default risk (Prybylski 2000:74).

In contrast, a “through-the-cycle” process requires assessment of the borrower’s riskiness based on a worst-case, “bottom of the cycle scenario”, i.e., its condition under stress. In this case, a borrower’s rating would tend to stay the same over the course of the credit/business cycle (Treacy and Carey 2000:182).

In deciding on those various aspects, bank management must weigh numerous considerations, including cost, efficiency of information gathering, consistency of ratings produced, staff incentives, the nature of the bank’s business, and the uses to be made of internal ratings. For example, a bank that uses ratings mainly to identify deteriorating or problem loans to ensure proper monitoring may find that a rating scale with relatively few grades is adequate. In contrast, if ratings are used in computing internal profitability measures, a scale with a relatively large number of grades may be required to achieve fine distinctions of credit risk. In addition to the extent to which the bank uses quantitative systems for credit risk management and profitability analysis, the bank’s mix of large and smaller borrowers appear to be the primary determinants of bank rating system architecture.

Banks with a substantial large corporate market presence are likely to benefit from a rating system that achieves fine distinctions among relatively low-risk credits, while other banks may find significantly less value in such distinctions. In addition, an independent credit staff is often solely responsible for rating large loans. Such an arrangement can greatly reduce potential incentive conflicts, but may involve per-loan costs that are too large to be economically viable for smaller loans, which are often rated by relationship managers.

Smaller loans also pose less risk to bank earnings and capital, and thus grading errors and biases may be more tolerable.

Other reasons why different banks may adopt differing approaches to rating systems, include the following (Basel Committee 2000c:3):

- Differing views on the appropriate degree of reliance on quantitative (i.e., measurable) as opposed to qualitative (i.e., difficult to measure) risk factors.
- The importance of each institution's individual credit culture and historical experience, in light of the close connection between rating systems and credit risk management processes more broadly.
- Differing judgements regarding the complexity and opaqueness of the risks associated with each transaction.
- Differing responses to the inherent difficulties associated with quantifying loss characteristics.

Thus, it is to be expected that internal rating systems are diverse in both conceptual make-up and practical working. Indeed, a survey by the Basel Committee (2000c:4) found substantial differences between the rating systems of different banks, including the following :

- The loss concept underpinning the rating differs across models and banks. Ratings often reflect counterparty default probability and/or expected loss on facilities. In some cases, however, ratings merely constitute an ordinal ranking of the bank's exposures each other.
- The horizon for assessing the credit quality of counterparty/exposures varies.
- The rating system may be calibrated on long-term average default/loss measures (so-called "central tendency" or "through the cycle" approaches) or assess the point-in-time quality of issuers/exposures.
- The methodologies used to arrive at a rating are themselves diverse. As discussed in section 3.3.1.1.1. some models directly infer a default probability from market indicators (spread or equity-based models), others rely on the statistical analysis of financial indicators relative to the counterparty (score cards, neural networks). Furthermore, many institutions also include a qualitative assessment of management and contingencies, which can modify their initial quantitative analysis.
- Models differ in the way they incorporate the effect of contingent credit risk (for example,

country risk and credit risk mitigation).

The differences in internal risk rating systems go beyond pure mechanics and extend to their purpose and function. For example, the main function of a system in some banks is to identify deteriorating loans, whereas in others it is used to compute internal profitability measures. These differences in the application of risk ratings, imply that there is no one “correct” risk rating system. However, regardless of the conceptual make-up and application of a risk rating system, some “sound practice” guidelines must be adhered to (Basel Committee 2000c:5). For a discussion on the uses and applications of internal risk ratings in the South African context, see section 5.5.1.

3.2.6 Sound practices in the function and design of internal rating systems

3.2.6.1 The role of judgement in assigning risk ratings

Experience and judgment, as well as more objective elements, are critical both in making the credit decision and in assigning internal risk grades. On the one hand, it is a clear “best practice” for a bank to incorporate such default modeling into the rating assignment and review process, contributing consistency and discipline to the rating and, indeed, the underwriting process. On the other hand, many elements of the lending decision are difficult, if not impossible, to measure well (Treacy and Carey 2000:171).

When internal ratings are produced primarily by models, several models may be needed for different borrowers or loan types and continuous tuning of the models is likely to be required. There is a risk that over time, the importance of more subjective elements could tend to be overlooked in an unduly model-centered rating process.

A properly designed rating system will allow subjective judgment to be applied in a structured, more or less formal, manner. The ideal is thus that banks design the operational flow of the rating process in ways that are aimed at promoting the accuracy and consistency of ratings while not unduly restricting the exercise of judgment (Board of Governors of the

Federal Reserve 1998:5).

A study by Brunner, Krahn and Webber (2000:23) shows that qualitative factors have a significant impact on the overall rating in the rating systems analyzed. Qualitative and quantitative criteria are evaluated differently. The frequency distributions of qualitative and quantitative sub-ratings differ significantly. Qualitative criteria are systematically assessed more positively than quantitative criteria and show less dispersion across risk classes. The impact of qualitative sub-ratings on the overall rating, which is measured as the difference between the quantitative sub-rating and overall rating, is generally positive. The qualitative sub-ratings upgrade the overall rating compared to the quantitative rating in about one third of cases. In an average of 55% of cases the qualitative sub-rating does not cause a difference between a quantitative sub-rating and an overall rating. The distribution of the difference between the overall rating and the quantitative sub-rating shows asymmetry around its median zero. The frequency of rating adjustments caused by qualitative factors is higher in systems with fixed, pre-set weightings than in a system, where the weighting is intentionally left to the individual expert (Brunner, Krahn and Webber 2000:24).

Institutions should provide in their credit policies clear and explicit criteria for each risk grade as well as other guidance to promote consistency in assigning and reviewing grades. Criteria should be specified, even when addressing subjective or qualitative considerations, that allow for consistent assignment of risk grades to similarly risky transactions. Such criteria should include guidance both on the factors that should be considered in assigning a grade, and how these factors should be weighed in arriving at a final grade (Treacy and Carey 2000:3).

Such criteria can promote consistency in assessing the financial condition of the borrower and other objective indicators of the risk of the transaction. One vehicle for enhancing the degree of consistency and accuracy is the use of “guidance” or “target” financial ratios or other objective indicators of the borrower’s financial performance as a point of comparison when assigning grades. Banking organizations may also provide explicit linkages between internal grades and credit ratings issued by external parties as a reference point, for example, senior public debt ratings issued by one or more major ratings agencies. The use of default probability models, bankruptcy scoring, or other analytical tools can also be useful as

supporting analysis.

Other practices that can be helpful in refining the subjective judgments that are central to almost all rating systems, include that a bank with appropriate data describing its historical loss experience by internal grade and by different risk factors is better able to assess the predictive power of its ratings criteria and to estimate values of parameters needed for its analyses (such as grade-specific values of PD or EL). Internal ratings grounded in clear loss concepts are helpful in grade assignment and review because rating criteria can be clearly linked to different aspects of risk. For example, a system that has separate grades for default probability and loss in event of default can incorporate different effects for a wide variety of types of collateral (Treacy and Carey 2000:169).

3.2.6.2 Accuracy and consistency of internal ratings

Because ratings are typically applied to different types of loans, for example, both commercial real estate and commercial loans, it is important that each grade retains the same meaning to the institution (in terms of overall risk) across the exposure types. Such comparability allows management to treat loans in high-risk grades as a potential concentration of credit risk and to manage them accordingly. It also allows management and supervisors to monitor the overall degree of risk, and changes in the risk make-up, of the portfolio. Such consistency further permits risk grades to become a reliable input into portfolio credit risk models (Mark and Crouhy 2001:4). These systems should take proper account of gradations in risk and the overall composition of portfolios in originating new loans, assessing overall portfolio risks and concentrations.

Finally, institutions should track performance of grades over time to gauge migration, consistency, and default/loss characteristics to allow evaluation of how well risk grades are being assigned. Such tracking also allows for *ex post* analysis of the loss characteristics of loans in each risk grade. Such *ex post* analysis, one of the components of validation, is discussed in section 3.3.6.

3.2.6.3 Disclosure of rating practices

In many ways, the most difficult aspect of the rating decision is to weigh the various risk factors and arrive at an overall rating. Credit policies should describe in a meaningful way how various factors should be considered in coming to the overall rating decision.

The factors to be considered in a rating process need to be described in some detail (generally incorporated into credit policies) to ensure consistency, comparability, and thoroughness of rating decisions. For risk factors that are readily measured (for example, leverage or coverage), explicit quantitative target ratios or ranges should be described. If the factors are less measurable, such as management strength or market conditions for a borrower's product, verbal qualitative criteria should be clear and meaningful enough that an outsider with good credit background could understand and evaluate the assignment (Treacy and Carey 2000:3).

Without such clear internal criteria and standards, it is difficult to ensure that all relevant factors are properly considered in the overall rating process. Moreover, key internal control processes (for example, loan review) may find their effectiveness lessened or impaired if the standards by which these processes should dispute or criticize a rating decision are ambiguous or highly subjective (English and Nelson 1998:17).

3.2.6.4 Review functions

Sound practices also include regular formal review of each risk rating. Monitoring is intended to keep the rater well enough informed to recommend changes to the internal risk grade in a timely fashion as needed.

Reviews of ratings are threefold (Treacy and Carey 2000:199), namely: 1) monitoring by those who assign the initial rating of a transaction, 2) regularly scheduled reviews of ratings for groups of exposures, and 3) occasional reviews of a business unit's rating assignments by an independent loan review unit. Such independent reviews of individual ratings support the discipline of the rating assignments by allowing management to evaluate the performance of those individuals assigning and reviewing risk ratings. Such independent reviewers should,

themselves, reflect a level of experience and business judgment that is comparable to that of the line staff responsible for assigning and reviewing initial risk grades. Among the elements of such independent review should be whether risk rating changes (and particularly downgrades) have been timely and appropriate. If an institution places reliance on outside consultants, auditors, or other third parties to perform all or part of this review role, such individuals should have a clear understanding of the institution's "credit culture" and its risk rating process in addition to commensurate experience and competence in making credit judgments. See section 5.6.1.7 for an overview of the risk rating review practices of South African banks.

3.2.6.5 Sound practices in the management application of risk ratings

A sound credit risk management process should adequately illuminate the risks being taken and apply appropriate controls to allow the institution to balance risks against returns and the institution's overall appetite for risk (Board of Governors of the Federal Reserve 1998:5). Reporting on risk profiles to directors and management, conducting internal bank analysis of loan and relationship profitability, assessing capital adequacy, and performance-based compensation include some of the management applications of internal risk ratings. (Management applications of risk ratings are discussed in section 3.3.5). However, such applications have serious implications for the design and accuracy of internal risk ratings.

Among the various uses of internal ratings, profitability analysis and product pricing models have the most significant implications for the rating system. At banks where such analyses are in place, ratings can have a material effect on the measured profitability of transactions and relationships and can directly or indirectly influence the compensation of bank staff (Treacy and Carey 2000:179). Pressure to rate loans favorably arises because expected losses and capital allocations are lower for lower-risk loans. Some institutions found that many loans were upgraded shortly after the introduction of profitability analysis, although the overall degree of the shift was small. Thus, careful attention to review and control procedures that limit biases in ratings is important to the accuracy and consistency of internal ratings.

This has important implications for the staff responsible for assigning and reviewing ratings.

The key participants in ratings processes are relationship managers, credit staff, and loan review staff. As used here, the term “relationship managers” refers to staff who market bank services to customers and are typically compensated in some fashion based on the profitability of those relationships. Credit staff is primarily responsible for approving loans and assigning ratings at the origination of transactions and periodically thereafter. The loan review function is responsible for reviewing loans throughout the portfolio for adherence to bank policies including accurate assignment of ratings (Board of Governors of the Federal Reserve 1998:5).

Relationship manager’s primary goal is to generate loan business at the highest possible risk-adjusted return on capital (RAROC). Therefore, they have an incentive to provide overly favorable credit assessments of their potential clients. In this case, the relationship manager could try to compensate a decline in the objective quantitative sub-rating by an overoptimistic evaluation of qualitative criteria which can hardly be verified (Brunner, Krahn and Webber 2000:22). By contrast, credit staff’s main responsibilities are to undertake risk analysis in the interest of managing the bank’s overall exposure and credit risk. As such, they are more independent.

In addition to pressure for more favorable ratings, a rating-sensitive profitability analysis also creates pressure to increase the number of rating categories. This pressure arises because of a desire to sub-divide grades that cover broad ranges of risk, allowing for better recognition of such risk differences (Treacy and Carey 2000:4). Institutions reported that the pressure to increase the number of grades has become more pronounced in recent years as competitive forces have compressed loan spreads. In this setting, reducing expected loss factors by a few basis points, or slightly reducing the amount of capital allocated to the loan, may be the difference between a transaction that meets internal profitability “hurdles” and one that does not.

However, internal rating systems with many grades may make review and control of grading both more difficult and more expensive because reasonable people are more likely to differ in their subjective judgments when differences between grades are small rather than large.

These stresses place increased pressure on the loan review unit to maintain discipline and

enforce consistency, stability and accuracy. Controlling rating biases is always a challenge. As the number of grades on the scale increases and the distinctions of risk become finer, disagreements about ratings naturally arise more frequently, and the control of biases becomes even more difficult. The difficulty seems likely to be greatest just after the number of grades is increased because the loan review staff must enforce (and if necessary, develop) new cultural definitions for the grades. The latter task is somewhat easier at banks that use external references in assigning or reviewing ratings, such as agency ratings of borrowers. Such references give loan reviewers objective benchmarks to use in identifying problems and communicating with staff. Redesigns of the rating scale that split existing grades into smaller compartments are also easier to implement because the existing cultural definitions can be refined rather than replaced.

Risk-sensitive profitability analysis also increases the demand for internal data on loss experience and for mappings to external references because the analysis demands relatively precise quantification of the risk characteristics of each grade. However, such analysis can also make existing data and mappings less useful, at least in the short run, because rating pressures or changes in architecture may, to some extent, change the effective meaning of grades (Mark and Crouhy 2001:2).

Due to the rapid pace of change in the risk management practices of banks, their rating systems are increasingly being used for purposes for which they were not originally designed (Treacy and Carey 2000:171). When a bank applies ratings in a new way, such as in a risk-sensitive analysis of business line profitability, the existing ratings and rating system are often used without any modifications. It may become clear only over time that the new function has imposed new stresses on the rating system and that changes in the system are needed. Such circumstances make ratings more difficult to review and audit. It may also require loan review units in effect to define, maintain, and fine-tune rating standards in a dynamic fashion.

Several other conditions appear to magnify such stresses on bank rating systems. This includes corporate databases that do not support analysis of the relationship between grade assignments and historical loss experience. Furthermore, rating criteria may be largely or wholly maintained as a matter of culture rather than formal written policy. In such a case, risk

rating systems are nurtured and developed through training, mentoring, and experience. However, a positive credit culture can potentially enhance the integrity of rating systems. Positive credit culture refers to an implicit understanding among bank personnel that certain standards of underwriting and loan management must be maintained, even in the face of constant pressures to increase revenues and bring in new business (Treacy and Carey 2000:170).

This includes internal rating systems at least partly designed to promote and maintain the overall credit culture. At such banks, relationship managers are held accountable for credit quality partly by having them rate all credits, including large exposures that might be more efficiently rated by the credit staff. Strong review processes aim to identify and discipline relationship managers who produce inaccurate ratings. Such a setup provides strong incentives for the individual most responsible for negotiating with the borrower to assess risk properly and to think hard about credit issues at each stage of a credit relationship rather than relying entirely on the credit staff.

The importance of accurate risk ratings is further underpinned by their use as key inputs in portfolio credit risk models (Carey and Hrycay 2001:198). The conceptual nature of such models, possible applications in credit risk management, as well as validation of such models are discussed in the following section.

3.2.6.6 Implications of the use of internal risk ratings for regulatory use

The use of internal risk grades is now an explicit element in the evaluation of capital adequacy (Basel Committee 2001a:4). As explained in chapter 4, greater supervisory reliance on internal credit risk ratings require that supervisors be confident of the integrity and rigor of internal rating systems. Supervisory use of internal ratings introduces new stresses on internal rating systems. In some respects, these stresses would parallel those associated with rating-sensitive profitability analyses (Treacy and Carey 2000:220). That is, incentives would arise to grade optimistically and to alter the rating system to produce more fine-grained distinctions of risk. For example, banks might have incentives to design internal ratings systems that systematically underestimate credit risk and, hence, lower the regulatory capital

requirement, deliberately (i.e. consciously) or non-deliberately (i.e. unconsciously). A deliberate underestimation occurs when banks decide to manipulate the internal ratings systems, i.e. they are aware that the credit risk ratings they present to the supervisory authorities are lower than the true risk profiles. A non-deliberate underestimation of the credit risk occurs when banks are too optimistic about the quality of their loan portfolios, because they have not developed sufficient expertise in risk evaluation. Recent banking problems and crises in more than 90 countries since the early 1980s suggest that such an underestimation is conceivable (Benink 2001:4).

Underestimation of credit risk is very difficult to prove due to the lack of sufficient data and the length of the economic cycle. Even if it is possible to prove for a supervisor that an individual bank faces severe problems because of underestimation of credit risk, it is very hard to design credible penalty systems, because the penalties are likely to lead to the bankruptcy of the bank that are to be penalized. Moreover, supervisors are facing an unequal battle with the banks. Since banks might have strong incentives to design internal ratings systems generating a lower capital requirement, they will be willing to hire the best people and pay the highest salaries (Benink 2001:4).

Deliberate underestimation of credit risk is even more likely to occur in some banking markets where supervision is weak or “captured”. In such markets favorably treated banks would be able to charge a lower spread on their loans. The efforts of the IMF to establish rules of conduct for supervisory authorities, to provide training, and to publish evaluations of national supervisory authorities could play a valuable role in reducing the scope for favored treatment of banks. However, serious doubt remains whether supervisory authorities around the world are able and/or willing to detect and correct those banks presenting an overoptimistic credit risk profile based on their internal ratings (Benink 2001:4). For a more complete discussion of the challenges and issues involved in the effective implementation of supervisory review (Pillar two of the proposed new Accord), see chapter four.

Summarizing, the argument is that banks might have strong incentives to be overoptimistic when designing their internal ratings systems. Such incentive conflicts could overwhelm the checks and balances currently provided by internal review functions. Even in the absence of such conflicts, the degree of accuracy and consistency in rating assignments by the Basel

Committee might be greater than that required internally. This necessitates external reviews and validation of the rating system. In addition, banks and supervisors should both be aware that the additional stress imposed by external uses, if not properly controlled, could impair the effectiveness of internal rating systems as a tool for managing a bank's credit risk (Treacy and Carey 2000:200).

3.3 CREDIT RISK MODELING

Since the mid-1980s, models geared to apply knowledge about market risk from portfolio selection theory to credit portfolios have been proposed in the relevant technical literature. But it was not until the recognition of internal market risk models for regulatory purposes by the Basel Committee on Banking Supervision in January 1996 that modeling of credit portfolio risk with all of its particularities became a major focus of academics and practice. In the meantime, several methods and (software) products for measuring credit portfolio risk have been developed and became available.

These models are essentially variants of Value-at-Risk (VaR) approaches to measurement and management of credit risk. In such approaches, an institution estimates probability distributions of credit losses conditional on portfolio composition (Carey and Hrycay 2001:198). VaR indicates the maximum likely loss over a specific period within a given confidence level. In the context of credit risk, VaR measures include Default VaR and Credit Value-at-Risk (CaR).

The expected default loss is an indication of the maximum credit exposure at some level of confidence. The maximum default loss (as opposed to credit exposure) tells us the maximum loss to expect from default, within the specific confidence interval (for example 95% of cases). It is therefore a measure of the Value-at-Risk arising from credit risk, or a measure of default-related Value-at-Risk (Dowd 1998:171).

Credit risk models come with substantial conceptual and practical difficulties (Basel Committee 1999b:5) and no one universally accepted approach to counterparty credit risk modeling has been developed to date. There are a number of policy initiatives addressing the various credit risk modeling alternatives including the International Swaps and Derivatives

Association's 1998 report and *Credit Risk and Regulatory Capital*, the Federal Reserve System task force on internal credit risk models (1998) and most recently the Basel Committee's April 1999 paper entitled, *Credit Risk Modeling: Current Practices and Applications*.

The use of credit risk models to ensure that credit risk incurred by the institution remains within its stated risk appetite and that the assessment of that risk occurs in a timely manner, as well as potential benefits of the use of credit risk models as risk management techniques, was discussed in chapter 2. These benefits include the ability to process a great deal of information and provide an independent, timely and consistent measure of risk on a transactional or relationship basis were also discussed.

The Basel Committee (1999b:7) reports substantial diversity in risk modeling practices, as well as the conceptual nature of such models. For example, distinctions are made between mark-to-market (MTM) and default mode (DM) approaches to credit risk modeling. In this section, the conceptual nature of credit risk models, including different approaches to calculating risk measures, are discussed.

The discussion focuses on the concepts that are common to all credit risk models. The models described in this section are those that are usually applied to bank's wholesale and middle-market commercial lending portfolios.²

This section also includes a summary of four widely available vendor models within this conceptual framework.

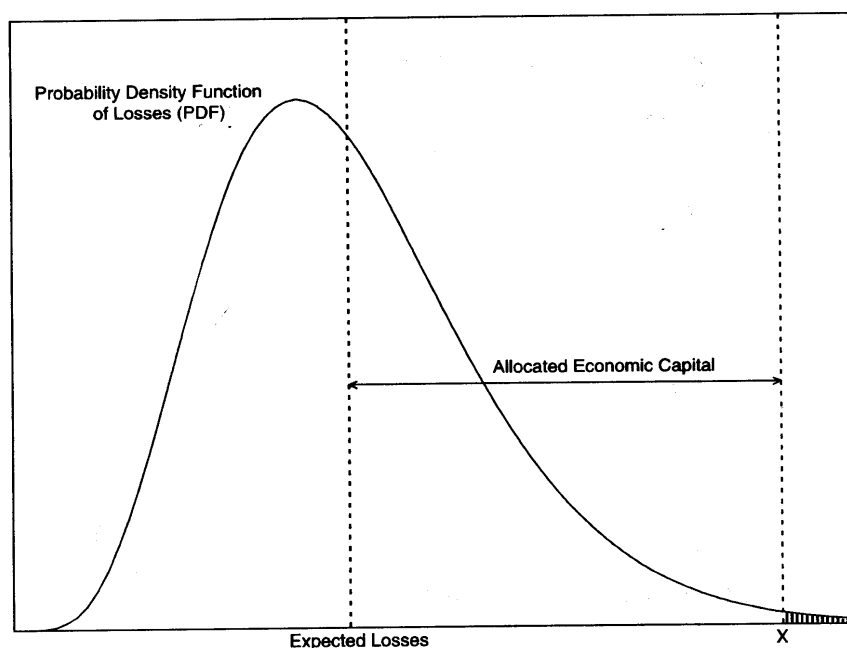
²The models used for some other types of credit, for example retail lending, credit cards and small business loans, generally differ from the models described in this section.

3.3.1 Conceptual approaches to credit risk modeling

3.3.1.1 Probability density functions

Broadly defined, a credit risk model encompasses all of the policies, procedures and practices used by a bank in estimating the probability density function of credit losses (PDF) of future losses that can be used to calculate the losses associated with any given percentile of the distribution. In practice, banks concentrate on two such loss figures: expected loss and unexpected loss. Expected loss is the mean of the loss distribution and represents the amount that a bank expects to lose on average on its credit portfolio. Unexpected loss, in contrast, is a measure of the variability in credit losses, or the credit risk inherent in the portfolio. Unexpected loss is computed as the losses associated with some high percentile of the loss distribution (for example, the 99.9th percentile) minus expected loss. A high percentile of the distribution is chosen so that the resulting risk estimates will cover all but the most extreme events. A typical PDF is shown in figure 3.1. (Basel Committee 1999b:16). The probability of credit losses exceeding a given amount X (along the x-axis) is equal to the (shaded) area under the PDF to the right of X . A risky portfolio is one whose PDF has a relatively long and fat tail. The expected credit loss (shown as the left-most vertical line) shows the amount of credit loss the bank would expect to experience on its credit portfolio over the chosen time horizon.

Figure 3.1 Probability density function



Many models seek to estimate explicitly the full PDF; statistics such as the mean and standard deviation or a chosen target credit loss quantile can then be calculated readily. Examples of this approach include the vendor models CreditRisk+, PortfolioManager, CreditPortfolioView, and CreditMetrics in its Monte Carlo formulation.

Other proprietary and vendor models (including the unexpected loss approach and CreditMetrics in its analytical formulation) aim only to generate the first two moments of the distribution, i.e. its mean and standard deviation; the full PDF remains implicit in the model. This approach is followed mainly for purposes of analytical simplicity and data or computational constraints.

A consensus within the industry about a “standard” shape of the PDF has yet to emerge. Observed portfolio credit loss distributions are markedly non-normal. They are typically skewed towards large losses, and leptokurtic (i.e. for a given mean and standard deviation, the probability of large losses occurring is greater than would be the case if the distribution were normal) (Global Association of Risk Professionals 1999:33). The “skew” loss probabilities of individual debt assets means that, most of the time the borrower does not default and the loss is zero. However, when default occurs, the loss is usually substantial. Given the positive correlation between defaults, this unevenness of loss never fully “smooths out”, even in very large portfolios. There is always a large probability of relatively small losses, and a small probability of rather large losses (Kealhofer 2001:10). This “skewness” leads to an unintuitive result: a very high percentage of the time (around 80%), the actual losses will be less than the average loss. The reason is that the average is pulled upwards by the potential for large losses (Kealhofer 2001:10).

For these reasons, the modeling of losses from individual credit exposures is more difficult than is the case for market risk, and a wide range of simplifying assumptions is made (see section 3.3.7.). The portfolio PDF that results from aggregating these individual credit exposure losses will depend strongly upon these assumptions (and upon assumptions made in estimating credit correlations (Jackson and Perraudin 2000:9).

3.3.1.2 Basic steps of portfolio credit risk modeling

Portfolio credit risk models allow the model user to calculate a distribution of probable credit losses for the current portfolio of credit risks. This then permits the institution to determine necessary provisions for expected loss. Also, by the application of a confidence interval related to tolerance for risk, the firm can assign economic capital for unexpected loss, plus set in place other management controls, such as stress testing, for possible tail events.

The detailed methods for calculating this distribution vary between models, but the basic steps are similar. To simplify, these are (International Swaps and Derivatives Association 1998:54, Hirtle et al 2001:20-21 and Knoch and Rachev 2001a:5):

- Measure the current level of credit exposure within the firm's existing portfolio.
- Classify the individual credits in the portfolio by their current credit quality. Most frequently, this is done by distributing the credits across the bank's internal credit risk rating system, which provides a picture of the current state of the credit portfolio.
- Assess the probability that the positions might migrate to different risk categories, sometimes called "credit quality states", during the planning horizon. Different techniques are available for this, including application of default volatilities or use of credit rating transition matrices and analysis of correlation, both based on information gathered over a prescribed observation period. The accuracy of both the assignment and the quantification of bank's internal risk ratings is critical, as these ratings and transition probabilities have a very significant effect on the estimation of portfolio credit risk.
- Application of a prescribed confidence interval to establish the estimated level of unexpected loss due to credit risk.

Thus far, the discussion has focused on the treatment of individual positions in a bank's credit portfolio. Generating the PDF of future credit losses requires bringing these individual positions together to capture the behavior of the overall portfolio. From standard portfolio theory, this process essentially requires capturing the correlations between losses associated with individual borrowers (Hirtle et al 2001:21). Correlations are vital in assessing risk at the portfolio level since they capture the interaction of losses on individual credits. In general,

portfolio risk will be greater the more the individual credits in the portfolio tend to vary in common. In practice, incorporating correlations into a credit risk model involves capturing variances in and correlations between the risk category transition probabilities, credit exposures, and credit valuations. For a discussion on the measurement correlations between credit events, see section 3.3.3.2.

Nearly all models assume that these variances and relations are driven by one or more “risk factors” that represent various influences on the credit quality of the borrower (for example, industry, geographic region, or the general state of the economy). In some models, risk factors are economic variables such as interest rates and economic activity factors, while other models derive default and transition probabilities from equity price data. In every case, the assumptions about the statistical process driving these risk factors determine the overall mathematical structure of the model and the shape of the PDF. Different approaches to credit risk modeling is discussed in more detail in section 3.3.2. Thus, assumptions about the distribution of risk factors are a key element in the design of all credit risk models. Depending on the assumptions about the mathematical processes driving the risk factors, there are a variety of ways the final PDF of future credit losses can be generated.

3.3.1.3 Single exposure and portfolio credit risk models

The Global Association of Risk Professionals (1999:16-17) distinguishes between single credit exposure models and portfolio type credit risk models. Single exposure models have been widely used to measure counterparty credit risk stemming from OTC derivative products. These models are used to evaluate whether a potential transaction would increase credit risk to a particular counterparty because of an added concentration of credit, or reduce risk through the benefits of product diversification.

Many single exposure credit risk models, however, were developed to measure credit risk arising from a specific product or type of borrower. The results from these models, however, are not being aggregated with similar risks in other products or types of borrowers. A model, for example, which characterizes and measures counterparty trading-related credit risk is typically not aggregated with on-balance sheet credit-related products. In many instances,

model results have not been fully integrated into the various credit risk management activities.

On the other hand, portfolio models are designed to assess the risks involved in holding portfolios of credit-sensitive instruments (Jackson and Perraudin 2000:2). The emphasis on portfolios (rather than individual exposures), incorporating correlations between the returns on credit-sensitive instruments, distinguishes these models from single exposure models. These models provide management with portfolio-related information which includes concentrations of credit, product and counterparty distribution statistics, expected loss and their distribution figures as well as corresponding capital requirements. This allow informed decisions on how the portfolio may be adjusted to reduce concentrations or increase the portfolio's return on capital.

If the risk manager eventually were to succeed in calculating a trustworthy portfolio loss distribution, it would significantly enhance a bank's ability to manage and control credit risk. Concentration risk and diversification opportunities can be identified by means of calculating marginal risk contributions of individual exposures to the overall portfolio risk. Froot and Stein (1998) pointed out that the price of non-tradable, marginal credit exposures would also have to depend on their value correlation with the already existing non-tradable risks in the bank's portfolio (Kern and Rudolph 2001:3).

Portfolio-based models, however, are often computationally intensive, and therefore are often utilized to determine a post-transaction impact on the portfolio. The discussion of credit risk models in this chapter is in the context of portfolio models.

3.3.1.4 Mark-to-market (MTM) and default mode (DM) paradigm

Portfolio models can be classified into two general categories, depending on whether they include the risk of downgrades in estimating the annual loss distribution. Default-mode (DM) models evolve default scenarios at the end of the risk horizon. The loss in case of default is then determined from the assigned recovery value. The second category of models incorporates the risk of downgrade by evolving both default scenarios as well as rating

change scenarios at the end of risk horizon (Global Association of Risk Professionals 1999:28, and Basel Committee 1999b:33).

Within the DM paradigm, a credit loss arises only if a borrower defaults within the planning horizon. Thus, in the absence of a default event, no credit loss would be incurred. The current and future values of credit instruments in the DM paradigm are defined in a manner consistent with the underlying two-state (default vs. non-default) notion of credit losses. For a term loan, the current value would typically be measured as the bank's credit exposure (for example, book value). The (uncertain) future value of the loan, however, would depend on whether or not the borrower defaults during the planning horizon (Board of Governors of the Federal Reserve system 1998:19). If the borrower does not default, the loan's future value would normally be measured as the bank's credit exposure at the end of the planning horizon, adjusted so as to add back any principal payments made over the period. On the other hand, in the event of default, the future value of a loan would be given by its recovery value, equal to one minus the LGD (Skora 1998:14). This requires the estimation of recovery rates. Recovery rates are usually derived from a combination of published studies and a high degree of internal experience/ judgement and can be set anywhere between 20% and 100% based on factors such as seniority type, region, and industry (see section 2.2.1.3 for a discussion of loss concepts, including recovery rates and LGD).

In contrast to the DM paradigm, mark-to-market models estimate the distribution of portfolio value at some future date allowing for credit quality declines, even if they are short of full default. Thereby, measures of portfolio Value-at-Risk (VaR) are estimated. MTM-type models recognize that changes in an asset's creditworthiness, and its potential impact on a bank's financial position, may occur due to events short of default. Hence, these models incorporate the probabilities of credit rating migrations to non-default states. MTM models rely on transition matrices that incorporate both historical default rates as well as historical rating change rates. In addition, credit spreads are an integral part of these models. The credit spreads are generally derived from bond, asset swap, and credit default swap markets (Skora 1998:15).

Given the rating transition matrix associated with each customer, Monte Carlo methods are generally used to simulate migration paths for each credit position in the portfolio. For each

position, the simulated migration is used, in effect, to mark the position to market as of the end of the time horizon.

Various justifications are put forward in support of one paradigm versus another (Basel Committee 1999b:36). For example, advantages of the MDM paradigm include the multi-state nature of the model, accounting for the full change in value of the portfolio due to credit events. This can potentially enhance accuracy and precision. DM models, on the other hand, have the advantage of requiring less input data and being simpler to compute. However, the ability of a default mode model to capture the effects of potentially adverse credit events, may be particularly sensitive to the assumed length of the planning horizon. For example, it is not clear whether a DM-type model with a one-year horizon is capable of accurately representing the riskiness of a portfolio of multi-year term loans (Basel Committee 1999b:35).

The determination of model “superiority” is largely influenced by the fit between model output and model application. For example, an institution that utilizes credit risk models for performance measurement purposes associated with a buy-and-hold portfolio might reasonably opt for a DM model. In contrast, certain pricing decisions for a portfolio of more liquid credits may require a loss measurement definition that incorporates potential shifts in credit spreads. In general, MTM-based methods are most applicable to portfolios where meaningful markets exist for either the physical assets and /or credit derivatives. Surveys show that many institutions are starting to run both methods in parallel, particularly for portfolios where securitization is possible (Global Association of Risk Professionals 1999:35).

Within this paradigm, various approaches for the purposes of modeling the current and future (mark-to-market) values of credit instruments are used.

3.3.2 A framework for the classification of available credit risk models

These different approaches are reflected in the proliferation of a new breed of sophisticated credit portfolio risk models. A number of models have been developed, including both

proprietary applications developed for internal use by leading-edge financial institutions, and third party applications intended for sale or distribution as software. These include J.P. Morgan's *CreditMetrics* (1997), *ager Credit* (1997), *an CreditSuisse Financial Products* (1997), *CreditRtsk+* (1997), McKinsey & Company's *CreditPortfolio View* (1993) and KMV's *PortfolioManager* (1997). These models allow comprehensive measurement and quantification of credit risk at both the portfolio and contributory level (Lopez and Siadenberg 2000:152).

Different models employ different distributional assumptions and functional forms, solution techniques, suggested methods for calibration, and mathematical language. Despite these differences, Carey (2000:5) showed a remarkable consensus in the underlying modeling framework. These models differ primarily in calculation procedures and parameters rather than financial intuition, demonstrating that the difference is one of presentation and not substance. The models value credit risk following the same basic procedures: (1) assessment of the firm's financial position; (2) derivation of default probabilities; and (3) pricing of a risky asset or estimation of credit losses (Knoch and Rachev 2001a:5).

Various authors take different approaches in classifying the different conceptual approaches to credit risk modeling (Basel Committee 1999b, Jackson and Perraudin 2000:2). This study adopts the approach taken by Koyluoglu and Hickman (1998:1) who introduced a generalized credit risk portfolio framework. This place credit risk modeling techniques from three different sciences namely finance, economics and actuarial - into the following framework:

1. Merton-based - for example, *CreditMetrics* and *PortfolioManager*. Credit default is modeled as an explicit option on the underlying firm's value. These models are microeconomic in nature, and uses equity price volatilities and correlations as inputs. The shape of the transformation function is defined by the option valuation formula of Black-Scholes.
2. Econometric - for example, *CreditPortfolio View*. Credit default is modeled as a non-linear function of macroeconomic drivers. This involves regressing default rate against changes in the underlying macroeconomic variables. This regression analysis defines the shape of the transformation function. The transformation function refers to the relationship between default probability and more observable financial quantities, including equity prices and macroeconomic factors.

3. Actuarial - for example *CreditRisk+*. These models assume a default rate distribution (commonly Gamma or Beta) and fit the mean and standard deviation to empirical default distributions. The first two techniques focus on defining the transformation function, and the third approach characterizes the distribution of default directly.

Hybrid models combine features of both structural and reduced-form approaches. An example of a hybrid model is the CreditMetricsTM product of J.P. Morgan. It is based on the rating transition model of Jarrow, Lando, and Turnbull (1997) and assumptions that joint credit quality changes are driven by joint movements of firm's asset values (Rachev, Schwartz and Khindanova 1999:1).

From a theoretical perspective, default risk has been modeled in a variety of ways. This includes, among others, the structural and reduced-form approaches (Skora 1998:11). These approaches will consequently be discussed.

3.3.2.1 The structural approach to credit risk modeling

The Merton approach is often termed the “structural” approach, since the conceptual framework imposes a structural model of firm value and bankruptcy based on the work of Robert Merton (Bohn 1999:5). This approach uses the firm's market asset value as the fundamental factor determining the firm's default probability. In this framework, a firm goes into default when the value of its underlying assets falls beneath the level needed to support its debt. Default is assumed to occur when the market value of assets has fallen to a sufficiently low level relative to the issuer's total liabilities. Essentially, the issuer (more accurately, the issuer's shareholders) receives an option to default on its debt. The issuer will likely exercise this option when its assets no longer have enough value to cover its debt obligation.

In the structural approach this probability can be calculated as the probability that the stochastic process of the asset values behaves in a way that leads to default (where the conditions for default or the set of trajectories that lead to default have to be specified). Thus, in structural models default probabilities are derived endogenously.

A loan can thus be viewed as a set of derivative contracts on the underlying value of the borrower's assets. The value of the loan equals the sum of the present values of these derivative contracts. The discount rate applied to the contract's contingent cash flows is determined using the risk-free term structure of interest rates and the risk-neutral pricing measure (Bohn 1999:6).

Using a diffusion process to describe changes in the value of the firm, Merton (1974) was the first to demonstrate that a firm's default option could be modeled with the Black and Scholes (1973) methodology. He showed that stock could be considered as a call option on the firm with the strike price equal to the face value of a single payment debt issue. Different versions of the model reflect varying assumptions about the constraints governing when a firm can default. Beginning with Black and Cox (1976), other authors have extended this model to include certain kinds of indenture conditions (e.g. safety covenants) effectively allowing for default prior to the maturity of the debt. In the case of debt issued with safety covenants, an issuer may be forced into reorganization when its asset market value falls too close to (or below) the principal value of its debt. Geske (1977) extended Merton's analysis by showing that multiple default options for coupons, sinking funds, junior debt, safety covenants, or other payment obligations could be treated as compound options.

More realistic models can be constructed by modifying the asset price process (characterizing the expected growth rate of the firm's asset value and characterizes the firm's asset volatility) or its boundary conditions (characterizing the nature of the firm's debt obligations).

The key characteristic shared by structural models is their reliance on economic arguments for why firms default when its asset value drops to the value of its contractual obligations (Bohn 1999:12). As exemplified by the CreditMetrics and PortfolioManager modeling frameworks, the model-builder would typically posit some explicit microeconomic model of the process determining defaults or rating migrations of individual customers.

In general, the random variable assumed to determine the change in a customer's risk rating, (e.g. customer asset value or net worth) is called migration risk factor. Thus, within structural models, it is the correlations between migration risk factors (across borrowers) that must be

specified (estimated or assumed) by the model-builder. In turn, these correlations between migration risk factors determine, implicitly, the correlations among borrower's defaults or rating migrations (Board of Governors of the Federal Reserve System 1998:13).

The structural approach can also be classified as using a risk neutral pricing measure (or the RNV approach). This approach is often contrasted with the discounted contractual cash flow (DCCF) approach. The DCCF represents the current value of a loan that has not defaulted as the present discounted value of its future contractual cash flows. The future value of a loan would depend on its uncertain end-of-period risk rating and the term structure of credit spreads associated with that rating. Thus, changes in the value of a loan, can reflect either a migration of the borrower to a different risk rating grade or a change in the market-determined term structure of credit spreads.

Typically, identical discount rates are assigned to all loans to firms having the same internal risk rating or expected default frequency (EDF). Consequently, senior and subordinated loans to a single firm would have the same future discount price, regardless of differences in expected recovery in the event of future default. Furthermore, finance theory holds that the value of an asset depends on the correlation of its return with that of the market. Under DCCF, however, loans to two identically rated firms receive the same discount rates, even if the two firms are not equally sensitive to the business cycle or to other systematic factors (Basel Committee 1999b:41).

The dichotomy between the DCCF and RNV approaches to pricing may be sharper in theory than in practice. In each methodology, a loan's value is constructed as a discounted present value of its future cash flows. The approaches differ mainly in how the discount factors are calculated. The DCCF method takes a nonparametric approach to estimate these discount factors. Public issuers of debt are grouped into rating categories. Credit spreads on the issuers are then averaged within each "bucket". Alternatively, the RNV method is highly structural. It imposes a model that prices each loan simultaneously in a single unified framework. In practice, the calibration of the market risk premium in the model typically makes use of credit spreads from the debt market (Basel Committee 1999b:42).

The two approaches will, in general, assign different values to any given loan. Nonetheless, if

debt markets are reasonably efficient and the assumptions of the RNV model are approximately valid, then the two methods ought to produce similar aggregate values for well-diversified portfolios (Global Association of Risk Professionals 1998:31).

3.3.2.2 Reduced-form models

In contrast to the assumption of a specific microeconomic process generating customers' defaults and rating migrations in structural models, reduced-form models typically assume a particular functional relationship between customers' expected default rate/migration matrix and so-called background factors (Global Association of Risk Professionals 1998:35). These background factors may represent either (1) observable variables, such as indicators of macroeconomic activity, or (2) unobservable random risk factors. Within reduced-form models, it is the dependence of the financial condition of individual customers on common or correlated background factors that gives rise to correlations among customers' default rates and rating migrations. Thus, reduced-form models do not attempt to explain default or credit rating transitions, they simply select a statistical process to describe default or credit rating transition (Bohn 1999:7).

On the other hand, reduced-form models rely on statistics of prior default experience. It is common to assign a bond with the average historical default rate of bonds with the same rating as the one to be evaluated (Knoch and Rachev 2001a:5).

Examples of the reduced-form approach are the CreditRisk and CreditPortfolioViewM credit risk modeling frameworks. The reduced-form approach allows the modeling of default probability and credit migration probability data to arrive at models useful in the context of credit derivatives, sovereign debt, consumer debt, and other types of risky debt that defy structural economic explanations of value (Board of Governors of the Federal Reserve System 1998:13).

The strength of reduced-form models is also their weakness (Jarrow and Turnbull 2000:280). Breaking the link between the economics of firm behavior and the event of default, enables modeling default without much information about why the issuer defaults, eliminates the

need to specify the priority structure of a firm's liabilities and allow for exogenous assumptions regarding observables. Herein lies the strength. However, because these models do not require a causal relationship between firm value and default, they are significantly more dependent on the quality of the credit-spread data than the structural models.

Modeling default without theoretical guidance runs the risk of both ignoring market information and drawing erroneous conclusions without the tools to discover the appropriate explanation. Moreover, the parameters estimated in these models will likely exhibit instability over time.

3.3.3 Parameter specification and estimation

3.3.3.1 Estimation of EDFs/rating transition matrices

One of the main inputs in a credit risk model is estimating EDF's or risk ratings (discussed in section 3.2.4.). As mentioned, these cannot be directly observed, but must be indirectly estimated, usually involving "mapping" from observable data. Two methods are generally used for mapping observable data historically into customer-specific EDFs/transition matrices: actuarial-based methods and equity-based methods.

(a) Equity-based approach

This methodology, used solely within structural models, is often used to cross-check estimates generated by actuarial-based methods. Publicly available information on a firm's liabilities, the historical and current market value of its equity and the historical volatility of its equity is used to estimate the level, rate of change and volatility (at an annual rate) of the economic value of the firm's assets. Based on Merton's model of firm equity values, expected default probabilities can be inferred from the option models (Global Association of Risk Professionals 1998:40 and Basel Committee 1999b:37).

(b) Actuarial-based approach

Actuarial-based methods are used to calibrate EDFs or rating transition matrices in both structural and reduced-form models. The basic approach involves using historical data on the default rates of borrowers to predict the expected default rates/rating migrations for customers having similar characteristics. One such approach utilises formal credit scoring models to predict EDFs. While some banks have developed their own in-house credit scoring models for corporate and/or retail customers, others purchase credit scores from external vendors. Historical data for developing internal credit scoring models are generally based either on the bank's own historical data on loan performance, or on the historical default experience within the corporate bond market. Data availability tends to be a critical limiting factor (Basel Committee 1999b:38).

A second actuarial approach (risk segmentation) involves grouping borrowers into discrete "buckets" or "risk segments" based on observable characteristics. Within any risk segment, all borrowers, and the stochastic properties of their underlying migration risk factors, are assumed to be statistically identically. Thus, all customers in the same risk segment would be assumed to have the same EDF/transition matrix. For large corporate borrowers, risk segments are typically defined on the basis of factors such as the borrower's internal credit rating, size, country and industrial sector. For retail customers, risk segmentation would normally be based on the product category (e.g. credit cards or residential mortgages) and borrower-specific information, such as credit score (if available), country and state/province. Given the assumption that all borrowers within a segment have the same EDF and/or rating transition matrix, the model-builder would attempt to estimate these parameters from average historical default and/or rating migration data of borrowers in that segment. In practice, however, data availability may severely limit the length of time over which such an average can be calculated.

3.3.3.2 Measuring correlations between credit events

As mentioned, the interdependence between defaults and/or rating transitions is a key

determinant of a portfolio's PDF. Complexity arises as it is extremely difficult to calculate credit risk correlations directly. Indeed, to measure default correlations between two companies would require repeated observations over a given time period during which each company would either default or survive. Credit risk correlation could then be calculated from the number of times both companies defaulted simultaneously. Clearly such an analysis is impossible in practice. Similar difficulties exist when trying to estimate correlation between changes in credit rating or bond spreads (Global Association of Risk Professionals 1998:35).

The simplest solution is to use aggregate time series to infer credit risk correlation. Unfortunately this approach is unsuitable except for the most basic of portfolio analysis for two main reasons. (Basel Committee 1999b:32) Firstly, aggregate time series are usually available at a very high level, with insufficient data on underlying credit risk rating, industry and geographic distribution of the portfolio. Secondly, using aggregate time series produce unstable results over time. A more attractive solution to calculate risk correlation is to use a causative default model that takes more observable financial quantities as inputs, and then transforms them into a default probability.

In this regard, several approaches are possible. In the context of reduced-form models, the interdependence between customers' default/rating migrations reflects the assumed or estimated processes relating observable and unobservable background factors to EDFs or rating transition matrices. The effects of interdependence may be modeled at the level of either individual credit exposures (common for middle-market and large corporate customers) or pools of relatively homogeneous exposures (common for retail portfolios).

Structural models parameterize this interdependence in terms of the correlations among customers' migration risk factors, which are often interpreted as being represented by customers' asset values or net worth positions. The rationale here is that default and rating migrations are driven by the asset value of the firms. Therefore asset correlations drive the joint likelihoods of default or rating migration. The more correlated the movements in two companies' assets, the greater the probability that the credit quality of the two firms will rise, fall and ultimately default together (Kealhofer 2000:9).

These two distinctive approaches are often termed the “top-down” and “bottom-up” approaches to credit risk aggregation.

3.3.3.3 Approaches to credit risk aggregation: Top-down and bottom-up approaches

Differences in modeling individual level credit risk for different product lines, arise primarily in the ways the underlying parameters are estimated using available data. In general, credit risk is measured at the individual asset level for corporate and capital market instruments (a so-called bottom-up approach). Such a bottom-up approach attempts to measure credit risk at the level of each loan based on an explicit evaluation of the creditworthiness of the portfolio’s constituent debtors (Board of Governors of the Federal Reserve System 1998:12).

The need to account for each asset’s unique features arises from the large variability among assets and entities, exceptions and concentrations, and the severity of individual losses.

On the other hand, aggregate data is used for quantifying risk in consumer, credit card or other retail portfolios (a so-called top-down approach). In this instance, loans with similar risk profiles, such as credit scores, age and geographical location, are aggregated into buckets, and credit risk is quantified at the level of these buckets. Loans within each bucket are treated as statistically identical. Loss concepts are estimated using historical time-series data for that risk segment taken as a whole, rather than by arriving at this average through the joint consideration of default and migration risk factors for each individual loan in the pool.

However, while the literature on credit risk models tends to make a distinction between these two approaches, the differences are less clear-cut in practice. For example, different models may be classified as bottom-up given their use of borrower-specific information to slot loans into buckets, even though underlying parameters may be calibrated using aggregate data.

The choice of method is driven by pragmatism and business orientation. According to the Basel Committee (1999b:34), both bottom-up and top-down approaches are valid, but the top-down approach should be used only when the specific risks of the underlying assets can be captured.

The following section provides a summary of the conceptual nature, calculation methodology, as well as advantages and disadvantages of five publicly available credit risk models.

3.3.4 Overview of publicly available credit risk models

3.3.4.1 CreditMetrics

In 1997, JP Morgan presented Creditmetrics, as the credit risk counterpart of RiskMetrics, and implemented the CreditManager software tool. CreditMetrics can be classified as a structural form model, relying on Merton's model of a firm's capital structure where a firm defaults when its asset value falls below its liabilities. A borrower's default probability then depends on the amount by which assets exceed liabilities and the volatility of those assets. If changes in asset value are normally distributed, the default probability can be expressed as the probability of a standard normal variable falling below some critical value.

Input data includes loss exposure of individual assets, default rates of a rating class, recovery rates of a rating class (optional), transition matrix, industry/ sector correlations, spread curves by sector and rating. Clients can use their own data sets, or use the data available from CreditMetrics. The CreditMetrics package offers a variety of data available on the Internet—default rates, transition data, recovery rates and pricing information, as well as underlying data needed for measuring correlations between industries and between countries (Kern and Rudolph 2001:5).

CreditMetrics employs the standard three-step VaR process to compute individual and portfolio credit Value-at-Risk (JP Morgan 1997:11):

Firstly, CreditMetrics establishes an exposure profile of each instrument. Secondly, it computes the volatility of each instrument caused by credit events (including upgrades, downgrades, and defaults). Likelihoods derived from a transition matrix are attributed to each possible credit event. Each event results in an estimated change in value (derived from credit

spread data and, in default, recovery rates). Each value outcome is weighted by its likelihood in order to create a distribution of value across each credit state, from which expected value and volatility (standard deviation) of value are computed. Finally, taking into account correlations between each of these events, the model combines the volatility of the individual instruments to give an aggregate portfolio volatility. Correlations are inferred from equity price correlations. Joint default events amongst borrowers in the portfolio are related to the extent that the borrower's changes in asset value are correlated (input in the form of a pairwise correlation matrix determined according to country and industry groupings).

CreditMetrics includes a Monte Carlo simulation engine that estimates the entire distribution of a credit portfolio and computes percentile levels. These reflect the likelihood that the portfolio value will fall below a specified level, e.g. that the likelihood of its falling below the first percentile level is 1 per cent.

Advantages of the CreditMetrics approach include that risk due to recovery rate uncertainty can be accounted for and stress testing of inputs are possible. Furthermore, the software package allows customizable reports on different types of risk. The CreditMetrics methodology has a number of limitations (Jarrow and Turnbull 2000:273). Firstly, it considers only credit events because the term structure of default free interest rates is assumed to be fixed. CreditMetrics assumes no market risk over a specified period. Although this is reasonable for floating rate and short dated notes, it is less reasonable for zero-coupon bonds, and inaccurate for derivative transactions. Secondly, the CreditMetrics default probabilities do not depend upon the state of the economy. Thirdly, a key difficulty in structural-based approaches such as CreditMetrics is that the correlation between assets' returns must be estimated using equity returns, as asset returns are unobservable. Initial results suggest that the credit VaRs produced by these methodologies are sensitive to the correlation coefficients on asset returns and that small errors are important. Unfortunately, because asset returns cannot be observed, there is no direct way to check the accuracy of these methodologies.

CreditMetrics is often criticized for relying too heavily on the migration matrixes which are usually generated from averaged historical data. With this approach the model neither takes into account the current macroeconomic conditions for the debtors nor does it anyhow

differentiate between debtors of the same rating category but different businesses. But this would especially be recommendable for medium sized companies which presumably show a greater heterogeneity than the comparably small group of publicly rated corporate bond issuers (Kern and Rudolph 2001:10). Furthermore, for the calculation of discounted portfolio losses from rating downgrades the model requires the extensive input of market data. This data is usually not fully available for middle market loan portfolios and therefore has to be approximated. This especially seems problematic with respect to the approximation of asset correlations (Kern and Rudolph 2001:9).

3.3.4.2 CreditRisk+

The CreditRisk+ model is based on insurance industry models of event risk (Wilde 1997:4). It uses actuarial methods and offers the attractive feature of a closed-form analytical solution in its basic version. Only credit risk from defaults is considered and contrary to the asset value models potential reasons for a default are of no significance. Default rates are assumed to be stochastic and are the risk drivers themselves. Therefore CreditRisk+ is also regarded as a representative of the “default rate models”. Hereby the model takes the observation into account that default rates are not constant over time but can significantly fluctuate over the so-called credit cycle (Kern and Rudolph 2001:10).

The default probabilities increase or decrease in response to background macroeconomic factors. The effects of these background factors are incorporated into the model through the use of default rate volatilities and sector analysis rather than using default correlations as explicit inputs into the model. To the extent that two obligors are sensitive to the same set of background factors, their default probabilities will move together. These co-movements in probability give rise to correlations in defaults (Gordy 1998:2).

CreditRisk+ needs default rates per country or industry segment as input as well as (average) default rates for the individual credit exposures. These can be taken out of a migration matrix or to be generated by an internal credit analysis. Recovery rates are taken as constants or alternatively only exposures net of collateral are used for the calculation of losses. For a large portfolio of n homogenous and independent loans with the same exposure and the same

default rates the probability q_d that exactly d defaults will happen in the portfolio approximately follows the Poisson distribution (Wilde 1997:10).

$$q_d \approx \frac{e^{-\mu} \cdot \mu^d}{d!}$$

In order to incorporate the joint and correlated default behavior counterparties are assigned to different country and industry sectors for the systematic portion of their exposures similar to the procedure at CreditMetrics. Thereby every exposure is divided into several sub-exposures each of which is allocated to exactly one sector. The expected default rate of a sector can be estimated historically or as the average (expected) default probability over all debtors actually being assigned to this sector. The volatility of the sector-specific default rate is to be determined in an analogous way as far as sufficient data is available. Default probabilities of any two counterparties fluctuate in a correlated way through this joint (even if only partial) affiliation to the same sector(s) and therefore due to the same macroeconomic influences characterizing this sector. In order to get to the distribution of the number of defaults within any sector the “independent” Poisson distribution now has to be combined with the sector-specific gamma distribution or to express it technically, the two distributions must be “folded”. As an intermediate result a negative binomial distribution of defaults is obtained for every sector (Kern and Rudolph 2001:11).

If all exposures were homogenous the sector-specific distributions of a number of defaults could directly be translated into the portfolio loss distribution taking the weight matrix into account (that summarizes the dependence of the counterparties on different sectors). In the case of exposures of differing size, a distribution of exposure sizes within any sector has to be defined by the user. Then the negative binomial distributions can be transferred sector wise into the loss distributions, again using an actuarial technique (Kern and Rudolph 2001:12).

Advantages of the CreditRisk+ methodology include closed-form expressions for the probability distribution of portfolio loan losses that does not require simulation (Jarrow and Turnbull 2000:274). Therefore, computation is relatively quick. Secondly, the methodology requires minimal data inputs of each loan, namely the probability of default and the loss given default. No information is required about the term structure of interest rates or probability transition matrices.

Nevertheless, it is questionable whether this “simplicity” of the approach might not be at odds with the aim of modeling the “complex” reality as accurately as possible (Gordy 1998:3). For example, recovery rates for traditional bank loans are in no way constant, but vary considerably. Consequently, the user of the model might want to allow for stochastic recovery rates. Already with this modification an analytical solution is not feasible anymore and simulation methods have to be applied. In this context also the two fundamental distributional assumptions (Poisson and Gamma) have to be examined with respect to their implications for model results (Kern and Rudolph 2001:13). Other disadvantages of this approach include the following:

CreditRisk+ ignores the stochastic term structure of interest rates that affect credit exposure over time. The problems with ignoring interest rate risk discussed in the previous section on CreditMetrics are also pertinent here. Furthermore, even in its most general form where the probability of default depends upon several stochastic factors, no attempt is made to relate these factors to how exposure changes. The CreditRisk+ methodology also ignores non-linear products such as options, or even foreign currency swaps (Gordy 1998:21).

The above-mentioned two models can be classified as unconditional models, reflecting mainly borrower- or facility-specific information. These modeling frameworks base EDFs and derived correlation effects on relationships between historical defaults and borrower-specific information, such as internal risk ratings. The data is estimated over (ideally) many credit cycles. Whatever the point in the credit cycle, these approaches will predict similar values for the standard deviation of losses arising from a portfolio of obligors having similar internal risk ratings. Such models are currently not designed to capture business cycle effects, such as the tendency for internal ratings to improve (deteriorate) more during cyclical upturns (downturns), unconditional models do not adjust expectations for seasons of adverse economic conditions (Basel Committee 1999b:34).

On the other hand, conditional models also attempt to incorporate information on the state of the economy, such as levels and trends in domestic and international employment, inflation, stock prices and interest rates, and even indicators of the financial health of particular sectors (Global Association of Risk Professionals 1998:34).

3.3.4.3 CreditPortfolioView

One example of a conditional credit risk model is McKinsey and Company's CreditPortfolioView. Within its modeling framework, rating transition matrices are functionally related to the state of the economy. The rating matrices are modified to give an increased likelihood of an upgrade (and decreased likelihood of a downgrade) during an upswing (downswing) in a credit cycle.

Default rates are linked to an "index" of empirically derived of macroeconomic factors. In this way, the coefficients to the macroeconomic variables can be determined. The portfolio loss distribution is calculated by MonteCarlo simulation.

The concept of CreditPortfolioView can be seen somewhere in between CreditRisk+ and CreditMetrics. As with CreditMetrics, losses from defaults and rating downgrades can be accounted for. Default correlations are not approximated by stock data, but the original migration matrix is "adjusted" according to the prevailing macroeconomic situation. Therefore default probabilities are not constant but volatile, as it is the case in CreditRisk+. To calculate this, complete time series of default rates per sector are required in CreditPortfolioView. Those time series are the most important data input for a complex econometric tool used by CreditPortfolioView to (Monte Carlo-) simulate macroeconomic scenarios (Kern and Rudolph 2001:13).

CreditPortfolioView employs the following procedure: In the first step a rating and a country-industry segment have to be assigned to every credit exposure/debtor in the portfolio. Secondly, macroeconomic variables have to be selected that might be suitable to represent the systematic risk of the default rates in the chosen country-industry segments (for example unemployment rate in Germany, long term interest rate in the U.S., Euro-USD exchange rate, etc.). Another preparatory work is to estimate autoregressive (moving-average) processes for these macroeconomic factors out of the respective time series. Subsequently, for every country-industry segment up to three macro variables are identified as the most suitable exogenous factors using a non-linear ordinary-least-squares (OLS) regression and therefore as the best to explain past fluctuations of the default rate in this segment. This regression

procedure can also be described as mapping the time series of the macro variables with the time series of the default rate per sector (Kern and Rudolph 2001:14).

After that, the “new” realizations of every single macro variable for the next period can be simulated using the historical auto-regressive patterns. Those simulated realizations are then directly translated into “current” default probabilities per sector, based on the causal connections identified in the OLS-regressions. A simulated default probability higher than the long-term average in this sector indicates an “unfavorable” macro scenario. Consequently, the downgrade and default probabilities have to be marked up relative to their long term average (Jackson and Perraudin 2000:14).

Finally, CreditPortfolioView draws new ratings (and defaults) for every counterparty in the portfolio and for every simulation scenario out of those “conditional” sector-specific migration matrices. Analogous to CreditMetrics “mark-to-market” valuations can be performed for liquid credit exposures that have not been drawn as “defaulted” and mature later than the risk horizon. For defaults, net losses are simulated after having assigned every exposure in the portfolio to a certain recovery rate distribution. Performing many thousands of Monte Carlo simulations eventually lead to the portfolio loss distribution (Kern and Rudolph 2001:15).

Because of its complex econometric approach to model sector specific default rates the historical data requirements of CreditPortfolioView is substantial. At first it is up to the user’s economic intuition to identify the potentially relevant macro variables for the different groups of debtors in the portfolio and to supply the respective time series. CreditPortfolioView is a much more complex model than for instance CreditRisk+. However, its economic intuition and the transparent causality between the macroeconomic environment and the default behaviour in the different segments are convincing (Gordy 1998:16).

A caveat is that it is questionable how well actual default correlations can be approximated. Furthermore, CreditPortfolioView’s extensive data requirements might not seem attractive for the usage on a middle market credit portfolio. However, as the user will concentrate on the credit risk from defaults for a buy-and-hold portfolio, they do not seem to be unrealizable. Especially for internationally diversified credit portfolios adequate macro variables and their

historical values as well as a reasonable country-industry segmentation should be identifiable and determinable (Kern and Rudolph 2001:17).

3.3.4.4 CreditMonitor (KMV Corporation)

A different approach to rating is exemplified by CreditMonitor™. Building on option pricing theory, KMV Corporation has developed a model of default probability, that utilizes both equity prices and financial statements. The rationale for this approach is that market prices are the result of the combined willingness of many investors to buy and sell and thus prices embody the synthesized views and forecasts of many investors. The most effective default measurement, therefore, derives from models that utilize both market prices and financial statements (Kealhofer 2000:3).

This approach eliminates the need to collect a variety firm-related, fundamental information, nor is there any weighting function needed. It only requires a time series of observable stock market prices and an estimate of firm indebtedness.

The following methodology is employed in the determination of the default probability of a firm (Kealhofer 2000:7):

- Estimate asset value and volatility. In this step the asset value and asset volatility of the firm is estimated from the market value and volatility of equity and the book value of liabilities. CreditMonitor uses this option nature of equity to derive the underlying asset value and asset volatility implied by the market value, volatility of equity, and the book value of liabilities.
- The distance-to-default (DD) is calculated from the asset value and asset volatility (estimated in the first step) and the book value of liabilities.
- The default probability is determined directly from the distance-to-default and the default rate for given levels of distance-to-default. In practice, the distribution of the asset values is difficult to measure. Moreover, the usual assumptions of normal or lognormal distributions cannot be used. For default measurement, the likelihood of large adverse changes in value are critical to the accurate determination of the default probability. Consequently, CreditMonitor measures the distance-to-default as the number of standard deviations the asset value is away from default and uses empirical data to determine the corresponding default probability.

-Given a firm's estimated distance to default, its EDF is calculated as the historical default frequency for firms having the same distance-to-default, derived from a proprietary KMV database on the historical default experience of publicly rated businesses.

The credit risk of the whole portfolio is quantified by the relationship between the expected default risk of each pair of assets in a portfolio. The correlation of defaults is inferred from correlation of the asset values and the respective EDFs. A loss probability distribution can be obtained both analytically and from a Monte Carlo simulation.

The KMV methodology has many advantages (Jarrow and Turnbull 2000:273). Firstly, by relying on the market value of equity to estimate the firm's volatility, it incorporates market information on default probabilities. Secondly, relating the distance to default to the observed default frequency implies that the estimates are less dependent on the underlying distributional assumptions (Jarrow and Turnbull 2000:273).

There are also a number of disadvantages (Gordy 1998:12). Many of the basic inputs to the KMV model such as the value of the firm, the volatility and the expected value of the rate of return on the firm's assets cannot be directly observed. Implicit estimation techniques must be used and there is no way to check the accuracy of the estimates. Secondly, interest rates are assumed to be deterministic. While this assumption probably has little effect on the estimated default probability over a one year horizon, it limits the usefulness of the KMV methodology when applied to loans and other interest rate sensitive instruments. Thirdly, an implication of the KMV option model is that as the maturity of a credit risky bond tends to zero, the credit spread also tends to zero. Empirically, this implication is not observed. Fourthly, historical data is used to determine the expected default frequency and consequently there is the implicit assumption of stationarity. This assumption is probably not valid. For example, in a recession, the true curve may shift upwards implying that for a given distance-to-default, the expected default frequency has increased. Consequently, the KMV methodology underestimates the true probability of default. The reverse occurs if the economy is experiencing strong economic growth. Finally, an *ad hoc* and questionable liability structure for a firm is used in order to apply the option theory (Jameson and McNee 2002:1).

Although the KMV methodology has achieved a remarkable level of acceptance within major banks around the world, it has come to be used as a parallel system of risk assessment by most banks rather than as the primary determinant of credit quality. The approach offers near to real-time credit assessment of deterioration in the standing of individual names, because it can quickly incorporate the implications of equity price movements. And the very strength of the KMV approach - the constant factoring in of equity information - means that EDFs are much more volatile than traditional credit ratings and more likely to be affected by transient market sentiment (Jameson and McNee 2002:3).

In February 2002 Moody's announced that it was to acquire KMV corporation. Moody's indicated that KMV's technology will not be used to update traditional methodologies for producing a credit rating. Analyst would take market-based assessments into account but would not allow their decisions to be driven by market events or information. This points to the increasingly complex interaction between the hitherto separate worlds of credit rating, market-based credit assessment and internal bank credit ratings.

3.3.4.5 The Wilson approach

Wilson describes an approach to credit risk modeling that resembles CreditRisk (Perraudin 1998:75). More specifically, this approach employs binomial and multinomial models of default/no-default events and of movements between ratings. Correlations between the risks on different exposures are incorporated by allowing the probabilities to vary according to whether the macroeconomy is in one of two states, namely an upswing or downswing.

The primary focus is on probabilities of default. Credit losses are deemed to occur only if a borrower defaults and not if, for example, its rating declines sharply without default taking place. This approach resembles traditional practices in insurance and banking markets (Wilson 1998:72). By contrast, CreditMetrics takes a more portfolio-theoretic approach in which losses are registered as the credit rating of a borrower declines. From an economic viewpoint, the portfolio-theoretic approach appears preferable.

The above discussion highlights how the most well known credit risk models differ in terms

of the “risk definition” (default only vs. rating downgrades and defaults), the modeling “technique” or “methodology” (distributional assumptions vs. calculation methods), the necessary “data input” and the required information technology (Kern and Rudolph 2001:18).

Differences in model results are to a lesser extent due to the model methodology or distributional assumptions but rather to different ways of approximating the default correlations that are empirically hardly available. Presently it is still one of the most important aspects that the user finds confidence in the particular approximation technique for default correlations. The choice of methodology hereby adds substantially to differences in model results. There is still no assured knowledge about which of the three models at best approximate actual default correlations. For this purpose first of all a thorough backtesting of the single models would have to be conducted, but for risk horizons of six months or a year there simply does not exist enough performance history yet. Thus, it has to be seen as the primary task for further progresses in credit risk measurement to consistently estimate or approximate default correlations despite of the lack in empirical data (Kern and Rudolph 2001:24).

3.3.5 Application of risk ratings and credit risk models to credit risk analysis and management

Robust internal credit rating systems are, as noted earlier, an important element in several key areas of the risk management process. This includes their use as key inputs in credit risk models. Most banks use ratings in one or more key areas of risk management that involve two broad categories of activity: analysis and reporting, and administration. Analytic uses include reporting of risk postures to senior management and the board of directors’ loan loss reserving; and economic capital allocation, profitability measurement, product pricing, and (indirectly) employee compensation (Basel Committee 2000c:31 and Board of Governors of the Federal Reserve System 1998:4).

Administrative uses include monitoring the structure and migration of the loan portfolio, regulatory compliance, and credit culture maintenance and to ensure the prompt reporting of any deterioration in borrowers’ positions, evaluating the accuracy and consistency of rating

criteria (i.e., to determine whether different assets in the same grade have the same loss characteristics).

Credit risk models are playing an increasingly important role in management control and incentive compensation schemes, as well as economic capital allocation and other credit risk management applications. The following discussion regarding possible credit risk management applications refers to both credit risk ratings and credit risk models (Global Association of Risk Professionals 1998:16-19, Treacy and Carey 2000:200, Basel Committee 2000c:33-35 and Board of Governors of the Federal Reserve System 1998:5-7):

3.3.5.1 Loan approval

The rating process can be a potentially integral part of the credit authorization process. In particular, loan approval authority approval requirements and thresholds are tied to rating categories, allowing less scrutiny and greater latitude in decision-making for loans with lesser risk. While this appears reasonable, institutions should also consider whether the degree of eased approval requirements is supported by the degree of reduced risk and uncertainty associated with these lower-risk credits. If not, they may provide incentives to rate loans too favorably, with resulting under-assessment of transaction risks.

The analysis supporting the ratings is inseparable from the analysis supporting the underwriting or credit approval decision. In addition, the rating and underwriting processes, while logically separate, are intertwined. The rating assignment influences the approval process in that underwriting limits and approval requirements depend on the grade, while approvers of a credit are expected to review and confirm the grade. For example, an individual staff member typically proposes a risk grade as part of the pre-approval process for a new credit. The proposed grade is then approved or modified at the same time that the transaction itself receives approval and must meet the requirements embedded in the bank's credit policies. After approval, the individual that assigned the initial grade is generally responsible for monitoring the loan and for changing the grade promptly as the condition of the borrower changes.

3.3.5.2 Reporting to management on credit risk profile of the portfolio

As part of reports analyzing the overall credit risk in the institution's portfolio, management and directors should receive information on the profile of credit exposure by internal risk grade. Such reports typically contain the aggregated exposure for all rating classes. This gives a sense of the share of bank assets that are troubled, as well as a sense of trends in the bank's risk profile. Borrower-specific information, such as major shifts in rating classes for a single customer, is also included.

Such information can thus be one consideration in evaluating an institution's appetite for originating various types of new loans. Portfolio analysis may range from simple tallies of aggregates by risk grade to a formal model of portfolio behavior that incorporates diversification and other elements of the interaction among individual loan types. In such an analysis, gradations of risk reflect only one among many dimensions of portfolio risk, along with potential industry concentrations, exposure to an unfavorable turn in the business cycle, geographical concentrations, and other factors.

3.3.5.3 Reserving policies

Although accounting and regulatory policies also influence the setting of loan loss reserves and provision, balances in different rating categories are integral to internal analysis of the adequacy of an institution's allowance for loan losses.

3.3.5.4 Allocation of capital

Rating information can be utilized for attributing economic capital to products or business lines. Additional risk characteristics beyond those embodied explicitly in the internal rating are also included in the economic capital allocation process, for example, the level of concentration in the portfolio.

The use of appropriately allocated capital in evaluating profitability offers many advantages.

This includes the incentive to consider both risk and return in making lending decisions, rather than merely rewarding loan volume and short-term fee revenue.

3.3.5.5 Profitability analysis, pricing guidelines, and compensation

Ratings can also be utilized in loan pricing analysis and internal profitability analyses (of different business lines, for example). This application ranges from calculating the cost of funds to assigning grade-specific risk premiums and costs of allocated capital that vary by internal rating. The higher such costs, the lower the measured profitability of a business unit or individual transaction. Exposures in riskier grades would typically be associated with a higher cost of capital.

Given the competitive nature of bank lending, application of appropriate discipline to pricing, in conjunction with a clear and meaningful assessment of the risks inherent in each transaction and in the portfolio as a whole, is of paramount importance. One way to discipline their overall pricing practices across their portfolios is by incorporating risk-rating specific loss factors in determining the minimum profitability requirements (i.e., “hurdle rates”). Following this practice may render such institutions less likely to price loans well below the level indicated by the long-term risk of the transaction.

The measured profitability of business units is an important factor in management decisions about which units should grow or shrink. When risk-sensitive profitability is appraised at the level of the individual loan or relationship, unprofitable loans are not made and unprofitable relationships are eventually dropped. At a growing number of banks, employee compensation is formally tied to profitability measured by such systems.

3.3.5.6 Using ratings to trigger administrative actions

Reassignment of a loan to watch or regulatory grades typically triggers a process of quarterly (or even monthly) reporting and formal reviews of the loan. However, incentives associated with rating-sensitive profitability analysis can reduce the effectiveness of administrative

management of problem loans. The staff may delay assigning credits to watch or regulatory grades because of the negative implications for measured profitability. Thus, there is a certain tension in the simultaneous use of rating systems for administrative purposes and for profitability analysis. Such tension can be overcome with proper oversight, the implementation of which represents another burden on loan review functions.

From the above it is clear that different uses place different stresses on the rating system and may have different implications for the internal controls needed to maintain the system's integrity. Furthermore, the extensive potential of management applications of risk ratings and credit risk models imply that the quality of estimates of portfolio credit loss distribution is an increasingly important determinant of many financial decisions. This underpins the importance of the validation of risk ratings and credit risk models, discussed in the following section.

3.3.6 Validation of internal risk measurement methods

Validation of model forecasts, aimed at assessing the accuracy of model forecasts or outputs is one of the main issues in credit risk modeling. The following section describes the purposes, methods and problems related to credit risk measurement validation. This is done in the context of internal credit risk ratings (section 3.3.6.1.) as well as credit risk models (section 3.3.6.2.).

Several years after the first models have been proposed, empirical evidence regarding their predictive ability remains limited (Nickell, Perraudin and Varotto, 2001). One explanation for the scarcity of research is concerns that evaluation procedures developed for market risk models have little power when applied to credit data sets. The available time series on credit portfolio losses are believed to be too short to produce reliable results.

3.3.6.1 Validation of internal credit risk ratings

The purpose of validation is to assess both the credit rating process and its outcome in order

to identify sources of biases and errors. Thus, validation methods aim at assessing the accuracy and discriminatory capacity of rating systems, with a view to detecting four main types of flaws (Carey and Hrycay 2001:199):

- Calibration errors. Are the central default probabilities (or expected loss levels) corresponding to each grade adequately established?
- Rating errors. Are assets graded consistently with their inherent loss characteristics?
- Granularity errors. Does the number of gradings allow sufficient differentiation of the exposures in a portfolio?
- Stability of ratings (if relevant to the rating system used). Is the proportional relationship between the average EDFs defining rating categories consistent throughout the business cycle, both overall and within market segments?

These four questions can be answered by using several validation techniques (Treacy and Carey 2000:197). For instance, the first and third question can be addressed by comparing expected and actual default/loss rates (performance testing). The second issue may be examined by comparing the ratings awarded to the same company or set of companies by a variety of institutions, including ratings agencies (benchmarking).

In addition to performance testing and benchmarking, internal ratings can also be validated by relying on external assessments. These validation techniques will consequently be discussed.

a) Benchmarking

Benchmarking involves contrasting the output of an internal rating system against estimations of default/migration probabilities or losses, obtained from other rating sources (Jackson and Perraudin 1999:10). For example, internal ratings can be benchmarked against those developed by agencies such as Moody's and Standard & Poors.

For such comparison to be meaningful, the degree of conceptual consistency between the two systems being compared must first be assessed. The problems related to banks' "point in time" methodology, as opposed to ratings agencies' "through the cycle" approach to ratings (discussed in section 3.2.2.2.) is also relevant in this regard. Benchmarking against external

ratings has further potential limitations (Carey and Hrycay 2001:208):

Firstly, for banks whose portfolios contain a substantial proportion of externally rated assets, validating against external ratings may create a large selection bias, which would compromise the reliability of the validation process itself.

Secondly, ratings agencies' default histories have tended to be US-focused, which may lead to question their relevance in countries where default patterns have been distinct from those observed in North America. However, most agencies are actively expanding their activities into Europe and Asia.

Collective databases offer another potential benchmark. Such databases exist in certain countries, where they have been assembled at the initiative of the industry, commercial firms or even the supervisors themselves. In the context of the proposed IRB approach (see chapter 4) supervisors might need to consider the need for setting-up such databases, since these are a prime method of checking the distribution of bank ratings across a sample of counterparties.

Banks may also assess the outcomes of their internal rating models by running other models and comparing outputs. For this purpose, they may for example attempt to replicate KMV s CreditMonitorTM. They can feed the same data used in their internal model (and other pertinent information) to an alternative methodology. The study of differences in output between the internal rating system and the alternative method can reveal possible inconsistencies.

b) External assessments

Another approach to validation is to subject internal ratings to external assessments, including:

-Assessment by consultants. Consultants can also play a role in validating internal systems, including the audit of the validation process itself.

-The market test. A compelling validation process is already performed by the market. For example, credit spreads is itself a function of the underlying portfolio s credit qua
may be used as a basis for assessing the underlying rating system (Basel Committee 2000b:36).

3.3.6.2 Validation of credit risk models

The need for effective model validation procedures is even more apparent in the case of credit risk models, given the greater conceptual uncertainties and extensive judgment required in specifying credit risk models. The same data limitations that render parameter calibration problematic (discussed in section 3.3.3.) also makes model validation exceedingly difficult. However, the nature and scope of these complexities are partially influenced by the type of model concerned. The validation of standard models implemented on publicly available data is less problematic than standard models employing bank-specific information, such as internally developed models which use in-house data.

In the case of standard models employing public data, model performance may be assessed using simulated data (Gordy 2000:2). Another approach is the use of time series information on bond prices (Nickell, Perraudin and Varotto 2001:4) to evaluate the model's assumptions and the quality of the data.

It is much harder to perform such analyses for models which employ bank-specific data. The difficulties stem partly from the fact that bank's internal data sets typically cover quite short periods of time and partly from the obvious practical problems involved in implementing numerous different models with various data and basic assumptions.

Regardless of the type of model involved, model validation techniques can be grouped into four broad categories (Basel Committee 1999b:50):

- Backtesting, or verifying that *ex ante* model results match *ex post* data within the model's confidence interval.
- Stress testing, or analysing the results of model output given various economic scenarios;
- Assessing the sensitivity of credit risk estimates to underlying parameters and assumptions;
- and
- Ensuring the existence of independent review and oversight of a model.

(a) Backtesting of credit risk models

The Basel Committee (1999b:56) specifically mentioned validation through backtesting as a particular problematic issue regarding credit risk models. This prominence of backtesting in the validation of credit risk models is probably by analogy with market risk models, not because it was obviously feasible. In contrast to market risk models, where backtesting offers an efficient method of validation, data limitations make backtesting problematic in the credit risk context.

The small number of forecasts available with which to evaluate a model's forecast accuracy is a major impediment to model backtesting. That is, while VaR models for daily, market risk calculations generate about 250 forecasts in one year, credit risk models can generally produce only one forecast per year due to their longer planning horizons. Obviously, it would take a very long time to produce sufficient observations for reasonable tests of forecast accuracy for these models. In addition, due to the nature of credit risk data, only a limited amount of historical data on credit losses is available and certainly not enough to span several macroeconomic or credit cycles (Lopez and Saidenberg, 2000:156).

Backtesting, therefore, is almost certain to be problematic in practice, owing to insufficient data for out-of-sample testing. A quantitative validation standard similar to that in the Market Risk Amendment would require an impractical number of years of data, spanning multiple credit cycles.

In addition to the above-mentioned data limitations, the following factors contribute to the problematic nature of backtesting credit risk models (Basel Committee 1999b:51):

- The long time horizons employed by credit risk models imply that errors in measuring credit risk are more likely to affect the assessment of the bank's overall soundness.
- The higher target loss quantiles used in credit risk models, present problems in assessing the accuracy of models.
- Limited availability of market prices for most types of credit exposures.
- The relative size of the banking book, and the potential repercussions on bank solvency if modeled credit risk estimates are inaccurate, underscores the need for a better understanding of a model's sensitivity to structural assumptions and parameter estimates.

Despite the complexity of credit risk models and the above-mentioned problems, backtesting can be feasible in certain cases. Backtesting may have a role in testing loss experience on consumer loans and receivables, where the population of borrowers is large and the credit loss cycle short enough to obtain reasonable approximations. The issue with backtesting, then, is to identify those cases for which backtesting is feasible, and where it is not, to describe a more limited role for backtesting. It is also necessary to propose what other routes to validation may fill the shoes of backtesting as relied on in the Market Risk Amendment to the 1988 Basel Accord (Global Association of Risk Professionals 1999:53).

However, to validate credit models generally, one needs an appropriate substitute for backtesting. One possible solution is to squeeze more information out of existing data. Recommendations in this regard include working with both virtual portfolios and fictional time-series of credit events, as well as broader measures of historical credit loss experience aggregated at a higher (and available) level (Global Association of Risk Professionals 1999:54 and Lopez and Saidenberg 2000:152).

Empirical evidence in this regard is presented by Lopez and Saidenberg (2000:158). Using a panel data approach, they propose several evaluation methods for credit risk models based on cross-sectional resampling techniques that make the most use of the available data. Specifically, models are evaluated not only on their forecasts over time, but also on their forecasts at a given point in time for simulated credit portfolios, since simulated data are used, the number of forecasts and observed outcomes can be made to be as large as necessary.

Although this resampling approach cannot avoid the limited number of years of available data on credit defaults and rating migrations, it does provide quantifiable measures of forecast accuracy that can be used to examine the robustness of specific model assumptions and parameters, both for a given model and across models.

However, the strongly positive cross-sectional correlation between the credit standing of different obligors, and the strong cyclical element in credit risk, suggests that understanding the time series dimension of credit risk is quite crucial. Furthermore, it would be difficult to

perform similar analyses for models which employ bank-specific data and adopt non-standard assumptions.

Frerichs and Loffler (2001:2) show that backtesting credit portfolio risk models based on a default history of only ten years is possible if the information of the complete default distribution is utilized. For this purpose, they recommend using Berkowitz's (1999) test procedure. Observed credit losses are transformed in such a way that they are independent and identically distributed standard normal random variables. Standard likelihood ratio tests can then be used to test the null hypothesis that the model is correct. Berkowitz proposes a test of independence and a test of zero mean, unit variance and independence against a first-order autoregressive structure. For a market risk setting, Berkowitz shows that powerful tests can be constructed with a sample size as small as 100. Simulations indicate that even ten observations are sufficient to detect misspecifications in credit risk models.

As mentioned, proposing other routes to fill the shoes of backtesting, is one of the main issues in the validation of credit risk models. In this regard, qualitative methods, such as stress-testing and sensitivity analysis, can play an important role in the evaluation of credit risk models.

(b) Market-based evaluation of credit risk models

One alternative to formal backtesting is to validate credit risk models indirectly, through various market-based "reality" checks. An example is rate of return analysis comparing the bank's hurdle rate with the expected risk-adjusted rate of return (i.e., the RAROC) that could be achieved by investing in corporate bonds or syndicated loans having a particular credit rating, say, BB. An implied RAROC well below (above) the bank's hurdle rate is interpreted as evidence that the model's capital allocation for BB-rated credits was too high (low), possibly requiring some re-calibration of the model's parameters.

Peer group analysis, and comparisons of market credit spreads with those implied by the bank's own pricing model are other examples of market-based validation techniques. Clearly, an implicit assumption underlying these techniques is that market perceptions of appropriate capital levels or appropriate credit risk spreads are "about right."

(c) Stress testing

The purpose of stress testing is to learn more about the downside tail of a return distribution. All styles of VaR rely at some point on explicit or implicit forecasts of the volatility (standard deviation) and correlation of underlying market factors. The distributions of these financial factors are rarely bell-curves; the frequent arrival of new information distinguishes the financial marketplace from truly random settings. In addition, the correlations of these factors are notoriously non-stationary. One of the benefits of normal (bell curve) distributions with stationary correlations is that once the standard deviation is computed, the entire distribution can be specified. For example, one can conclude that, in a normal distribution, a move larger than three standard deviations has a 1% chance of occurring. However, in less well-behaved distributions, it is very dangerous to derive any conclusion about tail probabilities from the standard deviation. Further, because the standard deviation and all “confidence interval” analyses are probability-weighted, the sizes of individual outcomes in the downside tail are hidden, because they only contribute to the calculation after being multiplied by their (small) probabilities.

In other words, VaR does not yield information about whether a particular downside event might be catastrophic for the firm in question; that can only be ascertained by examining the events individually. The challenge here is choosing a set of events for intensive analysis (i.e. stress-testing) from the nearly infinite universe of possible events. At present, firms are only beginning to share information on how they determine which events are simulated in stress testing, and no consensus has yet emerged. Some simulate historical market shocks, some distill market risks to a manageable set of independent factors and stress the factors individually and in combinations, some stress the factors underlying their major risk positions, and some stress those factors which show the most current volatility in the market (Fender, Gibson and Mosser 2001:5). As progress is made in the art and science of stress-testing, the results are increasingly being used for setting risk limits, and, in some judgmental fashion, are a factor in determining internal capital allocation. (Using stress test results exclusively or mechanically for capital allocation would be the rough equivalent of requiring every resident of an earthquake zone to conduct daily activities as if the earthquake were occurring today; ordinary business would come to a standstill).

Stress testing is used to value portfolios under extreme unfavorable changes in input variables and under chaos scenarios where more than one unexpected unfavorable change in variables occurs. Unlike backtesting, stress testing does not necessarily use historical scenarios. Its purpose is actually quite the opposite. Stress testing seeks to analyze potential future scenarios. More than anything, stress testing serves to explore the logical implication of a model's internal structure combined with extreme assumed values, such as default rates, default correlations, or sudden credit spread widening.

There are two basic types of stress testing models for credit: the structural approach and the reduced-form approach. The former involves creating simulations based on broad, multiple risk factors across scenarios and determined by detailed structural models, then using them to estimate a broad loss distribution (McNee 2001:1).

Alternatively, there is the reduced-form approach. Ratings agencies, for example, might look back over multiple business cycles and ask when actual credit losses were worst, then ask what would be the consequences of that happening again. There is a middle ground to be taken between these two extremes. This would involve looking at the risk factors available, acknowledging the need to see how they behave over a full business cycle, and stress testing to see how the losses behave over a certain period in response to changes in the risk factors (McNee 2001:2).

Another distinction between different types of stress testing for corporate credit risk, namely a micro and a macro approach. The micro approach involves constructing cash flow models for individual companies, concentrating on high-yield, lower-rated exposures, then subjecting them to stress tests. This approach is particularly valuable in commodity industries, such as mining, forestry or the oil industry, where the economic influences on a company are relatively straightforward. A macro approach, on the other hand, take an overall view of how events would impact on an entire portfolio. A practical limitation of the micro approach is that it is extremely computationally intensive, involving running models on numerous different companies (McNee 2001:2).

In principle, stress testing could at least partially compensate for the data limitations,

estimation problems, and shortcomings in available backtesting methods for credit risk models. Most of the uncertainty within credit risk models (and the infeasibility of backtesting) relates to estimation of the joint probability distribution of risk factors. Stress tests circumvent these difficulties by specifying, albeit arbitrarily, particular economic scenarios against which the bank's capital adequacy might be judged - without regard to the probability of that event actually occurring.

As an element of the validation process, stress testing can contribute insight and evidence of the credit model's internal consistency and realism in responding to extreme values of assumptions, and unusual combinations of assumptions. Thus, stress testing serves at least two purposes. One is to overcome uncertainties in the model by testing scenarios, which are not explicitly addressed by the model. The other purpose is part of the regular business review, namely, to test scenarios which one may intuitively know the bank may be vulnerable to, but which the model may not pick up (Basel Committee 1999b:51).

(d) Sensitivity analysis

Sensitivity analysis is the process of exploring how a model's predictions change in response to an incremental change in one or more risk factors, assumptions, or model parameters. The analysis may show the change at the margin with a single input, or may explore the effect of jointly changing a group of inputs.

Risk factors, assumptions and parameters, as used here, are defined as follows (Basel Committee 1999b:53):

Risk factors are the fundamental drivers of the risk in a given portfolio, regardless of the model being used to quantify it. Unlike model assumptions and parameters that require extensive time series data, exposures to risk factors can be listed in factual and descriptive reports. This includes consolidated views of debtors' exposures by country, industries, external or internal ratings, instrument type, time to liquidation and liquidation values.

A model's assumption is a general hypothesis on the behavior of one or more variables defined in the model. Assumptions are typically simplifying devices based on business

experience. It is current practice for risk model builders to start the engineering process with a set of assumptions and then attempt to relax these assumptions in an effort to increase its scope. This relaxation

□ generally in

a result, model output sensitivity to certain assumptions, may be difficult if not impossible, to compute, since relaxing or modifying a central assumption really means using a different model.

A model parameter is estimated on past data series and being used as a constant in the future for the calculation of the output. Stability through time of these generally historical sample-dependent parameters is one of the major assumptions underlying risk models. It is widely recognized that this stability breaks down in major crises not only within a risk class (such as market risk or credit risk) but also across risk classes, often through rapid deterioration in asset liquidity. As a result recent history has shown more occurrences of events than models would have anticipated (Global Association of Risk Professionals 1999:55).

In addition to a testing model's rationality and accuracy, sensitivity analysis serves other important objectives. Firstly, it is one way to quantify and relate the risk factors found in a given portfolio. This can highlight areas where data time series and stress testing will be most required in the current portfolio credit structure context. Secondly, it spells out which variables have the largest impact on the capital number allowing "portfolio dependent" stress testing practices as described in the Market Risk Amendment (Basel Committee 1996). Thirdly, it allows disclosing additional risk profile information to the public.

While not covering all the validation concerns, sensitivity analysis offers several advantages (Global Association of Risk Professionals 1999:55):

-Sensitivity analysis is the best tool for illustrating the transparency (or lack of it) of the model's assumptions and structure. This can be done by demonstrating incremental sensitivity of its output to its various inputs. At a minimum, sensitivity analysis can show that the model's response to a change in input value is directionally rational and proportionate across the spectrum of different types of inputs. This should alleviate the "black box" concerns that more complex models may inspire.

-As a diagnostic for validation, sensitivity analysis can demonstrate input/output relationships at parameter, risk factor, correlation and time horizon values far above and below current

experience, mapping the behavior of the model. Such analysis serves not only to help validate a model for a particular range of applications, but may also help define the range over which the model should be considered valid.

Sensitivity analysis is thus an integral part of credit model validation.

(e) Cumulative accuracy measures

As mentioned, the highly infrequent nature of default events and the averaging effect (over multiple credit cycles) present challenges in assessing the accuracy and reliability of credit risk models for most institutions. Many standard statistical tests of model accuracy are not sensitive enough to adequately distinguish between models. Sobehart and Keenan (2001:S31) provide some guidance on testing and benchmarking default risk models, using simple, yet powerful performance measures based on the cumulative accuracy of the models.

Measures of cumulative accuracy have become increasingly popular because they can be used to compare the performance of different types of default risk models. The data requirements for using these performance measures consist of multiple risk measures for a cross-sectional or panel data set of borrowers, and associated default or loss information that provides the criterion of accuracy (Sobehart and Keenan 2001:S31).

(f) Qualitative aspects of credit risk model validation

Much of the above discussion has focused on the mathematical and technical aspects of validation. These quantitative measures, however, cannot be expected to encompass every risk facing the firm and they will generally involve the use of methodologies and assumptions that may not be robust in some circumstances (Basel Committee 1999b:54).

As mentioned, qualitative aspects, such as the internal environment in which a model operates, is especially important in the credit risk context. The amount of senior manager oversight, the proficiency of loan officers, the quality of internal controls and other traditional features of the credit culture will continue to play a key part in the risk management framework. Even if it were possible to test models satisfactorily, the way in which a

particular bank used its models remains important. For example, the pre-processing the bank performs before applying the model to the portfolio (for example, netting apparently offsetting risks) would be reflected in the output of the model.

Relevant qualitative risk information that provides context for and supplements the quantitative risk information, includes the following (International Swaps and Derivatives Association 2001:17 and Carey and Hrycay 2000:206-208):³

- Proactive approach to ratings. To ensure the effectiveness of a rating system it is fundamental that banks adopt a philosophy that is conducive to high control standards. This involves:

- Active use. Internal ratings should be used internally by banks, for instance for pricing, limit setting, economic capital allocation or provisioning decisions.

- Oversight and revision. Banks should commit to continuous review and regular improvement. In particular, they should commit resources to audit internal models and empower capable staff in the introduction of necessary changes.

- Sound practice. Banks should aim at “sound practice” both in the design and usage of internal ratings system. This includes topics such as the choice of methods, calibration and validation. Concerning systems usage, banks should aim at verifying the use of models and their output; the quality of the input data; and model user’s understanding of the ratings process. An internal rating system that has appropriate mechanisms in place to avoid biases goes a long way to demonstrating robustness. Biases can be avoided through:

- Static grids. Users of rating systems should not, as a general rule, have the ability to modify them. Having “static” internal ratings that can only be amended using specific procedures provides greater certainty.

- Rating availability. Internal ratings should be made available throughout the firm to allow users to flag inconsistencies and play the role of control officers.

- Clear guidelines on the rating process. For consistency and clarity, the rating system design group should produce guidelines that clearly outline the models used and the rating process within the firm. Proper documentation substantially improves consistency, as well as continuity over time and beyond specific teams of experts.

³ Some of these qualitative standards are similar to those outlined in the Basel Committee’s Amendment to the Capital Accord to Incorporate Market Risks (January 1996).

-A uniform approach to rating. Teams with different portfolios of customers should take a consistent approach to rating.

-Appropriate organizational controls. Banks should have an organizational structure that has sufficient control mechanisms built-in to ensure that the rating system is properly designed, implemented, validated and revised. The following illustrates how this might be achieved, drawing on banks' practice.

-Rating system design group. The design of the internal rating model(s) of a bank often lies in a group separate from the commercial relationship staff (originating group). Apart from working on the methodology and the technology behind model(s), this group is responsible for producing guidelines on the rating process. The originating group uses model(s) and provides some of the data necessary to allow them to run.

-Separate rating audit group. A rating audit group, usually part of the bank's group audit, is typically in charge of controlling the quality of the rating methods and practices, notably the conceptual adequacy of the rating system used and its validation, including checking on the accuracy and completeness of the input data; the consistency, timeliness and reliability of data sources; the adequacy of the information system used in the rating process; and the organization of the rating system design group.

-Senior management oversight. The rating and rating validation processes need to be reviewed by senior management, i.e. managers with sufficient seniority and authority to enforce reductions in a bank's overall risk exposure.

The latter requirement is especially important and the following section elaborates on senior management oversight as a qualitative requirement in the validation of credit risk models. Especially as credit risk models become an integral part of an active business performance measurement and compensation scheme, banks will need to ensure proper oversight over the models in order to avoid potential conflicts of interest.

Under the heading of "Management Oversight and Reporting" the Basel Committee's document on credit risk models (1999b:54) expresses concerns over (1) the way the model is to fit into the internal credit environment of the institution, (2) the quality of senior management oversight and understanding, (3) the internal organizational rigor in requiring fully developed validation analyses as a reflection of management oversight, and (4) the adequacy of internal controls on the quality of key data input to the model. Thus, the key

validation issue is whether the institution itself is ready to support, supervise, and rely on the model.

As to the first concern, the success of a model depends as much on the way the model itself is used as it does on the environment in which the model operates, especially given many credit models' considerable complexity. Recent history in the derivative markets has repeatedly demonstrated that errors are more likely to occur when a model is abused, even when the fundamental model is sound (Global Association of Risk Professionals 1999:58).

The use of proprietary credit risk models empowers risk management with a renewed scope and responsibility. But the rest of the organization must also get ready to support the credit model to supply portfolio characteristics and other data in a consistent form and with sufficient detail. That may imply considerable investment and management time spent on improving and regularizing the flow of data.

At the other end of the modeling process, the institution should get ready to receive and interpret the model's results, and then take the results as a basis to recommend management decisions affecting the bank's credit exposures. That represents a substantive adjustment in the internal management of the business. Without this organizational adaptation, it will be more difficult to keep operating units motivated enough to commit to maintain data quality.

As to the second concern, effective management oversight is necessary, and consists of investing senior management time in understanding the salient issues. Then they should establish a clear and specific set of policies that prescribe the environment in which model-based credit risk management takes place.

Senior management should periodically receive and review relevant qualitative risk information that provides context for and supplements the quantitative risk information it receives. In addition, management should periodically receive contextual information sufficient to assess the degree of reliance placed on quantitative risk management information. This is required to highlight key judgments and assumptions involved in developing the qualitative risk information, and to shed additional light on a firm's overall risk profile.

Among the more important topics that should be addressed periodically are (Global Association of Risk Professionals 1999:59):

- Data integrity and completeness, including the sources from which reported data is drawn; the quality, completeness and timeliness of data; and the nature of controls to ensure data integrity and completeness.

- Model assumptions and limitations. This includes strengths and weaknesses of risk quantification and aggregation methods; which risks are not captured; what risks are poorly captured; and how models are backtested.

- Valuation methods and limitations, including controls over the marking process; exceptions to normal mark-to-market policies; methodology for fair value adjustments, methodology of illiquidity and/or concentration adjustments; validation and calibration of valuation models; and valuation of collateral.

- Legal uncertainties. This include enforceability assessments with regard to netting and collateral; assessments of ability to perfect security interests in collateral under the circumstances relevant to a firm's various positions; and how well judgments on such issues are reflected in exposure measurement systems.

- Documentation, including the status of documentation covering, for example, the number and importance of undocumented transactions, unsigned masters or collateral agreements; the degree of involvement of the credit department in reviewing credit terms in documentation and how well credit terms are reflected in exposure measurement systems.

- Margin and collateral management. This includes the degree of involvement of the credit department in setting margin and collateral terms for individual transactions; how well marginal and collateral activities are integrated in exposure measurement systems; and the adequacy of monitoring of collateral, concentration and liquidity.

Without appropriate contextual information, senior management may not be able to interpret these measures correctly in light of their strengths and weaknesses. Furthermore, senior management information must avoid two common predicaments: oversimplification, which may give management false comfort, and undecipherable complexity, which may lead senior management to ignore the information all together. Finally, there is a great need to avoid a "silo" approach to risk management and reporting, that is, an approach which treats often interdependent elements of risk as separate and independent categories. Avoiding such an

approach involves coordination across traditional market and credit risk management disciplines as well as inclusion of the collateral management, client documentation, and operation control groups.

Qualitative standards also include disclosure requirements. Banks typically maintain documentation on the credit risk modeling process and the underlying methodology, as well as the results of any stress testing procedures. However, in estimating model parameters, banks at times rely on proprietary consultant data derived via undisclosed methodologies. Furthermore, the fact that validation analyses are generally undeveloped also raises concerns regarding the effective quality and completeness of the oversight process (Jackson and Perraudin 2000:10).

Credit risk quantification models should be fully described in a comprehensive document spelling out (Basel Committee 1999b:55):

- The risk factors handled by the model.
- The model's assumptions and parameters.
- The sensitivities of the model output to changes in exposures to risk factors.
- Sensitivities to changes to model assumptions and parameters.

The need to evaluate credit risk models within the context of banks' overall credit risk management approaches is accentuated by the fact that credit risk is generally endogenous, in the sense that it is greatly affected by the bank's expertise and investment in loan screening and monitoring. This suggests that quantitative models such as CreditMetrics or CreditRisk+ that take credit risk as exogenous should be used with caution (Winton 1999:31).

3.3.7 Weaknesses of credit risk models

Modeling portfolio risk in credit portfolios is neither analytically nor practically easy, presenting at least two significant challenges. Comprehensive and accurate credit risk modeling requires the combination of complex and highly quantitative risk estimation which captures the broad range of potential value outcomes in a portfolio with in-depth counterparty credit analysis which measures the probability of credit deterioration and default. This makes

credit risk modeling one of the more challenging aspects of credit risk management. The quantitative estimation of credit risk is further complicated by the long, fat tails typically observed in credit risk distributions. The very nature of credit risk implies an effectively skewed bet in which the lender runs a small risk of incurring a large loss (default), balanced by a much larger probability of earning a (relatively) small excess return (net interest earnings), given no default. The distribution of losses will therefore be skewed to the left and exhibit potentially fat tails.

Considering an entire portfolio rather than a single obligor has the effect of smoothing the distribution and capturing diversification effects. Nevertheless, the limitation of upside opportunity, combined with the remote possibility of severe losses, still causes the asymmetry and fat, long tails in typical credit portfolio distributions, where these risks are not easily diversified away. Because of this feature, to understand the risks of credit portfolios completely requires that the nature of these tails be explored (JP Morgan 1997:10).

To do this requires a great deal of information beyond simple summary statistics such as the mean (expected value) and standard deviation (volatility of value). In fact, to examine the nature of the tails in credit risk portfolios requires deriving the entire shape of the portfolio distribution through simulation. Simulation reduces the computational burden by sampling outcomes randomly across all possibilities. Once the portfolio distribution has been approximated in this way, it is possible to compute percentile levels and summary statistics that describe the shape of the distribution.

3.3.7.1 Risks omitted and “data blanks”

Furthermore, the specification of the process of default and other factors leading to changes in credit quality is severely constrained by a lack of data on the historical performance of loans and other modeled variables (Basel Committee 1999b:47).

The scarcity of data required to estimate credit risk models also stems from the infrequent nature of default events and the longer-term time horizons used in measuring credit risk. Hence, in specifying model parameters, credit risk models require the use of simplifying

assumptions and proxy data, for example: (1) the determinants of credit loss are assumed to be independent from one another; (2) certain variables, such as the level of loss given default in some models, are treated as non-random variables, while estimated parameters and structural model assumptions are treated as if they were “true” (i.e. known with certainty); (3) borrowers within pre-defined risk segments are taken to be statistically identical; and (4) model parameters are assumed to be stable. These assumptions are often based on subjective judgements, and there is generally little empirical analysis supporting the choices made by model-builders. The materiality of these judgements and assumptions on the model’s estimate of risk is unclear as it is not yet standard practice to conduct sensitivity testing of a model’s vulnerability to such assumptions (Jackson and Perraudin 2000:5). □s

3.3.7.2 Parameterization by judgment

Most models contain parameters which crucially affect the risk measures which are generated, but which must be set on a judgmental basis by the user implementing the model. To take an example, in CreditMetrics, the fraction of idiosyncratic risk assumed for the asset values of obligors is difficult to assess. Typical estimates based on factor models suggest that idiosyncratic risk in equity returns is actually quite high. However, assuming high levels of idiosyncratic risk within CreditMetrics leads to implausible low levels of total portfolio volatility. Hence, analysts working with CreditMetrics generally assume much lower idiosyncratic risk. To take a second example, within the Merton-style models employed by KMV, a very important parameter is the dividend payout rate assumed for firms (Perraudin 1998:96). According to the model’s assumptions, if firms pay large dividends, the value of their underlying assets drift towards the bankruptcy trigger and hence their debt is relatively risky. In real life, high dividends often signal that the firm is performing well and are therefore associated with relatively low risk debt. Effectively, the assumptions of the model are too simple to capture this latter effect. So, parameterizing the model from historical data on recent dividend payout rates will lead to incorrect results. Hence, the dividend payout rates in the model must be selected in a fairly arbitrary way by the user (Jackson and Perraudin 2000:6).

This problem can be mitigated to a certain extent by the use of reduced-form models, such as

the Jarrow-Turnbull model, considering both market and credit risk. They can be calibrated using observable data and consequently incorporate market information.

A further problem is what one might term “data blanks”. There appears to be a relatively limited set of data sources and techniques available to banks for use in estimating loss characteristics. Moreover, these data sources appear to have potentially quite significant inconsistencies with each other. In particular, it seems clear that differing sources and institutions utilise differing definitions of “default” and “loss” when recording raw data used to derive measures of the probability of default (PD) and loss-given-default (LGD) (Perraudin 1998:95).

On data, banks face the difficulty that they have only recently begun to collect relevant information in a systematic manner. Many do not even know simple facts about defaults in their loan books going back in time. Although serious, this difficulty is transitional and will be mitigated as time goes by and perhaps as banks make arrangements to share what data exist (Perraudin 1998:95).

The more serious data problem is that bank loans and even many corporate bonds are either partly or totally illiquid and mark-to-market values are therefore not available. This means that one must rely on some other measure of value in order to establish and track the riskiness of credit-sensitive exposures. Two approaches have been followed by credit risk modelers. J.P. Morgan and Credit Suisse Financial Products in their respective modeling methodologies, CreditMetrics and CreditRisk+, employ ratings and probabilities of ratings transitions as bases for measuring value and risk. The consulting firm KMV uses equity price information to infer a borrower’s underlying asset value and the probability that it will fall below some default trigger level.

The problem with this approach is that models are applied to types of exposure for which historical data is unavailable. Such models simply assume that the behaviour of such risks is the same as other kinds of exposure for which data can be obtained. For example, data on ratings transitions by US obligors is used to calculate transition matrices which are then employed for non-US obligors. Furthermore, ratings transition matrices based on bond rating data is used in models applied to portfolios of loans. Empirical evidence suggests differences

between transition matrices for different countries' industries and stages of the cycle and default rates for bonds versus private placements, syndicated bank loans (Altman and Suggit 2000).

In addition, the current generation of credit risk models all have "blind spots" in that there are categories of credit risk which they simply ignore or correlations between different categories of risk which they take to be zero (International Swaps and Derivatives Association 1998:42). For example, in CreditMetrics future spreads for given ratings categories are assumed to be known. The large swings in credit spreads observed through 1998 strongly suggest that this assumption is unjustified. A study by Kiesel, Perraudin and Taylor (2001) shows that, especially for relatively high credit quality exposures, ignoring spread risk within a CreditMetrics-style framework may lead to risk measures which significantly understate the true level of risk.

Current credit risk models also simplify risk measurement by leaving out interest rate or other market risks (Jarrow and Turnbull 2000: 282). The CreditMetrics, CreditRisk+ and KMV methodologies emphasize the accrual accounting perspective and focus on only default risk. Interest rates are assumed to be constant, implying difficulty in the valuation of derivative products that are sensitive to interest rate changes, such as bonds and swaps.

It is particularly difficult to model the covariation in credit risks across different exposures in a tractable way while respecting this basic nature of credit risk. Unlike market portfolios where the data necessary to compute correlations are readily available, correlations in credit portfolios cannot be directly observed (JP Morgan 1997:9). Consequently, credit quality correlations must either be derived indirectly from other sources, such as equity prices, or tabulated from historical data at a relatively high level of aggregation (e.g. treating all A-rated obligors identically) (Jackson and Perraudin 2000:6).

Examples of the use of these approaches in vendor-supplied models include the CreditMetrics approach; supposing that ratings transitions are driven by changes in underlying, continuous stochastic processes. Correlations between these processes (and hence in ratings transitions) are inferred from correlations in equity returns (to some degree therefore relying on the KMV methodology). CreditRisk+, on the other hand, allows parameters of the univariate

distributions of individual exposures to depend on common conditioning variables (for example, the stage of the economic cycle). Conditionally, exposures are supposed to be independent, but unconditionally they are correlated.

The amount of computational time needed to process large portfolios, especially those resident in multiple geographies, involve a prohibitively long processing cycle. This has been a significant barrier for institutions with limited processing capacity. Furthermore, multiple legacy systems, both custom developed and purchased packages, are often not compatible with each other, namely due to inconsistent data formats and/or level of exposure data.

Many credit risk-related activities are difficult to model. Credit enhancement arrangements such as guarantees, collateral held, and netting agreements, for example, are difficult to model within a transaction processing system due to their distinct nature. While certain portfolio models can take these into account, the specific nature of these agreements (e.g. jurisdiction, applicability in cross-border trading etc.) makes it difficult to accurately model their impact at both the transaction levels, and are even less precise at the portfolio and institution wide level (International Swaps and Derivatives Association 1998:7).

Despite these difficulties, risk practitioners are continuing to create more robust, timely enterprise-level credit models. Institutions stand to benefit from more robust credit risk modeling in that these models often takes into account the benefits of portfolio or business line diversification, and thereby show a lower exposure to a specific product, borrower or geographic concentration than would otherwise be reported on a transaction-by-transaction basis (Global Association of Risk Professionals 1999:60).

3.3.8 Empirical evidence on the accuracy of credit risk models

Given the above apparent weaknesses of credit risk models, it is natural to ask what evidence is available about their performance. Up to now, relatively few studies have been completed which systematically analyse credit risk models from an empirical standpoint. The articles by and Crouhy, Galai and Mark (2000) present results from simulations on different models, focusing particularly on the extent to which different models yield similar risk estimates for

the same portfolio at one point in time.

Gordy's 2000 study focuses on a comparison of the CSFP model, CreditRisk+, and a simplified version of CreditMetrics in which obligors either default or do not, but no other ratings changes are considered. He shows, using simulated data, that various risk measures may be obtained using either and that it is possible to parameterize the models so the levels of these measures are broadly comparable. Crouhy, Galai and Mark (2000) compare four different credit risk models on a benchmark portfolio of 1800 bonds diversified across 13 currencies and covering a wide range of countries, maturities and credit qualities. The VaR estimates they produce are broadly similar, the highest being just 50% larger than the lowest.

The only paper which so far has looked at credit risk models on an out-of-sample basis, comparing risk measures with losses which would have been sustained on actual portfolios, is Nickell, Perraudin and Varotto. (2001). They examine the degree to which two standard credit risk models (CreditMetrics and a Merton-style model like that of KMV) accurately estimate Value-at-Risk for portfolios of Eurobonds over rolling twelve month periods. Their study is somewhat negative in its conclusions since these models yield far more "exceptions" than they would if they were accurately measuring risk. The models appear to perform poorly in particular for non-US obligors and for banks and financials.

Carey (2001b) uses the Moody's database (1970-98) to simulate credit portfolios in order to evaluate the relevance of several dimensions of credit risk. Gordy (2000) and Kiesel, Perraudin and Taylor (2001) use stylized portfolios to study how risk measures vary across different portfolio types. Crouhy, Galai and Mark (2000) and Gordy (2000) compare risk measures calculated for the same portfolio but using different models. Sobehart, Keenan and Stein (2001) propose techniques for assessing the quality of individual default rate estimates, an important input to credit risk models.

A possible criticism is that the tests are based on the entire range of the distribution, whereas risk managers and regulators are mainly concerned about the probability of extreme events. There are two arguments against focusing on the right tail of the distribution when constructing a test. Firstly, only a few of these rare events are observed in the data, a problem even sophisticated procedures are unlikely to overcome. Secondly, differences in the tails of

two distributions will often go along with predictable differences in the rest of the distribution. If default correlation is increased, for example, the probability of catastrophe losses rises, but so does the probability of very small losses (Frerichs and Loffler 2001:24).

While the models appear to perform adequately when used on exposures to US industrials, they underestimate the risks associated with exposures to non-US obligors and to banks and financials. Part of the problem is that many of the data inputs to such models are dominated by the experience of US industrials, which until recently comprised the vast majority of rated entities. When applied to credit exposures to a broader class of borrowers, it can be concluded that credit risk models should be applied cautiously, adopting conservative parameterisations (Jackson and Perraudin 1999:137).

In summary, credit risk models represent a substantial advance in the quantitative analysis of portfolios of credit exposures. Questions remain, however, about the reliability of the risk measures they supply (Jackson and Perraudin 1999:137).

3.4 CONCLUSION

The recent prominence of credit risk models partly results from the suggestion that such models be used as a basis for banks' calculations of regulatory capital. However, the Basel Committee decided not to use credit risk models in this regard. Instead, the Committee's *New Capital Adequacy Framework* paper suggests the use of internal credit ratings as an instrument to achieve the goal of closer alignment between banks' risk profiles and credit requirements. Regardless regulatory requirements, both credit risk models and internal risk ratings remain an integral part of risk measurement and management.

Whereas credit risk models are a relatively new development, rating systems have long been a critical traditional element of evaluating risk and maintaining internal credit discipline. Many banks are upgrading their risk rating systems beyond traditional limits to enhance the rigor and objectivity of ratings analysis, to distinguish more finely among degrees of riskiness.

Credit risk ratings both shape and reflect the nature of credit decisions that banks make daily.

Such rating systems are an important element in several key areas of the risk management process. This includes assessing the riskiness of a portfolio by examining the distribution of loans by risk rating and changes in that distribution. Moreover, rating systems are also utilized in establishing an appropriate level for the allowance for loan and lease losses, conducting internal bank analysis of loan and relationship profitability, assessing capital adequacy, and performance-based compensation. Understanding how rating systems are conceptualized, designed, operated, and used in risk management is thus essential to understanding how banks perform their business lending function and how they choose to control risk exposures.

As with all material bank activities, a sound credit risk management process should adequately illuminate the risks being taken and apply appropriate controls to allow the institution to balance risks against returns and the institution's overall appetite for risk, giving due consideration to the uncertainties faced by lenders and the long-term viability of the bank.

Several factors determine how informative and reliable the rating is in describing the risk of loss associated with a borrower or exposure. This includes the manner in which risk factors are considered in arriving at an overall borrower grade. The issues arising in these areas are closely related to good underwriting practices more generally. Furthermore, the availability and quality of loss data has emerged as a significant issue in measuring credit risk. Due to the lack of internal historical information, other kinds of information must be used to proxy changes in value or credit standing. In this regard, most banks rely on indirect risk measures, including mapping from external credit ratings agencies and the use of credit scoring models.

A key consideration in relying on external data is the comparability of such data to a bank's own portfolio. This is an issue for a number of reasons, including differences in the composition of the bank's portfolio and potential differences between the performance of publicly traded bonds and that of loans and discrepancies between point-in-time and through-the-cycle ratings.

A bank's decisions about its internal rating system can have a material effect on its ability to manage credit risk. However, the development of internal rating system architecture and

operating designs that are appropriate to the uses made of the ratings is an especially complex task. In designing rating systems, bank management must also weigh numerous other considerations, including cost, efficiency of information gathering, consistency of ratings produced, staff incentives, the nature of the bank's business, and the uses to be made of internal ratings. The central role of human judgement in the rating process and the variety of possible uses for ratings mean that internal incentives can influence rating decisions. Thus, careful design of controls and internal review procedures is a crucial consideration in aligning form with function.

This includes consideration of the appropriate mix between objective and subjective risk assessment methods. In this regard, the use of statistical based methods must be balanced with subjective methods to generate accurate and consistent ratings, yet to allow professional judgement to significantly influence a rating where it is appropriate. The ideal is thus that banks design the operational flow of the ratings process in ways that are aimed at promoting the accuracy and consistency of ratings while not unduly restricting the exercise of judgement. Furthermore, review activities are crucial for maintaining the culture in that the feedback they give is critical to common understanding and discipline.

Several conditions appear to place stress on bank rating systems. The conceptual meaning of ratings may be somewhat unclear, rating criteria may be largely or wholly maintained as a matter of culture rather than formal written policy, and corporate databases may not support analysis of the relationship between grade assignments and historical loss experience. Such circumstances make ratings more difficult to review and audit and also require loan review units in effect to define, maintain, and fine-tune rating standards in a dynamic fashion.

The inclusion of internal risk ratings as an explicit element in the evaluation of capital adequacy introduces new stresses on internal rating systems. As will be explained in chapter 4, greater supervisory reliance on internal credit risk ratings require that supervisors be confident of the integrity and rigor of internal rating systems. In some respects, these stresses would parallel those associated with rating-sensitive profitability analysis. That is, incentives would arise to grade optimistically and to alter the rating system to produce more fine-grained distinctions of risk. However, new incentive conflicts could arise between outsiders on the one side and the bank as a whole on the other side. Such new conflicts could

overwhelm the checks and balances currently provided by internal review functions. Even in the absence of such incentive conflicts, the degree of accuracy and consistency in rating assignments by the Basel Committee might be greater than that required internally. This necessitates external reviews and validation of the rating system. In addition, banks and supervisors should both be aware that the additional stress imposed by external uses, if not properly controlled, could impair the effectiveness of internal rating systems as a tool for managing the bank's credit risk.

The use of internal risk ratings as inputs in credit risk models underpins the importance of accurate internal risk ratings. Credit risk models employ Value-at-Risk (VaR) methodology to the measurement and management of credit risk, providing estimates of probability distribution of credit losses, conditional on portfolio composition.

Modeling portfolio risk in credit portfolios is neither analytically nor practically easy, presenting at least two significant challenges. Comprehensive and accurate credit risk modeling requires the combination of complex and highly quantitative risk estimation which captures the broad range of potential value outcomes in a portfolio with in-depth counterparty credit analysis which measures the probability of credit deterioration and default. Furthermore, the specification of the process of default and other factors leading to changes in credit quality is severely constrained by a lack of data on the historical performance of loans and other modeled variables. This makes credit risk modeling one of the most challenging aspects of risk management.

The validation of model forecasts, aimed at assessing the accuracy of model forecasts or outputs is one of the main issues in credit risk modeling. The need for effective model validation is apparent, given the conceptual uncertainties and extensive judgement required in specifying credit risk models. However, the same data limitations that render parameter calibration problematic, also make model validation exceedingly difficult.

At present, there is no commonly accepted quantitative framework for periodically verifying the accuracy of credit risk models. Backtesting, the generally accepted validation method for market risk, is problematic in the credit risk models context, because of their underlying time horizons, data limitations and the confidence interval employed. Thus, it is important to find

alternative validation methods that supplement backtesting.

Quantitative model validation measures cannot encompass every risk facing a bank. Furthermore, such methods generally involve the use of methodologies and assumptions that may not be robust in some circumstances. The success of a model depends as much on the way the model itself is used as it does on the environment in which the model operates, especially given many credit models' considerable complexity.

Consequently, qualitative aspects, such as the internal environment in which a model operates, is of paramount importance. The amount of senior management oversight, the proficiency of loan officers, the quality of internal controls, the rigor of stress testing, the reporting process and other traditional features of the credit culture play a key part in the credit risk management framework.

Despite the difficulties in calibrating and validating credit risk models, risk practitioners are continuing to create more robust, timely enterprise-level credit models. Institutions stand to benefit from more robust credit risk modeling in that these models often take into account the benefits of portfolio or business line diversification, and thereby show a lower exposure to a specific product, borrower or geographic concentration than would otherwise be reported on a transaction-by-transaction basis.

CHAPTER 4: FINANCIAL REGULATION, THE REGULATORY HANDLING OF CREDIT RISK AND THE PROPOSED NEW BASEL ACCORD

4.1 INTRODUCTION

Banking was traditionally regarded as one of the most regulated industries in the world, and the rules on bank capital is one of the most prominent aspects of such regulation. This prominence results from the central role banks play in financial intermediation, as well as the importance of bank capital for banks' soundness and risk-taking incentives. Bank failures can have serious macroeconomic repercussions, due to the close relationship between bank solvency and the integrity of the payments system. The vulnerability of banks to contagious shocks creates the potential for a systemic shock, where a sudden unanticipated event impair the functioning of the financial system to such an extent that economic activity in a wider sense suffer. Consequently, safeguarding the economy against such a systemic shock is one of the major objectives of financial regulation. A further objective is enhancing efficiency, by creating securing competitive neutrality between financial sector firms. Creating such a level "playing field" was one of the key factors behind the international effort to harmonise capital standards in the 1980's.

The international convergence of bank capital regulation started with the 1988 Basel Accord on capital standards. This Accord considered only credit risk explicitly. The potential link between credit risk and contagious bank failure provides the basis for risk-adjusted capital requirements. Such capital requirements foster the safety and soundness of banks by limiting leverage and providing a buffer against unexpected losses. The current capital adequacy rules focus exclusively on credit risk and do not explicitly account for certain risks, such as interest rate risk and operational risk.

Since its introduction, the Capital Accord has been acknowledged for its contribution to the widespread use of risk-based capital ratios, both as measures of the strength of banks and as trigger devices for supervisors' intervention. The Accord has also been praised for the international convergence of capital standards and for the improvement of these standards in

many countries.

However, a decade of financial innovations, in some cases with the intention of circumventing the Accord, has eroded its effectiveness. For example, neither securitization nor credit derivatives are adequately captured in the 1988 Accord. In parallel to this development, risk management systems employed by the most sophisticated banks have undergone what can only be described as a dramatic change during the 1990's. As a result of rapid innovation in risk management technologies, the Accord has come to appear increasingly dated. Furthermore, its design has been blamed for several distortions to the business of banking. Growing evidence on these distortions, together with a better understanding of its conceptual shortcomings, has led to proposals to redesign it.

A proposal for a New Capital Adequacy Framework was released in June 1999 by the Basel Committee. On 16 January 2001, the Basel Committee on Banking Supervision followed up this first consultative document by presenting its second consultative document. The document outlines a number of measures which, taken collectively, amount to a fundamental revision to the 1988 Accord. It contained three fundamental innovations, each designed to introduce greater risk sensitivity into the Accord. Two of the innovations concern refinements of the existing risk measurement framework. These involve permitting banks to use their own internal systems for evaluating credit risk, known as “internal ratings”, or alternatively, to use risk ratings provided by approved external credit assessment institutions to classify their exposures into risk buckets.

The most significant innovation of the new proposals is that they move away from sole reliance on capital adequacy ratios and adopt a “three-pillared” approach, with a risk-sensitive capital framework being reinforced by supervisory review and enhanced disclosure, for ensuring bank solvency.

The proposed multi-track approach to prudential oversight was motivated by trade-offs between more detailed supervision and regulation, on the one hand, and moral hazard and the smothering of innovation and competitive response, on the other hand. In a financial industry landscape fundamentally transformed by globalization of markets and constantly increasing competitive pressures, risks in the financial industry are larger in scale and scope than ever

before. Closer ties on a global basis between bank supervisors and increased reliance on market discipline are essential for effective supervision.

These three pillars are critically interdependent and the new Accord's success hinges on ensuring the proper functioning of all three of them (Karacadag and Taylor 2000:16). Supervisory review is vital to ensure that capital allocation processes are sound and utilized effectively. Market discipline, in turn, is necessary to provide incentives for banks to manage their risks prudently.

The New Capital Adequacy Framework is a matter of immense significance for the international financial system, since the 1988 Accord became accepted as the *de facto* international standard for assessing a bank's capital adequacy. While both the 1988 Accord and the proposed New Capital Adequacy Framework share the same objectives of promoting safety and soundness in the financial system and enhancing competitive equality among them, the new Accord represents a significant departure from the 1988 Accord in terms of the principles it embraces and the methods it employs.

The main aim of this chapter is to give an overview of these principles and methods. Furthermore, key trade-offs among elements of the new framework, for example, between the accuracy of capital charges and the comparability of standardized capital ratios is highlighted. A subsidiary concern of this chapter is the applicability of the new Accord to emerging markets. It is evident that several preconditions for implementing important components of the new capital framework are absent in most emerging market economies. A number of implementation challenges need to be overcome before the potential advantages of the new Accord can be realized.

The chapter starts with a discussion of the objectives of financial regulation. The rationale of bank regulation, which centers around the special role banks play in the economy, as well as the relationship between bank solvency and the integrity of the payments system, is also discussed. Factors behind the international convergence of bank capital regulation with the 1988 Basel Accord are also discussed. This is followed by a review of key features of the 1988 Basel Accord, as well as the reasons motivating the Committee's proposal to revise it.

A conceptual framework for assessing the major reorientation in bank capital adequacy regulation is also developed. Both the 1988 Accord and the New Capital Adequacy Framework can be grounded in this conceptual framework which rests on two intersecting dimensions -regulatory versus economic capital and rules-based versus process-oriented capital regulation. Within this framework, the potential advantages of the new framework over the 1998 Accord is discussed.

The discussion then turns to a critical analysis of the three pillars upon which the proposed new Basel Accord is built. The chapter concludes with the identification of challenges associated with each of the three pillars and recommendations on how they might be overcome.

4.2 OBJECTIVES OF FINANCIAL REGULATION

A well functioning financial system makes a critical contribution to economic performance by facilitating transactions, mobilizing savings and allocating capital across time and space. Financial markets also provide a crucial source of information that helps coordinate decentralized decisions throughout the economy. Rates of return in financial markets guide households in allocating income between consumption and savings, while firms rely on financial market prices to inform their choices among investment projects and to determine how such projects should be financed.

In view of these critical contributions to economic performance, it is not surprising that the health of the financial sector is a matter of public policy concern and that nearly all national governments have chosen to regulate the financial sector. The overall objective of regulation of the financial sector should be to ensure a high degree of economic efficiency in the country (Herring and Santomero 1999:3).

However, actual financial regulation attempts to accomplish several objectives beyond facilitating the efficient allocation of resources, including (SBC Warburg Dillion Read 1998:217):

-Enhancing the efficiency of the financial system. Confidence that financial markets and

institutions operate according to rules and procedures that are fair, transparent and place the interests of customers first are of critical importance in this regard. Maintaining the maximum level of competition among market participants in the financial system and securing competitive neutrality between actual or potential suppliers of financial services would promote the attainment of a high level of efficiency. Competitive neutrality can be defined as a situation in which no party to a financial transaction would enjoy a competitive advantage due to regulation, and different suppliers of financial services do not have regulatory advantages (Falkena, Fourie and Kok 1995:255). From a regulatory perspective this would involve the creation of a “level playing field” for concluding financial transactions.

In addition, when regulation moves from the domestic to the international level, regulators aim to maintain competitive equality between firms from different jurisdictions. This objective aims to ensure that firms from one country or regulatory background do not enjoy an unfair competitive advantage over firms that are subject to different regulatory requirements.

-Securing the stability and safety of the financial system. In an operational sense, this means that financial market disruptions should not have a significant impact on aggregate real economic activity, in particular by limiting the chance of a “systemic” event. Systemic risk may be defined as the risk of a sudden, unanticipated event that would damage the financial system to such an extent that economic activity in the wider economy would suffer. Such shocks may originate inside or outside the financial sector and may include the sudden failure of a major participant in the financial system, a technological breakdown at a critical stage of settlements or payments systems, or a political shock such as an invasion or the imposition of exchange controls in an important financial center (Herring and Santomero 1999:4).

Supervision cannot, and should not, provide an assurance that banks will not fail. In a market economy, failures are part of risk-taking. Prudential regulation and the bank examination process, even if structured in optimal fashion, are a second line of support for bank soundness and can never be a substitute for internal bank management.

This implies that regulators must accept the possibility of bank failures, as the role of regulation is not that of delivering guarantees of banks’ deposit liabilities. To attempt to

avoid any bank failing would not only be unhealthy for the economy (as it would involve limits on competition, innovation and the taking of risks, and increase the cost of supervision) but will also be virtually impossible to achieve. South African banks supervisors recognized this principle, as documented in the annual report of the Bank Supervision Department (2001a:23) of the South African Reserve Bank. This is also evident in the fate of Regal Treasury Bank, for example.

-Protection of the client of financial services against excessive prices or opportunistic behavior by providers of financial services or participants in financial markets. Financial regulation thus has a consumer protection (and micro prudential) rationale as well as a macro prudential rationale to safeguard the system against systemic risk. Thus, regulators seek to limit the real costs associated with bank failures, while at the same time permitting banks to carry out their socially critical functions, including the financing of investment (Meister 1998:102).

Supervision and regulation are neither infallible nor likely to prove sufficient to meet all the above-mentioned intended goals. As with most factors in the economy the difficult part is to balance these objectives to an optimal point. Conflict exists between these objectives if regulators aim to achieve all objectives in full. For example, increased competition may adversely affect the stability of the financial system, but it can also increase efficiency. Similarly, additional prudential measures can potentially reduce the efficiency of the financial system. Efficiency is reduced because regulatory restrictions, by their nature, slow innovation and often limits the ability of institutions to adapt to changing market conditions (Barclays PLC 2001:5).

Furthermore, a regulatory framework that is resilient to changing needs over time and has the flexibility to move in step with the best practices in risk management is a key pre-requisite to strike the optimal balance between the safety and soundness of the banking system and the need for a level playing field (Estrella 1998: 195).

It must also be kept in mind that regulation imposes a range of costs (institutional, compliance and structural), which are ultimately reflected in the price of financial services. The authorities avoid regulation that is “excessive” (in that it exceeds what is needed to

achieve its limited objectives) and has a cost that may exceed the economic costs that regulation is designed to prevent.

4.3 THE JUSTIFICATION OF FINANCIAL REGULATION

The justification for any regulation usually stems from a market failure such as externalities, market power or asymmetry of information between buyers and sellers (Santos 2000:5). The preceding discussion of the objectives of financial regulation has identified three categories of objectives that apply not only to the financial sector but also to some non-financial products and services as well. Although the means of regulatory intervention may vary from sector to sector, the objectives of consumers' protection and enhancing the efficiency of markets, motivates regulation in a broad range of industries in addition to the financial services industry.

In the case of the financial industry, there are two justifications that are often presented for regulating banks: the risk of a systemic crisis and the inability of depositors to monitor banks (Santos 2000:5). Systemic risk motivates a considerable amount of financial regulation but does not apply to regulation in other industries.

A financial crisis is systemic in nature if many banks fail together, or if one bank's failure propagates as a contagion causing the failure of many banks. Systemic risk can be defined as the potential for a relatively modest economic shock to induce disproportionate volatility in the prices of financial assets, significant reductions in corporate liquidity, substantial mark-to-market losses, and perhaps even unanticipated bankruptcies among financial institutions (Kupiec and Nickerson 2001:2).

Furfine (1999:1) distinguishes between two different, albeit potentially correlated types of systemic risk. The first type is the risk that some financial shock causes a set of markets or institutions to simultaneously fail to function efficiently. The second type of systemic risk is the risk that failure of one or a small number of institutions will be transmitted to others due to explicit financial linkages across institutions.

At the heart of bank regulation is a deep-seated concern that social and economic costs of

such systemic crises are large. Thus, systemic supervision takes a broader view than merely the undertakings of individual financial institutions and focus on the health and ability of the financial system to weather shocks, with special regard to the likely impact of financial disturbances on the economy as a whole.

On the other hand, prudential supervision looks into the health of individual financial institutions. That is, prudential supervision puts more emphasis on analyzing the health of institutions' balance sheets, especially in regard to whether they have sufficient capital to weather the ups and downs of business. Although regulatory capital requirements cannot prevent systemic shocks, it can reduce the vulnerability of the financial sector. Credible enforcement of uniform regulatory capital requirements thus may reduce systemic risk by introducing a measure of confidence in the solvency of financial counterparties. This fundamental objective of minimum capital standards may be articulated as follows: "Capital provides a measure of assurance to the public that an institution will continue to provide financial services even when losses have been incurred, thereby helping to maintain confidence in the banking system and minimise liquidity concerns" (Kupiec and Nickerson 2001:2).

It is thus broadly understood that the goal of prudential regulation should be to ensure the financial stability of the system as a whole, i.e. of an institution not only individually but also as a part of the overall financial system (Acharya 2001:1). Special regard is made to capital adequacy, operational risk and other indicators of prudential soundness. The aim of prudential supervision can be seen as both consumer protection and reducing the threat of spill-over effects on the wider economy.

However, the ultimate intent of capital regulations encompasses more than the prevention of systemic risk. This is described in the following statement: Banks should maintain a level of capital that is sufficient to: (1) reduce the likelihood of bank insolvencies to a level consistent with a stable banking system; (2) immunize taxpayers from losses incurred by government-guaranteed bank claimants in the event of bank insolvencies; and (3) align the incentives of bank owners and managers with those of uninsured bank claimants with respect to the risks assumed by banks. (Rojas-Suarez 2001a:6)

As will be discussed in section 4.4, world-wide banks operate within a public safety net. They have access to central bank funds in an emergency, and they are often covered by publicly provided deposit insurance. These facilities allow banks to transfer some of the risk in their asset portfolios from shareholders to taxpayers without compensating them for that increased risk. Because safety nets create incentives for banks to take on more risk, banks must be supervised and regulated in order to restrain their ability to shift risk to the public. Forcing banks to have sufficient capital at risk is a way to achieve this objective, as is made clear in the second point in the above quotation.

The systemic risk rationale for the prudential regulation and supervision of banks start from the presumption that the three basic functions making banks special are central to the functioning of the financial system and the real economy, but give rise to bank financial structures that are vulnerable to liquidity shocks.

These functions, namely loan origination, provision of payment services and acceptance of deposits, are performed more or less simultaneously. Banks transform the longer term, risky, illiquid claims that borrowers prefer to issue into safer, shorter term, more liquid demand and savings deposits that savers prefer to hold. This asset transformation often involves maturity transformation as well. The implication of the simultaneous performance of these three functions is that banks combine a large portion of liabilities in the form of demand deposits with a large portion of assets in the form of illiquid loans. The consequence is a balance sheet structure vulnerable to liquidity shocks and bank runs (Santomero 1997:10).

A rumor that a bank has sustained losses that are large relative to its equity may be sufficient to precipitate a run. Moreover, because forced liquidation of illiquid bank assets can cause additional losses, once a run has begun it tends to be self-reinforcing. Even depositors who were not alarmed about the original rumor of losses may join the run once it has begun because they know that the run itself may jeopardize the bank's solvency. When a large fraction of a bank's depositors or creditors behave this way, even solvent banks can fail (Herring and Santomero 1999:15). Moreover, the probable reassessment by investors of other banks which are perceived to be similar to the failing bank may also lead to bank runs that precipitate failures of even healthy banks. The potential size and number of interbank loans mean that individual bank failures may have risks for the country concerned's banking

system as a whole. As evidenced by the recent banking crisis in Asia, such problems can also spill over to banks in other countries in the region.

Bank runs are a particularly serious problem when there are a few large institutions with national or international franchises. The larger the institutions, the greater the likelihood that the failure of any one will attract public attention and undermine confidence in the financial system in general, and in other similar large financial institutions in particular (Santomero 1997:10). Thus in a concentrated banking sector like the South African banking sector, systemic risk resulting from a bank run is an especially serious possibility. However, bank failures in South Africa was limited to small banks in the recent past (Joffe 2002g:1). This includes Regal Treasury Bank and Saambou.

The most obvious way for authorities to limit direct contagion effects would be to set regulatory limits for the size of the exposures banks were allowed to have towards one another. Most countries have rules regarding large exposures, but these are mainly set up in order to limit concentrations in banks' lending portfolios. This approach is also followed by the South African Reserve Bank (see section 5.5.2.1.). In the EU regulatory framework, banks are not allowed to have individual counterparty exposures that are larger than 25 per cent of their capital base. It is common to regard the need for banks to take on large exposures between each other as an unavoidable part of their business. This is especially so in a concentrated banking system, as banks may have few other alternatives than to deal with each other in the inter-bank markets.

Blavarg and Nimander (2002:15) conclude that moral hazard seems to be present with respect to the exposure towards direct contagion. To some extent banks are actually protected by the existence of risks of direct contagion, as these make government intervention more likely. Consequently, this can be seen as a market failure, which makes it reasonable to question whether there is scope for regulation in this area.

A generalized failure of the whole banking system would also threaten the payments system. Banks' short-term liabilities are the main means of payment and store of liquid wealth in the economy (Hoggarth 2001:11). This underlines the importance of the systemic risk rationale of bank regulation. An additional rationale for banking regulation, the representation

hypothesis that builds on the inability of depositors to monitor banks, is proposed by Dewatripont and Tirole (1993:6). The departing point of their argument is that banks, like most businesses, are subject to moral hazard and adverse selection problems. Customers are vulnerable to *adverse selection*, the possibility that a customer will choose an incompetent or dishonest firm for investment or agent for execution of a transaction. They are also vulnerable to *moral hazard*, the possibility that firms or agents will put their own interests or those of another customer above those of a customer or even engage in fraud. In short, unsophisticated consumers are vulnerable to incompetence, negligence and fraud. The ultimate rationale for the aspect of regulation designed to protect the consumer is to correct for market imperfections or market failures, which would compromise consumer welfare in a regulation free environment.

Therefore, it is important that investors monitor them. Monitoring, however, is expensive and requires, among other things, access to information. Furthermore, it is wasteful when duplicated by several parties. In the case of banking, this is complicated by the fact that bank debt is mainly held by unsophisticated depositors without the necessary information to perform efficient monitoring (Santomero 1997:14). This problem creates a need for a private or public representative of depositors. In effect, regulators serve a monitoring function on behalf of unsophisticated customers of modest means. One way of achieving these objectives is through conduct of business regulation. Conduct of business regulation relates to how financial firms do business with their customers. It is more focused on aspects of consumer protection, such as information disclosure, honesty, integrity and fair business practices. Another way is the adoption of a deposit insurance scheme. Deposit insurance is one of the components of a financial safety net, which will be discussed in the next section.

4.4 PRUDENTIAL REGULATION AND SUPERVISION: THE FINANCIAL SAFETY NET

The financial safety net is an elaborate set of institutional mechanisms designed to safeguard the economy from systemic risk that might result from contagious bank runs. This safety net can be viewed as a series of circuit breakers designed to stop the sequence of events that follows the disturbance at a number of points, in order to preserve the integrity of the financial structure and the health of the real economy (Herring and Santomero 1999:17). The

aim is not only to make systemic breakdowns less likely, but also to limit the disruption and fiscal costs generated when they do occur (Demirgürç-Kunt and Kane 2001:2).

A safety net thus consists of a multidimensional policy scheme that seeks to balance the costs and benefits generated by (Kane 2001:4-5):

1. Protecting bank customers from being blindsided by bank insolvencies.
2. Limiting aggressive risk-taking by banks.
3. Preventing and controlling damage from bank runs.
4. Detecting and resolving insolvent banks.
5. Allocating across society whatever losses occur when an insolvent bank is closed.

The components of a safety net are best described in terms of functions, because the agencies that perform a particular function vary across countries. A typical financial safety net can be seen as consisting of the following functions (Santomero 1997:11):

Firstly, the chartering function seeks to screen out imprudent, incompetent or dishonest bank owners and managers who would take on excessive insolvency exposure. This usually involves fit and proper tests that bank owners and managers must pass to qualify for a banking license. In the aftermath of the collapse of the Bank for Credit and Commerce International, which was engaged in fraud on an international scale, a number of countries established additional tests for continuance of a banking license for foreign banks (Milne 2001:11).

Secondly, the prudential supervisory function seeks to reduce the probability of insolvency. Prudential supervision is concerned both with leverage and asset quality. Capital adequacy standards attempt to constrain leverage risk and ensure that the bank has an adequate buffer against unanticipated losses (Kane 2001:8). In addition to minimum capital requirements, supervisors also attempt to control asset risk by diversification rules, restrictions on connected lending or outright prohibitions on certain kinds of assets.

Thirdly, in the event that prudential supervision does not prevent excessive insolvency exposure and a damaging shock occurs, the termination authority attempts to make a

regulatory disposition of the bank before it exhausts its net worth and causes losses to depositors. In this regard, minimum capital requirements provide a basis for regulatory intervention in a troubled bank before insolvency has occurred. Regulatory authorities can require that a bank recapitalise, through for example, an issue of new capital, a merger with a stronger institution, or other balance sheet restructuring. Without such regulation, the regulators will typically have to await until insolvency is threatened before taking action (Milne 2001:9).

Prompt corrective action provisions require supervisors to intervene earlier and more vigorously when a financial institution gets into trouble (Mishkin 2000:17). A key element of making prompt corrective action work is that bank supervisors have sufficient government funds to close down institutions when they become insolvent. However, supervisory authorities face technical and political difficulties in implementing the termination function with such precision. The result is that insolvent banks are often permitted to operate long past the point at which they have exhausted their net worth. It is very common that politicians and regulatory authorities engage in wishful thinking when their banking systems are in trouble, hoping that a large injection of public funds into the banking system will be unnecessary. The result is regulatory forbearance with insolvent institutions allowed to keep operating which ends up producing disastrous consequences (Corbett and Mitchell 2000:2).

The way in which failures are handled, and their cost borne, is largely a political matter involving decisions on whether, and to what extent, public funds should be committed to supporting the banking system. Such matters cannot therefore always be entirely the responsibility of banking supervisors.

Fourthly, even if the depository institution closes abruptly, deposit insurance may protect depositors from loss and remove the incentive for bank runs. In response to the banking crisis of the Great Depression, the United States established the Federal Deposit Insurance Corporation in 1933 to provide insurance against loss for owners of small deposits. Other countries also have explicit or implied government guarantees backing their financial institutions (Demirgürç-Kunt and Kane 2001:4).

The primary benefit of establishing a deposit insurance scheme is to eliminate the immediate

threat of financial panic. Since all countries have a safety net, deposit insurance can cap the government's future commitments to depositors of insolvent institutions. Similarly, offering deposit insurance may allow a government to negotiate increased rights to intervene in a timely fashion into the affairs of insolvent institutions. Furthermore, deposit insurance can be seen as a means for protecting unsophisticated small depositors and provide a risk-free asset to small savers (Demirgürç-Kunt and Kane 2001:20).

Despite its increased favor among policy-makers, the desirability of deposit insurance remains a matter of some controversy among economists. Economic theory offers a mixed message. On the one hand, credible deposit insurance contributes to financial stability by making depositor runs less likely. On the other hand, it may induce a willful increase in inappropriate risk-taking on the part of banks. The increase in risk-taking is described as willful because it responds to the extent that a given scheme undermines pre-existing incentives of depositors to monitor and police bank risk-taking (Santomero 1997:1). Unless insured institutions' capital positions and risk-taking are supervised carefully, the insurer will accrue loss exposures that undermine bank stability in the long run (Kupiec and O'Brien 1998:201). The potential moral hazard effect of deposit insurance is also reflected in empirical studies, although empirical evidence concerning the impact of deposit insurance on bank risk-taking and the potential for banking sector fragility is mixed (Demirgürç -Kunt and Kane 2001:13).

A deposit insurance scheme for South Africa (SADIS) has been under consideration for a number of years, and its introduction may have been hampered by the possible lukewarm reception it has received from big banks in South Africa. They perceive deposit insurance facilities to be tantamount to subsidization of small banks by big banks (ABSA 2002b:6). According to the SA Reserve Bank, draft legislation on a deposit insurance scheme for banks could be ready by the end of 2002. The proposed deposit insurance scheme for South Africa (SADIS) is likely to have a co-insurance element, in that it will provide cover for, say, only 85 per cent of a deposit (Bank Supervision Department of the South African Reserve Bank 2001a:23).

Finally, the lender of last resort function may enable solvent institutions to meet the claims of liability holders, avoiding forced asset liquidations and depressed prices. The monetary

authority may also prevent a shift in the public's demand for cash from reducing the volume of reserves available to the financial system as a whole, thereby confining the damage to the institutions directly affected by the original shock.

The refusal of the South African authorities to use the lender of last resort function to assist Saambou with liquidity, forcing it to go in curatorship (see section 5.4) caused much controversy. It might be that the authorities are wary of being perceived to be too generous in acting as a lender of last resort for fear that bailing out banks too readily might encourage reckless banking practices.

Problems at BOE, however, elicited a quick official response. The authorities' decision to stand behind BOE can be seen as demonstrating that banks as big or bigger than BOE will be supported if they get into difficulties, because of the systemic risk this would pose to the banking system. Some banks may therefore be regarded as "too big to fail". According to ABSA (2002b:5) the impression has been created that only small banks will be allowed to fail since they constitute a very small percentage of the total banking deposits in South Africa, and therefore pose no material systemic risk.

In the major industrialized countries, the various circuit breakers that comprise the financial safety net have been generally successful in preventing a problem at one institution from damaging the system as a whole. In effect, banking systems in most market economies operate with the implicit support of their regulatory authorities. With the possible exception of New Zealand, where the authorities have explicitly taken down their safety net for banks, the intervention of the regulatory authorities in time of crisis is rationally expected in every market economy (Santomero 1997:12).

However, the safety net works best in its early and late stages. The chartering and prudential functions have been responsible for maintaining a reasonably good reputation for the sector as a whole, world-wide. Likewise, the last stages of contagion control, using the functions of lender of last resort and monetary neutralization of a crisis, have worked reasonably well. Indeed, many would argue that it has been used too often, thereby prohibiting the exit of failed institutions and reducing the cost of risk-taking by institutions (Santomero 1997:12).

Depositors and other creditors have come to rely on their banks' access to the safety net as a protection against losses with the consequence that they exercise only limited surveillance over riskiness. The pricing of bank liabilities depends heavily on a bank's presumed access to the safety net. The result is that banks are not penalized for taking greater risks as heavily as they would be if they did not have access to the safety net. Consequently, banks take on greater risks.

The moral hazard feature of the safety net has contributed to the frequency and severity of banking problems, which appear to be rising. Examples include several banks in Eastern Europe and the Far East that have assumed excessive risk and suffered severe consequences (Mishkin 2000:19). This has led many to argue that financial regulation and the safety net itself need some adjustments. Addressing the problem of moral hazard is one of the reasons for the adoption of a new approach to bank regulation and supervision, as envisaged under the proposed new Basel Accord. This new approach, among other things, include a "three-pillar" approach to bank regulation, as explained in section 4.7.

In this context, the existence of a financial safety net will always be a balancing act (Santomero 1997:2). On the one hand, managers are expected to minimize the risk of a banking disaster. On the other hand, they are expected to minimize the cost of supporting troubled banks by subjecting banks to market-mimicking disciplines. This expectation imposes a painful trade-off between the immediate bureaucratic and reputational benefits that can be reaped by being merciful to troubled banks and the unmeasured long-run costs caused when bank insolvency is not resolved promptly (Kane 2001:24).

Thus, there is a clear trade-off between safety net provisions which help manage crises today and the likelihood that associated moral hazard will create even bigger crises tomorrow. This implies that regulatory standards are incomplete unless they accept the idea that on occasion even the best-designed safety net will fracture or prove too small. Consequently, authorities need to develop and regularly review strategic plans for managing financial crises and to train their staff in the use of crisis management protocols. Paradoxically, unless the safety net is backed up by solid crisis planning, improvements in the safety net may result in less frequent but more devastating crises. On balance, the more effective a nation's safety net becomes, the less likely it is that regulatory personnel will have prior hands-on experience in coping with

severe crisis pressures (Kane 2001:5).

The existence of this trade-off leads to the conclusion that the practical design of safety nets is an important issue, and one made more complicated by the realisation that safety net provisions can also interact in complicated ways (White 2000:24).

The preceding discussion regarding the rationale for financial regulation rests on the special role banks play in the financial system and the macroeconomy. However, banks are markedly less special than they were a decade ago. They are no longer the primary source of business and consumer finance. Neither are they the main repository of liquid savings for the financial system. However, banks do remain custodians of the payment system and for that reason concerns about systemic risk persist. The principal source of concern is what Flannery (1998: 22) has described as “credit-based” mechanisms for the exchange of large-value payments. The problem is that many national payment systems permit banks to run substantial overdrafts in the process of clearing and settling payments. In effect, the systems rely on the equity of participating banks to control default risks. Failing that, problems at a particular institution can threaten the viability of other institutions.

Although risk of contagion is crucial as a motive for a public interest in banking systems, it is striking how little this is reflected in regulatory systems. Historically, financial regulators maintained the view that the health of the financial system is dependant on the health of individual institutions. Accordingly, if institutions are protected from failure through regulation of capital and prudential supervision, the viability of the system is ensured. However, if the purpose is to protect otherwise sound banks from systemic problems, then perhaps there are more direct ways of achieving this.

Specifically, measures such as collateral requirements, debit caps, and pricing of intraday credit can be used to prevent large interbank credit exposures in the payments system. In addition, limits on interbank deposit exposures and on loans to a single borrower can further protect the economy from problems at both bank and non-bank financial institutions (Hoenig 1996:8).

Several measures have already been taken to reduce and eventually eliminate overdrafts. The

objective is real time gross settlement, in which settlement is made payment for payment without overdrafts (Hoenig 1996:6). In support of these efforts to reduce credit risk in the payments systems of central banks in the three largest economic regions (north America, Europe and Japan) have committed to expanding their hours of operation so that payment against payment transactions can take place in bank reserves.

Flannery (1998:30) sees this movement away from a credit-based payments system as “eliminating the need for prudential government supervision of large financial firms.” Once the issue of bank solvency has been divorced from the integrity of the payments system, the last remaining aspect in which banks are special will have ended. When banks are no longer a source of systemic risk, the safety net can be taken down and banks can be regulated like other financial firms.

However, to date the existence of a financial safety net remains an integral part of maintaining a safe and sound financial system in most countries. Establishing a system of explicit deposit insurance guarantees is an important component of such a safety net and remains a principal feature of policy advice on financial architecture (Garcia 1999:31).

4.5 APPROACHES TO REGULATION

As mentioned, financial regulation is largely driven by the view that the soundness and safety of individual institutions will guarantee the health of the financial system (Hoenig 1996:7). Within this framework, Karacadag and Taylor (2000:9) differentiate between two approaches to regulation, namely rules-based and process-oriented regulation. These concepts are best thought of as “ideal types” or models to which actual regulation can conform in varying degrees.

Rules-based regulation sets prescriptive standards that regulated firms are required to follow. In the context of capital regulation, it relies largely on the application of simple mechanical formulas for assessing capital adequacy. Rules-based regulation thus aims for consistency across institutions. Indeed, it might be criticized on the grounds that it adopts a “one-size fits all” or “cookie cutter” approach to assess risk. The prudential soundness of banks is monitored by using a standardized risk measurement framework, employing data based on a

snap-shot of their balance sheets on certain specified reporting dates. The approach is standardized since regulators specify the precise form in which the calculation of the capital adequacy is to be performed, for example, the specific risk categories to which assets are assigned. It is also a calculation that is intended to be performed only periodically, reflecting the assumption that credit risk is the main type of risk arising from banking activity, and problem loans can be detected sometime in advance of default. If a loan goes bad, provisions can be made, and possibly a workout organized. Consequently, it is not necessary to monitor these risks on a real-time basis.

By contrast, a process-oriented approach rejects both the ideas of standardization and that periodic reports are a sufficient basis on which to assess a bank's financial soundness. Standardization is inappropriate, it is argued, because capital adequacy must vary according to the quality and character of a bank's assets, the competence of its management, and the stability of the environment in which it operates. No simple mechanistic formula can adequately reflect these factors (Estrella 1998:195). While this has always been true, advances in technology and product innovation have made mechanistic formulas ever more inadequate as a means of assessing capital adequacy. Given the dynamic, evolving character of the industry it is not possible to predetermine a set of rules that will capture all aspects of the risks incurred by banks. This dynamism has also undermined the traditional approach based on periodic reporting to supervisors. As Greenspan (1996:3) has remarked:

“The use of new technology and instruments in rapidly changing financial markets means that some bank balance sheets are already obsolescent before the ink dries. They are not even necessarily indicative of risk exposures that might prevail the next day. In such a context, the supervisor must rely on his evaluation of risk management procedures as a supplement, and in extreme cases, a substitute for balance sheet facts. As the 21st century unfolds, the supervisors' evaluation of safety and soundness increasingly will be focused on process, and less on historical records”

This has been forcefully demonstrated by the failure of Barings in 1995 which, although initially well-capitalized, was brought down by a rogue trader in a matter of months (Mishkin 2000:19). Thus, an emphasis on the adequacy of processes is to take the place of standardization and periodic reporting. Instead of prescribing rules for assessing capital

adequacy, the supervisors should aim to assess the adequacy of the internal processes used by firms to assess their own risks.

Process-oriented regulation is harder to implement, given the diversity of internal systems in banks and the discretion involved in reviewing the adequacy of capital allocation mechanisms. Given that processes rely on institution-specific and proprietary information, they are difficult to replicate and validate, and therefore less transparent. By design and in practice, process-oriented regulation does not aim to subject all banks to a common risk assessment framework. Hence, it is not readily comparable across firms.

The above-mentioned framework, differentiating between rules-based and process-oriented regulation, will be used to evaluate the most important regulatory documents regarding credit risk, namely the 1988 Capital Accord (Basel Committee 1988) and the 2001 New Capital Adequacy Framework (Basel Committee 2001a).

Related to the distinction between rules-based and process-oriented approaches to regulation, is the concepts of regulation versus supervision. Regulation and supervision may be characterized as two fundamentally different approaches to the same task (Karacadag and Taylor 2000:27). Regulation is related to the concept of a rules-based approach to capital requirements, since it is concerned with the formulation of precise rules and monitoring compliance with those rules. It employs standardized approaches to risk measurement and assessment, and demands comparatively little in terms of judgment from individual bank regulators and examiners. It may, somewhat crudely, be characterized as regulation by algorithm. In theory, it would be possible to reduce a large part of the regulatory task to a computer-based algorithm, for example, for calculating a few key ratios.

By contrast, supervision is concerned with formulating general guidelines rather than prescriptive rules. Within the broad framework of these guidelines, individual supervisors are encouraged to employ their own judgment to determine the most appropriate standards, including the capital ratio, required of individual institutions. The road is being traversed from a banking supervision primarily based on compliance with quantitative standards to a qualitative form of banking supervision.

The focus is primarily on the determination of optimum capital by the bank, monitored by the supervisor. Under this approach, the bank would be accountable in the first instance for determining its own appropriate level of capital, abiding by sound practices developed in the context of the business.

The basic thrust of the examination process should shift to providing constructive feedback that the bank can use to enhance further the quality of its risk management systems. Consequently, supervision and regulation focus even less on detail and more on the overall structure and operation of risk-management systems. Sir Andrew Large (1997) indicated that “I don’t think we should lose sight of the fact that so much in regulation is not about structure but about attitude and management: the ‘how’ of regulation; the way it is done.” The implications for regulatory capital seem clear. It is an important priority of supervisors to determine whether the appropriate “attitude and management” toward capital prevail in a firm, to focus on the way things are done (Estrella 1998:197). In monitoring the determination of capital, the supervisors would also ensure that the views of the firm are consistent with the public goals of systemic safety and soundness, and that there is no attempt to take undue advantage of elements of the financial safety net, such as deposit insurance.

Thus, supervision is a flexible, individual, and participative approach (Karacadag and Taylor 2000:29). It is flexible in that it does not aim to try to make individual banks conform to rigid patterns. Instead, its aim is to examine each bank as an individual entity, using criteria that must be adaptable to changing circumstances. It is individual since the risk profile of the bank will be monitored by the supervisors be judged according to its specific circumstances, including a judgement of the quality and capacity of its management. Finally, it is participative in that it aims to encourage a dialogue between regulators and bank management; regulators treat management as partners in determining the extent of the risks to which the institution is exposed and how these can be contained. Process-oriented regulation and supervision in this specific sense are closely linked.

Supervision is an old established practice that seems to have lost out to regulation over time (Karacadag and Taylor 2000:28). The techniques of supervision developed out of a set of very specific circumstances. They were practiced, above all, by the Bank of England at a time

when it was able to rely on its powers of “moral suasion” over the banking sector rather than on formal legal powers. This, in turn, was a product of a highly concentrated banking sector in which a few large banks shared a sense of belonging to a “common club.” Indeed, supervision as practiced in this form grew out of what were essentially a set of club rules with the Bank of England as the presiding judge. It relied on a series of social norms, which can be described as a pattern of behavior that is customary, expected and self-enforcing.

As other countries have striven to develop their supervisory capacity in recent decades, regulation rather than supervision has been the preferred form, since many of the self-regulating aspects of club rules have been absent from their banking systems and are difficult to create without an appropriate cultural and institutional background. These observations suggest one reason why the supervisory aspects of the Accord did not attract the importance in practice that was originally intended for them. Put simply, the institutional infrastructure necessary for the techniques of supervision to be operated effectively were absent from many of the countries that have adopted the Accord. In consequence, the emphasis came to be placed predominantly on its rules-based aspects.

However, the complex evolution of banking business highlighted the limitations of rules-based regulation. The globalization of the financial markets calls for a departure from purely national rules and regulations, and the adoption of greater flexibility and greater proximity to the bank on the part of supervisors, so as to foster financial market stability (Hoenig 1996:8). Consequently, for much of the 1990s, regulatory agencies focused on improving supervisory oversight of capital adequacy on a bank-by-bank basis. This emphasis on internal processes has been driven partly by the need to make supervisory policies more risk-focused in light of the increasing complexity of banking activities. In addition, this approach reinforces market incentives that have prompted banks themselves to invest heavily in recent years to improve their management information systems and internal systems for quantifying, pricing, and managing risk. A greater awareness of risk and risk management has led to a whole structure of conventions designed to deal flexibly with new risks as they are identified.

4.6 FINANCIAL DEREGULATION

Banks have traditionally been highly regulated, and highly protected, entities. Supervisors

tightly restricted the activities banks were permitted to undertake. In many countries, these restrictions extended as far as dictating the interest rates that could be charged on customer deposits. In return for this high degree of regulation, banks were protected from competitive forces. Strict control over the issue of banking licenses, for example, ensured that banks could operate without fear of takeover or the fear of losing market share to outside entities. This arrangement, which was designed to ensure the stability of the financial system, proved very successful until the middle of the 1970s. At this time, a substantial increase in exchange rate and interest rate volatility, resulting from the collapse of the Bretton Woods agreement, put the relationship between supervisors and institutions under intense pressure. Ultimately, this tension led to a process of deregulation and the exposure of financial institutions to the cold winds of competition (Matten 1998:10).

The result was somewhat predictable: an industry which was unaccustomed to competitive pressures suddenly became prone to increased risk-taking, for example over-lending to lowly rated organizations in the drive for greater performance. The result was lower earnings and ever-narrowing spreads.

The consequent erosion of capital levels began to trouble supervisors, as the prospect of large banking failures loomed ever larger. The only way to address the situation without increasing the competitive differences between countries was at the international level. This led to the forming of a committee under the auspices of the Bank for International Settlements in Basel to investigate possible solutions. The Committee, known as the Basel Committee on Banking Regulation and Supervisory Practice, consists of representatives of the central banks and supervisory authorities of the G10 countries (Jorion 1997:45).

An agreement (International Convergence of Capital Measurement and Capital Standards) was reached in July 1988, which was phased in by January 1993. It was a groundbreaking document that established a common framework for the calculation of capital adequacy on the basis of the riskiness of institutions' assets. The framework established a structure that was intended to make regulatory capital more sensitive to differences in risk profiles among banking organizations, take off-balance sheet exposures explicitly into account in assessing capital adequacy and lower the disincentives to holding liquid, low risk assets.

4.6.1 *The 1988 Basel Accord*

As mentioned, concern that the capital of the world's major banks had become dangerously low after persistent erosion through competition was the major impetus for the 1988 Basel Capital Accord. The overriding objective behind the adoption of a single capital adequacy standard was thus to strengthen the soundness and stability of the international banking system by encouraging international banking organizations to boost their capital positions. Providing cross-border consistency in capital standards and reducing competitive inequalities was an equally important objective (Matten 1998:11).

The Accord was successful in this regard. It helped to reverse a prolonged downward tendency in international banks' capital adequacy into an upward trend in the 1990's. Its widespread adoption in non G-10 countries has further reinforced the soundness of banks world-wide. Furthermore, the Accord has been praised for contributing to enhanced market transparency, promoting international harmonization of capital standards, and thus, importantly, to level playing fields within the Group of Ten (G-10) countries and elsewhere (De Swaan 1998: 232).

The 1988 Accord explicitly considered only credit risk. The underlying principle was that institutions should hold a minimum level of capital that is somehow linked to the risks to which they are exposed (Santos 2000:17).

It required international banks from the G-10 countries to hold a minimum total capital equal to 8% of risk-weighted assets, with at least half of this met by tier 1 capital (equity capital and disclosed reserves). Tier 2 capital could include, among other instruments, hybrid debt capital instruments. Risk-weighted assets were defined as the sum of the risk-weighted assets on- and off-balance sheet. On-balance sheet assets were assigned to one of four risk buckets (0%, 20%, 50% and 100%) and then weighted by the bucket's weight.

Exposures to OECD governments, for example, are deemed to be risk-free and consequently assigned a zero risk-weight. Claims on OECD banks are assigned a risk-weight of 20 per cent. Claims on or secured by residential property usually attract a risk-weight of 50 per cent

and, in general, all other exposures are assigned a risk-weight of 100 per cent.

Techniques are also specified for converting off-balance sheet exposures, such as guarantees and derivatives, into on-balance sheet equivalents using conversion factors to capture the counterparty risk associated with such exposures.

The risk-based capital rules also set the stage for the emergence of more general risk-based policies within the supervisory process. Over time, the Accord has been fine-tuned to account for financial innovation and some of the risks it did not consider initially (Greenspan 1998:164). The best example is the amendment of January 1996 to introduce capital charges for market risk, including an internal models alternative to the use of standardized rules.

In the credit risk area, the Accord has also been revised, to allow the recognition of close-out netting for derivatives contracts in 1994 and to both revise and allow partial recognition of netting of the “add-ons” for potential future exposure a year later.

The Accord approximates to what have termed a rules-based approach in section 2.4. Its aim was not to produce a precise quantification of risk, but a first-order, comprehensive approximation based on the application of a number of simple rules. This conferred it with a number of advantages (Karacadag and Taylor 2000:11):

Firstly, a rules-based approach is easy to implement. Precisely because the Capital Accord is relatively simple, the framework is useful for banks and their supervisors in emerging market countries and contributes to market transparency. Secondly, it is an objective measure that is easily verifiable and reproducible. Thirdly, as a common metric in the form of the 8 percent capital ratio, it is comparable across institutions world-wide and promotes competitive equality among banking industries.

The simplicity, comparability, and verifiability of capital ratios in fact, may have given markets a false sense of certainty and security, especially as the capitalization of most banking systems world-wide surpassed the 8 percent minimum. The existence of an officially sanctioned quantitative benchmark lends itself to misuse as quantitative indicators are perceived as more tangible, sometimes without due regard to their analytical value. For

example, a bank with a nominally high capital ratio of 12 percent normally would be characterized as “well-capitalized”, given the Basel minimum requirement of 8 percent. Yet, a 12 percent ratio may be inadequate for the bank’s operating environment and risk profile, which may warrant a capital ratio of 15 or 20 percent (Greenspan, 1998:3). Indeed, prior to the 1997—98 Asian financial crisis, many of the region’s banking systems were considered adequately or well-capitalized on the basis of Basel capital adequacy ratios - which clearly misrepresented the solvency of banks and their ability to cope with economic stress.

A further indication that capital requirements have not performed their expected role as an effective supervisory tool in many emerging markets is evident from growth rates of banking systems’ net equity during the year previous to the eruption of a major banking crisis. If equity capital is at all a good indicator of banking soundness, banks in countries about to fall into a major crisis should be facing difficulties in raising capital. In contrast, on the eve of disastrous crisis episodes in emerging markets, real net equity growth was not only positive but it also reached very high levels. Cases in point are Thailand, Mexico, and Ecuador where, judging from the rapid accumulation of equity capital, there did not seem to be signals of major banking turbulence (Rojas-Suarez 2001a:14).

According to Rojas-Suarez (2001a:16) the disappointing performance of capital requirements as an effective supervisory tool in emerging markets can be ascribed to fundamental reasons that go beyond the improvements in regulatory procedures and design features of minimum regulatory capital requirements. Instead, these reasons center on the particular features of financial sectors in many emerging economies (see section 4.7.4.2.).

Concerns regarding the risk reducing effects of capital regulation is also relevant in this regard. The literature in this area is highly inconclusive and empirical evidence concerning the corresponding risk impact is mixed. In other words, a systematic relation between the level of capital and the risk of insolvency could not be demonstrated so far (Swiss Bankers Association 2001:34). Some theoretical studies even suggest that capital requirements (especially if applied uniformly across banks) may lead to an overall increase in the riskiness of portfolios, partly because banks may face an incentive to substitute towards riskier assets within a given risk category (Swiss Bankers Association 2001:34 and Milne 2001:18). Furthermore, an “average amount of capital” is not a helpful concept as an overcapitalized

firm does not offset an undercapitalized firm (Barclays PLC 2001:6).

The Accord also came under pressure as a result of several other important developments. First of all, a decade of innovations in financial markets, in some cases with the intention of circumventing the Accord, has eroded its effectiveness (Jones 2000:41). For example, neither securitization nor credit derivatives are adequately captured within the existing framework of the Accord, which is cast largely in terms of banks' conventional on-balance sheet risks.

Over time, these financial innovations, together with some of the simplifications of the Accord - the broad risk-weighting categories and the lack of a term structure of credit risk - created incentives and opportunities for regulatory capital arbitrage. Through such transactions, banks move exposures, for which their internal capital targets are much less than 8%, out of their books through so-called regulatory arbitrage transactions. The result is to reduce substantially their regulatory measures of risk, with little or no corresponding reduction in their overall economic risk. Consequently, a bank may achieve an overall regulatory capital ratio that is nominally high yet may mask capital weakness. That is, despite a high regulatory capital ratio the bank may have an unacceptably high probability of insolvency (Jones and Mingo 1998: 54).

These developments have been a source of concern for three reasons (Jones 2000:45). Firstly, if banks shed their low risk exposures, the average riskiness of what remains will rise, reducing the effective capital buffer implied by the Basel 8% rule. Secondly, in many cases, regulatory arbitrage transactions reduce capital requirements without a commensurate reduction in the risks the bank faces. For example, securitizations, many of which are driven by regulatory arbitrage, may leave much of the underlying credit risk with the originating bank. Thirdly, complex regulatory rules reduce the transparency of banks' activities, both for regulators and for the market.

Ultimately, regulatory capital arbitrage is driven by large divergences that frequently arise between underlying economic risks and the notions and measures of risk embodied in regulatory capital ratios. Thus, aligning regulatory capital requirements more closely to banks' own assessments of economic risks is the only effective way to reduce regulatory arbitrage.

In addition to the distortions that arise between regulatory and economic capital, due to the unsophisticated nature of the risk-weighting system (for example, all corporate loans carry a 100% risk-weight), other limitations of the 1988 Accord include the following (International Swaps and Derivatives Association 1998:20):

-The capital adequacy rules ignore critical differences in credit risk among financial instruments, as well as differences across banks in hedging, portfolio diversification, and the quality of risk management systems.

-The regulatory measures of “capital” may not represent a bank’s true capacity to absorb unexpected losses. Deficiencies in reported loan loss reserves, for example, could mask deteriorations in banks economic net worth.

-The regulatory risk-weights do not reflect certain risks, such as interest rate and operating risks.

Many commentators called for the revision of the Accord, based on these shortcomings and the resulting impact on pricing of credit, incentives for credit risk management bank ratings, funding costs and share performance. For example, mortgage lending is less regulatory capital intensive than corporate lending, so this activity is encouraged by the current capital rules. Also, if regulatory capital charges positively punish the hedging of credit risk by adding to capital requirements, then this activity will be discouraged. The fine margins of banking activity mean that the incremental costs or savings involved with a regulatory capital requirement influences business decisions. Even if the institution as a whole is well-capitalized, the capital requirements will still reduce lending activity that has high regulatory capital costs, because this will affect the risk-adjusted return on capital for that activity (International Swaps and Derivatives Association 2000:25).

Despite these shortcomings, the 1988 Accord, with its simple regime of risk-weights, was still a step forward for many institutions. At the very least, this illustrates the level of sophistication of credit risk models just a decade ago; there was little evidence that more sophisticated approaches to the measurement of credit risk were being used by banks (Greenspan 1998:165). Furthermore, these deficiencies are inevitable under any standardized rules, which must apply general rules that are easily understood and implemented.

Although many commentators perceived the requirement that banks maintain a ratio of eligible capital to risk-weighted assets of at least 8 per cent as the core requirement of the Accord, the authors of the Accord emphasized “that capital adequacy as measured by the present framework, though important, is one of a number of factors to be taken into account when assessing the strength of banks” (Matten 1998:11). It was intended that it be supplemented by a process of supervisory review, which would involve an assessment of the risk management capacity and processes of individual banks. For example, the Accord explicitly considers only credit risk. That meant that the Accord left out a number of risks to which banks are potentially exposed, most notably concentration risk and operational risks, deriving from inadequate systems and controls.

The 8 percent capital requirement was explicitly intended to be a minimum, and a process of supervisory review was meant to determine the appropriate circumstances for setting a higher capital requirement based on these additional risk factors. It was also implicit in the Accord that supervisory review would result in setting a higher capital requirement for all institutions if factors in a specific country’s macroeconomic environment warranted it. In this sense, the actual capital ratio set for each institution would reflect the process of supervisory judgment. The rules-based aspect of the Accord was only to be one element in determining whether or not a bank could be regarded as well-capitalized. As the first chairman of the Basel Committee, Sir George Blunden, once remarked, a capital ratio was valuable as “a yardstick, not a categorical imperative” (Matten 1998:10).

Thus, the banks which operated at the 8 percent minimum, were to have been the best managed and well-diversified institutions operating from the G-10 industrialized countries. To the extent that most banks were less well-diversified or were comparatively lacking in risk management capacity, or operated in a more volatile macroeconomic environment, they would be expected to maintain a capital ratio in excess of the 8 percent minimum. In this respect, therefore, the process of supervisory review was intended to compensate for those elements of a bank’s risk profile that were left out of the Accord’s framework. Thus, the criticism, for example, that the risk measurement framework made no allowance for well-diversified portfolios was answered by the argument that only banks with well-diversified portfolios should be able to operate at the 8 percent minimum. To the extent that a bank had

a more concentrated portfolio, this would be identified through the process of supervisory review, and a higher capital requirement would be set.

In practice, however, this feature of the Accord's methodology has not played the central role that was initially envisaged. Most supervisory authorities have regarded the 8 percent minimum as a "categorical imperative" rather than as a yardstick. In its application, if not the original intention, the mechanistic, rules-based features of the Accord have prevailed over its process-oriented elements. The only supervisory judgment has tended to be whether the 8 percent minimum standard have been complied with (Matten 1998:12).

In addition, there have been political and presentational difficulties for countries outside the G-10 to acknowledge that the 8 percent minimum may not be adequate for their banks. Although some supervisory authorities have adopted a capital requirement above the 8 percent minimum for all their institutions, they have been the exception rather than the rule. Instead, the 8 percent figure has been adopted as the *de facto* international standard for "adequately capitalized."

The business of banking, risk management practices, supervisory approaches, and financial markets each have undergone significant transformation since the introduction of the 1988 Accord. This has prompted a debate on the design of capital standards and put pressure on the regulatory authorities to revise the Accord. This debate focused initially on the alternative approaches to setting capital standards put forward in the literature, for example the Basel Committee's (1999b) document on credit risk models.

Since mid-1999 it has centered on the Basel Committee's proposal for a New Capital Adequacy Framework (Basel Committee 1999c). Reflecting comments received on the discussion document and the results of ongoing dialogue with the industry and supervisors world-wide, the Committee presented "A New Capital Adequacy Framework" (Basel Committee 2001a), seeking comments from interested parties. Initially, the Committee expected the final version of the new Accord to be published around the end of 2001 and to be implemented in 2004. Currently, the Basel intent to finalize the new accord in 2002 and for member countries to implement it in 2006. This is despite an additional formal consultation period announced in September 2001.

4.7 THE PROPOSED NEW CAPITAL ADEQUACY FRAMEWORK

The proposals for a new capital adequacy framework have been crafted over the course of a few years, using a highly interactive dialogue process among banks and their supervisors that is unprecedented. The result, it is hoped, will be a capital framework that reflects modern risk management practices and could establish strong standards for the protection of financial system resilience by fostering robust risk analysis at each bank (Working Group on Capital Adequacy 2001: 7).

These proposals contained three fundamental innovations, each designed to introduce greater risk sensitivity into the Accord. One was to introduce a three-pillar approach, with a risk-sensitive capital framework being reinforced by supervisory review and enhanced disclosure (Barclays PLC 2001).

The second and third innovations both aim at making capital charges more correlated with banks' risk profiles. Banks with advanced risk management capabilities would be permitted to use their own internal systems for evaluating credit risk, known as "internal ratings", instead of standardized risk-weights for each class of asset. The third principal innovation was to allow banks to use the risk grades provided by approved external credit assessment institutions to classify their exposures into risk buckets.

Whereas the 1988 Accord provided essentially only one option for measuring capital adequacy, the new framework recognizes that the best way to measure, manage and mitigate risk differs from bank to bank. Consequently, it provides for a spectrum of approaches for the measurement of credit risk in determining capital levels. The flexible structure allows banks to adopt approaches which best fit their levels of sophistication and their risk profiles, subject to supervisory approval.

The second pillar, the supervisory review process, is intended to ensure that a bank's capital position is consistent with its overall risk profile and to enable early intervention. The last pillar is intended to encourage banks to disclose information in order to enhance the role of market participants in monitoring banks. The introduction of the three pillar approach was

intended to reduce the stress on the quantitative Pillar 1 by providing a more balanced approach to the capital assessment process.

Trade-offs between more detailed supervision and regulation, on the one hand, and moral hazard and the smothering of innovation and competitive response, on the other, has motivated the proposed multi-track approach to prudential oversight (Greenspan 1999:2). The regulatory environment now includes several “watchful eyes,” that is, participants in the financial marketplace with information about banks available to them and the incentives to act on it. Collectively, these reforms in bank regulation mean that owners, creditors, and supervisors are more likely to monitor banks effectively (Barth, Caprio and Levine 2001:10). The new framework still acknowledges the vital role of capital, but intends to improve safety and soundness in the financial system by placing more emphasis on banks’ own internal control and management, the supervisory review process, and market discipline.

These three pillars are critically interdependent and the new capital framework’s success hinges on ensuring the proper functioning of all three of them (Karacadag and Taylor 2000: 16). Supervisory review is vital to ensure that capital allocation processes are sound and utilized effectively. Market discipline, in turn, is necessary to provide incentives for banks to manage their risks prudently and for supervisors to perform their tasks in a manner that instills market confidence. However, none of these can substitute for effective bank management.

From the above discussion it should be clear that the revised Accord cannot be considered fully implemented if all three pillars are not in place. Minimum (or partial) implementation of one or two of the pillars will not deliver an adequate level of soundness. The Basel Committee recognizes that in certain jurisdictions it is not at present possible to implement all three pillars fully. In such a case, the Committee recommends that supervisors consider more intensive use of the other pillars. For example, supervisors could use the supervisory review process to encourage improvement in transparency, disclosure and consequently market discipline. The Basel Committee considers implementation of Pillar 1 as a minimum requirement (Basel Committee 2001a:5).

4.7.1 Objectives of the new framework

The new capital adequacy framework paper states the following objectives (Basel Committee 2001a:6):

- The Accord should continue to promote safety and soundness in the financial system.
- The Accord should continue to enhance competitive equality.
- The Accord should constitute a more comprehensive approach to addressing risks.

The latter encompasses approaches to capital adequacy that are appropriately sensitive to the degree of risk involved in banks' positions and activities.

The main innovations of the new capital framework compared with the Accord are firstly, that it aims to bring the methodology of calculating capital requirements more closely into line with the advances in risk management technology that have occurred since 1988. The new capital framework aims to go further than simply bringing a number of innovative financial instruments within the scope of the Accord. It does not merely aim at *ex post* adjustments of the Accord to accommodate market developments. It also aims to be forward-looking by making capital standards less distortionary *ex ante*. The overall objective is to limit the incentives that capital standards create for banks to arbitrage its requirements by more closely aligning regulatory capital charges with the concept of loss risks (Karacadag and Taylor 2000:13-14).

The use of external ratings would align capital charges with default risk more closely than current capital requirements. The use of internal systems goes even further. The endorsement of internal capital allocation mechanisms in setting regulatory capital, in effect, means the adoption for regulatory purposes, of the methodologies for calculating economic capital currently used by firms.

Secondly, it aims to move capital regulation in a more process-oriented direction. Whereas the original Accord laid down a series of simple rules in order to develop a common metric for setting capital requirements, the new capital framework envisages an approach in which supervisors will become less involved in determining the precise rules of calculating capital

adequacy. Instead, supervisors will concentrate on ensuring that a bank's internal risk management procedures are adequate. This can be seen as a relative shift away from the mechanistic, formulaic approach to setting bank capital (rules-driven) toward a more process-oriented form of regulation.

The change from rules-driven to process-oriented is a matter of degree, not of kind: it is not all-or-nothing. Thus, the new capital framework retains elements of regulatory and rules-based capital regulation, just as the Accord incorporated elements of economic and process-oriented approaches.

This shift in emphasis from rules - to process-regulation involves foregoing the verifiability and comparability of capital ratios across banks and banking systems to the extent that it involves greater reliance on internal risk measurement and control systems. This will have important consequences. Banks will have to be evaluated more holistically by analysts and regulators alike and capital ratios will become less comparable on their own. Capital ratios will become more difficult to interpret in isolation and the terms "under-capitalized" and "well-capitalized" will be difficult to designate without in-depth analysis, taking into account whether or not the level of capital adequately reflects the risks embedded in the asset portfolio.

The need for more in-depth analyses of banks under the new capital framework raises two additional issues, especially with respect to the third pillar. Firstly, internal processes of capital allocation are inherently less transparent than current capital ratios. Unless essential elements of internal risk management and capital allocation mechanisms are disclosed, market participants may not have the information required to evaluate capital adequacy (though supervisors presumably would have greater access). This would undermine the market's ability to exert discipline, and along with it, the effectiveness of the third pillar. Secondly, even if sufficient information was available, market participants would have to devote much more resources to analyze banks, which they may not elect to undertake given the "free-rider" problem in the market for risk analysis. These and other issues regarding the proposed disclosure requirements will be discussed in section 4.7.4.1.

4.7.1.1 Overall capital

The absolute calibration of overall capital levels or the appropriate quantum of capital that banks should carry is one of the most actively debated aspects regarding the new Accord (Jackson, Perraudin and Saporta 2002:954). In this regard, regulators can either use a bottom-up or a top-down approach to the absolute calibration of capital levels (Carey 2001a:1). In the top-down method, policymakers make a judgmental choice of a target capital ratio for the banking system as a whole. In the bottom-up method, an economic analysis of the relationship between portfolio risk and various loss characteristics such as PD and LGD is conducted. Most such analyses are in the Value-at-Risk (VaR) tradition. To calibrate the new Accord, financial authorities opted for the latter approach. Credit risk models were used to assess how much capital a bank holding a representative loan portfolio would have to hold in order to limit the likelihood of default to a specified probability (Jackson, Perraudin and Saporta 2002:4).

The new framework intends to maintain the overall level of regulatory capital in the banking system while providing approaches which are both more comprehensive and more sensitive to risks than the 1988 Accord. Consistent with these objectives the Basel Committee envisages the following (Australian Prudential Regulation Authority 2001:10 and UBS 2001:1):

-Under the standardized approach, the Committee maintains the quantitative 8% minimum capital requirement and states that they “desire neither to produce a net increase nor a net decrease on average in minimum regulatory capital.”

-With respect to the IRB approach, the Committee’s ultimate goals are to ensure that the overall level of regulatory capital generated is sufficient to address the underlying credit risks and is such that it provides capital incentives relative to the standardized approach (Risk Management Association 2001:1).

-Consequently, for foundation IRB institutions, the Committee is aiming for a small (2 - 3%) average decline in minimum capital requirements compared to current capital requirements and the proposed standardized approach.

-For institutions on the advanced IRB approach a further fall of similar average magnitude is

being targeted.

Despite basing the overall calibration of the new Basel Accord on capital levels required under the 1988 Accord, regulators admit they have no scientific evidence that the banking system presently holds the “right” amount of regulatory capital. However, since the last reform in 1988, there has been little reason to think that banks are reserving too much capital (Jameson 2001a:2). Even since the introduction of the 1988 Accord, there have been a surprisingly large number of banking crises. The special role of banks in the real economy (for example, as originators of loans to the retail and small business sectors) means that the costs of banking crises are high. Hoggarth, Reis and Saporta (2002) estimate that the costs of a banking crisis in terms of output foregone can amount to as much as 15% or 20% of GDP. The Asian and Japanese banking crises have further underlined the substantial costs imposed by fragile financial systems. In combination, these experiences have contributed to the reluctance to see any erosion in minimum capital.

The Basel Committee recognizes the difficulty in assessing the “average” impact of its proposals across a diverse range of internationally active banks (Basel Committee 2001a:16). This is despite attempts to quantify possible effects of the new proposals on absolute capital levels through several comprehensive quantitative impact studies (QIS). The objective of these studies was to gather the data necessary to gauge the impact of the proposals for capital requirements set out in the January 2001 second consultative paper. The results of the first two studies in this regard, QIS1 and QIS2, are already available.

On average, the QIS2 results indicate that the current proposals for credit risk would deliver an increase in capital requirements for all groups under both the standardized and IRB foundation approaches. However, there remains uncertainty regarding interpreting the QIS results. This is partly due to the exceedingly complex nature of the document, data limitations, the variety of approaches on offer, an uncertain migration path for many of the major banks and the lack of detail currently attaching to many aspects of the proposals the results from the QIS remains imprecise (UBS 2001:1).

Consequently, there is currently little consensus on the likely effect of the new proposals on the overall level of capital in the banking system. For example, a survey by Carratu, Lake and

Greenlees (2001:13) reveals that 45% of banks surveyed in Europe estimate that it will lead to an increase in capital adequacy requirements, while 45% estimate it will lead to a decrease. These different estimates are also reflected in the commentary received on the new Accord (Australian Prudential Regulation Authority 2001:11 and Citigroup 2001:11).

Although QIS1 and QIS2 indicate an overall increase in capital requirements for all banks on average, several studies indicate that this is not the case for all individual banks. For example, the preliminary results of the quantitative impact study for Australian banks indicate that under the standardized approach smaller institutions face substantial increases in their overall minimum capital requirements in the order of 20% to over 30% (Australian Prudential Regulation Authority 2001:5). Under the foundation approach reductions in regulatory credit capital seem broadly consistent with the size of the new operational risk charge (and a small overall average decrease in regulatory capital).

Under the advanced internal ratings based approach, however, very much larger declines in regulatory capital are estimated, as the more accurate LGD and to a lesser extent, maturity estimates come into play. The initial QIS results are pointing towards possible overall declines in regulatory capital in the order of 30% after taking into account the new operational risk charge (Australian Prudential Regulation Authority 2001:11). Such substantial decreases in the average level of regulatory capital held is contrary to the intentions of the Basel Committee and might also have serious implications for the safety and soundness of the global banking system.

After careful analysis and consideration of the quantitative impact study (QIS2) data and feedback that was received through the consultative process, the Basel Committee has responded by reviewing the proposed New Basel Capital Accord and is considering several modifications. These modifications are intended to help the Committee to achieve its stated objectives to maintain equivalence on average between current required capital and the revised standardized approach and provide modest incentives regarding the aggregate level of required capital under the foundation IRB approach. That is, adjustments towards absolute and relative calibration more in line with the stated objectives of the Basel Committee (see also sections 4.7.2.2.4. and 4.7.5). In this regard, the results of a third Quantitative Impact Survey (QIS 3), in which South African banks will participate, will also be taken into

account.

One concern that has been identified in the Committee's prior impact surveys has been the potential gap between the capital required under the foundation and advanced IRB approaches. To modestly narrow this gap, the average maturity assumption in the foundation approach will be modified from 3 years to 2.5 years, and the majority of the supervisory loss given default (LGD) values in the foundation IRB approach will be reduced by five percentage points (e.g. for senior unsecured exposures from 50% to 45%). These changes will be combined with offsetting changes to the IRB risk-weight function for corporate lending (Basel Committee 2002b:10). More fundamentally, the Committee is proposing to alter the structure of the minimum floor capital requirements in the revised Accord (Basel Committee 2002b:4). Under the new approach, there will be a single capital floor for the first two years following implementation of the new Accord. This floor will be based on calculations using the rules of the existing Accord. Beginning year-end 2006 and during the first year following implementation, IRB capital requirements for credit risk together with operational risk capital charges cannot fall below 90% of the current minimum required, and in the second year, the minimum will be 80% of this level. Should problems emerge during this period, the Committee will seek to take appropriate measures to address them, and, in particular, will be prepared to keep the floor in place beyond 2008 if necessary.

Several observers ascribe these problems of absolute and relative calibration to the fact that the Consultative Proposals incorporate a variety of elements that, taken together, appear excessively conservative. The result is a systematic overestimation of regulatory capital. (Working Group on Capital Adequacy 2001: 19 and Citigroup 2001:14). These elements are discussed in section 4.7.2.2.3.

In contrast to these viewpoints that the current calibration overestimate capital requirements, some observers warn that the new capital requirements may actually lead to an underestimation of capital requirements. This can undermine the soundness and stability of the banking system.

For example, Karacadag and Taylor (2000:15) warn that a regulatory approach relying more heavily on internal capital allocation systems must incorporate the less than perfect alignment

between the incentive and cost functions of banks and regulators. This follows from the definitions of economic and regulatory capital, respectively. Economic capital can be defined as the quantum of capital that a firm determines is prudent, desirable and achievable over the long term in the absence of regulatory requirements (Berger, Herring and Szego 1995). The purpose of economic capital is primarily to limit the probability of bank failure, according to the owner's subjective assessment of the probability of failure, and secondarily to finance bank activities. Internal capital allocation processes, therefore, aim to ensure that sufficient capital is set aside for the risks undertaken by the bank.

Regulatory capital differs from economic capital in taking into account the public costs of bank failure (Santomero 1997:14). Given the systemic costs associated with individual bank failures, regulators want to ensure that negative externalities are incorporated into banks' pricing decisions. This implies that regulatory capital requirements should be set at levels that require participants to take account of these costs. In consequence, regulatory capital is likely to require banks to maintain more capital than they would hold otherwise according to their internal capital allocation systems.

Whereas banks naturally focus on the private costs of failure and allocate capital accordingly, regulators must concentrate on the public costs and ensure that regulatory capital is commensurate with the latter. Economic capital determined by banks, in principle, may be too low for regulatory purposes. Admittedly, economic capital could be higher in practice where banks are more risk averse than regulators or if bank managers decide to maintain more capital to enhance their bank's reputation. For example, an empirical study by Jackson, Perraudin and Saporta (2002) indicates that banks large enough to have a rating target a solvency standard which is significantly more conservative than that delivered by the current (1988) Basel Accord.

Furfine (1999) supplies an explanation for this. His key argument is that banks face considerable costs from approaching, let alone falling below, the minimum capital requirement. These might come in the form of intensified supervisory review, weakening reputation, or immediacy of the need to restore the capital position either by cutting lending or trying to obtain new external capital. To avoid these costs, banks choose to hold capital buffers in excess of the minimum requirement. In the New Basel Accord the increased risk-

sensitivity of the capital charge would apparently increase the likelihood that, *ceteris paribus*, an institution “hits” the eight per cent minimum ratio some time in the future as ratings, either internal or external, migrate unexpectedly. This effect would be supposedly stronger in the more risk-sensitive IRB approach. Banks may want to limit this probability by further increasing the capital cushion above the minimum level. This means that, for a portfolio for which the new capital rules would leave the minimum capital requirement unchanged, the bank would hold an actual amount of capital which is higher than under the current framework. Banks may also shift their asset allocations towards less risky assets. Other things equal, these effects would improve banks’ stability.

Nonetheless, regulators cannot count on bank managements’ conservatism to ensure that economic capital is equal to or higher than the desirable level of regulatory capital (Kupiec 2001:8). This principle is recognized by the Basel Committee and incorporated in terms of the three-pillared approach of the new Basel Accord. Each of the three pillars will consequently be discussed.

4.7.2 Pillar 1: minimum capital requirements

Minimum capital requirements consist of a definition of regulatory capital, measures of risk exposure, and rules specifying the level of capital in relation to those risks. With respect to the definition of regulatory capital, the existing rules as set out in the 1988 Accord will be maintained (Basel Committee 2001a: 8-10).

Pillar 1 covers regulatory capital requirements for market, credit and operational risk. The Committee has decided to treat interest rate risk in the banking book under Pillar 2. The denominator of the minimum total capital ratio will consist of three parts: the sum of all risk-weighted assets for credit risk, plus 12.5 times the sum of the capital charges for market risk and operational risk. Assuming that a bank has \$875 of risk-weighted assets, a market risk capital charge of \$10 and an operational risk capital charge of \$20, the denominator of the total capital ratio would equal $875 + [(10 + 20) \times 12.5]$ or \$1,250.

The new capital adequacy rules are intended to strike a balance between simplicity and

accuracy. In recognition that the optimal balance may differ markedly across banks, the Committee is proposing a range of approaches to credit risk, as it has for market risk. Banks will be expected to calculate regulatory capital in a manner that best reflects the current state of their risk measurement and management practices.

For the measurement of credit risk, two principal options are being proposed. The first is the standardized approach, and the second the internal ratings based (IRB) approach. There are two variants of the IRB approach, the foundation approach and the advanced approach. The standardized approach is conceptually the same as the present Accord, but is more risk sensitive. The credit risk measurement methods are more elaborate than those in the current Accord. Regulatory capital requirements are aligned more closely with the key elements of banking risk by introducing a wider differentiation of risk-weights and a wider recognition of credit risk mitigation techniques, while avoiding excessive complexity. Accordingly, the standardized approach should produce capital ratios more in line with the actual economic risks that banks are facing, compared to the present Accord.

As in the current Accord, the risk-weights will be determined by the category of the borrower: sovereign, bank, or corporate. Measurements of risks i.e., the calculation of the denominator of the capital ratio, are to be refined by reference to a rating provided by an external credit assessment institution (such as a rating agency) that meets strict standards.

4.7.2.1 The revised standardized approach

In the 1999 document, the Basel Committee proposed the new standardized approach to minimum capital requirements. The proposals contained a set of risk-weightings, based on the assessments of external credit ratings agencies. After considering numerous responses in this regard, the Committee now proposes a revised set of risk-weightings in the 2001 document. The following provides a summary of those proposals (Basel Committee 2001h: 7-9):

-The use of published credit scores of export credit agencies (ECA), in addition to the rating of credit agencies, is proposed for determining risk-weights in the case of sovereigns. The use

of such scores is expected to increase the number of sovereigns that have a recognized external assessment. Table 4.1. gives a summary of the proposed risk-weights for exposures to sovereigns.

Table 4.1 Risk weights for exposures to sovereigns

CREDIT ASSESSMENT	AAA TO AA-	A+ TO A-	BBB+ TO BBB-	BELOW B-	UNRATED
Risk-weights	0%	20%	50%	150%	100%

Source: Basel Committee 2001a:34

-The Committee is no longer seeking to establish a so-called sovereign floor (as proposed in the 1999 discussion document), but rather to allow for recognition of highly rated banks and corporates. Accordingly, exposures to banks and corporates that have external credit assessments higher than those assigned to the sovereign of incorporation may receive a preferential risk-weight (provided it is not less than 20%).

-For corporate lending, the existing accord provides only one risk-weight category of 100% but the new accord will provide four categories (20%, 50%, 100% and 150%). (See table 4. 2)

Table 4.2 Risk-weights for exposures to corporates

CREDIT ASSESSMENT	AAA TO AA-	A+ TO A	BBB+ TO BB-	BELOW BB-	UNRATED
Risk-weight	20%	50%	100%	150%	100%

Source: Basel Committee 2001a:35

Several banks feel that the number of risk-weights in the proposed standardized approach is still insufficient. For example, the Working Group on Capital Adequacy recommended that the minimum number of risk-weights in the standardized approach be at least eight for the corporate portfolio, with substantial increases (rather than step-wise increases) as credit

quality deteriorates. Emerging market banks, where the standardized approach is most likely to be applied broadly, are particularly worried that the standardized approach's five risk-weights do little to help banks in such countries prepare to implement an internal ratings based approach. They note that the move from a system that relies on five buckets for assessing credit risk to a system with a minimum of six to nine performing and two non-performing grades is significant and costly, especially in areas where relationship banking remains the market norm. Increasing the number of risk-weights in the standardized approach can potentially encourage banks to apply more detailed analysis to obligors and develop a credit culture emphasizing credit quality (Working Group on Capital Adequacy 2001: 33).

The Basel Committee is also clarifying that the 100% risk-weight for banks' exposures to unrated corporates represent a floor. Supervisors are encouraged to increase this standard risk-weight when warranted by the overall default experience in their jurisdiction. National supervisors may decide to apply a risk-weight of 150% or higher to exposures in which the volatility of losses arising from credit risk is, on average, significantly higher than that for exposures receiving a lower risk-weight. Assets that may warrant such treatment include venture capital and private equity investments held by banks.

The decision to base risk-weightings on the assessments of credit ratings agencies follows from the relative simplicity of such an approach, while still allowing for a significant refinement in risk-weights, compared to the old Accord.

Furthermore, it provides for transparency and comparability in the risk adjustment process, based especially on the extensive public disclosure of the criteria, methodology, process and actual credit decisions of agencies (Milne 2001:11). Despite these advantages and despite the revisions of the Basel Committee's original proposals, the use of ratings in the regulatory process is still subject to some controversy. On the one hand, the debate focuses on the accuracy and stability of credit ratings and whether or not they are "fit" to serve as a basis for setting capital charges. On the other hand, the adequacy of the Basel Committee's proposals for the regulatory recognition of ratings agencies has been a major issue. The following are some of the controversies in this regard (Cantor 2001: 175-177, Griep and De Stefano 2001: 151-158 and IMF 1999:152):

-There is no single, universally accepted, quantitative standard for each credit rating category. No expected loss benchmarks have been, or are likely to be accepted by all ratings agencies. Yet, by incorporating ratings in regulations, officials implicitly assume that the risk content of ratings is comparable within and across agencies and across time. Several empirical studies indicate that this might not be the case. This follows from the observation that rating transition probabilities vary according to issuer, industry and domicile. Nickell, Perraudin and Varotto (2000) found that the rating transition matrix of US-domiciled and UK-domiciled issuers closely resembles that for the sample as a whole. Japanese domiciled entities on the other hand differ substantially from the whole sample results. The Japanese ratings of Moody's may be relatively tough, since fewer defaults have been observed over time in Japan than would have been predicted by Moody's ratings. The empirical results of Ammer and Packer (2000) and Nickell, Perraudin and Varotto (2000) also suggest that credit ratings have not always been consistent across issuer sectors. In particular, US banks experienced significantly more defaults than US industrial firms, taking the year and credit rating as given. However, a few recent reports indicate that ratings agencies are paying increased attention to sectoral comparisons (for example, Standard and Poors, 1999). Moody's also intends to increase efforts to harmonize its ratings across sectors (Ammer and Packer 2000:11).

-The credit rating agency industry is subject to moral hazard. Every rating agency has a business incentive to assign high ratings to issuers, who are free to choose among the agencies. Pressure on issuers to "shop" for the least expensive and/or least demanding rating is increased by their use in regulation. Such practices could undermine the reliability of ratings over time.

-By using ratings as a tool of regulation, regulators fundamentally change the nature of the rating agency product. Issuers pay rating fees, not to facilitate access to the capital market, but to purchase a privileged status for their securities from the regulator. As a result, licensed ratings agencies will have a product to sell regardless of the analytic quality of their ratings and their credibility with the investor community. Flawed incentives promote aggressive rating practices that, in turn, will undermine a capital adequacy system based on such ratings.

-Ratings are theoretically not an optimal solution for setting relative capital requirements. This is because ratings focus on the level of default risk, while the key to bank capital adequacy is capital sufficiency relative to unexpected losses. Thus there appears to be a gap

between the target of the Accord (to provide against unexpected loss) and the instrument (ratings) which measure default risk. This gap results from the difference between default risk and expected loss (the recovery rate) and because ratings focus on the level of expected loss (which is supposed to be offset by spreads and provisioning) rather than unexpected loss (which is not offset by spreads but requires a capital cushion).

-An increased regulatory use of ratings creates the potential for increased regulatory efforts by various national regulators to influence or control ratings agencies, thereby jeopardizing the industry's independence and credibility.

-There are concerns about how accurately credit ratings reflect underlying risks (particularly for sovereigns). Contrary to corporate ratings, credit ratings agencies currently have only a limited and mixed track record with regard to rating less than ultra-prime borrowers. This is recognized both by the Basel Committee and the ratings agencies themselves (Monfort and Mulder 2000:4-6). The IMF (1999), in its review of ratings agencies, highlights, in addition to the limited track record, the lack of an explicit and probabilistic methodology and limited resources devoted by ratings agencies to sovereign ratings.

Any judgement on the merits of a proposal of an explicit role for external ratings agencies in the assessment of the credit risk of banks' assets calls for an assessment of the information contained in credit ratings. There are two alternative views of the information about default risk in the ratings produced by agencies. One view is that the ratings agencies have access to publicly available information only and that the agencies generally lag the market in processing that information. Proponents of this view argue that the frequency with which ratings agencies review companies is too low even to generate timely summaries of relevant public information. An alternative view is that ratings agencies are specialists at obtaining and processing information, and thereby generate information on default risk that was not previously in the public domain. Clearly, there is a much stronger case for the use of ratings in bank supervision if the latter rather than former view is correct (Gropp and Richard 2001:7).

-The debate on the accuracy and stability of ratings to date has been dominated by the agencies' failure to give an advance warning of the Asian crisis (IMF 1999:145). However, it appears that market spreads, as well as market analysts, as represented in Institutional Investor and Euromoney ratings, provided signals similar to those of the credit ratings

agencies. Furthermore, in reviewing developments since the beginning of the Asian crisis, the credit risk profession has identified a number of economic factors that will receive increased emphasis in any evaluation of a country's creditworthiness. This include placing greater emphasis on external debt and liquidity, banking soundness, corporate leverage, and policy response capacities.

-Moreover, it has been argued that the linkages between regulatory requirements and rating changes can have a sharp impact on market dynamics, both within national markets and across borders. For example, one concern is that if a sovereign is suddenly downgraded from investment to non-investment grade in the midst of a crisis, then a number of institutional investors could be faced with either higher capital charges or prohibition on continued holdings of the sovereign's securities. The ensuing portfolio adjustments could limit the funding available to sovereigns and/or impose higher borrowing costs. In this regard, the empirical results of Altman and Saunders (2000b:25) show that "traditional" agency ratings could produce cyclically lagging rather than leading capital requirements, resulting in enhanced rather than reduced degree of instability in the banking system. The results of Monfort and Muller (2000), estimating a model of sovereign ratings of emerging market countries suggest that this might indeed be the case. Their results indicate that capital requirements as under the proposed Basel Accord would result in significantly sharper fluctuations in required capital than under the current Accord. This is also suggested by the findings of a study by Ferri, Liu and Majnoni (2000). Ultimately, linking banks' capital asset requirements to private sector ratings would reduce the credit available to non-high income countries and make it more costly, limiting economic activity.

-Externally rated counter-parties account for a small proportion of corporate and financial borrowers. As a result of its limited coverage, the ratings based approach potentially creates a more "uneven" playing field, favoring US banks and banks which hold traded debt.

-As it does not include any benefit for diversification, the ratings-based approach effectively discriminates against "relationship" banks, with well-spread lending to small, medium and private companies, most of which will remain 100% weighted, regardless of relative credit quality.

-The IMF report on ratings agencies (IMF 1999:189) cautions that the agencies may not be devoting enough resources to conduct high quality risk analysis, and to ensure accurate and timely ratings. It should be noted that the proposed use of ratings in setting capital charges would create additional demand for ratings, which could cause new agencies to proliferate and competition to intensify. Resulting pressures on profit margins, in turn, could diminish the resources devoted to the analysis, rating, and monitoring of issuers. This underscores the importance of robust selection standards for agencies whose ratings may be used for capital charges and their consistent application. This, in turn, raises the issue of the adequacy of the criteria that the Committee proposes for the regulatory recognition of ratings agencies.

The minimum criteria that the Basel Committee sees as essential for regulatory recognition of ratings agencies are as follows (Basel Committee 1999c: 33-34).:

Objectivity. The methodology for assigning credit assessments must be rigorous, systematic, continuous, and subject to some form of validation based on historical experience. Moreover, assessments must be subject to ongoing review and responsive to changes in financial condition. Before being recognized by supervisors, the Committee proposes that an assessment methodology for each market segment, including rigorous backtesting, must have been established for at least one year, while recognizing that a three-year period would be preferable.

Independence. The methodology should be as free as possible from any external political influence or constraints, or economic pressure from assessed entities.

Transparency. For validation purposes, the individual assessments should be publicly available.

Credibility. To some extent, credibility will be derived from the criteria above. This criterion should not be used as a barrier to the entry of new institutions, but, at the same time, any new institution that emerges following this change in the supervisory framework would need to be carefully evaluated. The credibility of an institution would also be underpinned by the existence of internal procedures to prevent the misuse of confidential information.

International access. The institution is not required to assess firms in more than one country, but its results should be available to non-domestic parties with legitimate interest on the same basis as to equivalent domestic parties.

Resources. The institution should have sufficient resources to allow substantial ongoing contact with senior and operational levels of assessed entities.

Recognition. National supervisory authorities will be responsible for recognition of institutions based on the above criteria. It is proposed that the Secretariat to the Committee will serve as a clearing house of information on the institutions recognized by national supervisory authorities.

The proposed criteria is criticized for lacking the level of detail required for operational use (Karacadag and Taylor 2000:19). For example, how are objectivity and independence to be judged? What level of financial and staffing resources will be considered adequate, and on what basis? Especially, ratings agencies criticize the lack of reference to a rating agency's market acceptance, historical performance or scale equivalence (Griep and De Stefano 2001:154). Rather, the proposal states that the rating methodology must be "rigorous, systematic, continuous and subject to validation." Attempts to translate such requirements into practical criteria would require discretion and subjective judgment to a degree that would make it difficult to ensure uniformity across countries. Even if the criteria included objective and well-founded benchmarks in some areas, judgments on issues of objectivity, independence, and track record inevitably would be subjective. As a result, approval processes would be prone to inconsistencies at best and politicization at worst, especially where market discipline is weak.

A number of thorny issues arise in this regard (Karacadag and Taylor 200:24). Firstly, in countries where the approval process is more lenient, and quality of ratings on borrowers is lower, the ability of capital standards to achieve banking system soundness and a level playing field would be compromised. Secondly, policies will have to be developed on how to handle rating differences among approved agencies on the same borrower. Thirdly, consistency among international and local ratings agencies on rating definitions and scales is a key prerequisite for the successful use of ratings. Inconsistent approaches in any one of

these areas would undermine the use of external ratings' intended contribution to increasing the precision and effectiveness of capital standards.

Another major field of criticism is the track record criterion. While the Basel Committee calls for "rigorous backtesting" of the ratings before approving an agency, it sets the minimum time for an agency to be in operation at only one year. It is unfeasible to evaluate the track record of an agency established for only one year, because robust relationships between ratings and defaults take years to emerge (Cantor 2001:174, and Griep and De Stefano 2001:156).

The Committee appears reluctant to set a higher threshold from fear of erecting barriers to entry to the ratings industry, which is already oligopolistic. However, the attempt to strike a balance between the competing goals of securing high quality ratings (based on experience and track record) and minimizing the regulatory barrier to new entrants carries risks. For instance, a deliberately low barrier to entry would create incentives for inexperienced and possibly incompetent agencies to operate. Thus, the thresholds used to evaluate an agency's track record should be tightened considerably. Ultimately, the key task for supervisors is to distinguish between new ratings agencies striving to build up a reputation and those intent on conquering market share and maximizing short-term profits (Benink 2001:5).

Commentary from ratings agencies suggests less reliance on the Basel Committee's proposed "administrative" rules and more reliance on market acceptance by major investors and published track records as the most meaningful indicators of rating agency credibility (Cantor 2001:175, Griep and De Stefano 2001:167). For example, Standard and Poor's believes the market itself through its discriminating choice of ratings and ratings agencies, remains the best and most rigorous judge of the committee's proposed minimum criteria: quality, objectivity, independence, transparency, credibility, access, resources and recognition. Market acceptance and judgment of ratings agencies implicitly take these factors into account, including whether agencies' criteria, methodologies and ratings have been tested over a sufficient period of time and are publicly available.

Karacadag and Taylor (2000:21) also suggest the approval criteria should rely heavily on feedback from market makers and participants, drawing lessons from the Securities and

Exchange Commission (SEC)'s experience on designating Nationally Recognized Statistical Rating Organizations (NRSROs) in the United States.

The SEC states that “the single most important criterion is that the rating organization is nationally recognized, which means that the rating organization is recognized in the United States as an issuer of credible and reliable ratings by the predominant users of securities ratings” (SEC 1997). In order to determine whether an agency is nationally recognized, the SEC contacts a sample of market makers, ascertaining the degree to which an agency's ratings are known and relied upon. Several other factors are also assessed, including the organizational structure of the agency, the agency's financial resources (to ensure its independence from the companies it rates), the size and quality of the agency's staff and its rating procedures. A qualitative judgment is made, based on the combination of all factors, with market feedback serving as the decisive factor. The burden of subjective judgment ultimately rests on the shoulders of the market.

In the light of the SEC's overall experience and acceptance of the primacy of market over “administrative” criteria, Karacadag and Taylor (2000:27) suggest that the new capital framework's rating agency selection criteria maximize the market's input into the approval process, especially in developed economies. They argue that “the market's collective judgment on an agency's credibility and reputation” is likely to be superior to a “bureaucratic approval process”. They admit that reliance on a market-based approval process in most emerging markets, where market discipline is weak, is not a realistic policy option. Thus, an official review and approval process based on a set of eligibility criteria is inevitable for many countries.

A final issue in this regard concerns the centralization or decentralization of the recognition of external credit assessment providers. The Basel Committee proposes that this responsibility should be decentralized to national supervision authorities. However, this may potentially create a burdensomely diverse set of recognition and reporting requirements for global ratings agencies. Diverse compliance and interpretation issues would create time and resource constraints for both ratings agencies and the authorities responsible for compliance.

Given these complexities, as well as the need to ensure the consistent application of approval

criteria, there is a strong case for centralizing the recognition of ratings agencies (Karacadag and Taylor 2000:22). Such a centralized authority may include participation of multilateral financial institutions or a representative group of local supervisory authorities meeting under the auspices of the Bank for International Settlements. A central authority would ensure consistent application of the selection criteria and develop a uniform approach to resolving administrative questions that would be applied universally. Undoubtedly, vesting considerable power in a central authority, whose decisions affect the business prospects of new ratings agencies, could be a source of political pressure.

However, such pressures are more likely to be resisted by a single authority managed transparently under the scrutiny of global capital markets than several authorities, some of which may be operating in environments with limited market discipline. Given that international financial stability can be viewed as a public good, there is a strong argument for having a public element involved in credit rating. Griffith-Jones and Spratt (2001:16) argue that the BIS has the best track record in terms of spotting potential crises as well as having financial stability as its main objective, and would be well placed to fulfil this role.

Despite their earlier concerns about the use of ratings in the regulatory process, some of the ratings agencies have indicated that the new Basel Committee proposals for using credit ratings to determine risk-weights in capital adequacy requirements will have positive implications for bank credit strength and risk strategies. For example, Cantor (2001:172) has argued that under the Basel Committee proposals there would be extra incentives for banks to focus on the quality of their borrowers and counterparties. Moreover, the new capital framework could result in lower loan-loss provisions to the extent that banks increase their focus on risk at the beginning of the loan relationship rather than at a later stage in that relationship.

4.7.2.2 The internal ratings based approach (IRB)

In the June 1999 consultative paper (Basel Committee 1999c), the Basel Supervisors Committee briefly outlined three approaches to capital regulation: 1) a revised standardized approach-architecturally similar to the current Accord; 2) a full models approach, similar to

that now available for market risk, in which a bank's internal models would compute required regulatory capital for credit risk; and 3) an internal ratings based (IRB) approach in which credit risk capital would be computed using formulas involving various relevant portfolio characteristics

In the above-mentioned proposal, the Committee envisioned that the use of internal assessments of credit risk for setting capital charges would be limited to some sophisticated banks. After further study, the Committee considers an expanded role for the IRB approach in the New Accord and believes that the minimum eligibility standards for the IRB approach are within the reach of a wider range of banks.

Under the IRB approach, banks will be allowed to use their internal estimates of borrower creditworthiness to assess credit risk in their portfolios. A bank estimates each borrower's creditworthiness, and the results are translated into estimates of a potential future loss amount. This will form the basis of minimum capital requirements, subject to methodological and disclosure standards.

This framework explicitly recognizes more elements of credit risk (for example, the creditworthiness of the obligor, the structure and maturity of the transaction, and the concentration of loans to a particular borrower or borrower group) in the regulatory capital calculation.

The IRB approach provides a similar treatment for corporate, bank and sovereign exposures, and a distinct analytical framework for retail, project finance and equity exposures. For each exposure class, the treatment is based on three main elements: risk components, where a bank may use either its own or standardized supervisory estimates; a risk-weight function which converts the risk components into risk-weights to be used by banks in calculating risk-weighted assets; and a set of minimum requirements that a bank must meet to be eligible for IRB treatment (Basel Committee 2001a:15).

4.7.2.2.1 *Rationale for the IRB approach*

The inherent attractiveness of such an approach is that it is based on a bank's own

quantitative and qualitative assessment of its credit risk. It offers the potential of a “customized” approach to prudential policies, taking into account the specific bank’s business mix, appetite for risk, risk controls, and organizational and management structure.

In principle, an approach for setting capital requirements based on internal ratings creates a direct link between the regulation of capital requirements and banks’ internal structures for assessing, pricing and monitoring the risks involved in individual operations. Consequently, it should ensure that regulatory capital charges more closely reflect the banks’ risk profiles and contribute to greater alignment of regulatory and economic capital (Desario 1999:2). In addition, the use of internal ratings places the responsibility of risk management squarely where it belongs; within each bank.

Potentially, an IRB approach gives banks better incentives to improve on their risk management practices, as this would be reflected in capital savings. However, the extent of this advantage depends partly on the way regulators map the information produced by banks’ internal models into the regulatory capital (International Swaps and Derivatives Association 2000:21).

From a regulatory perspective, the presence of a well-functioning internal rating system allows examiners to gain confidence in the overall strength of credit risk management (Treacy and Carey 2000:182). Furthermore, flexibility of internal rating systems in responding to changes in the economic environment and innovations in financial products may reduce the incentive for banks to engage in regulatory capital arbitrage.

The informational advantage of internal systems could generate more accurate credit risk assessments. It may incorporate supplementary customer information which is usually out of the reach of an external credit assessment institution. Such information includes detailed monitoring of the customers’ accounts and greater knowledge of any guarantees or collateral. Internal ratings may also cover a much broader range of borrowers, providing assessments of the credit quality of individuals and small-to-medium-sized companies.

Finally, the benefits of the IRB approach potentially include a greater awareness, by both banks and supervisors, of the risks faced, as well as improvements in efficiency, with

institutions using the same model for regulatory and internal purposes.

Despite these potential advantages, the internal ratings based approach necessarily introduces complexity into capital requirement calculations. Some of these complications relate to the proposed architecture for an internal ratings based approach.

4.7.2.2.2 *Possible architecture for an internal ratings based approach*

The recognition of internal ratings involves an assessment of the concepts behind internal rating models, the use of such models and the validation methods adopted to provide confidence in the output. The regulator should set overall requirements, as well as approve and police the use of the framework within individual banks via the normal supervisory and audit processes.

The Basel Committee (2001a:15) envisages that the foundation of this architecture would include the following elements:

- A bank's assessment of the risk of default in a borrower, as embodied in its internal rating and the measurable risk characteristics associated with these ratings.
- A system for slotting those exposures within a given bank grade into a regulatory capital bucket. This will be based on the bank's quantifiable concept of borrower default, as well as loss given default and potentially other asset characteristics.
- The development of a capital charge associated with each regulatory capital bucket based on estimates of its relative riskiness.
- Minimum standards and sound practice guidelines for key elements of the rating process, including key characteristics of the rating system and process.
- A supervisory process for validating this approach, including ways of ensuring that a rating reflects all relevant information on the underlying risk of an exposure, that the process by which it is assigned ensures its integrity, and that the underlying measures of loss are consistent and comparable across banking institutions, countries, and over time.

From the above discussion it is clear that the New Capital Adequacy Framework is essentially a ratings-based risk-bucketing system. In such a system, banking book assets are

grouped into buckets, which are presumed to be homogeneous. Associated with each bucket is a fixed capital charge per dollar (money value) of exposure. In a bucketing scheme, capital charges are portfolio invariant, i.e., the capital charge on a given instrument depends only on its own characteristics, and not the characteristics of the portfolio in which it is held (Gordy 2001:2). As mentioned, the Basel Committee decided not to allow credit risk portfolio models for capital requirement estimation. Instead, portfolio effects are intended to be captured by a so-called “granularity index” adjustment added to the basic capital requirement, where the latter is intended to cover for credit risk at individual transaction level. That is, rather than calculating both credit risk at the individual level and portfolio effects simultaneously, as portfolio credit risk models do, the Basel Committee has opted to assess the impact of concentration risk incrementally. Thus, the point of the granularity adjustment is to include credit risk-related to concentrated portfolios in a simple way (Gordy 2001:4). In essence the granularity factor is a second step adjustment that reflects the difference between a hypothetical infinitely fine grained portfolio, assumed in the calibration of the IRB risk-weighting function, and an actual bank portfolio (British Banker’s Association 2001:20).

However, significant concerns with the construction of the proposed granularity index exist. Although the importance of correlation across borrowers is recognized, it only addresses a limited kind of correlation and does not consider the distribution of exposures across countries or industry sectors (Working Group on Capital Adequacy 2001: 36).

In addition to being a ratings-based risk-bucketing system, another important aspect of the architecture of the IRB approach is that it differentiate between a foundation and advanced approach. The distinction between these two approaches will consequently be discussed.

4.7.2.2.3 *The foundation and advanced IRB approaches*

As mentioned, a bank’s assessment of the risk of default in a borrower, as embodied in its internal rating and the measurable risk characteristics associated with these ratings is an integral part of the architecture of the IRB approach. In this regard, the framework allows for both a foundation method and more advanced methodologies for calculating capital requirements. In the foundation methodology, banks estimate the probability of default associated with each borrower, and the supervisors will supply the other inputs. In the

advanced methodology, a bank with a sufficiently developed internal capital allocation process will be permitted to supply other necessary inputs as well. This include internal estimates of three additional risk components: Loss given default (LGD), Exposure at default (EAD) and the treatment of guarantees/credit derivatives (Basel Committee 2001b:31-33).

Both the foundation and advanced IRB approaches are based on a regulatory function (known as BRW, or benchmark risk-weight). For each broad classification of exposure (for example corporate or retail) risk-weights are derived from a specific, continuous function. A risk-weighted asset is defined as the risk-weight of a transaction multiplied by a measure of exposure for that transaction. Total risk-weighted assets (RWA) are the sum of the individual RWA across all transactions. The calculation of total RWA for non-retail exposures under the IRB approach is a two-step process. Firstly, the bank computes a baseline level of RWA for the non-retail portfolio. This baseline level is calculated by summing the individual exposures multiplied by their respective IRB weights which, in turn, depends on each instrument's PD, LGD, and, where applicable, M. Secondly, the bank's total RWA for the non-retail portfolio is calculated by adding to this baseline level a granularity adjustment (discussed above). This granularity adjustment may be positive or negative, reflecting the degree of single-borrower risk concentrations within the non-retail portfolio. The effect of this adjustment is to increase (reduce) the total RWA of portfolios having relatively large (small) single-borrower's risk concentrations (Basel Committee 2001a:19).

Under the foundation approach, corporate exposures will receive a risk-weight (RWC) that depends on PD and LGD (after recognizing any credit enhancements form collateral, guarantees or credit derivatives) where there is no explicit maturity. The average maturity of all exposures will be assumed to be three years. An exposure's risk-weight (RWC) will be expressed as a function of PD and LGD according to the following formula:

$$RWC = (LGD/50) \times BRW_c(PD)$$

or $12.5 \times LGD$, whichever is smaller

In this expression, RWC denotes the risk-weight associated with given values of PD and LGD, while $BRW_c(PD)$ denotes the corporate benchmark risk-weight associated with a given PD.

As described by Gordy (2001), the formula is derived from a restricted version of the

CreditMetrics model.

Representative values for the above benchmark risk-weights are presented in table 4.2. below.

Table 4.3 **Representative values for benchmark risk-weights**

PD (%)	BRWC
0.03	14
0.05	19
0.1	29
0.2	45
0.4	70
0.5	81
0.7	100
1	125
2	192
3	246
5	331
10	482
15	588
20	625

Source: Zentraler Kreditausschuss 2001:51

Under the foundation approach, the effective LGD is determined on the basis of different intervals of C (collateral) and E (exposure) (Zentraler Kreditausschuss 2001:51) as reflected in table 4.4.

Table 4.4 Determination of LGD under the foundation IRB approach

CASE	CONDITION	EFFECTIVE LGD	TREATMENT
Case 1	C/E < 30%	50%	As uncollateralized
Case 2	C/E > 140%	40%	Floor LGD for this type of collateral where the loan to value ratio does not exceed 71%
Case 3	30% < C/E < 140%	{1 - [0.2 x (C/E)/140%]} x 50%	Weighted average of collateralized and uncollateralized LGD

Source: Zentraler Kreditausschuss 2001:50

In the “advanced” version, the BRW regulatory function is adjusted to include the effect of maturities other than 3 years (the longer the maturity, the greater the risk-weight). Furthermore, banks are allowed to supply their own estimates of EAD and LGD. The treatment of collateral also differs between the foundation and advanced approaches. Unlike the foundation approach, the advanced approach does not limit the list of eligible collateral to “high-quality, high-marketable financial collateral or specified forms of commercial and residential real estate”. Valuation of collateral is not prescribed either (Zentraler Kreditausschuss 2001:54). However, the proposal envisages that during the first two years of application of the advanced IRB approach, the capital requirements calculated using this method cannot fall below 90% of the requirements deriving from the foundation IRB method (Sironi and Zazzara 2001:13)

A corporate exposure’s risk-weight in the advanced approach, RWC, can be expressed as a function of PD, LGD and the effective maturity M according to the following formula:

$$Rwc = (LGD/50) \times BRWC(PD) \times [1 + b(PD) \times (M - 3)]$$

or 12.5 x LGD, whichever is smaller (Basel Committee 2001b:21)

In this expression, BRWc(PD) is the corporate benchmark risk-weight associated with PD

and the term $1 + b(\text{PD}) \times (\text{M} - 3)$ is a multiplicative scaling factor, linear in M , where the maturity adjustment factor $b(\text{PD})$ is also a function of PD . For maturities ranging from one to about seven years, a linear relationship between maturity and credit risk is viewed as a reasonable approximation to both industry-standard mark-to-market credit risk models, such as CreditMetrics and Portfolio Manager, and a multi-period default mode (DM) model developed by the Basel Committee (2001b:24).

Overlooking the effect of maturity, and thus considering only PD and LGD , Sironi and Zazzara (2001:14) show that risk-weights may vary between 0% ($\text{PD}=0.03\%$ and $\text{LGD}=0$) and 625% ($\text{PD}=20\%$ and $\text{LGD}=50\%$). Therefore, under both the foundation and advanced IRB approaches, the range of risk-weights will be far more diverse than those in the standardized approach, resulting in greater risk sensitivity.

Several banks perceive the calibration of the capital requirement proposals as excessive and over-conservative. The following elements of the risk-weight function is relevant in this regard:

-Capital covers for both expected and unexpected losses. The new capital framework is structured so as to create a capital cushion to cover both expected loss (EL) and unexpected loss (UL) (Working Group on Capital Adequacy 2001: 8). This aspect represents an important difference compared to the logic adopted by banks' internal models: the latter are based on the separate assessment of expected loss, which is covered by a specific provision and unexpected loss, covered by economic capital (Sironi and Zazzara 2001:7). Furthermore, the proposals also limit the amount of reserves that count toward capital. This can result in a systematic over-statement of risk and an undercount of the resources available to absorb it. This imbalance can be particularly punitive for business lines that have high, but stable, expected losses, such as credit cards (Working Group on Capital Adequacy 2001:14, and The Royal Bank of Scotland 2001:13). During 2002, the Basel Committee (2002b:2) issued a paper proposing a revised treatment of specific provisions under the IRB approach whereby capital requirements would continue to be calibrated towards expected loss and unexpected loss, but done so in recognition of specific provisions actually made:

-Adjustment for absorptive capacity of tier two capital. The risk-weighting function also contains an adjustment factor probably best described as an insurance policy to cover an event in which a bank's tier two capital is insufficiently robust to absorb expected losses.

This is criticized on the basis that the quality of tier two capital does not affect obligor default probabilities. Skewing the risk-weights to address concerns with the quality of tier two capital can potentially generate inappropriate and inaccurate estimates of risk, distorting decision-making within risk management processes (Working Group on Capital Adequacy 2001: 22).

-Probability of default estimation error. The risk-weighting function also includes an uplift factor (+20%) intended to buffer against measurement error (British Bankers' Association 2001:15 and Barclays PLC 2001:17). The function applies to all banks using the IRB approach at all times, regardless of the caliber of the bank's internal ratings process and regardless of whether the internal ratings over time have proved to be generally consistent with loss experience. This can be interpreted as an implicit assumption that all banks are consistently wrong and excessively optimistic about the credit risk and that these biases are reflected in their internal ratings. Furthermore, it assumes that loss experience does not provide a "reality check" that forces the bank to change its perspective and its rating system. It should be noted that no similar PD estimation error factor is incorporated into the risk-weighting function under the standard approach, implying that no risk of estimation error exists at external ratings agencies (Working Group on Capital Adequacy 2001: 20).

In addition to these factors perceived leading to an overly conservative estimation of credit risk-weights, the following aspects of the credit risk-weight function was also criticized in commentary received on the capital adequacy proposals:

-Correlation between probability of default (PD) and loss given default (LGD). The specified form of the risk-weight function assumes that loss given default is independent from the default rate (Federal Reserve Bank of Chicago 2001:2). However, economic intuition suggests that realized losses tend to be higher when default rates are higher. That is, the same conditions that cause a greater default rate also cause greater loss given default. This suggest that it would be appropriate for the functional form of the risk-weight to take account of the positive correlation between realized default rate and realized losses (Federal Reserve Bank of Chicago 2001:3).

-The Basel Committee's proposal that no more than 30% of gross exposures should fall into a single grade, also led to some criticism. Generally speaking, it makes sense to spread borrowers across rating grades so as to ensure a meaningful differentiation. However, stipulating that no more than 30% of the gross exposures should fall into any single borrower grade, could lead to considerable interference in banks' business policy. Moreover, there is

no reason from a risk angle why a bank should not have more than 30% of its gross exposures in its top rating grade. Setting a rigid ceiling could also mean that small and medium-sized banks in particular, whose business is concentrated on certain types of borrowers, will be unable to adhere to such a ceiling, especially if these banks pool their data to obtain statistically reliable PD estimates. In the field of small and medium-sized enterprise finance in particular, this could mean a bank being excluded from the IRB approach solely because of such a ceiling (Zentraler Kreditausschuss 2001:58).

The regulatory treatment of retail, small and medium enterprise exposures, as well as the treatment of risk mitigation techniques also attracted negative criticism. This includes the following aspects:

-Calibration of retail exposure risk-weights based on the corporate EL/UL relationship. This calibration implies that the higher the EL, the higher the UL. For many retail portfolios this is simply not true (Citigroup 2001:30). This is due to substantial differences between retail and corporate credits, especially with respect to the relationship between EL and UL (Working Group on Capital Adequacy 2001: 41). Although annual expected loss rates in retail portfolios tend to be quite high relative to corporate portfolios, the volatility of these loss rates tends to be comparatively low. This is due to the large number of exposures in retail portfolios. Consequently, the original calibration significantly overstates the risk involved, while simultaneously creating double counting problems. The latter results from failure to take into account the fact that EL in the retail portfolio is often mostly covered by margin interest (Working Group on Capital Adequacy 2001: 41). Based solely on an evaluation of obligor risk, this could generate a reluctance to continue extending retail credits and could result in passing along regulatory costs to consumers.

Following research on retail, the Basel Committee announced on 10 July 2002 that, in an effort to achieve greater risk sensitivity in the treatment of non-mortgage retail lending, two distinct IRB risk-weight curves will now be available for this set of exposures. The first curve for “other retail” lending will produce capital requirements modestly higher than those proposed in November 2001 and will apply to those exposures that do not qualify for use of the second curve. The second curve will apply to qualifying revolving exposures and will produce capital requirements materially below those previously proposed by the Committee (Basel Committee 2002b:4).

In an effort to maintain consistency with likely changes in capital requirements under the retail IRB framework, risk-weights for residential mortgage exposures under the standardized approach will be reduced from 50% to 40%. Risk-weights for non-mortgage retail exposures (including SME exposures less than Euro 1 million) will be reduced from 100% to 75%.

-Treatment of small and medium enterprises. Quantitative studies show that, under the foundation IRB, capital requirements will increase steeply for middle-market commercial lending activities (Working Group on Capital Adequacy 2001: 9). Failure to adjust the relevant capital weight could undermine many of the goals of the new Accord. The primary effect may well be to discourage the use of the IRB. Those banks that do use the IRB will have two unfortunate incentives. Firstly, they may respond by reducing the amount of credit they provide to the middle market. This would be bad both for regulated banks (reducing their share of one of the few financial sectors where they still retain a big advantage over non-banks) and their customers (reducing their access to credit). Banks using the IRB will also have an increased incentive to arbitrage the capital requirements, either through balance sheet transfers, or by attempting to classify commercial loans as retail (Oliver, Wyman and Company 2001:6).

Since the release of the second consultation paper on the proposed New Capital Adequacy Framework (2001) the Committee has been carrying out further work to assess the appropriate corporate and retail curves. The corporate weighting function has been adjusted to take into account the fact that small and medium enterprise (SME) exposures account for a heavy proportion of the loans at higher PDs. These exposures have greater idiosyncratic risk which reduces the correlation for loans in the higher PD bands.

In the above-mentioned statement released on 10 July 2002, the Basel Committee also announced several changes with regard to the regulatory treatment of SMEs. In recognition of the different risks associated with SME borrower's, under the IRB approach for corporate credits, banks will be permitted to separately distinguish loans to SME borrowers (defined as those with less than Euro 50 million in annual sales) from those to larger firms. Under the proposed treatment, exposures to SMEs will be able to receive a lower capital requirement than exposures to larger firms. The reduction in the required amount of capital will be as high

as twenty percent, depending on the size of the borrower, and should result in an average reduction of approximately ten percent across the entire set of SME borrowers in the IRB framework for corporate loans.

In addition, banks that manage small business-related exposures in a manner similar to retail exposures will be permitted to apply the retail IRB treatment to such exposures, provided that the total exposure of a bank to an individual SME is less than Euro 1 million. A similar threshold will be established in the standardized approach.

-The consistent capital markets emphasis of the proposed framework is also criticized. The framework favors recognition only of capital markets instruments as collateral. Physical collateral (except for residential mortgages) is not recognized, in part due to the lack of secondary market values for such collateral. All capital charges are calibrated using systems and assumptions taken from the corporate portfolio, where many credits are liquid instruments or, through credit derivatives, can become liquid instruments. Thus, the framework overlooks the macroeconomic importance of banks' lending to small and medium-sized companies, whose lending is often collateralized by physical collateral (Working Group on Capital Adequacy 2001: 9).

-A related concern is the regulatory treatment of risk mitigation tools. The Basel Committee has proposed to expand the recognition of the risk mitigating impact associated with a variety of instruments (Working Group on Capital Adequacy 2001: 9). However, it provides only partial recognition of its risk mitigating value, by discounting very conservatively the value of the mitigation in relation to the collateral's perceived liquidity (the more liquid, the more recognition). The original proposal also subjected almost all major forms of collateral to an additional 15% discounting w-factor, ostensibly to cover residual risks (Working Group on Capital Adequacy 2001:8).

The proposed w-factor was criticized for creating an arbitrary, across-the-board factor to penalize all collateralized transactions. This creates an excessively and unrealistic conservative answer that will create disincentives for banks to seek risk mitigation alternatives. After further consideration rather than applying the w-factor in Pillar 1 (minimum capital requirements), the Committee is considering leaving supervisors to

consider in Pillar 2 the various risks the w-factor was supposed to cover.

The Basel Committee has announced several modifications to the original proposals during 2002, aimed at streamlining the minimum standards for the IRB approach. These requirements were developed to ensure an appropriate degree of credibility and consistency in banks' use of internal ratings for capital purposes. The Committee has recently revisited the minimum standards. Modifications have been made to allow for consistent application of the requirements, as well as to allow for innovation and appropriate differences in the way in which banking organizations operate. Changes have also been made to permit greater flexibility to banks in implementing the IRB approaches across their various portfolios, in terms of both timing and scope (Basel Committee 2002b:4).

In addition to criticism regarding the risk-weight function, the consultation process revealed several other aspects of criticism. A summary of these are given in section 4.7.5.

4.7.2.2.4 The proposed approach to progression from the standardized to the internal ratings based approach

Bank supervision and regulation are necessarily dynamic and evolutionary. This necessitates a regulatory framework whose underlying goals and broad strategies can remain relatively fixed, but within which changes in application can be made as banking practices change, and as individual banks grow and change their operations and risk control techniques (Greenspan 1998:165).

To secure the objective of prudentially sound, incentive-compatible and risk sensitive capital requirements, the Basel Committee is providing for a progressive, evolutionary approach to the calculation of Pillar 1 capital charges, similar in nature to that of the 1996 Market Risk Amendment. This evolutionary approach allows banks that meet incremental minimum requirements to avail themselves of more risk sensitive methodologies in calculating regulatory capital (Basel Committee 2001a:17).

The “evolutionary” aspect of the Pillar I proposals for credit risk can be understood in a number of ways (Basel Committee 2001a:8). Firstly, over time and at the industry level, the

Committee hopes to see more banks moving from the standardized approach to the IRB approach. Within the IRB approach, the Committee expects to see banks moving from the foundation to the advanced approach, as their risk management capabilities develop and enable them to meet the more rigorous minimum requirements.

In formulating an initial approach that acknowledges the current limitations on banks and supervisors, but contemplates recognition of more sophisticated forms of analyzing credit risk, the Committee believes that this framework will provide incentives for banks to further improve credit risk measurement and management practices. However, certain observers feel that several aspects of the new Accord does not achieve this objectives. These aspects include the following:

- It is unclear from the results of the QIS (see section 4.7.1.1.) whether there are sufficient incentives within the current proposals to encourage banks to move from the standardized to the foundation IRB, or from the foundation IRB to advanced status (Barclays PLC 2001:9). Initial surveys of the impact upon banks suggest that the best case is neutral whilst the majority of respondents report that the transition from the standardized to the foundation IRB approach results in an increase in regulatory capital (UBS 2001:1, and Federal Reserve Bank of Chicago 2001:4).

- On average, the QIS2 results indicate that the foundation IRB approach would generate higher capital requirements than the standardized approach, counter to the Committee's desired incentives. Requirements seem likely to be lower under the advanced IRB approach with an average change of -5% (Basel Committee 2001c:3). A number of factors put potential users of the foundation IRB approach at a relative disadvantage to banks operating both the standardized and the advanced internal ratings based approaches. This include the following (British Banker's Association 2001:15):

- Simulations of credit risk capital charges that apply for corporate exposures show for exposures rated BBB (S&P rating) and above, the IRB provides a lower capital requirement and thus creates an incentive for banks to adopt the IRB approach. The results also show that for credits rated below BBB, there is a clear incentive to use the standardized approach as the capital charges under the IRB are punitive (Kupiec 2001:4). According to Kupiec (2001:7) this discrepancy can be partly explained by a fundamental difference of philosophy associated with the assignment of credit ratings under the standardized and IRB model

approaches. External credit ratings are based on assessments of a creditor's long-term ability to repay obligations, while the IRB has been calibrated using one year mark-to-market (MTM) credit exposure estimates (Kupiec 2001:7).

-The proposed restriction of the use of the IRB approach to those institutions that are able to apply the approach to their entire loan portfolio. Under paragraph 159 of The New Basel Capital Accord, the implementation rules for the adoption of an IRB approach are provided as follows:

“A banking group that has met the requisite minimum requirements and is using the IRB approach for some of its exposures must adopt the IRB approach across (1) all exposure classes and (2) across all significant business units (groups, subsidiaries, and branches) within a reasonably short period of time. Banks must agree to an aggressive, articulated plan to adopt the IRB approach across all exposure classes and business units with the home supervisor. Within this period, no capital relief would be granted for intra-group transactions between the IRB bank and a business unit on the standardized approach. This include asset sales or cross guarantees” (The Royal Bank of Scotland 2001:20).

Given the significant differences between the standardized and IRB approaches, this stance can be justified as a solution to the possibility of “cherry-picking”, i.e. banks choosing between the standardized and IRB approaches for individual portfolios according to whichever produces the lower capital requirement (Australian Prudential Regulation Authority 2001:16). However, it does not take into account the inherent complexity of a global organization where it is impractical to apply the same standards of risk management across all business units. The eligibility requirements for the use of IRB have wide-ranging implications for management, staff, training and IT systems. These implications are further exacerbated if an identical approach would have to be used across an entire organization-particularly for units using solutions tailored to their specific business. Principally, it needs to be recognized that for many asset classes or businesses, the same level of historic data is simply not available. Furthermore, not all markets are at the same stage of development, and it is inappropriate to assume the same level of sophistication in all circumstances (Barclays 2001:15 and Australian Prudential Regulation Authority 2001:16)

In this regard, several banking groups suggested allowing “partial model approval” - combining the standardized and IRB approaches, subject to supervisory validation. Banks

should be required to extend the IRB to areas where material credit risk is run, but should be able to agree with their supervisors how to treat geographical areas and business lines where the application of the IRB approach makes less sense (PriceWaterhouseCoopers 2001:7 and CreditSuisse Group 2001:16).

As mentioned, after consideration of these and other concerns, the Basel Committee has responded by reviewing the proposed new Basel Capital Accord and is considering several modifications (see also section 4.7.5.).

4.7.2.2.5 *Critical issues regarding the implementation of the IRB approach*

In addition to the above-mentioned impact of the current relative calibration of the proposed capital requirements, several other critical issues regarding the implementation of the IRB approach remain. This includes the following:

-How to validate banks' internal risk ratings. The lack of homogeneity among the rating systems at different banks, together with the central role of subjective risk factors and business judgements in assigning internal grades, means that comparability across institutions and countries presents an important hurdle (Karacadag and Taylor 2000:28). In some countries, for example, a higher percentage of banks might use scoring or equity-based processes for estimating individual obligor PDs and/or these banks might use these obligor-specific PDs, rather than ratings-based PDs, within their internal economic capital models. Since no widely acceptable evidence exists to show that ratings-based economic capital models are better than (or worse than) individual-obligor PD-based models, it might be best to preserve great latitude in the accreditation process and, within that process, great latitude in the allowable methods for arriving at the inputs into the regulatory capital model (Risk Management Association 2001:12).

-Further questions arise concerning the extent to which risk management methods should become standardized. On the one hand, the regulatory endorsement of specific risk management techniques run the risk of reducing the diversity of techniques to the detriment of innovation and the discovery of superior techniques. More importantly, the standardization of risk management practices would involve regulators in the business of banks to a degree that would imply some responsibility for regulators over the solvency and success of regulated banks. An endorsement by regulators of banks' risk management practices, thus,

could create moral hazard problems of its own. On the other hand, if regulations and standards are broad-brushed, the full discretion awarded to banks and supervisors may result in a wide range of risk management and supervisory review practices in terms of quality and rigor. This can undermine the effectiveness of capital standards.

-How to link risk-weights to these internal ratings so as to ensure economically meaningful and reasonably consistent capital treatment of similar risks across banks. This requires an acceptable trade-off between operational feasibility and conceptual soundness at the time of implementation (Basel Committee 2001b:29). According to the Basel Committee, this can be achieved, for example, by mapping internal ratings to an expanded set of risk-weights. Another possibility, perhaps longer-term, would be to allow a bank's own estimates of loss, such as default probability, together with some other considerations, to translate directly into a capital requirement for that exposure. This would be conditional on supervisory recognition of the bank's methodology as being suitable for this purpose. However, this would require that a number of challenges are addressed. These include estimation of a loss probability, through, for example, measures of EDF (Expected Default Frequency) and its associated PDF (Probability Density Function), evaluation of the conceptual methodologies used in estimating a PDF (such as the holding period and definition of credit event), validation and data limitations.

An IRB approach constitutes a revolutionary change from the current capital Accord. This poses challenges to banks and regulators alike. Banks would need to demonstrate the strength of their rating systems and the accuracy and consistency of their risk measurement. The role of supervisors in this regard will be a critical component to the substance - and the credibility of an IRB proposal (Treacy and Carey 2000:1).

4.7.3 Pillar 2: supervisory review

As mentioned, the three-pillar approach requires that supervisory review become an integral part of capital standards and an essential complement to the first pillar. In this context, the concept of supervision versus regulation was introduced in section 4.5. in order to identify why supervision lost out to regulation in the past, but why conditions might be ripe for

supervision to revert itself (Karacadag and Taylor 2000:27).

The Basel Committee sees four areas where supervisory review is a necessary complement to the Pillar 1 minimum capital requirements and the disclosure requirements of Pillar 3:

- Dealing with risks only partially addressed in Pillar 1 where review of individual institutions reveals issues that are not adequately covered by the general requirement.
- Capturing risks that have been left out of Pillar 1 (e.g. interest rate risk in the banking book and strategic and reputational risks facing the institution).
- Assessing factors external to the institution (e.g. effects of the business cycle).
- Ensuring compliance with the various operational and disclosure standards associated with use of advanced approaches for credit and operational risk or use of particular credit risk mitigation techniques.

Supervisors already review and evaluate a bank's capital adequacy through on-site examinations, off-site surveillance, and review of the work of internal and external auditors. Under the new approach, supervisors will also review the internal capital adequacy assessments of banks and discuss the internal capital targets set by each (Hofmann 1999:4). The goal of supervisors in reviewing a bank's capital position is to ensure that the position is consistent with its overall risk profile and strategy. Furthermore, supervisory review is assigned the task of ensuring banks operate above minimum regulatory capital ratios and to enable early supervisory intervention if the capital does not provide a sufficient buffer against risk.

These goals are also reflected in the following four basic and complementary principles contained in the New Capital Adequacy Framework (Basel Committee 2001a: 15):

Principle 1: Banks should have a process for assessing their overall capital in relation to their risk profiles and a strategy for maintaining their capital levels.

Principle 2: Supervisors should review and evaluate banks' internal capital adequacy assessments and strategies, as well as their ability to monitor and ensure their compliance with regulatory capital ratios. Supervisors should take appropriate supervisory action if they are not satisfied with the results of this process.

Principle 3: Supervisors should expect banks to operate above the minimum regulatory capital ratios and should have the ability to require banks to hold capital in excess of the minimum.

Principle 4: Supervisors should seek to intervene at an early stage to prevent capital from falling below the minimum levels required to support the risk characteristics of a particular bank and should require rapid remedial action if capital is not maintained or restored.

With regard to the practical implementation of these principles, the new capital framework document contains the following guidelines (Basel Committee 2001a: 5, 11):

Firstly, on the requirements for a sound capital adequacy assessment process, the document list the following: It should include policies and procedures designed to ensure that material risks are captured, procedures for relating the bank's strategies and level of capital to risk and internal controls, reviews and audit to ensure the integrity of the overall management system. The responsibility for the establishment and maintenance of this process rests with management.

Secondly, in evaluating a bank's overall capital adequacy and capital assessment process, supervisors will have to consider various factors, including the bank's risk appetite and its track record in managing risk and the experience and quality of its management and key personnel. Other relevant factors include:

- The quality of its capital and its access to new capital.
- The nature of the markets in which the bank operates.
- The quality, reliability and volatility of its earnings, the diversification of its activities and concentration of exposures.
- Its adherence to sound valuation and accounting standards.
- The diversification of its activities.
- Its relative importance for the national and international financial markets.
- The support and control provided by shareholders.
- The degree of supervision by other supervisors.

Business cycle effects and the overall macroeconomic environment also need to be considered in assessing capital adequacy. As part of this process, a bank should perform rigorous forward-looking stress testing that identifies possible events or changes in market conditions that could impact it adversely, and assess its ability to withstand them. Stress testing should also consider the impact of likely “worst case” scenarios.

In conducting their reviews, supervisors should rely on periodic meetings with bank management, bank prepared reports that detail the results of its capital adequacy assessment and/or internal and external audit reports.

Supervisors should consider a range of options if they become concerned that a bank is not meeting the requirements embodied in the supervisory principles outlined above. These actions may include intensifying the monitoring of the bank, restricting the payment of dividends, requiring the bank to prepare and implement a satisfactory capital adequacy restoration plan and requiring the bank to raise additional capital immediately.

The consultation process has revealed some concerns regarding Pillar 2. The detailed requirements of Pillar 2 can be perceived as an indication that the supervisory review will be intrusive. Furthermore, principle 3 suggests that regulators will, as a matter of course, require banks to hold capital above the regulatory minimum even where there is no well defined weakness or lack of management and control. In the light of the considerable capital safety margin incorporated in Pillar 1, the suggestion that banks with sound internal risk management and control practices and standards should be required to hold more than the regulatory minimum capital calculated under Pillar 1 is questioned (UBS 2001:26).

4.7.3.1 Challenges: supervisory approach

Notwithstanding the above-mentioned increased focus on supervisory review, several important challenges remain in making supervisory review central to the assessment of capital adequacy.

Firstly, the process of supervisory review calls on bank regulators to make judgments that are

inherently subjective and may be difficult to defend. For example, the high degree of discretion awarded to supervisors risks counteracting the second of the main objectives of the existing and proposed accords, namely that of generating a level playing field. In particular, flexibility creates the inherent danger that regulators may use their discretion to lower capital ratios for banks under their control in order to afford them a competitive edge. Alternatively, they may choose to stick to the minimum ratios prescribed under Pillar 1 when prudence would suggest higher capital charges. These possibilities take on real significance in the light of existing differentials in enforcement of the current accord within Europe, with the UK taking a markedly more flexible approach than some continental regulators. In the US, in contrast, relaxing capital adequacy ratios is ruled out by legislation. Consequently, more explicitly specified and harmonized criteria upon which bank management will be judged by supervisors across jurisdictions is needed (Swiss Bankers Association 2001:4).

One possibility is the use of a peer-group review mechanism to subject the processes by which bank supervisors reach their judgments to independent outside scrutiny. However, the concept of peer review has been mooted in the past with little success. There is a widespread perception that the process may be too intrusive and may involve supervisors in second guessing each other's judgements in a way that ultimately may undermine mutual confidence rather than build it (Karacadag and Taylor 2000:33).

Another potential challenge in the successful implementation of Pillar two is that supervision, with its heavy reliance on the judgement of individual supervisors, is extremely intensive of human capital. A supervisory program as envisaged under the New Capital Adequacy Framework has serious resource implications for most bank supervisors. At the very least, it requires skilled and knowledgeable supervisors who will be able to explain and defend their decisions, especially as the imposition of a higher capital requirement has a direct impact on the firm's costs.

Supervisory authorities in G-10 countries, but particularly emerging markets, will be hard pressed to mobilize the necessary resources to establish and operate effective supervisory review functions as required under Pillar two. For example, leading US regulatory bodies have said that they will "have to run hard" to make sure that they have the necessary skills and resources (Jameson 2001a:5). This will also be the case in South Africa, as indicated in

the annual report of the Bank Supervision Department of the South African Reserve Bank's annual report (2001a:14) (see also section 5.1. and 5.4.3.). One aspect suggesting that the requirements of the new capital adequacy framework will lead to a substantial reorganization of banking supervision in South Africa is the fact that the process of on-site supervision only became fully operational during 2000 (Bank Supervision Department of the South African Reserve Bank 2001a:1).

These concerns are especially serious in the light of the current stance of bank supervision in many countries. Indeed, absence of sufficient monitoring of banking institutions has occurred in many emerging market and transition countries (Mexico, Ecuador and East Asia being recent examples), but it has also been a very serious problem in industrialized countries. The resistance to providing the savings and loan supervisory agencies with adequate resources to hire sufficient bank examiners by the U.S. Congress was a key factor in making the S&L crisis in the United States in the 1980s much worse. The inadequacy of bank supervision in Japan and the problems it has caused are well-known, with the lack of resources for bank supervision exemplified by the fact that the number of bank examiners in Japan is in the order of 400 in contrast to around 7,000 in the United States (Mishkin 2000:22).

Most supervisory agencies in emerging economies are already understaffed, and supervisors underpaid. Relying on supervisory review to a greater extent than hitherto may involve these staff in making important judgements that they may be technically ill-equipped to make, or which they find hard to maintain in the face of opposition from powerful and well-connected senior bankers.

The greatest risk is that supervisory resources will be diverted away from the supervisory review of relatively weak banks onto strong banks who will be amongst the first to shift to the IRB approach. Consequently, the scope of supervisory review must be adjusted to clearly focus scarce supervisory resources onto the monitoring of weak banks with low incomes, low capital, and high risk. Otherwise, overall regulatory discipline could be seriously weakened (Milne 2001:18).

These considerations suggest that supervisory review will probably have a limited role under the New Capital Adequacy Framework. The most likely outcome is that extensive use of

supervisory review will only be found where (1) bank regulators have the capacity and the expertise to be able to exercise it, and 2) where the institutions that are subjected to supervisory review have a sense of themselves as forming a “club” with quasi self-regulatory aspects. These conditions are most likely satisfied in the regulation of the main internationally active and diversified banking groups. Indeed, banking on a global scale has become increasingly more concentrated and therefore “club-like.” Over the decade spanning 1987-1997, the total assets of the largest 20 banks in the world increased to 36 percent of total banking assets in G-10 countries from 27 percent, a trend that undoubtedly has continued in recent years (Karacadag and Taylor 2000:31).

One result will be a capital standard that is more obviously two-tier than at present. On the one hand, supervisory review will play a central role in the risk assessment of large complex banking organizations. On the other hand, the rest of the global banking system will be primarily dependent on Pillars one and three for the assessment of its capital adequacy.

However, as shown in the next section, the role of Pillar three may also be limited unless the conditions for exercising market discipline are put in place.

4.7.4 Pillar 3: market discipline

The increasing complexity of large banking organizations makes them difficult to monitor and control using traditional supervisory tools. Accordingly, financial regulators have been increasingly drawn to the idea that private investors can help identify or control financial firms’ risk exposures (Flannery 1998:276). Advances in computer and telecommunications technologies reinforce this trend, making greater reliance on market discipline both possible and necessary (Greenspan 2000:1).

Furthermore, as capital requirements shift toward a process-oriented approach, banks’ capital adequacy will be less clear-cut and more difficult to evaluate (McNee 2001:2). Involving market participants as “third-party” reviewers of banks’ risk management and capital allocation systems thus becomes a necessary complement to the supervisory review of capital adequacy. The third-party review both enhances the overall evaluation of capital adequacy

and provides banks with added incentives to maintain capital commensurate with their risk profiles.

Market discipline could play an equally important role in capital standards by serving the purpose of reviewing the reviewers. Supervisors not only face a technically more challenging task, but in the exercise of discretion and judgement over subjective and qualitative matters, they are likely to come under political pressure from banks and other interested parties. Market discipline could act to counter such forces and provide supervisors with incentives to conduct their responsibilities rigorously and even-handedly (Basel Committee 2001a: 40).

Empirical studies indicate that neither the market nor supervisors possess clearly superior quality assessments. This is recognized by the Basel proposals, with market discipline and supervisory review as part of an integrated three pillar approach. The supervisors' advantage over outside investors is that they can require access to all firm data, including confidential information that the bank would prefer not to make public. At the same time, supervisors are more constrained by law, regulation, and data availability to keep their formal analytical methods constant for relatively long periods of time. The strength of market quality assessments is that investors can investigate any information that seems relevant, and they can freely change their analytical methods when circumstances seem to warrant it (Bliss and Flannery 2001:8).

The latter is an important component of the concept of market discipline. It incorporates two distinct components: investors' ability to evaluate a firm's true financial condition, and the responsiveness of firm managers to the investor feedback impounded in security prices. This two components are often termed market monitoring and market influence (Bliss 2002b:29):

-Monitoring refers to the hypothesis that investors accurately understand changes in a bank's condition and incorporate those assessments promptly into the firm's security prices. Monitoring thus generates the market signals to which managers are thought to respond.

-Influence is the process by which a security price change engenders bank (manager) responses to counteract adverse changes in firm condition. Thus, the channels through which the influence leg of market discipline works are changes in access to funds and/or changes in risk premia. The changing cost and availability of bank funding affect *ex ante* risk appetites

of bank management and serve as market signals of a bank's condition to market participants and to examiners.

Bliss (2002a:2) categorize influence as either direct or indirect. Investors and other counterparties can directly induce a bank to avoid risky situations if they will raise a riskier bank's cost of funds or reduce the volume of business they are willing to undertake with riskier banks. Security prices influence bank behavior indirectly if price changes lead supervisors to take steps designed to reduce a bank's risk exposure. Some price signals may confirm what supervisors already knew or suspected while other signals add new information to supervisory assessments (Bliss and Flannery 2001:5).

From the above definition of market discipline it is evident that disclosure of financial information is of paramount importance in the effective working of market discipline. Indeed, increased disclosure is one of the key aspects of the New Capital Adequacy Framework.

The interest in harnessing market forces to assist regulatory goals also reflects the growing evidence that investors can assess financial firms' true condition quite well. A wide body of empirical research suggests that bank creditors, credibly put at risk, do assess and act upon the risk-taking of banks (Bliss 2002b and Bliss and Flannery 2001).

In this regard, analysis of traded subordinated debt in the U.S. established that debenture risk premiums correlate with bank accounting ratios in a sensible way (Flannery 1998:6). Sironi (2001:3) lays the groundwork for a similar study of European debenture prices. Sironi (2001:5) concludes that European banks' debenture spreads do reflect cross-sectional differences in risk, despite the appearance of strong conjectural guarantees in European countries. His evidence suggests that debentures may work as well in Europe as they do in the U.S.

Berger, Davies and Flannery (2000) find that in the eight week window following (unannounced) CAMEL⁴ rating downgrades, the stocks of affected banks on average showed

⁴ On-site examinations yield ratings assigned on a scale from 1 (strong) to 5 (critically deficient) for 6 categories- capital adequacy (C), asset quality (A), management quality (M), earnings (E), liquidity (L) and

cumulative negative abnormal returns of nearly 5 percent. This finding is consistent with the notion that supervisors uncover information during examinations, which subsequently either leaks to the markets or is reported via the normal reporting process. Further, Berger, Herring and Szego (1995) show that confidential supervisory assessments have explanatory power with respect to rating agency assessments. However, they also find that bond ratings can help predict supervisory assessments, and that both combined, are more accurate in predicting future bank performance than supervisory assessments alone. Overall, Berger, Herring and Szego (1995) conclude that all parties, namely supervisors, ratings agencies and the market-produce valuable complementary information, which may improve corporate governance of banks (Gropp and Richard 2001:11).

Gropp and Richard (2001:23) have assessed the issue regarding whether bank ratings convey new information to bond and stock markets via an event study of rating change announcements by leading international ratings agencies. They focused on rating changes for European banks for the period 1989 to 2000. The evidence in this regard is mixed. For equity prices, they found strong effects of ratings changes. They also find strong evidence that the reason for the ratings is of central importance when analyzing the impact of bond ratings on stock prices.

In contrast to the results for stocks, Gropp and Richard found little evidence of announcement effects on bond prices. This might be an indication that bond prices do not react to ratings changes, because bondholders believe, rightly or wrongly, that they would be bailed out in any event, if the bank were to run into serious problems. A second possibility is that the result is due to the fact that all banks in the sample were quite far away from the default point. It has recently been suggested that bond prices stay stable in the face of considerable stock price volatility and only react close to default (Gropp and Richard 2001:24).

Richards and Deddouche (1999) analyze the effect of ratings changes for banks in emerging markets and find that stock prices do not respond or respond counter intuitively to announcements of ratings changes (Gropp and Richards 2001:11). This indicates that the

sensitivity to market risk (S). A composite rating, reflecting the examiner's overall assessment of the bank, is also assigned.

behavior of one or both of these groups is not consistent with a strong private sector oversight of bank management. Unlike in studies involving U.S. data, they found little evidence that bank stock prices respond to ratings changes in the way that one would expect if ratings changes convey information to stock market participants. The data do not permit them to judge whether this reflects a failure of stock market participants to use value-relevant new information, or if it reflects shortcomings in rating agency assessments.

A paper by Peria and Schmukler (1998) examines the existence of market discipline in the banking industries of Argentina, Mexico and Chile during the 1980's and 1990's. Using a panel data set, the test for the presence of market discipline by studying whether depositors punish risky banks by withdrawing their deposits. They found that across countries and across deposit insurance schemes, market discipline exist even among small, insured depositors.

These results suggest that the potential for effective market discipline varies both within and across countries. This is also recognized by the Basel Committee. Nonetheless, the potential for oversight through market discipline is significant.

4.7.4.1 Disclosure

As mentioned, increased disclosure of financial information is one of the key aspects of the proposed capital adequacy framework. The Basel Committee aims to encourage market discipline by developing a set of disclosure recommendations and requirements which will allow market participants to assess key pieces of information on capital, risk exposure, risk assessment and management processes, and hence the capital adequacy of the institution.

To this end, the Committee has issued a separate paper, outlining guidelines on the disclosure. According to the Basel proposals, banks should disclose the following information (Basel Committee 2001a:45):

- Summary information about its capital structure, including the components of capital and terms and main features of capital instruments, especially in the case of innovative, complex and hybrid capital instruments.

- Information about its reserves for credit losses and other potential losses.
- The components of its capital based on the Accord, including the amounts of tier 1 capital, tier 2 capital, and (if applicable) tier 3 capital. Information disclosed should provide a clear picture of the institution's loss-absorbing capacity and include any conditions that may merit special attention in an analysis of the strength of a bank's capital including: maturity, level of seniority, step-up provisions, interest or dividend deferrals, use of Special Purpose Vehicles (SPVs), and terms of derivatives embedded in hybrid capital instruments.
- Qualitative and quantitative information about risk exposures.
- Information on its accounting policies, including policies for valuation of assets and liabilities, provisioning, and income recognition.

An example of an attempt to raise the prominence of disclosure requirements in prudential supervision is the system put in place in New Zealand in 1996. New Zealand scrapped its previous system of regular bank examinations and replaced it with one based on disclosure requirements that uses the market to police the behavior of the banks. Every bank in New Zealand must supply a comprehensive, quarterly financial statement that provides among other things, information on the quality of its assets, capital adequacy, lending activities, profitability, and its ratings from private credit ratings agencies and whether it has one. These financial statements must be audited twice a year, and not only must they be provided to the central bank, but they must also be made public, with a two-page summary posted in all bank branches (Mishkin 2000:26).

In addition, bank directors are required to validate these statements and state publicly that their bank's risk management systems are adequate and being properly implemented. A most unusual feature of this system is that bank directors face unlimited liability if they are found to have made false or misleading statements (Mishkin 2000:26).

The New Zealand example illustrates that disclosure requirements can be strengthened appreciably. However, suggesting that relying solely on disclosure requirements to police the banking system is a workable model for other countries is going too far. Depositors are unlikely to have the sophistication to understand fully the information provided and thus may not impose the necessary discipline on the banks. Disclosure requirements might be sufficient in New Zealand because almost all New Zealand banks are foreign owned, so that bank

supervision has been in effect outsourced to the supervisors of the foreign banks that own the New Zealand banks. However, it is unlikely to work in countries where most of the banking system is domestically owned (Mishkin 2000:27).

It appears as if the Basel proposals do not adequately recognize the limitations of disclosure as sole instrument of enhancing market discipline in most countries. Beyond disclosure, the Basel Committee offers little guidance on specific instruments and ways of enhancing market discipline (UBS 2001:29).

Failure to recognize the potential limited impact of enhanced disclosure on market discipline is not the only concern regarding the Pillar three proposals. Indeed, the Basel Committee's disclosure requirements have led to extensive criticism, including the following:

The potential impact and efficiency of the disclosure requirements are questioned, since the prerequisites for effective market discipline is absent in several countries, especially the emerging markets (see section 4.7.4.2.). Furthermore, it can be argued that in highly sensitized market conditions, increased transparency has an ambiguous effect on stability and economic welfare (see section 4.7.5.).

On a microeconomic level, several banks have also criticized the proposed disclosure requirements. According to Stephen Bland of the UK's FSA, disclosure "wins the prize as the least popular thing to come out of the proposals" (Erisk Report 2002:3). Although banks in general seem to support the idea of more reliance on market discipline, they differ from the Committee in the assessment of the amount and type of disclosure which will achieve the desired effect (UBS 2001:29 and Swiss Bankers Association 2001:29). The disclosure requirements are perceived to be excessive and onerous (UBS 2001: 30 and Working Group on Capital Adequacy 2001: 52). The official response of the South African banks in this regard was also negative (Banking Council of South Africa 2001:6).

A related concern is the involved costs to produce the corresponding information. Banks are further concerned that some of the required disclosures may inadvertently require banks to provide information that could adversely affect their competitive position in financial markets. This is especially true of banks that operate in small national or niche markets. Nonbank competitors such as hedge funds, corporations, and investment banks will not be

required to comply with the same disclosure standards. This could generate an unfair competitive advantage for such entities relative to banks (Working Group on Capital Adequacy 2001: 52 and Swiss Bankers Association 2001:31).

Another criticism is that the proposed disclosure requirements probably amounts to much more information than what the external audience can digest (Swiss Bankers Association 2001:29). Markets may not always understand the true significance of a particular disclosure. Many disclosures lend themselves to a variety of interpretations, the market may not react as expected or intended. Fed by misinterpretations of the data, market discipline could accentuate a problem rather than facilitate orderly resolution of a problem. In this regard, the Working Group on Capital Adequacy mentions the experience of a leading bank in the United States in the mid-1990s that shared a sophisticated presentation of its interest rate risk hedging activities using swaps and other derivative instruments. The analysts failed to understand the information presented and promptly issued sell orders on the bank's stock based on an assessment that the bank did not have its risk management processes sufficiently under control. After the market volatility subsided and the stock price recovered (over a period of a few months), and after market analysts became more familiar with the information presented, it became clear that the bank in fact had a robust risk management and sophisticated interest rate risk management process in place. This situation must be avoided going forward, especially since markets are more interconnected now than in the past (Working Group on Capital Adequacy 2001: 53).

The potential impact of disclosure requirements on market discipline is further limited by the fact that the aims of regulators and those of the market may not always coincide: the equity market in particular supports a well-capitalized firm, but it does not look favorably on an over-capitalized firm, and may therefore drive a firm to reduce, rather than increase, its capital ratio (UBS 2001:29).

Finally, as mentioned before, the dynamic financial markets in which banks operate imply that a bank's risk profile can change very quickly. Given the ease with which positions can be altered in modern financial markets, anything short of real-time disclosure may give a very misleading indication of what is really going on (White 2000:7). Therefore, users of financial information need measures of risk exposures that remain meaningful over time and which

accurately reflect sensitivities to changes in underlying market conditions. Among other things, this implies that some other means of disseminating the data on a more timely and frequent basis than financial statements should be considered (The Royal Bank of Scotland 2001:48).

A major challenge, thus, is to develop a set of disclosure standards that will provide meaningful, timely, and relevant information to the market. Recommendations have been made to adopt a more holistic approach to disclosure by framing the general principles that disclosure is designed to achieve. This includes a focus on the performance of an institution's credit portfolios under a variety of scenarios supplemented with relevant summary data about the portfolio(s) under investigation. Such refocusing will hopefully lower the risk of providing more data and less risk information to financial statement users (Working Group on Capital Adequacy 2001: 53 and Royal Bank of Scotland 2001:48). The financial press can play an important role in supporting the goal of enhanced disclosure and transparency. In this regard, the regulatory authorities should establish a practical, mutually effective, working relationship with senior financial journalists in order to promote better communication with the public at large.

Further recommendations include consistently distinguishing between disclosure to supervisors and disclosure to the public. It should be possible to envisage broader sets of data being openly available to supervisors who have to assess the fitness of internal approaches for the different levels of sophistication envisaged in Pillar 1. This scrutiny would allow supervisors to act as intermediaries by issuing health checks or benchmark assessments of the internal processes used by different banks (Swiss Bankers Association 2001:29 and International Swaps and Derivatives Association 2000:34). However, it could be counter-productive to air publicly some data made available to the supervisors. A parallel may be drawn in this respect between the supervisory process and the debt rating process: institutions seeking a rating will supply ratings agencies with more information than would be made available to the public. Supervisors find themselves in a position somewhat comparable to that of ratings agencies, as guardians of the soundness of the banking system in the eyes of its creditors.

In the light of these and other comments received, and reflecting the objective to limit the

burden associated with disclosure, the Basel Committee has considered the possibilities for streamlining the proposals. These revised disclosure requirements are discussed in a separate document, “ Working Paper on Pillar 3 -Market Discipline” (Basel Committee 2001c). The Basel Committee stress that the requirements set out in this paper is not intended to repeat disclosures such as requirements of securities regulators, accounting standards setters, and/or other authorities. In addition, several disclosure recommendations issued by the Basel Committee (see chapter 2 for the relevant credit risk recommendations) remain an important complement to the requirements set out under Pillar 3. Furthermore, work continues on the Pillar I framework for the New Basel Capital Accord, and as a result, alternative or additional disclosure requirements may need to be introduced in the full and final consultation on the New Basel Capital Accord.

The Committee aims to provide investors with enough information to understand a bank’s risk profile without imposing an undue burden on any institution. Accordingly, the disclosure requirements have been streamlined to focus on elements needed to accomplish this objective. An overarching principle of the revised requirements is that the qualitative elements of disclosure provide a vital context in which to understand the quantitative elements. Thus, a general disclosure principle relating to qualitative information should form an integral part of Pillar 3. Accordingly, the following general disclosure principle is proposed (Basel Committee 2002b:5):

For each separate risk area (e.g. credit, market, operational, banking book interest rate risk, equity) banks must disclose their risk management objectives and policies, including:

- Strategies and processes.
- The structure and organization of the relevant risk management function.
- The scope and nature of risk reporting and/or measurement systems.
- Policies for hedging and/or mitigating risk and strategies and processes for monitoring the continuing effectiveness of hedges/mitigants.

The proposals also require banks to have a formal disclosure policy approved by the board of directors. In addition, banks should implement a process for assessing the appropriateness of their disclosures, including validation and frequency of them.

The revised disclosure requirements under Pillar three are classified into the following categories: capital adequacy, credit risk-related disclosures for banks on the standardized approach, credit risk-related disclosures for banks on the IRB approaches and credit risk mitigation techniques.

4.7.4.2 Prerequisites for effective market discipline

As mentioned, the behavior of stock market investors is not always consistent with strong private oversight of bank management, especially not in the emerging market context. A possible explanation is that the preconditions for effective market discipline are not always present.

The market discipline paradigm explained earlier in this section presupposes the following requirements:

- Incentives must exist for market participants to analyze available information and exercise discipline by making considered judgments on risk and return.
- Investors' assessments of firm condition and future prospects should be impounded into the firm's equity and debt prices.
- Ultimately, even if the market sends proper signals, market discipline works only if the recipients of those signals actually respond by altering their behavior. This requires that managers operate in the security holders' interests.

Each of these essential conditions - disclosure, incentives to exercise discipline, and recipient response, in turn, hinges on the following set of underlying preconditions (Karacadag and Taylor 2000:32):

Firstly, adequate accounting and auditing standards are essential foundations of the information required to scrutinize firms, including financial intermediaries. In particular, supervisors need to ensure that banks properly value loans and allocate provisions so that disclosed information reflects the true risk profile of banks and serves as a reliable basis for market price signals. Where such standards are absent, minimum capital requirements are given a task well beyond their intended purpose. Capital requirements should provide a buffer

against unexpected losses, while loan-loss reserves should take care of expected losses. In reality, however, underprovisioning leads to inadequate loan-loss reserves. As a result, the gap between minimum required capital and actual capital is larger than if banks had appropriate loan-loss reserves. Therefore, an adequate design of capital standards needs to incorporate an adequate design of loan-loss reserves.

However, circumstances surrounding the Enron saga have raised questions about auditing standards in developed countries as well. As details emerged regarding aggressive accounting practices and flawed internal governance, these prompted broader concerns about the transparency of individual disclosures, and a more general unease about the integrity of the information underpinning financial markets (Cohen and Remolana 2001:5). Consequently, there is a need to give as much attention to risks and vulnerabilities arising in the advanced countries as we do to problems in emerging markets and developing countries. Kohler (2002:5) sees the Financial Stability Forum as having an important role in this process.

In the South African context, the financial problems of the micro-lender Unifer offer a case in point. Reported earnings were inflated by more than 10%; fictitious income of R27m was declared with the full knowledge of the company's board, and auditors (Joffe 2002d:6).

Another manifestation of the inadequacy of accounting and auditing standards is a practice known as "evergreening". Accounting and supervisory conventions in many countries allow banks to make nonperforming loans look good by lending additional money to the troubled borrower who uses the proceeds to make the payments on the nonperforming loan, thus keeping it current (Mishkin 2000:26). Standards alone are clearly not enough. Putting high standards into effect hinge on an adequate supply of trained accountants and reputable auditing firms. While most industrialized countries meet high accounting and audit standards, many emerging economies still need to make major improvements in this sphere.

A second precondition for effective market discipline is that incentives must exist for accurate and timely disclosure. For example, the intensity of supervision of individual banks could be related to the accuracy and timeliness of their financial disclosure. Similarly, bank directors and management could be held legally accountable for the accuracy of the information provided by their bank. This is a vital part of the incentive structure created in

New Zealand to underpin its largely disclosure-based supervisory regime.

Thirdly, policies (among them government bail-outs) that shape incentives to exercise discipline should be designed in a manner that maximizes market discipline. To the extent that depositors and creditors expect the government to indiscriminately bail out failed banks and to be made whole under all circumstances, they have less reason to monitor banks. As far as banks and uninsured creditors and depositors are concerned, a “no bail-out” policy is thus necessary to minimize moral hazard problems. This condition, too, is often violated in developed and developing economies alike.

The ultimate test of market discipline is the extent to which institutions - bank and non-bank - respond to market signals by modifying their behavior. This, in turn, requires effective governance structures and legal frameworks. For example, shareholders’ ability to influence management hinges on competent board members in an executive board that plays an active role monitoring company management. Other key determinants of market incentive structures include the protection of shareholder and creditor rights, the rule of law and the efficiency of courts.

In essence, corporate governance arrangements should provide for the effective monitoring and supervision of the risk-taking profile of financial institutions. These arrangements would provide for, inter alia (Crockett 2002b:3):

- A management structure with clear lines of accountability.
- An independent audit committee.
- The four-eyes principle for important decisions involving the risk profile of the firm.
- Transparent ownership structures.
- Internal structures that enable the risk profile of the firm to be clear, transparent and managed.
- The monitoring of risk analysis and management systems.

These conditions are deficient in numerous developing countries. For example, the Latin American Shadow Financial Regulatory Committee (2001b:5) warns that weak judicial enforcement, poor bankruptcy laws and unreliable property registries limit the incentive for borrower’s to repay. In the South African context, certain segments of financial infrastructure

need urgent attention, such as the transparency of the OTC markets and capacity for investigating commercial crime and prosecuting offenders effectively in the justice system.

Another obstacle that could potentially hinder the successful implementation of the new Basel Accord in an emerging market context is the lack of deep and liquid capital markets. Even when accounting, reporting, and legal frameworks are adequate, capitalization ratios will be less effective if liquid markets for bank share, subordinated debt, and other bank liabilities and assets are not available to validate the “real” value of bank capital as distinct from its accounting value. For example, changes in the market value of bank capital provide supervisors in industrial countries with information about the quality of reported capital.

Rojas-Suarez (2001a:11) argues that asset ownership, both financial and real, is highly concentrated in emerging markets. Because wealth is highly concentrated, the potential market for equity capital is small, and hence concentrated and uncompetitive. In such an environment, supervisors have difficulty determining whether shareholders’ wealth is really at risk when they supply equity capital to a bank. This is the case since shareholders can finance their stake with a loan from a related party, which may even be a non-financial corporation, and hence outside the purview of the regulators. Thus, concentration of wealth provides incentives for bank owners to supply low-quality bank capital and therefore undertake higher risks than in industrial countries.

This suggests that it is relatively easy for bank owners in emerging markets to raise large amounts of low-quality equity capital relative to the bank’s capital base in a short time. The rapid growth of net “accounting” equity displayed on the eve of banking crises in several emerging markets reflects the low quality of capital in these economies. Lacking a market that assesses the quality of bank capital, capitalization ratios cannot reveal the true riskiness of bank activities and, therefore, cannot serve as an effective component of an early warning system.

These considerations imply that it might be necessary to employ additional measures to encourage market discipline, especially in an emerging market context. Such possible measures are discussed in the next section.

4.7.4.3 Proposals to encourage market discipline

One suggested way of fostering the conditions for market discipline would be to open the domestic banking sector to foreign banks (Karacadag and Taylor 2000:31). Indeed, the second half of the 1990s saw a dramatic increase in the presence of foreign banks in the emerging economies. For example, in central Europe, the share of foreign banks in terms of both total assets and capital is now around two thirds or higher, while in Latin America, the market share of foreign banks rose to 40% in 2000 from an average of 7% a decade ago (Hawkins and Mihaljek 2000:24).

From a supervisory perspective, advantages of foreign bank branches, include that they are subject to additional oversight by foreign supervisors on a consolidated basis with the parent and they are more likely to obtain financial support from the headquarters that they are less likely to engage in connected lending (Hawkins and Mihaljek 2000:29). Connected lending is often a major problem faced by domestic banks in emerging market countries, due to the often concentrated nature of such economies and the limited number of corporate borrower's. Furthermore, it is argued that internationalization of banking would allow the introduction of frontier technology and best practices in project evaluation, risk assessment, and hedging would permit better risk diversification and would increase competition. All these would lead to more and cheaper financial products. In addition, because international banks are usually subject to more stringent regulation than domestic banks, internationalization of banking should lead to an upgrade in accounting, disclosure, and transparency standards, improving the regulatory framework in most developing countries.

A more extreme position argues that internationalization of banking is desirable because it permits delegating bank supervision and regulation to the agencies charged with that task in the foreign banks' home countries. Thus, opening local markets to foreign banks means substituting imported bank supervision and regulation for its domestically produced counterpart. This is the case, for example, in New Zealand, where most banks are foreign owned (Hernández and Schmidt-Hebbel 2001: 12).

A contrasting view in this regard is that the presence of foreign banks generally leads the

domestic supervisory authorities to upgrade the quality and increase the size of their staff. This is in order to supervise the more sophisticated activities and new products that are usually introduced by foreign banks. This effect has been observed, for example in Brazil and Hungary. Before they gain sufficient skills, however, supervisors may be exasperated by highly sophisticated foreign bank operations, not knowing what questions to ask, or not being able to convince the courts to withdraw the licences of institutions with suspect operations. This is a particular concern in the cases of rapid expansion of foreign (and increasingly domestic) commercial banks into non-bank financial services, including insurance, portfolio management and investment banking. In the Czech Republic, for example, banks were major actors in the failed voucher privatization program of the early 1990s, and often seemed to be at least one step ahead of the supervisors (Hawkins and Mihaljek 2000:29).

Credit markets may become segmented as foreign banks tend to concentrate their business on the largest and most creditworthy domestic companies, leaving the riskier projects and less solvent firms to be financed locally. In a globally integrated economy it becomes even more difficult for local authorities to confront and effectively contain a confidence crisis, because now foreign creditors are involved, and because even domestically owned funds now have more avenues to flee abroad (Hernández and Schmidt-Hebbel 2001: 12).

A second policy option to encourage market discipline is to require that financial institutions have credit ratings. As part of the BASIC (which stands for bonds, auditing, supervision, information and credit ratings) supervisory system implemented in Argentina in December 1996 is the requirement that every bank have an annual rating provided by a rating agency registered with the central bank (Calomiris 1999:3). Institutions with more than \$50 million in assets are required to have ratings from two ratings agencies. As part of this scheme, the Argentinean central bank is responsible for performing an after the fact review of the credit ratings to check if the ratings agencies are doing a reasonable job. As of January 1998, these credit ratings must be published on billboards in the banks and these ratings must also appear on all publications related to obtaining funds from the public. As part of New Zealand's disclosure requirements, all banks must prominently display their credit ratings on their long-term senior unsecured liabilities payable in New Zealand, or alternatively, indicate if they do not have a credit rating. Clearly, the lack of a credit rating or a poor credit rating is expected to cause depositors and other creditors to be reluctant to put their funds in the bank, thus

giving the bank incentives to reduce its risk-taking and boost its credit rating. This has a higher likelihood of working in countries like Argentina and New Zealand with no government deposit insurance scheme (Mishkin 2000:29).

A third possibility to impose market discipline on banks is to require that they issue subordinated debt (uninsured debt that is junior to insured deposits, but senior to equity). Mandating subordinated debt issuance is the primary specific proposal under wide discussion for altering the supervisory framework to bring market discipline more forcefully to bear on banks. Although the numerous current subordinated debt proposals vary in their underlying goals and objectives can be broken down into three underlying rationales (Bliss and Flannery 2001:26):

- Subordinated debt holders may directly influence banks to prevent them from taking on too much risk.
- Yields on subordinated debt may provide additional useful information to regulators to assist in supervision.
- Prompt corrective action or automatic bank portfolio changes can be tied to yields on subordinated debt, preventing unwise regulatory forbearance and providing, in effect, a regulatory fail-safe mechanism.

A subordinated debt requirement would expose banks to the discipline of the market, especially if the subordinated debt requirement were to be supplemented by a requirement that the bank is to issue new subordinated debt on a regular basis. If the issuing banks' asset quality is perceived to have deteriorated, the spread on the bank's debt would increase. This implies a strong disincentives to the particular bank to take on additional risk (Gropp and Richard 2001:15).

Requiring banks to issue subordinated debt would place them under the scrutiny of a class of uninsured creditors that have strong incentives to monitor banks. Moreover, unlike shareholders, who face both upside and downside potential, subordinated debt holders would obtain no benefit on the upside, but pay dearly on the downside. As mentioned, besides serving a disciplinary role for banks, the prices at which subordinated debt is issued and traded would convey valuable information to market participants and regulators (Benink 2001:6). In addition, this information can help the public evaluate whether supervisors are

being sufficiently tough on a particular banking institution, thus reducing the scope of the principal-agent problem (Mishkin 2000:29).

Thus, the subordinated debt proposal has certain theoretical advantages that merit strong consideration. Evidence from Argentina suggests that requiring banks to issue subordinated debt as part of a coherent set of measures (including a strictly limited safety net, high minimum risk-based capital requirements, the obligation for banks to obtain ratings, and a liquidity requirement) can inject credible market discipline over banks (Calomiris and Powell, 2000). As reported in Calomiris (1999), initially about half of the banks have been able to comply with this requirement. As expected, it is the weakest banks that have had trouble issuing subordinated debt. Furthermore, banks that complied with the requirement had lower deposit rates and larger growth in deposits. Thus, the subordinated debt requirement looks like it has had the intended effect of promoting discipline on the banks (Mishkin 2000:30).

However, in practice, such measures might not be successful in enhancing market discipline. Requiring banks to issue subordinated debt assumes the existence of a class of non-bank investors, mutual funds, pension funds, and large companies, large enough to have an incentive to monitor issuing banks. In the absence of potential non-bank debt holders, other banks would be the only investors in the debt, conveying little more information than already present in the interbank market.

More importantly, subordinated debt holders cannot act as a substitute for equity holders. In this regard, Bliss and Flannery (2001:13) note that equity and bond investors value risk differently. Consequently, a combination of stock and bondholder scrutiny would be more effective. If shareholders are not performing their essential governance functions and governance structures in the economy are not in place, subordinated debt is unlikely to make more than a marginal contribution to market discipline

The foregoing analysis suggests that market discipline will not be able to perform the crucial role assigned to it in the new capital framework unless and until the necessary conditions are in place.

It is evident that these preconditions for implementing important components of the new capital framework are absent in most emerging market economies. Weak legal and regulatory institutions, and the limited human resource capacities of supervisory agencies will impair the effectiveness of supervisory review in evaluating capital adequacy. Similarly, without efficient markets that send appropriate signals and corporate governance structures that respond to them, market discipline cannot play a meaningful role in promoting financial system soundness. With the preconditions for the second and third pillars not satisfied, the first pillar will be the only operative pillar in emerging markets, at least during a transitional period. While the three pillar approach to capital adequacy will provide strong incentives for developing countries to strengthen supervisory capacities and governance structures, transitional arrangements may be required to ensure that the first pillar delivers higher levels of capital in emerging market banking systems.

4.7.5 General criticism on the proposed new accord

The Basel Committee received more than 250 comments on its January 2001 proposals (Basel Committee 2001f:1). In addition to the criticism discussed under the respective pillars, these comments revealed general concerns and criticism regarding the potential impact of the proposed accord. This includes, among other things, the following:

-The increased emphasis on risk sensitive capital requirements necessarily introduce a significant amount of complexity to an institution's capital adequacy calculations and internal risk measurement processes. With greater complexity comes greater compliance cost, as well as greater potential for inconsistent application. In addition there will be a wide variance in the interpretation of the new framework until such time as international benchmarks are established (Banking Council of South Africa 2001:15 and Milne 2001:5). Crockett (2002b:1) points out that much of its complexity is the inevitable result of three highly desirable features, viz increased risk sensitivity, wide applicability, and the shift of responsibility for risk measurement for capital purposes towards banks themselves. Thus, the disadvantages of increased complexity must be balanced against these benefits.

-The Basel Committee is criticized for not providing any cost-benefit assessment of the

proposed new Capital Adequacy Framework and it remains unclear that the new Accord represents the most cost-effective way to attain the overall objective of greater safety and soundness in the financial system (Milne 2001:18).

As mentioned, preconditions for implementing important components of the new capital adequacy framework are largely absent in most emerging market economies. A related concern is the probable impact of the new Accord on the macroeconomic environment of emerging countries. According to Griffith-Jones and Spratt (2001:1) it seems likely that the new Accord will have significant, and broadly negative, repercussions for the developing world, both internationally and domestically. They ascribe this mainly to the impact of the new Accord on the lending environment, as well as the impact on competitive equality in the banking sector.

It is envisaged that the major banks' lending patterns will significantly change as they adopt internal ratings based approaches. The outcome of these changes is likely to be a significant reduction of bank lending to the emerging markets, and/or a sharp increase in the cost of international borrowing for much of the emerging markets. Recent research has suggested that adoption of the IRB approach as currently proposed would result in speculative grade borrowers (BBB- or lower) being effectively excluded from international bank lending. The implications of this are that several emerging market countries will no longer be able to access international bank lending on terms likely to be acceptable. The impact of this is likely to be felt most severely in the poorest, and lowest rated, countries. The latter are the countries in most need of such access (Griffith-Jones and Spratt 2001:11).

Concerns have been raised that the more risk sensitive capital requirements would further destabilize international capital flows. While there could be such a danger in the short-term, more risk sensitivity of the capital accord could also give financial institutions, corporates and governments incentives to deal quickly with problems in order to restore their creditworthiness. In the long-run, this could actually help stabilize capital flows.

A related concern is the preferential treatment given to short-term interbank lending. Although shorter maturities carry less risk, this argument misses the adverse systemic consequences of such a measure. Policymakers are well aware of the emerging market

fragilities caused by short-term indebtedness; short-term exposures have in fact been identified as a key cause of recent crises in emerging markets. Shortening maturities for loans subject to preferential treatment thus contradicts the efforts of policy makers in industrial countries to avoid the eruption of systemic crises (Latin American Shadow Financial Regulatory Committee 2001a:3).

The impact of the New Capital Adequacy framework on the competitive equality among banks of different countries, is a further concern. In this regard, the following factors should be considered (Sironi and Zazzara 2001:8):

- The wide margin of flexibility that the second pillar leaves to national supervisory authorities.

- The exceptions to the general rules on risk-weightings introduced to meet the requests advanced by the supervisory authorities of some countries.

Emerging market banks are liable to face increased competitive pressure from internationally active banks who have adopted the IRB approach and have further enhanced their existing competitive advantages through the use of more finely-tuned, and therefore lower, capital requirements. Indeed, in their comments on the new Accord, both Deutsche Bank's Global Markets Research Division and Moody's Global Credit Research Department argue that this impact is likely to lead to smaller banks being at a disadvantage, with further industry-wide consolidation being the ultimate result. In developing and transition countries, this may imply an accentuation of current trends towards a strong increase in the proportion of foreign banks' control of the banking industry. This is not only a problem for developing world banks. In the US for example, it is estimated that only 20 of the country's 9000 banks are likely to be in a position to adopt an IRB approach. Thus, consolidation may be seen both in the emerging market countries and the more developed countries (Griffith-Jones and Spratt 2001:13).

Furthermore, (Griffith-Jones and Spratt 2001:2) argue that emerging market banks attempting to switch to the more sophisticated approach (so as to avoid a higher capital requirement), will find it extremely complicated and demanding to do so, if not impossible in the medium term.

Given the relatively high default rates in emerging market countries, IRB based capital

requirements are likely to be quite high on average, which could discourage implementation of the IRB approach in these countries. Calibration and verification of the IRB approach is likely to prove difficult, especially in countries that have experienced large swings in economic activity. Segoviano and Lowe (2002:30) found large variations through time in default rates for a given grade. They also found large variations in default rates across banks for a given grade. These variations will complicate the task for supervisors in assessing the validity and comparability of rating systems.

However, the validity of several of the above arguments is dependant on the assumption that the less sophisticated emerging and transition country banks would tend to use the standardized approach, which requires more capital, whilst the large international banks would be able to use the more advanced approach, which requires less capital. This might not be the case for South African banks. As indicated in chapter 5, several South African banks plan to adopt the IRB approach, among other reasons, for the sake of international competitiveness.

Nevertheless, the potential impact of the new Accord on competitive equality remains of significant concern. The need to enhance competitive equality and prevent “excessive consolidation in the financial sector” also arises from the need to promote the safety and soundness of the financial system (Swiss Bankers Association 2001:4). Against a background of increasingly integrated international financial markets, competitive pressures in the financial services area and the growing concern for shareholder value, there exists concerns on the possible impact of the new Accord on financial market stability. This is partly due to the failure of the proposed regulations to consider the fact that financial market risk is endogenous. Of special concern is how the proposed regulations would induce the harmonization of investment decisions during crises with the consequence of destabilizing rather than stabilizing the global financial system (Danielson et al 2001:4).

It is now widely accepted that volatility in financial markets is determined in the market, in large part by the behavior of all individual market participants - in other words, risk is endogenous by definition. The failure to recognize this endogeneity is relatively innocuous during times of stable financial market conditions in which the actions of many heterogeneous market participants (in terms of risk-aversion, portfolio positions etc.) more or

less cancel each other out. In times of crisis, in contrast, this endogeneity may matter enormously if agents become more homogeneous as a result. Using similar risk models, they may pursue similar strategies to mitigate the adverse effects of the on-setting crisis. In such a case, individual actions do not “more or less cancel each other out” but may in fact reinforce each other. Consider, for example, a fall in prices. Market participants may then have an incentive to sell assets, which in turn, is reinforced if other participants also sell assets, thus reducing the price even further. This effect is a pure externality. Individual banks do not take it into account when making decisions, yet it affects the stability of the banking system as a whole (Danielson et al 2001:6).

Thus, according to Danielson (et al 2001:7) employing VaR or similar approaches to measuring risk for regulatory purposes is problematic in two senses. Firstly, by failing to acknowledge the endogeneity of risk and liquidity at the systemic level they produce inaccurate volatility estimates. Secondly, by encouraging all market participants to employ similar risk modeling techniques regulation renders them more homogenous in risk-aversion and trading strategies, thus rendering the financial system less stable.

A related concern is the impact of the new proposals on pro-cyclical tendencies within the banking system (Oliver, Wyman and Company 2001:9). It is generally accepted that the existing Accord contains pro-cyclical elements and the fear is that greater risk sensitivity will increase this tendency⁵.

The proposed new Accord could have a profound effect on the dynamics of bank capital and lending in recessions. In contrast to the current Accord where, for a given quantum of lending to a particular set of borrowers, the capital requirement is invariant over time, under the new Accord the capital requirements will depend on the current risk assessment of these borrowers. If borrowers are downgraded in a recession, then the capital requirements faced by the bank will rise. This would be in addition to the possible reduction in the bank’s capital because of write-offs and specific provisions (Catarineu-Rabell, Jackson and Tsomocos

⁵ This literature is surveyed in a study carried out by the Basel Committee on Banking Supervision (Jackson et al 1999) and the conclusion for the US was that particular sectors such as real estate or small businesses may have been affected by pressure on bank capital. But there was no evidence of widespread problems.

2002:5). The results of several empirical studies suggest that these concerns might be valid, especially in an emerging market context. For example, Segoviano and Lowe (2002), using the ratings assigned by individual Mexican banks, found that the proposed internal ratings based approach would have generated considerable cyclical variation in regulatory capital requirements over the second half of the 1990's.

The drive for risk-weights to more accurately reflect PD is inherently pro-cyclical in that, during an economic upswing, average PD will fall, and thus incentives to lend will increase. Conversely, during a downturn, average PD will increase (due to more difficult economic circumstances) and, in consequence, a credit crunch may develop with all but the most highly rated borrowers having difficulty attracting funds (Griffith-Jones and Spratt 2001:12). As Ed Crooks, the Economic Editor of the Financial Times, puts it (Crooks 2001:10): “The effect of the capital requirements could be to encourage banks to lend more in the good times and discourage them from lending in hard times. That in turn could mean that economic cycles are more severe: the peaks of the booms will be higher, because credit is easy, and the troughs of the busts lower, because no one can borrow. It would seem reasonable to assume that an amplified business cycle will result in amplified financial crises, the consequences of which could be severe.”

The Basel Committee has recognized this concern, but argues as follows: “The Committee has also considered the argument that a more risk sensitive framework has the potential to amplify business cycles. The Committee believes that the benefits of a risk sensitive capital framework outweigh this concern” (Griffith-Jones and Spratt 2001:11).

The nature of the trade-off can be explained as follows: “The problem with market discipline and risk-based capital is that they work. If and as they do work, we may well observe what the critics note (i.e. increased pro-cyclicality). But that short-run effect has to be evaluated against the long run, and a judgement reached about the terms of the trade-off. For in the long run, both market discipline and risk-based capital charges affect *ex ante* risk appetites because lenders can calculate the likely impact of their actions. The resultant change in behavior should reduce the amplitude of cycles, and any resultant pro-cyclicality has to be evaluated against that backdrop” (Griffith-Jones and Spratt 2001:11).

Griffith-Jones and Spratt (2001:12) argue that the trade-offs in terms of costs and benefits are largely applicable to the major internationally active banks. For the developing world, it is likely that they will feel the costs disproportionately (reduced lending coupled with increased scale of crises) while simultaneously attracting none of the benefits. In addition to potential adverse macroeconomic effects, the pro-cyclical nature of the new Accord poses a considerably greater challenge to capital managers. This introduces a new and potentially significant element of uncertainty into capital planning (Barclays PLC 2001:15).

A final concern in this regard relates to the timing of the implementation of the Basel II Accord. With several major global economies approaching a turning point in the economic cycle, the Basel II Accord could be implemented just as banks are dealing with expected higher levels of non-performing assets. This implies a very real prospect of a credit crunch (Financial Services Roundtable 2001: 1).

Assessing the importance and relevance of these concerns, however, is a difficult task. There is very little data available to examine how banks' assessments of the riskiness of their loan portfolios change over time. Many banks are only now implementing systematic risk rating systems, and in those few cases where systems have been in place for a full business cycle, the data are normally proprietary.

This potential negative impact of the pro-cyclical nature of capital requirements might be interpreted as an argument for trying to relate risk-weights to the stage of the business cycle and smoothing capital charges over the business cycle. In this regard, supervisors can use their flexibility under Pillar two to cushion the impact of the business cycle on fundamentally healthy banks. If, during good times, banks are required to hold capital in excess of Pillar one minima, supervisors will have some room to allow banks to barely meet the Pillar one minima at the worst of times. Supervisors can also help to lead the markets and depositors by being vocal in their acceptance of reduced capital ratios at these times (Oliver, Wyman and Company 2001:10).

Two caveats apply to this argument. Firstly, such a welding of macroeconomic policy and regulation sits uneasily with the separation of control of monetary policy and regulation that already is or is about to be put into place in many countries (e.g. UK and Germany) and

would neutralize the initial argument in favor of such a separation to a certain degree. Allowing regulators to adjust risk charges to the business cycle may thus upset the level playing field, as some regulators will inevitably feel inhibited to do so due to their limited remit. Secondly, it is notoriously difficult to predict the business cycle. Any forward-looking adjustments in capital charges will inevitably be beset by forecasting problems (Danielson et al 2001:15).

Some observers argue that the pro-cyclicality problem is overstated. For example, it must be kept in mind that earnings are the first buffer against the need to raise provisions or write-off loans, limiting the impact of recessions on bank capital and therefore the pro-cyclical effects. Also, modest falls in capital may be covered by increased use of subordinated debt which is included in tier 2 capital. The extent of the pro-cyclicality problem also depends on whether the bank use a “through the cycle” or “point in time” rating system (see section 5.6.1.4). The extent to which banks need to downgrade borrowers in a recession will depend on the way in which borrowers are assigned to a rating band under the new Accord (Catarineu-Rabell, Jackson and Tsomocos 2002:5). If borrowers are assigned to a rating under the assumption that economic conditions prevailing when the loan was made were likely to hold over the life of the loan, then there would be substantial downgrading if economic conditions deteriorated (and vice versa, if conditions improved). In contrast, if banks, when assessing the creditworthiness of the borrower, consider the effect of a change in economic climate, then downgrades might be rather less. Furthermore, many banks hold capital in excess of deemed minimum regulatory capital. This excess over the minimum could accommodate any pro-cyclicality. “Best practice” banks are also very likely to consider the implications of any pro-cyclicality via internal stress tests (The Royal Bank of Scotland 2001:16 and Oliver, Wyman and Company 2001:10).

Furthermore, regulatory capital requirements are only one factor influencing the actual level of capital, with ratings agencies and market pressures perhaps playing an even more influential role. While regulatory requirements themselves may be pro-cyclical, it remains an open issue as to whether movements in the actual level of capital will exhibit the same cyclical pattern as the required level of capital. Finally, regardless of how the levels of actual and regulatory capital move through time, changes in the way the risk is managed within financial institutions, and changes in supervisory and disclosure arrangements, may

ultimately make the financial system less pro-cyclical and more stable than has been the case in recent decades (Segoviano and Lowe 2002:3).

By more closely aligning relative capital charges with relative risks, by increasing the focus on risk-based supervision, by enhancing disclosure of information and by improving the credit management processes in many banks, the New Accord should contribute to a more efficient and stable financial system. These benefits are, however, more likely to fully realized if the time dimension of risk is measured well, and appropriate safeguards are in place against the risk that from time to time, the overall level of credit risk in the banking system may be misassessed by the banks themselves.

In addition, the Basel Committee announced measures to address potential concerns about the cyclicity of the IRB approaches in November 2001 (Basel Committee 2001h:1). This includes the adoption of a considerably flatter risk-weight curve for corporate credits and is modifying its guidance for ratings processes to encourage banks to take more account of uncertainty over the full economic cycle. The Committee has agreed to supplement these measures through the addition of a credit risk stress-testing requirement in conjunction with the IRB approaches. Banks and supervisors will use the results of such stress tests as a means of ensuring that banks hold a sufficient capital buffer under Pillar two of the new Accord.

Finally, the absence of an integrated credit and market risk framework is criticized as discussed in section 2.9.4. It is widely believed that economic and financial volatility drive both market and credit risk. This suggests that these two risks vary over time and location (for example, country or region) are correlated with one another. Given the correlated nature of market and credit risk, the importance of integrated risk assessment methodology seems apparent. According to Barnhill and Gleason (2001:4) financial environment simulation modeling combined with portfolio theory offers a very promising integrated risk assessment approach (Barnhill and Gleason 2001:5).

Empirical work on US bond portfolios (Barnhill and Maxwell 2002), South African banks (Barnhill, Papapanagiotou and Schumacer 2000) and Japanese banks (Barnhill, Papapanagiotou and Schumacer 2000) has shown that bank capital levels appropriate for reducing the risk of failure to a given probability over a given time step are related to:

- The volatility of the financial environment in which banks operate.
- The correlations between important financial market variables.
- The mean returns on important financial market variables (e.g. real estate).
- The distribution of credit qualities in the banks' loan portfolios.
- The diversification of the loan portfolio across types of loans (business loans, residential mortgage loans, commercial mortgage loans).
- The diversification of the mortgage loan portfolio across geographic regions.
- Asset and liability maturity and currency mismatched, the amount and diversification of equity and other direct investments across sectors of the economy and regions of the country.

The proposed Basel Capital Accord accounts for some but not all of these important factors. For example, the volatility of the relevant financial environments only affects required credit risk capital levels indirectly through its impact on the credit rating of the borrower. This implies that banks operating in more stable financial environments may not have their lower risk levels fully recognized. Further, the correlation between market risk (for example, interest rates, exchange rates and equity prices) and credit risk is not accounted for. Capital charges for these two factors are not simply additive. This means that if capital charges are set appropriately for credit and market risk separately and then added together overall bank capital requirements will likely be too high (Barnhill and Gleason 2001:3).

Absent a conceptual framework for undertaking integrating bank risk assessments, each of the three pillars of the New Basel Capital Accord will have significant problems. Pillar 1 (minimum capital requirements) will be based on a set of *ad hoc* rules that can lead to serious errors in measuring bank risk levels and estimating appropriate capital levels. Pillar 2 (supervisory review process) will lack the capacity to quantify overall bank risk levels and develop preemptive measures for managing them. Pillar 3 (market discipline) will not identify all crucial data requirements from banks and other sources for the market to make informed risk assessments (Barnhill and Gleason 2001:3).

Consequently, Barnhill and Gleason propose that the Basel Committee:

- Explicitly endorse the need for and adopt rules that encourage the development of improved conceptual frameworks and data bases for undertaking integrated bank portfolio risk assessments which handle correlated market risk, credit risk and ultimately operational risk.

- Adopt financial reporting requirements for banks to provide to the public the basic information needed to estimate overall portfolio risk levels.
- Encourage the development of financial data bases that will facilitate modeling the global financial environment in which all institutions operate.
- Develop a conceptual framework for undertaking integrated bank risk assessments.

However, such an integrated risk management framework is not easily accomplished. And it implies considerable challenges to bankers and supervisors alike. Very few banks, even the bigger internationally active banks, are capable of such an approach. The level of technological sophistication required is probably absent in most developing countries. This emphasize the great challenge of harmonizing national standards that are binding on the minority of risky banks, but not unduly burdensome to healthy and prudently managed banks, incorporate objective and neutral criteria, and achieve defensible compromise between administrative simplicity and theoretical accuracy (Federal Reserve Bank of Chicago 2001:1).

The Basel Committee is considering these points of criticism, as well as those raised in section 4.7.2.2.3. In this regard, a considerable number of items in the credit risk proposals remain “work in progress” for the Basel Committee. During its 10 July 2002 meeting, members of the Basel Committee reached agreement on a number of important issues related to the new Basel Accord. This includes the following aspects (Basel Committee 2002b:3):

- The Committee approved the creation of a new IRB risk-weight curve that should provide a more risk-sensitive treatment of certain revolving retail exposures, including many credit card exposures (see section 4.7.2.2.3).
- The Committee approved new elements of the corporate and retail IRB frameworks and the standardized approach designed to ensure a more appropriate treatment of small- and medium-sized enterprises (SMEs) under the new Accord (see section 4.7.2.2.3)
- The Committee agreed to narrow the gap between the amount of capital required in the foundation and advanced IRB approaches. It has also agreed to revise the structure of the floor capital requirements to base them on current Accord requirements and, with the elimination of the operational risk floor, to move to a single overall floor that would apply for the first two years following implementation (see section 4.7.2.2.4.).

-As mentioned in the current section, the Committee also considers measures to help address potential concerns about the cyclicity of the IRB approaches. This includes an agreement that meaningfully conservative credit risk stress testing by banks should be a requirement under the IRB approaches as a means of ensuring that banks hold a sufficient capital buffer under Pillar two of the new Accord.

Further, the Basel Committee, in conjunction with national supervisors in both G10 and non-G10 countries, will launch a Quantitative Impact Survey (QIS 3) on 1 October 2002, which will allow banks to perform a concrete and comprehensive assessment of how the Committee's proposals will affect their particular firm. Banks will be asked to submit their findings by 20 December 2002. South African banks were also asked to participate in QIS 3.

The capital requirements for the various exposures included in QIS 3 have been designed to be consistent with the Committee's goal of neither significantly decreasing nor increasing the aggregate level of regulatory capital in the banking system. Assessment of the QIS 3 results will allow the Committee to determine whether any adjustments need to be made prior to the release of an updated revision of its proposals for public comment in the second quarter of 2003.

The Committee intends to finalize the New Capital Accord in the fourth quarter of 2003, allowing for implementation of the new framework in each country at year-end 2006. During this three-year period banks and supervisors are expected to adapt and develop necessary systems and processes in conformance with the standards of the new Accord. Although the broad detail of the new Accord has been worked out, there is considerable work required by the international community to complete the detailed analysis required to finalize the new regime.

The Committee recognizes that most supervisors may wish to introduce the new Accord. At the same time, the Committee realizes that of the more than 100 countries which have implemented the 1988 Basel Accord, some have done so only fairly recently and may need more time beyond 2006 to implement the new framework. The Committee encourages countries to continue laying the groundwork necessary for the effective implementation of the new Accord.

4.8 CONCLUSION

The New Capital Adequacy Framework is an attempt to narrow the widening gap between regulatory and economic capital, driven by the increasing sophistication of risk management techniques and capital allocation systems. To this end, the new framework proposes to shift from a rules-driven approach to a process-oriented one through the adoption of internal capital allocation mechanisms for regulatory purposes. The proposals contained three fundamental innovations. Two of the innovations aim at making capital charges more correlated with banks' risk profiles. Banks with advanced risk management capabilities would be permitted to use their own internal systems for evaluating credit risk, known as "internal ratings", instead of standardized risk-weights for each asset class. The proposed new Accord also allows banks to use the grading provided by approved external credit assessment institutions to classify their exposures into risk buckets. The other main innovation was to introduce a three pillar approach. Supervisory review (Pillar two) and market discipline (Pillar three) are introduced as essential elements to minimum capital requirements (Pillar one).

Each of these proposed pillars are designed to introduce greater risk sensitivity into the Accord and offer significant potential advantages over the old Accord. However, each of them proposes significant implementation challenges. On the first pillar, the hallmark proposal to place greater reliance on internal processes to set capital charges creates a direct link between the regulation of capital requirements and banks' internal structures for assessing, pricing and monitoring the risks involved in individual operations.

The potentially greater accuracy and coverage that could result from the use of internal ratings systems would have far reaching implications both for banks and their supervisors. Banks would need to demonstrate the strength of their rating systems and the accuracy and consistency of their risk measurement. The role of supervisors in this regard will be a critical component to the substance and the credibility of an internal ratings approach. Furthermore, the difficulty of ensuring their accurate and consistent application within and across national borders should not be underestimated.

As an alternative to the internal ratings approach, a refinement of the existing capital framework, based on ratings assigned by external ratings agencies, is proposed. It provides for transparency and comparability in the risk adjustment process, based especially on the extensive public disclosure of the criteria, methodology, process and actual credit decisions of agencies. However, the use of ratings in the regulatory process has been subject to some controversy, and the major ratings agencies have concerns about using ratings in this way. Most significantly, the successful use of external ratings in capital standards requires rigorous approval criteria and a robust approval process.

Under the new proposals the second pillar, supervisory review of capital adequacy and supervisory judgement, will move to the center stage of capital regulation. This pillar adds a discretionary, and therefore flexible, layer of control above the minimum capital requirements. A key component of the supervisory process is to ensure that banks have in place a disciplined internal process for assessing capital adequacy that transcends the calculation of regulatory ratios.

The conditions for the use of supervisory review are arguably becoming re-established given the consolidation in the banking sector in the G10-countries which is resulting in a small group of lending banks with club-like characteristics. However, this is likely to result in a bank capital adequacy standard that more obviously differentiates between a small group of lending institutions and the rest. Moreover, the high degree of discretion and subjective judgement involved in a supervisory review, especially in evaluating process-oriented capital allocation systems, creates room for wide inconsistencies in the application of capital standards. Ensuring that this pillar functions effectively will also require substantial investment in the human capital of supervisors in the developed world, and even more obviously in developing countries.

For many countries it will be difficult to make supervisory review a major pillar of the assessment of banks' capital adequacy without significant enhancement of their existing supervisory capacity. Supervisory authorities in G-10 countries, but particularly emerging markets, will be hard-pressed to mobilize the necessary resources to establish and operate effective supervisory review functions. Most supervisory agencies in emerging economies are already understaffed, and supervisors underpaid. Relying on supervisory review to a greater

extent than hitherto may involve these staff in making important judgements that they may be technically ill-equipped to make, or which they find hard to maintain in the face of opposition from powerful and well-connected senior bankers.

These considerations suggest that supervisory review will probably have a limited role under the New Capital Adequacy Framework. The most likely outcome is that extensive use of supervisory review will only be found where bank regulators have the capacity and the expertise to be able to exercise it, and where the institutions that are subjected to supervisory review have a sense of themselves as forming a “club” with quasi self-regulatory aspects. These conditions are most likely satisfied in the regulation of the main internationally active and diversified banking groups.

One result will be a capital standard that is more obviously two-tier than at present. On the one hand, supervisory review will play a central role in the risk assessment of large complex banking organizations. On the other hand, the rest of the global banking system will be primarily dependent on Pillars one and three for the assessment of its capital adequacy. Market discipline may also perform a limited function under the new framework. Disclosure alone is not enough to secure market discipline. An array of governance structures, including proper accounting standards, incentive-compatible safety net and good corporate governance are also equally vital prerequisites. While there may be a case to incorporate specific market based instruments, among them subordinated debt and rating requirements, specific instruments and guidelines cannot substitute for basis elements of good governance and the political will to effect them.

It is evident that these preconditions for implementing important components of the new Basel Accord are absent in most emerging market economies. Weak legal and regulatory institutions, and the limited human resource capacities of supervisory agencies will impair the effectiveness of supervisory review in evaluating capital adequacy. Similarly, without efficient markets that send appropriate signals and corporate governance structures that respond to them, market discipline cannot play a meaningful role in promoting financial system soundness. With the preconditions for the second and third pillars not satisfied, the first pillar will be the only operative pillar in emerging markets, at least during a transitional period. While the three pillar approach to capital adequacy will provide strong incentives for

developing countries to strengthen supervisory capacities and governance structures, transitional arrangements may be required to ensure that the first pillar delivers higher levels of capital in emerging market banking systems.

CHAPTER 5: AN EMPIRICAL EVALUATION OF THE CHALLENGES FACING SOUTH AFRICAN BANKS AND SUPERVISORS IN THE IMPLEMENTATION OF THE NEW BASEL ACCORD

5.1 INTRODUCTION

As explained in chapter 4, the Basel Committee's proposals of 16 January 2001 (new Basel Capital Accord) constitute a root and branch reform of the 1988 Capital Accord. Although the Basel Committee announced that it intended releasing a third consultative paper during the course of 2002, the Committee did not announce a revised schedule for completion or implementation of the new Accord (Basel Committee 2002b). There is general consensus that the basic framework of the new Accord will not materially be altered in the third consultative paper. Based on this premise, it is considered prudent to commence planning for the implementation of the new Accord in order to comply with the 2006 deadline as soon as is practically possible.

The proposed new Accord is a complex regulatory framework requiring stronger enforcement capabilities by supervisors and more powerful and professional corporate governance in banks. Thus, the implementation of the Accord poses significant challenges to banks and supervisors alike. Especially within the context of an emerging market environment the complexity of the new Accord might prove to be problematical. Several banks, regulatory bodies and academics raise concerns in this regard. This include concerns by the Bank Supervision Department of the South African Reserve Bank. As quoted from the department's 2001 annual report, "The level of skills and the resource requirements that the new Accord imposed on the Bank Supervision Department and banks, especially within the context of a skill shortage in South Africa, are of concern" (Bank Supervision Department of the South African Reserve Bank 2001a:19).

These implementation challenges are not limited to emerging market countries. Several empirical studies indicate possible implementation challenges from a developed country perspective. For example, results obtained by Ewert and Szczesny (2001:21) indicate that German banks' respective internal rating systems are not comparable across institutions.

Furthermore, there were marked differences between credit rating determining and default probability determining factors respectively. These results suggest that at the time of the study there is still “homework” to be done before German banks are ready for the internal ratings based approach. The main tasks consist of both, harmonization between and improvements within banks’ internal credit rating systems (Ewert and Szczesny 2001:21). A study by Sironi and Zazzara (2001:5) verifies the probable impact of the capital adequacy rules proposed under the new Basel Accord on the corporate portfolio of Italian banks. The main conclusion emerging from this analysis is that due to the high average default rate of Italian banks, the IRB approach is penalizing in terms of capital requirements compared to the standardized one. Secondly, under the original proposed risk-weight function (see section 4.) of the proposed IRB approach, there would be little incentive for Italian banks to adopt the IRB approach.

European banks surveyed by Carratu, Lake and Greenlees (2001:3) highlighted several overarching challenges in complying with Basel II including data management, securing senior level buy-in to the scope and cost of the project, coping with delays and uncertainties, implementing cultural reforms and balancing the needs of the project with other management priorities.

Several concerns regarding the implementation challenges posed by the proposed Basel Accord were also mentioned in banks’ responses to the second consultative paper of the Basel Committee (see also sections 4.7.3.1. and 4.7.4.2.). The main implementation challenges relate to the three pillars of the proposed new Basel Accord in the following way:

-Pillar one. The scale and complexity of data requirements to satisfy the conversion to the IRB approach and to maintain compliance on an on-going basis. Current management systems and processes may not stand up to regulatory scrutiny. Consequently, adaption of the IRB approach will have organisational and risk management system implications.

-Pillar two represents a fundamentally different approach to supervision. This will have far reaching implications for both supervisors and banks. Banks need to ensure they have a demonstrably robust process for assessing their overall capital in relation to their risk profiles, as well as allocating economic capital. Supervisors will have to develop procedures for the evaluation of banks’ internal credit ratings, as well as a procedure for the evaluation of capital adequacy.

-The disclosure requirements contained in Pillar three implies an approach that moves away from minimum disclosure to one that encourages maximum transparency. Especially, the proposed disclosure on credit defaults and details of internal rating systems (for institutions seeking to use the IRB approach) go well beyond anything institutions currently disclose.

South African banks did not submit individual responses on the proposed accord to the Basel Committee. Instead, the Board of Directors of the Banking Council resolved that the South African banking industry would issue a combined response to the new Basel Capital Accord proposals (Banking Council of South Africa 2001:1). In this document, concerns were raised about the following aspects (Banking Council of South Africa 2001:4-6):

-South African banks operate in an emerging market dominated economy. By implication, banks will be prejudiced as the reduction in their credit risk component would not offset the increased requirement for operational risk.

-The majority of South African corporates do not have an external rating. Consequently, under the standardized approach, most corporate exposures will carry a weighting of 100%.

-A lack of historical data availability in the South African market on probability of default (PD) and loss given default (LGD). Where South African banks have operations in Africa it is going to be even more difficult to obtain meaningful PD data due to a lack of industry database and company ratings in these countries.

-Concerns were also raised about implementation of the Accord in the context of the relative volatile macroeconomic environment in which SA banks operate, specifically interest rate and exchange rate volatility.

-In terms of the proposed disclosure requirements, the quarterly frequency are regarded as inappropriate for South African banks. Furthermore, due to the size of the South African market, the information disclosed could present opportunities for competitors to trade against (Banking Council of South Africa 2001:13).

Apart from raising such general concerns, the official response of South African banks to the Basel Committee included very little information on individual banks' "readiness" and preliminary action plans to ensure compliance with Basel II. This creates a substantial research agenda for identifying specific implementation challenges in the South African context, as well as evaluating the preparedness of South African banks to implement the new Basel Accord.

5.2 AIM OF THE EMPIRICAL STUDY

As mentioned, the implementation of the proposed new Basel Accord poses significant challenges to banks and supervisors alike. The primary aim of the empirical study is to identify the most critical issues and challenges posed in this regard in the context of the South African bank supervision and the banking system. These challenges, and the readiness of South African banks and supervisors to address them, will be discussed in terms of each of the three pillars of the proposed new Accord.

Secondary aims of the empirical study include the following:

-To identify the implementation challenges posed by the external environment in which South African banks operate. As discussed in chapter four, several preconditions for the successful implementation of Basel II are absent in many emerging market countries. Therefore, an important secondary aim is to evaluate the extent to which these preconditions are met in the South African context.

-To establish the preparedness of South African banks for implementation of Basel II on a micro level in terms of bank management issues. The aim is to give an indication of aspects such as the South African banks' preferred approach for the calculation of regulatory capital requirements for credit risk, as well as banks' perceptions regarding the biggest challenges posed by the implementation of the new Basel Capital Accord.

-To specifically compare South African banks' current internal credit risk rating systems with the requirements set by the Basel Committee for approval for the IRB approach. In this way, possible challenges with regard to the implementation of the IRB approach is identified.

5.3 RESEARCH METHOD

5.3.1 Data collection

As mentioned, the first part of the empirical study deals with the implementation challenges posed by the external environment in which South African banks operate, evaluating the extent to which these preconditions for successful implementation of the Basel Accord are met in the South African context. Secondary data sources will be utilized in this regard.

These sources include a study by Barth, Caprio and Levine (2001), containing detailed and comprehensive information on the regulation and supervision of commercial banks in 107 countries. The study, mainly based on 1998 and 1999 data, also contains information on selected aspects of bank structure and deposit insurance schemes. Aspects such as entry into banking, ownership, capital, external auditing requirements, liquidity and diversification requirements, depositor (savings) protection schemes and provisioning requirements are addressed.

Information from this data set is used as basis to discuss bank supervision, as well as selective aspects of the banking industry in South Africa. Issues such as the administrative structure of bank supervision, and the regulatory and supervisory environment in which banks operate are addressed. In terms of the banking sector, aspects such as credit risk management practices, overall profitability and capital adequacy are addressed. This data set makes it possible to compare the South Africa situation to world-wide trends.

Information from annual reports from South African banks is also used to give an overview of credit risk management practices of South African banks. In this way, the circumstances under which the new Accord must be implemented, is identified. A survey by the Basel Committee's Transparency Group on the disclosure practices of internationally active banks constitutes a third secondary data source. The latter study is used as basis to evaluate the current disclosure practices of South African banks.

As mentioned, the second part of the empirical study entails the use of primary data sources. In this regard, the cooperation and inputs of senior officers responsible for credit risk management in the major South African banks, as well as members of the Bank Supervision Department of the South African Reserve Bank were elicited.

The following instruments and methods were used to gather the required data:

- Non-scheduled interviews.
- Non-scheduled structured interviews.
- Scheduled structured interviews.

Bless and Higson-Smith (1995:107) defines a non-scheduled interview as asking respondents

to comment on widely defined issues. Such a non-scheduled interview, with Dries Smal and Jay Tikam, from the Bank Supervision Department of the South African Reserve Bank (see appendix four) were utilized to identify broad issues regarding the implementation of the new Basel Accord. A non-scheduled structured interview involves some precise questions, but the interviewer is free to formulate other questions as judged appropriate for the given situation. This method was used in a pilot survey, meant to aid to the formulation of accurate and precise questions and a representative set of possible answers.

A scheduled structured interview based on a questionnaire (see appendix 3) was used to obtain information from banks included in the sample. The questionnaire consists of a set of questions with fixed wording and sequence of presentation, as well as indications of how to answer each question. Care was taken to present the questionnaire to each respondent in exactly the same way to enable a more objective comparison of the results. One bank indicated that a policy decision prevented them from completing the questionnaires. However, a respondent from this bank agreed to a personal interview, answering questions in a more informal way. Information obtained from personal interviews with personnel from the Bank Supervision Department of the South African Reserve Bank is also used in the survey.

5.3.2 Target population

The target population is locally controlled registered banks in South Africa. However, any banks under curatorship and banks involved in take-over bids at the time of the study were excluded from the survey. For the purposes of this study, the target population is regarded as the list of such registered banks as provided by the Bank Supervision Department of the South African Reserve Bank⁶. According to this list, the South African banking system consisted of 30 locally controlled registered banks by the end of September 2002 (see appendix 2).

Based on the above definition of the target population, it was decided to exclude several of these banks from the target population, due to the following reasons:

⁶ Available on the website of the South African Reserve Bank, <http://www.resbank.co.za>.

- Regal Treasury Private Bank (under curatorship).
- Saambou (placed under curatorship 9 February 2002).
- BoE, based on the friendly take-over bid from Nedcor.
- Real Africa Durolink (acquired by PSG Investment Bank).
- Corpcapital (decided to cancel banking license).
- PSG Investment Bank (acquired by ABSA).

This leaves a population of 24 locally controlled registered banks. Furthermore, some banks belonging to the same group are listed separately. For example, Peoples Bank and Nedcor Investment Bank, both part of the Nedcor group is listed separately. Rand Merchant Bank, part of the Firstrand Group, is also listed separately. If this is taken into account, the sample comprises of 21 locally controlled banks.

5.3.3 Sampling

A “purposive” sampling strategy is used. According to Tashakkori and Teddlie (1999:73) this type of sampling is suitable for small-scale, in-depth research projects. They define “purposive” sampling as sampling performed on the basis of either qualitative or quantitative information that is available regarding the units of study based on the specific purposes of the research in lieu of random sampling. Based on the dominant position of the “big four” banks, all are included in the sample. Investec, originally classified as one of the “big six”, were also included in the sample.

A sample of the remaining banks was selected in order to ensure a good representation of the South African banking sector in terms of market share, client profile and products and services offered. All the South African banks participating in QIS 3 were also included in the sample. A total of 12 banks were contacted and 6 (including “the big 5”) returned the completed questionnaires.

5.4 CONTENTS OF THE SURVEY

As mentioned, the aim of this empirical study is to identify challenges regarding the

implementation of Basel II in the South African context, as well as evaluating the “readiness” of South African banks and supervisors to overcome these challenges. In order to achieve these, the empirical study is divided in two main sections:

The first section identifies implementation challenges posed by the macro environment in which South African banks operate. The possible impact of the implementation of the proposed Basel Accord on the South African banking system is evaluated in the context of the general financial environment in which South African banks operate. Secondary data sources are used in this regard (see section 5.3.1.). This section provides a preliminary indication of the areas in which it will be difficult to implement the new Accord. As mentioned, the absence of preconditions for the implementation of important components of the new Basel Accord in several emerging market countries is a cause for concern. The extent to which these preconditions are met in the South African context, is evaluated in this section. The factors that seemingly render minimum capital requirements as an efficient tool to enhance bank system soundness in many emerging market countries⁷ are evaluated in the South African context. Recent amendments in the regulatory framework of bank supervision in South Africa, is also discussed. In this way, possible implementation challenges with regard to Pillar two (supervisory review) is identified.

The second section is based on a questionnaire, it is intended to identify challenges regarding the implementation of Basel II on a micro bank-specific level, and evaluate the preparedness of South African banks. This section deals specifically with Pillar one of the proposed new Basel Capital Accord.

The last part of this chapter deals with Pillar three (market discipline). The current disclosure practices of South African banks (as reflected in annual reports) are evaluated, based on a survey of the Basel Committee’s Transparency Group which deals with the public disclosure practices of internationally active banks. Furthermore, an index measuring private oversight of banking activities in South Africa is also included.

⁷ This include a lack of sufficiently deep and liquid capital markets that make the raising of “low quality” capital possible and a lack of complimentary policy such as loan loss provisioning regulations that complement minimum capital requirements.

5.4.1 Contents of the questionnaire

The questionnaire is divided into three different sections to provide a more meaningful analysis. In the first section, the credit risk management and measurement processes of the banks are analysed. This part of the questionnaire is not intended to give a thorough and detailed account of the credit risk management practices of South African banks. It is intended, rather, to give a limited overview of credit risk management practices, directly related to internal credit risk rating systems. Furthermore, information obtained from this section of the questionnaire is supplemented by information obtained from the annual reports of banks included in the sample. As explained, the new Capital Accord implies greater emphasis on the risk management processes and systems of banks. The motivation for the inclusion of this part of the questionnaire is thus to evaluate certain aspects of credit risk management practices in South African banks against international best practices, as indicated by the Basel Committee's publications. This part of the questionnaire also addresses aspects such as pricing of credit risk and incentive-based compensation, since the regulatory application of banks' internal risk ratings can have serious implications in this regard.

The second part of the questionnaire covers specific factors regarding the internal credit risk rating systems of South African banks. Credit risk rating has become an important feature of most South African banks' credit risk management systems over the past few years. This reflects the efforts of institutions to strengthen credit management practices, the wider availability and growing familiarity with rating techniques, an increasing sophistication within the industry, and a growing array of uses to which ratings may be put. The use of internal ratings in the determination of regulatory capital, as proposed under the IRB approach, also underscores the importance of internal credit risk ratings. The purpose of this section is to compare current internal credit rating system practices with requirements set out by the Basel Committee for adoption of the IRB approach.

A bank will need to demonstrate that its internal rating system and processes are in accordance with the supervisory standards set by the Basel Committee if it is to be eligible to adopt an IRB approach. The Basel Committee's proposals contain important strong points

that together form a “user’s guide” for banks setting up an internal rating system. These attest, inter alia, to both the assessment and quantification of the inputs provided and to the robustness of the banks’ internal rating systems and overall credit risk management processes. The requirements fall into the following nine broad categories, each relevant to a different aspect of the rating and risk measurement process:

- Meaningful differentiation of credit risk.
- Completeness and integrity of rating assignment.
- Oversight of the rating system and processes.
- Criteria of rating system.
- Estimation of PD.
- Data collection and IT systems.
- Use of internal ratings.
- Internal validation.
- Disclosure (requirements described in the Supporting Document Pillar 3: Market Discipline).

Some aspects relating to these requirements were also discussed in chapters 3 and 4. As explained, a bank will need to demonstrate that its internal rating system and processes are in accordance with the supervisory standards set by the Basel Committee to be eligible to adopt an IRB approach. The following outline provides a summary of these operational requirements (Latin American Banking Federation 2001a:5-6 and Sironi and Zazzara 2001:6).

1. Structure of the rating system. An important aspect of any credit risk rating system is the loss concept used to differentiate the riskiness of different credit exposures, i.e. whether the ratings are one- or two-dimensional in form, and whether they focus primarily on PD, LGD, EL or on all three credit risk measures. The cornerstone of the IRB proposal is that banks possess risk rating systems that differentiate borrowers representing similar levels of credit risk. The proposal distinguishes between the risk of borrower default, on the one hand, and transaction characteristics that influence the loss severity that a bank would likely suffer if the borrower were to default, on the other hand. As a result, banks that adopt the IRB approach will need a risk rating system that provides a separate assessment of borrower and transaction characteristics. The Basel Committee concludes that a two-dimensional approach is necessary

to provide supervisors with confidence that the assignment of borrower ratings (and, in turn, PDs to borrower grades) is not “tainted” by a consideration of the specific structure of the transaction.

2. Number of grades. Banks should have at least six grades for performing loans and two for problem loans with a meaningful distribution of exposures across grades and no excessive concentration in any particular grade. Specifically, the Committee is proposing that no more than 30% of the gross exposures should fall in any single borrower grade. This requirement recognizes that the granularity, and therefore usefulness, of a bank’s rating system will be reduced if credit exposures tend to be concentrated in only one or two risk grades.

3. Criteria for rating assignment and loss quantification. Banks must have specific criteria for assigning borrowers a rating and documentation on how these criteria are established. The criteria should be able to differentiate risk, have predictive and discriminatory power, and be specific enough to enable third-party assessment of an exposure.

Risk rating systems that have overly broad grade definitions, which result in borrowers of significantly different risk characteristics being assigned the same grade, are not acceptable. Likewise, risk-rating systems that materially assign borrowers of comparable risk to different grades are also unacceptable. The criteria should also be intuitively consistent with the PD estimates provided for each grade. For example, if the criteria describe a borrower whose repayment capacity is speculative in nature, the PD estimate should reflect the level of risk commensurate with its degree of financial flexibility, or lack thereof.

The requirements mandate banks to document their assessment criteria and also to track when an assigned grade deviates from that indicated by the application of the criteria. The requirements are designed to promote the consistent application of the risk rating criteria, a conservative credit evaluation when greater uncertainty exists, a comprehensive assessment of the borrower’s financial condition over the future horizon, and the use of risk rating models that have statistical power and encompass all significant variables.

4. Integrity of the rating assignment and review process. This include a requirement that each borrower and facility must be assigned a rating prior to the bank entering into a

commitment to lend. A further requirement is that ratings should be reviewed periodically by an independent source.

Oversight and supervision of the operations of the banks' risk rating systems should be designed to ensure the risk rating system is properly functioning. This should be done by timeously identifying borrowers, industries, and portfolios that are experiencing financial deterioration.

The Basel Committee requires that banks have an explicit policy for the frequency of the review of risk ratings. At a minimum, borrowers should be re-rated annually, or reviewed by an independent credit unit. Higher risk borrowers, and borrowers on whom new information comes to light, should have their risk ratings updated more frequently. Banks also need to have adequate capabilities to gather, prioritize, and analyze new information. The Committee has provided specific requirements for refreshing ratings once a bank has received periodic financial information. Generally, it is 90 days from receipt for non-problem borrowers, and 30 days for borrowers in a weakened financial condition.

The proposal also specifies operational requirements for banks' internal audit and credit risk control units. The requirements are designed to ensure that these areas employ a scope and frequency that are adequate to their control responsibilities and that test the proper functioning of the risk rating system. Control functions, such as credit risk or internal and external audits, are at the center of identifying and resolving risk rating system deficiencies that threaten its proper operations.

Ultimately it is the responsibility of senior bank management and boards of directors to ensure the integrity of the risk rating system. To this end, specific recommendations are made regarding the responsibilities of banks' boards of directors and senior management. Their responsibilities include the approval of the material aspects of the rating and PD estimation process, the frequency and content of risk rating management information reports, the documentation of risk rating determinations and statistical model methodologies, interaction with, and evaluation of, control functions, and provision of adequate resources to the control functions.

5. The use test. The proposals greatly stress organizational and operating functions. On the one hand, the proposals explicitly require the actual use of the internal rating system in order to obtain its acceptance and validation by national supervisory authorities. On the other hand, the proposals repeatedly refer to the responsibilities of banks' different organizational units, such as the internal audit and the top management, which are required to perform an "oversight" function in the internal ratings process. These requirements reflect the Basel Committee's intention that banks should not develop risk rating systems simply for IRB purposes. To be in a position to demonstrate to supervisors that an internal ratings system should be used for the purpose of determining minimum regulatory capital requirements, a bank must first demonstrate that the rating system is an integral part of its current business and risk management culture. Due to the many functions that risk ratings impact, considerable time and effort needs to be committed to adequately implementing all of these functions. As a result, the requirements mandate that a bank use a risk rating system that broadly meets the minimum requirements for at least three years prior to implementing the IRB approach.

As outlined in chapter three, the application for which an internal rating system is utilized provides an important indication of the degree of sophistication that should be built into the system's design and operating features. Banks that utilize internal ratings for relatively sophisticated purposes (e.g. as inputs in statistically-based provisioning, capital allocation and risk-based pricing models) require more sophisticated rating systems that feature adequate risk differentiation, strong control frameworks and ratings that are linked to quantitative default characteristics. However, where used for less demanding analytical tasks, a less sophisticated system may be adequate.

6. Internal validation. Banks need to have robust systems in place to validate the accuracy and consistency of rating systems, processes, and the quantification of internal ratings. This standard describes the requirements for internal validation for both the PD estimates assigned to the rating grades and the techniques used to assign the ratings. It is one of the most important requirements for banks to properly execute if they are to credibly estimate their levels of credit risk and the resulting regulatory capital requirements.

As a result of its importance, validation will likely receive significant supervisory attention

prior to a bank being allowed to adopt the IRB approach. A bank should also be able to readily demonstrate validation capabilities to its supervisor prior to adoption of the IRB approach, and on an ongoing basis.

The Basel Committee recognizes, however, that the statistical power, and hence the degree of reliance banks can place on techniques for the validation of PD estimates, is less than it is in the field of market risk, principally on account of the lower number of historical observations (Sironi and Zazzara 2001:8). As such, the Committee does not at this stage wish to set quantitative thresholds on what differentiates a valid estimate (a pass) from an invalid one (a fail). Consequently, validation procedures can involve comparing evolving credit migration statistics against expectations and/or comparing internal ratings with other available rating alternatives, e.g. external agency ratings and/or externally developed rating models.

Results from previous empirical studies regarding banks' preparations for the implementation of the new Basel Accord and surveys regarding internal credit risk ratings were also used in the construction of the questionnaire. These studies include the following:

McDonald and Eastwood (2000), Treacy and Carey (2000) and English and Nelson (1998) reported on several aspects regarding internal credit risk ratings of banks in Australia and the US.

In January 2000, the Basel Committee (2000c) issued a paper entitled "Range of Practice in Banks' Internal Ratings Systems" based on a survey of nearly 30 banks across the G-10 that were identified by their national supervisors as having well developed internal rating systems. These findings have guided the Committee in its design of the IRB approach for corporate exposures.

A number of international empirical studies provide a preliminary indication of banks' preparations in this regard. These include a study done by KPMG during May 2001. The preparedness of banks around the world for the proposed Basel II implementation was assessed. A total of 150 banks in Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, Germany, Italy, the Netherlands, Sweden, and the United Kingdom responded to the survey. A limited number of South African banks also participated in the study. The results of

the survey were then consolidated and analyzed by KPMG.

During August 2001, Carratu, Lake and Greenlees conducted a survey on a wide cross-section of banks and building societies in Europe to establish their preparedness for the new Basel Capital Accord. Their results indicate that banks included in the sample seemed to have a fairly clear idea of the nature and scope of work required to implement the credit risk proposals. As mentioned above, this study identified several implementation challenges, including data management, securing senior level buy-in to the scope and cost of the project, and balancing the needs of the project with other management priorities.

The last part of the questionnaire addresses specific issues regarding the implementation of the new Basel Accord. These issues include things such as South African banks' preferred approach to the calculation of regulatory capital requirements for credit risk, as well as perceptions regarding the biggest challenges posed by the implementation of the new Basel Capital Accord. Some of the larger South African banks have already indicated that they want to adopt the advanced IRB approach. The current sophisticated approach to credit risk management and the use of sophisticated models in this regard constitute a useful platform from which to do so. The extent to which current practices conform to the requirements set by the Basel Committee in this regard is evaluated.

The possible impact of the implementation of the proposed new Basel Accord in the context of the general financial environment, in which South African banks operate, is evaluated in the next section. The discussion includes a profile of the South African banking sector, as well as an overview of the Bank Supervision Department of the South African Reserve Bank's approach to bank regulation and supervision.

5.5 A PROFILE OF THE SOUTH AFRICAN BANKING SECTOR

The aggregated balance sheet of the banking sector in South Africa, as at 31 December 2001, equalled R1045.6 billion, as opposed to R819.2 billion as at 31 December 2000. The total funds of the banks, made up of capital, reserves, deposits, and loans, increased by 24.1 percent (year-on-year) to a level of R1034 billion at the end of 2001. The growth in total assets was brought about by an increase of 23.6 percent in loans and advances (Bank

Supervision Department of the South African Reserve Bank Annual Report 2001a:31). The value of industry assets has more than doubled in nominal terms between 1994 and 2000, which is reflected in the increasing contribution of the sector to GDP. In the year 2000, the financial sector contributed 20 percent of the country's economic product. The relatively large size of South African banking reflects the development and sophistication of the financial sector in this country.

By the end of May 2002, the South African banking system consisted of 32 locally controlled registered banks, as well as 15 local bank branches of foreign banks, and about 55 representative offices of foreign banks (Bank Supervision Department of the South African Reserve Bank 2002a). Foreign banks, targeting a corporate and wealthier clientele, hold about 8.1 percent of the total assets of all banks doing business in South Africa.

Although opening the domestic banking sector to foreign banks is one possible way of fostering banking sector stability in the South African context (Hawkins and Mihaljek 2000:24), the relatively small share of foreign banks cannot be seen as an indication of an unsophisticated banking sector. Indeed, locally controlled South African banks are generally regarded as sophisticated and well managed.

The level of concentration in the South African banking sector is high, with ABSA, Standard Bank, FirstRand, Nedcor, BOE, and Investec making up 83.2 percent of the market share (at the end of 2000) and 81.2 percent at end of December 2001 (Bank Supervision Department of the South African Reserve Bank Annual Report 2001a:33). Most of the market segments are overshadowed by the "big six"⁸, except for resale and repurchase agreements, where some of the overseas banks or their branches have a significant share of the market. Installment finance by the "big six" accounted for approximately 90.8 percent of the total at September 2000. The figures were 94 percent and 88 percent for mortgage lending and corporate overdrafts and loans, respectively. Despite these levels of concentration, even the largest South African banks are relatively small compared to the biggest international banking groups. For example, at 31 December 2000, the total assets of Citigroup amounted to

⁸ Due to the take-over of BOE by Nedcor, the "big six" banks was replaced by the "big five", namely ABSA, the Firstrand Group, Nedcor, Standard Bank and Investec.

US\$902 210 million. For Barclays and ABN Amro the corresponding figures are US\$473 052 and 505 415 respectively (Basel 2001d:20). This compares to South Africa's biggest bank, ABSA, with total assets of R121 352 million (ABSA 2002a: 32).

The concentrated nature of the South African banking sector is also reflected in table 5.1.

Table 5.1: Total deposits and market share of South African banks (as at end December 2001)

BANK	DEPOSITS (R'0000)	MARKET SHARE (%)
ABSA	151 213	21.1
Standard	133 155	18.6
Nedcor	129 617	18.1
FirstRand	106 728	14.9
BOE Bank	46 709	6.5
Investec Bank Ltd	42 946	6.0
Nedcor Investment Bank	18 014	2.5
Saambou Bank	15 445	2.2
Gensec Bank Ltd	5 831	0.8
Cape of Good Hope Bank	5 574	0.8
Unibank Ltd	4 971	0.7
Mecantile Lisbon Bank	2 336	0.3
African Bank Ltd	1 617	0.2
Brait Merchant Bank Ltd	1 382	0.2
CorpCapital Bank	1 284	0.2
PSG Investment Bank Ltd	1 227	0.2
African Merchant Bank	908	0.1
Marriot Merchant Bank	504	0.1

Source: ABSA 2002b:4

Gelbard and Leite (1999:8) classified the South African financial system as “well developed” in their study using a set of six indices representing key characteristics of the financial systems in 38 sub-Saharan African countries. These indices include a market structure index, a financial products index, a financial liberalization index, an institutional environment index, a financial openness index, and a monetary policy instruments index. Moreover, the International Monetary Fund and the World Bank’s most recent joint financial sector assessment (FSAP) found the entire South African financial system to be very stable. International ratings agencies Moody’s and S&P have said that the healthy banking system has enabled them to assign a higher country rating to South Africa than would otherwise be the case, given some remaining fundamental problems in the economy.

In contrast, the banking sector of one of the most highly developed countries, Japan, finds itself in severe difficulties, with indications that the official government and published bank figures may severely underestimate the bad debt problem being faced by banks. Analysts invariably estimate Japanese banks’ non-performing loans to be in excess of \$1 trillion,- or around 25 percent of Japan’s GDP (ABSA 2002b:3). The information in table 5.2 suggests that the soundness and profitability of the South African banking sector is above reproach - at least as far as the five biggest banks are concerned.

Table 5.2 International comparison of banks (Values for top 5 banks per country)

COUNTRY	TOTAL ASSETS \$MIL	CAPITAL/ ASSET RATIO	ROC	ROA	REAL PROFIT GROWHT %	COST/ INCOME RATIO	NPL TO TOTAL LOANS
Argentina	13626	8.8	14.7	1.1	34.5	54.4	12.2
Australia	98475	5.0	33.4	1.6	25.6	55.8	1.3
Brazil	38662	8.5	26.3	2	116.3	66.6	0.8
Germany	557250	2.6	17.4	0.4	50.1	61.0	1.4
Japan	663489	3.8	1.3	0.1	-68.1	88.0	5.6
Korea	50378	4.4	4.0	0.3	461.9	65.1	5.8
Malaysia	16316	9.4	14.6	1.3	63.3	40.4	5.6
South Africa	23967	6.3	37.4	2.2	16.5	59.1	3.6
Thailand	19634	6.1	-8.7	-1.1	N/A	87.0	21.7
UK	423887	4.2	36.6	1.4	18.9	54.7	2.1
USA	560278	6.2	35.0	1.8	-5.7	62.0	1.4

Source: ABSA 2002b:6

The capital/ asset ratio only include share capital (Tier 1 capital).

Legend: ROC= return on capital, ROA = return on assets, NPL = non-performing loans

South African banks are generally regarded as well managed and they generally have in place sophisticated risk management systems and corporate governance structures. However, claims have been made that cracks are appearing in an inherently sound banking system in South Africa, with confidence in small banks at a low ebb. The bad debt debacle that overwhelmed Unifer in January 2002, together with the curatorship of Saambou in February 2002 and the run on BOE in March 2002, have casted a shadow over South Africa's banking sector.

Media speculation during September 2001 that Saambou Bank was underperforming for the

six months ending September 2001 (due to bad debts relating to its high-risk micro-lending business), the sale of Saambou shares by its CEO and an executive director, and the unsuccessful attempt by Investec Bank Limited to dispose of its indirect shareholding in Saambou, contributed to the creation of negative market sentiment surrounding the bank and small banks in general. The situation was exacerbated by Saambou's profit-warning announcement on 11 October 2001 (Joffe 2002a:5).

Following these developments, Saambou experienced a steady withdrawal of deposits and a decline in its share prices. Saambou lost an average of R2 billion through deposit withdrawals from 6 to 8 February 2002, leaving the bank illiquid. These events led to the decision by the Minister of Finance to place Saambou under curatorship, on 9 February 2002. The demise of Saambou represents the biggest failure ever recorded in the South African banking system. Saambou was listed on the Johannesburg Securities Exchange (JSE) and was one of the top local banks, as measured by market capitalization, in the country. In terms of deposits, Saambou was the eighth largest bank in South Africa, with deposits of around R16 billion.

The troubles afflicting Saambou in March 2002 were quickly followed by pressures on BOE in April 2002. In the middle of March 2002, the government and the Reserve Bank had to provide an explicit guarantee for all depositors of South Africa's sixth largest group, BOE. This unprecedented move emphasized the authorities to supporting the stability of South Africa's banking system. BOE has assets of R67 billion as well as 1.4 million depositors. Yet it faced a run on its deposits, which possibly reached R14 million, in the middle of March (ABSA 2002b:6).

The turmoil in South Africa's banking industry was demonstrated yet again at the beginning of May 2002, when investment banking group Brait announced that it had applied to cancel its banking licence, after the events surrounding Saambou and BOE had persuaded it that the levels of capital and overheads required to support its banking licence were no longer sustainable. The cost of complying with the regulatory requirements of holding a banking licence is believed to be around R25million to R35million per year. Another small South African bank, Mercantile Lisbon, announced that it was in trouble late in May 2002 (Joffe 2002d:5).

Since Saambou was placed under curatorship, the South African banking system has witnessed an initial withdrawal of deposits from the smaller banks and a flight to quality of, especially, the corporate deposit base to the four big banks. It can be argued that the recent difficulties besetting small banks have badly shaken confidence in small and even medium-sized banks, and correspondingly have boosted the already strong position of big banks. However, these events were mainly due to confidence and liquidity problems and cannot be seen as an indication of general soundness problems in the South African banking sector (Joffe 2002b:7). Despite these developments, the South African banking system remains sound, as evidenced by, among other things, the credit risk profile of South African banks.

5.5.1 A credit risk profile of South African banks

An analysis of overdue amounts and large exposures can give an indication of the level of credit risk in the South African banking system. In terms of the *Amended Regulations Relating to Banks*, which became effective on 1 January 2001, banks have to classify all loans and advances according to the quality of the assets on a monthly basis. About 78.3 percent of the banking sector's assets (84.4 percent in December 2000) earned a reasonable margin, 5.9 percent (5.3 percent in December 2000) earned a small margin, and the remaining 15.8 percent (10.3 percent in December 2000), including infrastructure, earned no margin.

The ratio of net overdues (that is, gross overdues less specific provisions) to net qualifying capital and reserves is used internationally to benchmark the extent of amounts overdue in a banking sector. Net overdues as a percentage of net qualifying capital and reserves amounted to 21 percent in January 2001. By the end of December 2001, this ratio had improved to 17.3 percent which was well within the international benchmark of 25 percent (Bank Supervision Department of the South African Reserve Bank 2001a:62).

Expressed as a percentage of total loans and advances, gross amounts overdue decreased from 4.3 percent in December 2000 to 3.9 percent in January 2001, mainly because of the amendment of the definition of "overdues" in January 2001. By the end of December 2000, the gross amount overdue (as a percentage of total loans and advances) amounted to 3.2 percent.

The implementation of the *Amended Regulations Relating to Banks* made it possible to determine the exact amount of specific provisions made and the value of the security held against loans classified as non-performing. By the end of December 2001, specific provisions covered about 46 percent of all overdues. Internationally, it is generally accepted that specific provisioning should cover at least 40 percent of non-performing loans, which indicates the slightly more conservative stance of South African banks in this regard. At the end of December 2001, about 22 percent of overdues were covered by security (Bank Supervision Department of the South African Reserve Bank Annual Report 2001a:62).

The non-performing loans of the total banking sector stood at a level of R25,7 billion at the end of January 2002. Other loans and advances overdue (that is, excluding mortgage accounts overdue and installment accounts overdue) constituted the major portion of accounts overdue, namely 55 percent. Mortgage and installment accounts overdue constituted 34 percent and 11 percent, respectively, of total overdues. The total gross overdues of the banking system prior to the East-Asian crisis of 1998 amounted to R15,5 billion, attributable to the high interest rates of 1998 which manifested in the overdue accounts (Bank Supervision Department of the South African Reserve Bank Annual Report 2001a:63).

The inherent soundness of the South African banking sector, as well as South African banks' general sophisticated and prudent approach to credit risk management, constitute a useful platform from which to implement the more sophisticated approach as envisaged under the proposed new Basel Accord. However, the credit risk management practices of South African banks are not above reproach in all aspects. For example, in the view of the FSAP mission, there was clearly some danger in over-reliance on collateral in the management of credit risk in South African banks. The Banking Supervision Department is concerned that in certain limited instances, the bad- and doubtful debt position had been downplayed somewhat, because of managements' relatively optimistic valuations of security. However, South African supervisors are aware of the problem and are taking measures to address this issue. Prudential requirements set by South African bank supervisors, including loan provisioning and classification requirements, are discussed in the next section.

5.5.2 *Prudential requirements*

5.5.2.1 Large exposure and loan classification requirements

As of January 2001, the *Amended Regulations Relating to Banks* require large exposures granted not to exceed 800 percent of capital and reserves, in line with the guidelines of the European Economic Community. In terms of these guidelines, those large exposures granted that exceed 15 percent of capital and reserves should not exceed, in total, 800 percent of capital and reserves, and no single exposure should exceed 25 percent of an institution's capital base. Large exposures granted were at a level of R1,4 billion in January 2001 (representing 1 874.8 percent of net qualifying capital and reserves), compared to R690 million (representing 962.8 percent of net qualifying capital and reserves) in December 2000. These figures include, amongst other things, exposures to government and inter-bank settlements. The above-mentioned regulations refer only to large exposures to private sector non-bank borrowers. Overdues in respect of large exposures decreased from R437,7 million in December 2000 to a level of R216,7 million at the end of December 2001. Specific provisions covered about 75.9 percent of overdues. The remainder of the overdues were covered by the value of the security held by banks (Bank Supervision Department of the South African Reserve Bank Annual Report 2001a:63).

In South Africa the loan classification requirement is 120 days, and the foreign exchange risk exposure of a bank, referred to in South Africa as the net open position, may not exceed 10 percent of its capital and reserves. The net open position has recently been tightened (from 15 percent) as of 1 January 2001.

Banks' adequacy of hedging against exchange rate risk is reflected in the net open position in foreign currency after hedging. Measured against capital and reserves, the maximum net open position in foreign currency after hedging fluctuated between a minimum of 3.1 percent in August 2001 and a maximum of 5.4 percent in January 2002. Despite the high volatility of the rand during the latter part of 2001 and the early part of 2002, banks remained safely within the stipulated maximum limit of 10 percent of capital and reserves, and were thus

adequately hedged against exchange rate risk during this time (KPMG 2001:22).

The adequacy and good quality of the South African bank supervision framework is evident from the above discussion. Minimum capital requirements are supplemented with adequate regulations in terms of loan-loss provisions, loan classification, provision for large exposures, and foreign exchange risk. These regulations are in line with international best practices. In general, South African banks operate well within these guidelines and regulations (KPMG 2001:24).

5.5.2.2 Minimum capital requirements

It is a well-accepted recommendation that minimum capital requirements need to be above 8 percent in emerging markets. The higher level of economic and financial volatility in emerging markets relative to industrial countries implies that the buffer stock needed by banks to weather unexpected shocks without becoming insolvent is larger in the former set of countries than in the latter. Higher volatility translates into greater standard deviation for a portfolio's unexpected losses and, therefore, to the need for a larger buffer. South African bank supervisors recognized this concern and recently increased minimum capital requirements to 10 percent of risk-weighted assets⁹.

South African banks are well capitalized, and the average risk-weighted capital adequacy ratio for the banking system stood at 11.1 percent at 31 January 2002 (January 2001: 12.5 percent). Almost 50 percent of the banks have a capital adequacy ratio of 15 percent or more, whilst those banks that do not meet the newly required minimum capital adequacy of 10 percent have phase-in programs in place over the short-term (Bank Supervision Department of the South African Reserve Bank Annual Report 2001a:64).

For 2001, the average capital and reserves held by the banking sector amounted to R92,4 billion (R76,3 billion in December 2000). An analysis of the percentage distribution of banks in terms of capital adequacy at the end of December 2001 reveals that 11.5 percent (2000:

⁹ Interview material. 12 April 2002.

20.4 percent) of the total number of banking institutions did not meet the new minimum capital adequacy ratio of 10 percent, whereas 34.6 percent of banking institutions (2000: 44.4 percent) had capital adequacy ratios that exceeded 20 percent (ABSA 2002a:5).

Banking institutions that reported capital adequacy ratios of above 20 percent (that is, 34.6 percent of institutions) represented only 2.6 percent of total banking-sector assets. Banking institutions with a capital adequacy ratio of between 10 percent and 12 percent (30.8 percent of banking institutions) represented the biggest portion of total banking sector assets, namely, 48.9 percent. The banking institutions that did not meet the minimum capital adequacy requirement of 10 percent represented 39.1 percent of total banking sector assets.

At the end of December 2001, primary capital and reserves constituted 71.8 percent (2000: 73.7 percent) of qualifying capital and reserves before deduction of impairments amounting to R12,4 billion (2000: R11,2 billion). The net qualifying capital and reserves growth of 16.3 percent during 2001 was lower than the growth in the total balance sheet of 27.6 percent (Bank Supervision Department of the South African Reserve Bank Annual Report 2001a:64).

A study by Barth, Caprio and Levine (2001), containing detailed and comprehensive information on the regulation and supervision of commercial banks in 107 countries, indicated that South African supervisors received a high score for “capital stringency.”

The Barth, Caprio and Levine study includes three different capital regulatory variables that capture different but complementary measures of the stringency of regulatory capital requirements across countries. South Africa scores relatively high in all these measures. For overall capital stringency, the South African score is five. However, in terms of current capital regulations South Africa obtains the maximum score of six. In terms of the capital regulatory index, South Africa obtains a score of six out of a maximum of nine. The specific measures, as well as South Africa’s “score” for each, are recorded in appendix one.

The efficiency of capital requirements in the South African context is also demonstrated by the fact that the South African banking sector remained remarkably resilient in the face of

financial crises like the East-Asian crisis of 1997-88¹⁰. A further positive factor is that a relatively large percentage of total bank capital (71.8 percent) consists of primary capital. Furthermore, as mentioned above, policies complimentary to capital requirements (for example loans-loss provisioning regulations) in South Africa are in line with international best practices (Bank Supervision Department of the South African Reserve Bank Annual Report 2001a:65).

Despite the fact that most South African banks meet (or exceed) minimum capital requirements, bank capital ratios in emerging market countries are often perceived as notoriously unreliable. For example, due to the concentrated ownership of wealth in emerging market countries, it is easy to raise low quality bank capital (see section 4.7.4.2).

In the view of the Financial Sector Assessment Program (FSAP) mission, the economic value of bank capital in South Africa might be overstated by the existing cross-shareholdings between financial institutions, as well as by the reliance on collateral security. Although it was impossible to quantify the extent of the overstatement of bank capital resulting from cross-shareholdings, there was consensus that banks would remain well capitalized even after the netting out of cross-shareholdings. Measures taken by South African bank supervisors to address such issues are discussed in the next section.

5.5.3 The efficiency of bank supervision in South Africa

The FSAP mission regarded the Bank Supervision Department as an effective supervisor, and as acting in broad compliance with the Core Principles for Effective Banking Supervision. The efficiency of South African bank supervisors is also confirmed by the findings of the Barth, Caprio and Levine study. South Africa scores relatively high in most measures of supervisory power, including three out of a possible four for the “supervisory forbearance discretion” index, and the maximum score of three for the “liquidity/diversification” index.

¹⁰ However, to some extent, the South African banking sector experienced some signs of vulnerability at the beginning of 2002. This was discussed in section 5.3.

Several countries obtained scores of zero and one for the former index, with three countries (out of 107) obtaining the maximum score.

However, South African supervisors scored a relatively low 4 out of a maximum of 16 for the “official supervisory power” index (The USA obtained a score of 14, with Slovenia and Hungary obtaining the highest scores of 16). The official supervisory power measure gives an indication of whether the supervisory authorities have the authority to take specific actions to prevent and correct problems. However, it must be noted that part of this index consists of deposit insurance scheme detail, which is not applicable to South Africa and consequently caused a downward bias in the South African score.

The supervisory forbearance discretion measure is intended to capture the degree to which this type of discretion is allowed. The liquidity/diversification index captures the degree to which banks are encouraged or restricted with respect to liquidity, as well as asset and geographical diversification. A summary of the findings of the Barth, Caprio and Levine study is provided in appendix one.

Despite the general sophistication and efficiency of South African banks supervisors, some concerns were raised regarding recent failures of SA banks and the way regulators handled these failures. For example, there has been much controversy surrounding the refusal of the South African authorities to assist Saambou with liquidity, forcing it into curatorship. Some observers also indicate that the extent of recent bank failures might indicate that South African supervisors are not in a position to successfully implement a more complicated approach to bank supervision, such as the proposed new Basel Accord¹¹.

The implementation of the proposed new Basel Accord poses new challenges to bank supervisors. The Supervision Department of the South African Reserve Bank has taken several steps to address these challenges. These include specific preparation measures with regard to Basel II, as well as amending the banking legal framework in South Africa in order

¹¹ Comment made by Mr. Rohinton Medhora from the IDRC at TIPS Forum 2002. 9 September 2002. Glenburn Lodge, Johannesburg.

for the framework to remain in line with the latest national and international regulatory, supervisory, and market developments (Bank Supervision Department of the South African Reserve Bank 2002b:1).

The new regulations came into effect on 1 January 2001. The *Amended Regulations Relating to Banks* includes a chapter dealing specifically with corporate governance. Some of the issues addressed are: the maintenance of effective risk management by banks, guidelines relating to the conduct of directors, a statement relating to the attributes of serving or prospective directors or executive officers, and the introduction of an independent compliance function into each bank. These measures serve as an indication of the Bank Supervision Department's commitment to the application of good corporate governance standards in the banking system in South Africa.

In terms of Regulation 47, all banks are required to establish a compliance function, headed by a compliance officer, to ensure that the bank continually manages its regulatory risk (KPMG 2001:10). As part of the supervisory process, the SARB has compiled a compliance checklist, the new DI 800 series of regulatory returns. The objective of the SARB with the DI 800 is to monitor the extent to which each bank complies with the Act and the Regulations, and to follow up on any instances of non-compliance (KPMG 2001:10).

A fair value accounting statement AC 133 was also recently introduced and is applicable to year periods commencing on or after 1 January 2001. In terms of disclosure requirements of AC 133, banks are required to reflect the net mark-to-market adjustments of investments in their financial statements, as opposed to equity accounting (book value or purchase price), as was previously the case.

Connected lending is addressed in Section 77 of the *Banks Act* and Regulation 34, pertaining to the form DI 700 (restriction on investments, loans and advances), of the *Amended Regulations Relating to Banks*. In terms of Section 77, a bank's investments, holding of preference shares, loans or guarantees to any of its associates shall not at any time exceed 10 percent of the bank's liabilities, excluding capital and reserves. Furthermore, in terms of Regulation 22 of the amended Regulations, which pertains to the form DI 401 (consolidated return), a bank has to report particulars of all exposures entered into with an entity within the

banking group that result in the banking group being exposed to an amount exceeding 1 percent of its qualifying capital and reserves. Banks also have to indicate whether such loans were granted on the same terms and conditions as loans granted to any other party.

Controlling shareholders are addressed in the above-mentioned Regulation 22 of the amended Regulations, as well as in Sections 37(7) and 42 of the *Banks Act*. Regulation 22, together with the form DI 401, deals with connected lending, as well as group capital adequacy, group large exposures, intra-group exposures, and group currency risk (KPMG 2001:23).

With regard to cross-shareholdings between banks and insurance companies the Bank Supervision Department is following the principles and techniques developed by the Joint Forum on Financial Conglomerates. The techniques, which have been developed in line with the principles and methodologies of banking, insurance, and security supervisors, are successful in eliminating any double counting of capital. The issue is addressed in both Regulation 21, pertaining to the form DI 400 (capital adequacy), and Regulation 22, pertaining to the form DI 401 (consolidated return), of the *Amended Regulations*, by the inclusion of cross-shareholdings as impairments against both bank capital and group capital. Large cross-shareholdings of capital can permit difficulties in one entity to be transmitted quickly to other entities in a group. Since none of the reciprocal holdings represent externally generated capital, existing cross-shareholdings within a banking group should be phased out.

A further recent development in bank supervision practices in South Africa is the introduction of a system of on-site supervision during 2000. During 2001, more on-site reviews were undertaken. A start was made with follow-up visits to banks previously reviewed in order to assess the progress that these banks had made in addressing the issues that had been identified as requiring attention. More follow-up reviews will be undertaken in the future as resources increase, and the aim will be to decrease the time span between on-site reviews to a period of not more than 18 months.

The on-site reviews undertaken have enabled the Banking Supervision Department to uncover issues that would have remained unknown had the Department relied solely on the outsourcing of the on-site supervisory function to external auditors. Consequently, it was decided to establish a structure for regular interaction with the external auditors of banks, in

order to share information on the lessons learnt from on-site reviews of banks' risk-management practices, and, secondly, to hold meetings with the external auditors of individual banks after each on-site bank visit.

The scope of the on-site reviews is to include banks' entire risk management processes, on an individual and a consolidated basis. Thus, the emphasis placed on the risk management process in bank supervision in the new Basel Accord will not be entirely new to South African supervisors. However, supervision and review of the internal credit risk rating systems of banks constitutes new ground for South African supervisors.¹²

The Banking Supervision Department admits that it will have to develop its internal capacity to enable it to meet these and other challenges posed by the new Accord. The Department has allocated a staff member to the task of assessing and implementing the new Capital Accord and providing guidelines to the banking industry. Current plans are to conduct a detailed study of the new Accord and to determine the changes required to the current banking supervisory process. Once the Basel Committee has finalized the new Accord, South African supervisors will need to convert the Basel Committee's documents into prudential standards for South African banks. At the same time, the supervisors will need to begin work towards approving the internal ratings systems, and operational risk models, of the banks seeking to use the more advanced approaches. It is anticipated that a comprehensive project plan will be in place when the final Accord is released.

The Bank Supervision Department envisages arranging several conferences and workshops on the new Capital Accord during the next few years. Furthermore, it is also endeavoring to engage the banking industry through quarterly seminars and by forming an interest group/steering committee, at which implementation issues will be discussed. It is envisaged that this forum shall be coordinated by the Banking Council of South Africa.

However, at the time of the study, the South African bank supervisors provided very little specific information on preparations for the implementation of the new Accord. At the time of the study, discussions between banks and supervisors were fairly limited. South African

¹² Interview material. 12 April 2002.

banks perceive this to be a problem. Discussions with representatives from banks indicated that they would appreciate more guidance from and communication with supervisors. Communication with supervisors in terms of their (the supervisors') expectations from banks in terms of the implementation of the new Accord seems to be problematical. The establishment of a time frame for the implementation of the proposed new Accord is also a priority. The following aspects might be included in such a time frame:

- An indication of when supervisors intend having substantially completed the approval process for banks seeking to adopt the more sophisticated IRB approaches.

- If and when supervisors envisage banks having to operate a dual system for capital adequacy; that is to report (both to supervisors and the market) their capital ratios under the existing and the new methods.

- When supervisors plan the new regime to be fully operational.

Furthermore, South African supervisors provided no indication on specific aspects of the proposed new Accord where national discretion can play an important role. As explained in chapter four, both within Pillar one, and in the implementation of Pillar two, there is a range of issues on which supervisors can exercise a degree of national discretion when implementing the new framework. It seems as if supervisors from some other countries have already considered these issues. For example, Australian Prudential Regulation Authority (2002:4) indicated that they would need to exercise national discretion to tailor the standardized approach to more accurately reflect Australian conditions. This is deemed necessary since Australian banks are able to demonstrate an exceptionally low loss rate on their housing loan portfolios.

An area where South African supervisors might need to exercise national discretion is in the regulatory handling of concentrated lending. As explained in chapter four, the new Accord does not adequately capture risks that arise from excessive industry and geographic concentrations. Yet, concentrated lending remains a problem in the South African context (see section 5.5.1). With this in mind, South African supervisors might have to consider revisions to capital requirements designed to ensure that depositors' money are not being used to support overly speculative or concentrated lending portfolios.

South African supervisors need to further explore these issues, as well as others that will

undoubtedly arise during the period of finalizing the Accord and setting to work on implementation. Over the coming months, supervisors will need to start (and continue) discussions with banks, with a view to establishing a regulatory framework, which is sensible and effective in the South African environment.

5.6 A SURVEY ON SPECIFIC CHALLENGES IN IMPLEMENTING THE PROPOSED NEW BASEL ACCORD FOR SOUTH AFRICAN BANKS

5.6.1 Results of the survey based on the questionnaire

5.6.1.1 General factors regarding credit risk management

In general, the credit risk management practices of South African banks seem to be sophisticated and in line with international best practices. The following section provides a summary of surveyed banks' responses with regard to specific questions on credit risk measurement and management practices and processes.

Question 1: Did you benchmark your credit risk management practices against industry best practices?

All the surveyed banks indicated that they benchmarked their credit risk management practices against industry best practices within the last year to ensure that they remain at the cutting edge of global best practices. As indicated in their annual reports, all the surveyed banks endorse the Code of Corporate practices and conducted as recommended in the King report and aim at full compliance with these recommendations.

Question 2: Do you have a function that is responsible for credit risk management at the enterprise level?

All the surveyed banks indicated that their banks have a function that is responsible for credit risk management at the enterprise level (either at the banking group or bank level). This is

usually in the form of a group credit risk committee that comprises executive directors and non-executive directors. Some of the larger banks indicated that the heads of credit from each of the significant business units participate in the committee. The main objective of such committees is to facilitate the high-level monitoring of credit risk. This includes aspects such as approving the group’s credit policy, setting limits for sanctioning authorities, consideration of loan applications in excess of these limits and reviewing the concentration of risks to individual borrowers.

Question 3: Staff resources and skills for credit risk management, credit risk in the training program.

When asked to indicate how strongly they agree with the following statements using a scale from 1 to 5, with 5 indicating “strongly agree” and 1 “strongly disagree”, surveyed banks responded in the following way:

Table 5.3 Banks’ responses with regard to resources and skills for credit risk management and credit risk in the training program

SURVEY ITEM	SCORE INDICATED*		
We have sufficient staff resources and skills for effective credit risk management	3 (33%)	4 (67%)	
All relevant personnel clearly understand the bank’s approach to granting credit	4 (83%)	5 (17%)	
Credit risk management is effectively covered in our training program	2 (17%)	4 (66%)	5 (17%)

**The percentages in brackets indicate/represent the percentage of banks indicating the specific score.*

The majority of the surveyed banks are confident that credit risk management is effectively covered in their training programs, that all personnel understand the banks’ approaches to granting credit (and can be held accountable for complying with established policies and procedures), and that their banks have a corporate culture and values which align well with their credit risk management objectives. They are also confident that their credit risk policies

and procedures address credit risk in all the bank’s activities at both the individual credit and portfolio levels, and that credits are priced in such a way as to cover all of the imbedded costs and compensate the banks for the risks they take. They are also very confident that all relevant personnel clearly understand the banks’ approaches to granting credit and can be held accountable for complying with established policies and procedures. However, the banks appeared to be less confident about having sufficient staff resources and skills for effective credit risk management (more than one bank indicated a score of 3). This is the case for both the small and larger banks surveyed. Although all surveyed banks are confident that all relevant personnel clearly understand the bank’s approach to granting credit and can be held accountable for complying with established policies and procedures, recent problems at Saambou and especially Unifer raises the question whether established policies and procedures are always followed in South African financial institutions.

Question 4: Corporate cultures and values.

When asked to indicate how strongly they agree with the following statements using a scale from 1 to 5, with 5 indicating “strongly agree” and 1 “strongly disagree”, surveyed banks responded in the following way:

Table 5.4 Banks’ responses with regard to corporate cultures and values

SURVEY ITEM	SCORE INDICATED*		
I am confident that we have a corporate culture and values which assign well with our credit risk management objectives	3 (33%)	4 (67%)	
I am confident that our incentive compensation is well aligned with our credit risk management objectives	2 (17%)	3 (33%)	Not applicable 16%
Senior management has communicated and demonstrated an affirmative commitment to credit risk management	2 (17%)	4 (66%)	5 (17%)

**The number in brackets represents the percentage of banks indicating the specific score.*

All the respondents indicated that they are confident that their banks have a corporate culture and values which aligns well with their credit risk management objectives (scores of 4 and 5 mostly indicated). The majority of these respondents are also confident that senior management has demonstrated and communicated an affirmative commitment to credit risk management.

However, banks are not so confident that incentive compensation is well aligned with credit risk management objectives (scores of 2 and 3 were recorded). One of the respondents indicated that their bank do not want to link risk management processes to monetary compensation. In this regard, there is considerable variation in bank practices. Incentive compensation, especially compensation linked to credit risk grades, will be an important issue as banks adopt the IRB approach to regulatory capital determination. Consequently, as banks refine their credit risk rating systems and prepare for the implementation of the IRB approach, specific consideration need to be given to the use of credit risk ratings in remuneration policies.

Question 5: Written credit risk strategy that reflect the banks tolerance for risk and the level of profitability the bank expects.

Question 6: Written policies regarding the information and documentation needed to approve new credits, renew existing credits and/or change the terms and conditions of previously approved credits.

All the surveyed banks indicated that they have a written credit risk strategy that reflect the bank's tolerance for risk and the level of profitability the bank expects to achieve for incurring various credit risks. Policy documents also address the documentation needed to approve new credits, renew existing credits and to change the terms and conditions of previously approved credits. Such policy documents can help significantly to reduce credit losses by communicating clear thresholds for financial performance and potentially triggering corrective or protective action at an early stage.

Question 7: The use of credit scoring techniques in approving loan applications.

When asked “do you sometimes rely solely on credit scoring techniques in approving loan applications?” surveyed banks responded in the following way:

Table 5.5 Banks’ responses with regard to the use of credit scoring techniques in approving loan applications

Yes, for certain types of exposures	83%
Yes, for certain small exposures	0%
No, our bank always perform detailed analysis of all individual loan applications	17%

One respondent indicated that they always perform a detailed analysis of all loan applications. The remainder of the surveyed banks indicated that they sometimes rely solely on credit scoring techniques in approving loan applications. However, it seems as if South African banks make balanced and careful use of credit scoring technology and avoid utilizing this technology for loans or credit relationships that are large or complex enough to warrant a formal and individualized credit analysis. For example, several banks indicated that they rely on credit scoring for certain types of exposure to a certain limit, including home loans and motor vehicle financing.

Credit scoring techniques (and behavioral scoring) are especially used extensively in the retail sector. One of the large banks surveyed indicated that the use of such techniques allows the bank to adopt a customer centric (as opposed to a product centric) approach to credit evaluation and pricing in the retail sector. Thus, the maximum exposure to any customer is known, making loan pricing and profitability analysis more precise.

One of the smaller banks indicated that credit scoring is used for payroll lending, while another (large) bank indicated its use for the small business sub-portfolio. Where credit scoring models are difficult to apply (most notably in the agricultural market) facilities are approved by credit or lending officers acting according to formal credit authorisation

mandates. It was also indicated that credit scoring is supplemented by behavioural scoring, since credit scoring results get outdated. All the surveyed banks stressed that in all instances, the results obtained from credit scoring techniques/credit risk models are also discussed by the Credit Risk Committee.

Questions 8 -10: Approach to profitability analysis and loan pricing.

When asked, “Which of the following most accurately describe your bank’s approach to profitability analysis and pricing?” (question 8) surveyed banks responded in the following way:

Table 5.6 Banks’ responses with regard to approach to profitability analysis and pricing

Profitability analysis is based on the overall banking relationship with a customer	67%
Approach to profitability analysis differs for different sub-portfolios	17%
Profitability analysis is oriented to loans on a stand-alone basis	16%

Most of the banks surveyed indicated that profitability analysis is based on the overall banking relationship with a customer. One bank indicated that is only the case for corporate lending, whereas in the case of small business and retail lending, profitability analysis and loan pricing is based on a transaction basis.

One of the smaller banks indicated that profitability is determined on a product level. This bank offers two primary products, payroll and debit order/retail loans. Payroll loans are governed by various credit policy rules, which are controlled via a combination of systems and manual controls. Debit order/retail loans are governed by a credit policy which is controlled primarily through systems and which relies, as its main risk tool, on a series of scorecards which have been developed to provide appropriate terms, dependent on the individual borrower risk and the collection method.

When profitability analysis is oriented to the overall banking relationship of a customer, covering both credit and non-credit products, some banks may be tempted to ignore or minimize the effect of price concessions, particularly when such concessions appear to be essential to retaining business customers. Banks in their pricing policies should give due consideration to the possibility that the borrower might choose not to continue to purchase its non-credit products from the bank at some point in the future, so that an inadequately priced loan might remain part of the bank’s portfolio while non-credit revenues diminish. Thus, banks should understand the profitability of loans as a stand-alone product in order to gauge properly the significance of price concessions.

When asked, “do you base price and non-price loan terms on obligor risk?”(question 9), banks’ responses differed widely, as can be seen from the following table:

Table 5.7 Banks’ responses with regard to the relation between price loan terms and non-price loan terms and obligor risk

Most or all of the time, based on the obligor’s assigned risk grade	17%
Most or all of the time, based on a less formal assessment of the obligor’s risk	17%
Sometimes terms are based on the obligor’s assigned risk grade	34%
Sometimes terms are based on a less formal assessment of the obligor’s risk	17%
A combination of the above approaches	17%

Identical responses were indicated to question 10, “do you base loan non-price terms on obligor’s risk?” All the respondents indicated that they base loan price terms, as well as loan non-price terms on obligor’s risk most or all of the time. In the case of most of the larger banks surveyed, they indicated that this assessment is based on the obligor’s assigned risk grade. However, one of the large banks indicated that loan terms are based on a less formal assessment of obligor risk. One of the smaller banks surveyed indicated that it is based on a less formal assessment of the obligor’s risk. This can be ascribed to the nature of their customer base, as well as the fact that they largely utilize the expert judgement approach to

credit evaluation.

Question 11: Pricing of credit risk.

When asked to indicate how strongly they agree with the following statements using a scale from 1 to 5, with 5 indicating “strongly agree” and 1 “strongly disagree”, surveyed banks responded in the following way:

Table 5.8 Banks’ responses with regard to questions on the pricing of credit risk

SURVEY ITEM	SCORE*		
I am confident that credits are priced in such a way as to cover all of the imbedded costs and compensate the bank for the risks incurred	3 (33%)	4 (50%)	5 (17%)
I am confident that our bank has taken appropriate steps to identify and control the risks of connected lending	3 (17%)	4 (66%)	5 (17%)
I am confident that over-reliance on collateral does not compromise other elements of sound counterparty credit risk management	4 (50%)	5 (33%)	Not applicable (17%)

**The percentages in brackets indicate/represents the percentage of banks indicating the specific score.*

The majority of the respondents are confident that credits are priced in such a way as to cover all of the imbedded costs and compensate the bank for the risks incurred (most of the respondents indicated 4 or 5, with only two of the large banks indicating that they are not confident in this regard). This must be seen in the light of the answers to the previous question. All the large banks indicated that loan pricing is based on the overall banking relationship with a customer and that the profitability of every loan application is not based on its own merit, regardless of the total relationship with the customer. As explained, this can lead to a situation where the bank is not adequately compensated for the risks incurred.

Question 11: Connected lending.

All the respondents indicated that they are confident that their respective banks have taken appropriate steps to identify and control or mitigate the risks of connected lending. One of the

smaller banks indicated that over-reliance on collateral is irrelevant to their situation, since they only make unsecured loans. In general, respondents from large banks indicated that they are confident that over-reliance on collateral does not compromise other elements of sound counterparty credit risk management such as the due diligence process. This might be an indication of overconfidence on the side of banks. As indicated in section 4.4, connected lending and over-reliance on collateral is an area of concern in the South African banking industry, as identified by the FSAP mission.

Question 12-13: Measurement of credit risk.

Question 12: Confidence with regard to credit policies and processes, information systems and analytical techniques.

When asked to indicate how strongly they agree with the following statements using a scale from 1 to 5, with 5 indicating “strongly agree” and 1 “strongly disagree”, surveyed banks responded in the following way:

Table 5.9 Banks’ responses with regard to confidence with regard to credit policies and processes, information systems and analytical techniques

SURVEY ITEM	SCORE INDICATED*		
We have a clear definition of credit risk	4 (17%)	5 (83%)	
I am confident that our credit risk policies and procedures address credit risk in all of the bank’s activities	3 (17%)	4 (66%)	5 (17%)
I am confident that our bank have information systems and analytical techniques that enable management to measure credit risk	2 (33%)	3 (67%)	

**The percentages in brackets indicate/represent the percentage of banks indicating the specific score.*

The banks indicated that they are very confident that they have a clear definition of credit risk (83 percent of respondents indicated 5). The identification of existing and potential risks inherent in any product or activity is the basis for an effective credit risk measurement and

management process.

With the exception of one, all the surveyed banks are also very confident that their credit policies and procedures address credit risk in all the bank's activities at both the individual credit and portfolio levels. However, it was indicated that the nature of South African banks' customer base and the structure of the South African economy inevitably lead to concentrated lending. Corporate lending is limited to a few large corporates, due to the concentrated nature of the South African economy. Exchange controls also contribute to this problem, by "trapping" SA bank's lending inside the domestic market. However, the use of structured transactions is starting to take off in the South African banking sector, providing new avenues for diversification.

Banks seem to be less confident with regard to information systems and analytical techniques that enable management to measure the credit risk inherent in all on- and off-balance sheet activities. In particular, the large banks surveyed were not very confident that their information systems provide adequate information on the composition of credit portfolios. (All of the respondents of the large banks indicate 2 or 3 for this question.) One of the banks indicated that they are confident that the management information systems provide adequate information on the composition of the credit portfolio in terms of exposure, but not in terms of expected and unexpected loss. This might be a reason for concern, since management information systems that support the loan approval process should clearly indicate the composition of the bank's current portfolio to allow for consideration of whether or not a proposed new loan (regardless of its own merits) might affect this composition sufficiently to be inconsistent with the bank's risk appetite.

Question 13: Approaches to the measurement of credit risk: transaction and portfolio methods.

When asked, "in measuring credit risk, which of the following approaches do you use?"(question 13) surveyed banks responded in the following way:

Table 5.10 Banks' responses with regard to approaches to measuring credit risk

Transaction methods	33%
Portfolio methods	0%
A combination of transaction and portfolio methods	67%

An effective exposure monitoring and limit setting process depends on meaningful exposure measurement methodologies. One important aspect in this regard is the distinction between the use of transaction and portfolio methods for the measurement of credit risk. The use of transaction methods can result in overly conservative measures or other types of less than meaningful exposure measurements. This can easily compromise well-structured policies and procedures. Such situations can lead to limits being driven primarily by customer demand and used only to define and monitor customer facilities, rather than serving as strict levels defined by credit management that initiate risk controlling actions.

The majority of the large banks surveyed indicated that they use a combination of portfolio and transaction methods in measuring credit risk. One of the respondents indicated that a combination of the two methods is used since some counterparties have a wide range of facilities including primary (more direct exposure) and trading facilities (settlement risk).

The choice of approach is also determined by the nature of the exposure/ portfolio. For example, one bank indicated that in the case of retail portfolios, simple aggregation is used. However, in the case of the corporate portfolio, a portfolio approach is used.

One of the smaller banks indicated that they use the transaction method in the measurement of credit risk. Given the nature of their customer base and lending products offered (payroll lending to the retail sector), the approach to credit measurement seems appropriate.

5.6.1.2 Data collection and quantification of loss concepts

Questions 14-15: Rating history for each borrower.

Banks wanting to adopt the IRB approach are required to collect and store substantial historical data on borrower defaults, rating decisions, rating histories, rating migration, information used to assign the ratings, the party/model that assigned the ratings, a history of estimated PDs, key borrower characteristics and facility information. This must be established in a manner suitable for examination by regulators and for external verification. The data should be sufficiently detailed to allow retrospective re-grading of exposures, as rating models are reviewed and improved.

By collecting such diverse data, banks should be able to substantially improve the predictive power and robustness of their borrower risk rating models and PD estimates. In addition, bank managements will be able to improve their internal risk management information systems due to the greater detail, consistency, and depth of available data. These requirements should also facilitate banks sharing information on a more consistent basis.

Data requirements will have system implications that need to be considered as a matter of urgency. The ownership of data is a further issue to be addressed. Data that is currently exclusively used by risk managers will, in future, also be used by the finance function, and have to meet rigorous public scrutiny on information previously held privately.

When asked, “do you have a rating history for each borrower?” (question 14) surveyed banks responded in the following ways:

Table 5.11 Banks’ responses with regard to a rating history for each borrower

Yes	100%
No	0%

When asked, “which of the following elements are included in such a rating history?” (question 15), South African banks responded in the following way:

Table 5.12 Banks’ responses with regard to elements included in rating history

SURVEY ITEM	PERCENTAGE OF BANKS WHERE THIS ELEMENT IS INCLUDED IN THE RATING HISTORY
Rating since inception	80%
Methodology and key data used to derive the rating	100%
Key borrower characteristics	100%
Date rating was assigned	80%
Person/ model who assigned the rating	40%

There are currently a lot of initiatives in the South African banking industry to quantify loss concepts. In general, most development in terms of quantification is in the area of retail portfolios. For example, some of the banks indicated that a complete rating history is only available for retail exposures and that large corporate exposures remain a problem area in this regard. In line with overseas experience, South African banks currently lack long-term data on the performance of their internal rating systems. However, all the large South African banks surveyed indicated that they have a rating history for each borrower, including the methodology and key data used to derive the rating and key borrower characteristics. The date ratings were assigned, and the person/model who assigned the grade were included in such a rating history of respectively 80 percent and 40 percent of the surveyed banks. Thus, at the time of the study, all the surveyed banks did not fully comply with the rating history requirements set out by the Basel Committee for adoption of the IRB approach.

Questions 16-18: Computation of long-run average probability of default rates.

When asked if they compute long-run average probability of default (PD) rates solely based on historical data (question 16), surveyed banks responded in the following way:

Table 5.13 Banks’ responses with regard to the computation of long-run average probability of default rates

Yes, for all sub-portfolios	20%
Yes, only for retail portfolios	40%
No	40%

When asked, “what is the length of the underlying historical observation period used for the calculation of PD rates?” (question 17), South African banks responded in the following way:

Table 5.14 Banks’ responses with regard to the length of the underlying historical observation period used for the computation of long-run average probability of default rates

2-3 years	20%
3-5 years	20%
Not applicable	60%

When asked “do they compute PD’s with any of the following methods?” (question 18) surveyed banks responded in the following way:

Table 5.15 Banks’ responses with regard to the methods used for the calculation of PD rates

Statistical default models	80%
Not applicable	20%

All banks, using the IRB approach – whether using the foundation or advanced methodologies – must provide supervisors with an internal estimate of the PD associated with borrowers in each borrower grade. The preparation of the estimates, and the risk management

processes and rating assignments that lie behind them, must reflect full compliance with supervisory minimum requirements to qualify for IRB recognition.

The Basel study (2000c) revealed that many banks, through their internal rating systems, are capable of assigning an estimate of PD to borrowers within a particular grade. Although most of the surveyed banks did not have sufficient internal data for specifying loss characteristics for all borrowers based on their own default history, a number relied on internal data for analyzing the performance of certain borrower segments, in particular, retail or middle market customers. While the depth and breadth of such data varied, most banks appear to have initiated data-gathering efforts over the past three to five years.

The practices of South African banks in this regard seem to be broadly in line with international experience. All the surveyed banks indicated that they calculate PD estimates, although data limitations were indicated as a serious impediment to this. One of the surveyed banks indicated that it computes PD estimates from internal data (on default experience) and that it is confident about its estimates. The other surveyed banks indicated that they do calculate PD rates, but that internal default experience is not the sole driver of these calculations. All the banks indicated that they are more confident about PD estimates for retail than corporate measures.

One of the largest South African banks indicated that while it does calculate PD estimates at the moment, it perceives the estimates as not being robust and granular enough due to data limitations. The bank also indicated that it feels most comfortable about PD estimates for the retail sector, since automation elements of loan applications have been significantly improved through behavioural scoring for the retail sub-portfolio. Calculation of PD rates and other loss concepts is considered to be a work in progress. For example, the bank indicates that it will increasingly adopt statistically derived estimates of future credit losses, driven by ongoing improvements to internal risk ratings and underlying PD measurements.

The surveyed banks also indicated that they supplement data on internal default experience with external and pooled data, and that they use, especially, KMV methodology and other statistical default models. The banks that calculated PDs from historical data indicated that the length of the underlying historical observation period used for the calculation of PD

estimates is two to three years and 3-5 years respectively.

The banks' historical databases often lack enough default observations for meaningful statistical inference since borrower defaults are fortunately relatively rare. Another problem with historical PD data series is inconsistency in the definition of what constitutes "default". Currently, different banks under different jurisdictions use different definitions of default. Consequently, current historical PD data series are not necessarily comparable among different banks, and are thus not very useful for regulatory purposes.

Thus, when banks formulate their PD estimates, they should be able to supplement their use of internal default experience with statistical default models, and be able to pool their data and map it to that of others (see section 3.2.2.2). A key consideration in relying on external data is the comparability of such data to a bank's own portfolio. This is an issue for a number of reasons, including discrepancies between point-in-time and through-the-cycle ratings, differences in the composition of the banks' portfolios, and potential differences between the performance of publicly traded bonds and that of loans. US banks are pioneers in mapping external data to internal data. However, the limited number of borrowers with external ratings limits the use of mapping techniques in the South African context.

Pooling data from different banks is another alternative. Banks may also employ pooled data where the data was shared among a number of institutions to increase the breadth and depth of data. In order to do this, however, the bank must demonstrate that the population of borrowers represented in the data is representative of the population of the bank's actual borrowers. Additionally, a bank must demonstrate that the internal rating systems and criteria of other banks in the pool are comparable to its own. Some data sources will be richer for some borrowers than they are for others. Consequently, a bank may have a primary source of information, and use others simply as a point of comparison and potential adjustment to initial PD estimates.

The Bank Supervision Department of the South African Reserve Bank plans to start disseminating industry data, based on the DI900 forms completed by banks as part of regulatory compliance. However, it should be borne in mind that the Reserve Bank is not in the business of selling data. The dissemination of data is for the Banking Supervision

Department's own purposes, and is not intended to provide data to the banking industry.

Questions 19-20: Review of PD estimates, history of estimated PDS and realized defaults associated with each grade.

When asked "do you have a history of estimated PD's and realized defaults associated with each grade?" (question 20) surveyed banks responded in the following way:

Table 5.16 Banks' responses with regard to a history of estimated PDS and realized defaults associated with each grade

Yes (qualified, only for the retail portfolio)	80%
No	20%

All of the surveyed banks indicated that they review their PD estimates at least annually. One of the larger banks indicated that PD estimates are reviewed monthly.

In response to question 20 "do you have a history of estimated PDs and realized defaults associated with each grade?", surveyed banks responded in the following way:

Table 5.17 History of estimated and realized PDs

Yes	80%
No	20%

With the exception of one, all the surveyed banks also indicated that they have a history of estimated PDs and realized defaults associated with each grade, at least in the case of retail portfolios.

Questions 21-23: Computation of long-run average loss given default (LGD) rates which explicitly evaluates likely recovery rates for each transaction in the event of default.

To the questions “ do you compute long-run average loss give default (LGD) estimates?” (question 21) surveyed banks responded in the following way:

Table 5.18 Banks’ responses with regard to the computation of LGD rates

No	20%
Yes, and we are confident about the accuracy of the estimates	20%
Yes, but we do not find the estimates to be reasonable	40%
Yes, qualified confidence about the accuracy of estimates	20%

The majority of the surveyed banks indicated that they explicitly compute long run loss given default (LGD) rates, which explicitly evaluate likely recovery rates for transactions in the event of default. One of the banks indicated that LGD estimates are only computed for certain types of loans, for example mortgages and installment finance. This compares to the results of the Basel study, indicating that only about one-third of banks surveyed in the indicated that they apply facility-specific LGD estimates to their exposures for use in internal capital allocation and/or profitability analysis systems. Some of the banks included in the Basel survey specifically indicated that they had attempted to estimate LGD, and LGD volatility, and, after reviewing their findings, placed little confidence in their results.

The latter seems to be the case in South Africa as well. For example, two of the large banks admitted that they do calculate LGD estimates, but they do not regard these estimates as very robust. Again, data limitations are cited. Although surveyed banks indicated that they do have substantial data on their credit risk portfolios, this data is usually not available in electronic format and especially not in the format required by the Basel Committee. For example, the data on aspects such as collateral and guarantees are available, the systems “are not connected”. As explained in chapter two, credit risk information systems are not on the same platform as their market risk counterparts. This is largely due to the way credit risk was handled in the past, namely largely based on a personal relationship and knowledge of the customer, subjective evaluation. This resulted in a time consuming, expensive process, as

explained in section 2.4.

Questions 22 and 23: Approach to the estimation of LGD and length of historical observation period used for the calculation of LGD.

To the question “which of the following most accurately describe your approach to the estimation of LGD?” (question 22) banks responded in the following way:

Table 5.19 Banks’ responses with regard to approaches to the estimation of LGD

Standard valuation procedures	0
Directly estimating an expected recovery percentage	0
Applying a generic classification	0
Based on historical data	20%
Other - combination of above approaches	60%
Not applicable	20%

When asked to indicate the length of the underlying historical observation period in computing LGD based on historical data (question 23), South African banks responded in the following way:

Table 5.20 Banks’ responses with regard to the length of the underlying historical observation period in the estimation of LGD

Not applicable	60%
2-3 years	40%

A more mechanical process is typically employed when assigning LGD ratings than for PD ratings. Findings of a study by MacDonald and Eastwood (2000:18) suggest that LGD ratings are usually assigned in one of three ways:

1. On the basis of security coverage ratios, this is the main method used by all banks for most types of exposures. Security coverage is usually based on a discounted or ‘shaved’ loan to value ratio, whereby estimated loan security values are discounted by standardized ‘safe lending’ or ‘extension’ margins. The discount factors seek to cover such factors as uncertainties inherent in the valuation process (including liquidity considerations) and potential subsequent downturn in security values. The banks’ policy documents set out standard valuation procedures and discount factors based on types of security. The “discount factors” tend to be based largely on management judgement and traditional industry benchmarks/ “rules of thumb”. The smallest banks tend to extend value only on real estate or high quality assets, such as cash and government securities, whereas larger banks recognize a wider range of security types in their rating procedures.
2. By directly estimating an expected recovery percentage, for example, in the case of impaired assets.
3. By applying a generic classification based on the type of exposure. Some banks use this approach for certain types of exposures, eg in the case of subordinated debt, small leasing exposures, exposures secured over residential or non-specialised commercial property and exposures to other banks. One of the surveyed bank indicated that this approach is used in the case of residential property lending, specific recovery percentages are used for different suburbs/in terms of residential area. In general, the surveyed banks seemed to use a combination of the above methods, based on the nature of the specific facility.

In terms of the above classification, the majority of surveyed South African banks indicated that they use standard valuation procedures and discount factors based on the type of security set out in the bank’s policy documents, based largely on management’s judgmental industry benchmarks or rules of thumb. However, one bank indicated that LGD estimates are based on historical data, while other banks indicated that they use a combination of approaches, including directly estimating an expected recovery percentage.

As in other areas of credit risk rating, this aspect of the banks’ systems is heavily constrained by data limitations. This is not only the case in South Africa, but in all jurisdictions around the world. Although most of the local banks are working to reduce some of these limitations, key LGD parameters are currently a mix of the banks’ own loss histories, published studies of

bond and commercial loan experience (mostly data on US-based customers) and a large degree of management judgement.

As regards the data used to quantify LGD, nearly all banks considering LGD in some form rely entirely or in part on data from their own historical records. Surveyed banks indicated that the historical observation period is 2-3 years in this regard.

At the same time, there are relatively few available sources of external LGD data and internal use of such data requires analysis and evidence that the exposures on which the data is based are directly comparable to the bank's own loss history.

The Basel Committee (2000c) study revealed little consistency across banks in terms of the factors they take into account, or the effect they have on estimates of LGD. The analysis revealed that banks see a range of borrower and transaction specific characteristics as having an impact on LGD. Borrower characteristics include asset size, country of incorporation, industry sector and whether the corporate is a holding or operating company. Transaction specific characteristics include the seniority of the transaction, the amount and nature of any collateral taken and loan covenants. Bank specific characteristics such as the internal policy towards recovery and exogenous factors such as the economic cycle are also considered. Many banks will need to revisit their data on loss given default (LGD) to include the funding cost, administrative expense and an estimate of the time between default and recovery to obtain estimates for the economic loss as required by the Basel proposals.

5.6.1.3 Operating design features of internal credit risk rating systems

Questions 24-27: Approximate percentage of the rand value of total loans that has an internal credit rating.

When asked, "approximately what percentage of the rand value of your bank's total loans has an internal credit rating" (question 24), surveyed banks responded in the following way:

Table 5.21 Banks’ responses with regard to the approximate percentage of total loans that has an internal credit rating

Between 51 and 75 percent	40%
Between 76 and 95 percent	40%
More than 95 percent	20%

When asked, “approximately what percentage of the rand value of your bank’s corporate loans has an internal credit rating” (question 25), surveyed banks responded in the following way:

Table 5.22 Banks’ responses with regard to the approximate percentage of corporate loans that has an internal credit rating

Between 76 and 95 percent	80%
More than 95 percent	20%

When asked, “approximately what percentage of the rand value of your bank’s retail loans has an internal credit rating” (question 26), surveyed banks responded in the following way:

Table 5.23 Banks’ responses with regard to the approximate percentage of retail loans that has an internal credit rating

Less than 5 percent	20%
Between 76 and 95 percent	60%
More than 95 percent	20%

When asked on “what the decision to rate/not to rate (question 27) depends, banks responded in the following way:

Table 5.24 Banks’ responses with regard to the factors on which the decision to rate/not to rate depends

Type of exposure	60%
Not applicable	20%
Other	20%

The degree to which internal ratings were applied to different customer sub-portfolios varied among the banks surveyed. In principle, the banks apply ratings to all of their corporate, commercial and other transaction-managed exposures. In practice, exposures below certain thresholds tend not to be rated on an individual basis. At some banks these exposures are assigned a representative rating on a portfolio basis, at others the exposures remain unrated.

About half (40 percent) of the large banks indicated that between 76 percent and 95 percent of their total loans have internal credit risk ratings. One of the respondents that indicated that between 51 percent and 75 percent of total loans have an internal credit risk ratings explained that this was a conservative estimate. Although a bigger percentage of loans do have an internal rating, this figure only include exposures with a rating they are feeling confident about. In the case of other exposures, the ratings are very subjective and the loss concepts, for example PD associated with the rating cannot be substantiated.

The percentage of exposures assigned a rating differ between sub-portfolios, according to the nature of the business and customer profile of the bank concerned. For example, one large bank indicated that retail customers were almost completely covered by the rating systems (a figure of more that 95 percent in this regard) while between 76 percent and 95 percent of corporate customers have a rating. On the contrary, one merchant bank indicated that more than 95 percent of their total loans and corporate loans have an internal rating. In the case of retail loans however, the figure is between 76 percent and 95 percent. One of the large banks

indicated that less than five percent of their retail portfolio has an internal credit risk rating. This is attributed to the fact that the bank concerned does not use credit-scoring techniques in the rating of the retail portfolio. Consequently, data availability limits the percentage of retail loans with an internal rating.

It was indicated that the decision not to assign a rating to a specific exposure is mostly based on the type of exposure. For example, in the case of specialized lending, such as commercial property and agriculture, the lack of an appropriate ratings methodology prevent the assignment of a rating.

Question 28: The use of identical/ different rating methodologies for all sub-portfolios subject to rating.

When asked, “which of the following most accurately describe your rating system?” (question 28) South African banks responded in the following way:

Table 5.25 Banks’ responses with regard to the most accurate description of their credit rating systems

The use of identical rating methodologies for all sub-portfolios subject to rating	20%
Specific applications are used for different sub-portfolios	80%

About one-third of the banks surveyed by the Basel Committee reported that they use identical rating methodologies for all sub-portfolios subject to rating. The rest relied on different methodologies for different books/sub-portfolios/customer groups/subsidiaries.

Similar results were found for the surveyed South African banks, with 20 percent of the respondents reporting the use of identical rating methodologies for all sub-portfolios. In particular, South African banks reported extensive use of credit and behavioral scoring in assigning ratings to the retail portfolio. However, one of the large banks indicated that they do not use the latter approach. Consequently, only about 5 percent of their retail portfolio has

an internal credit risk rating. Differences in the treatment of medium versus mega corporate lending were also reported.

Even if the rating process differs across sub-portfolios, reconciliation of the outputs of these processes may be eased if banks use a single internal scale, or the estimation of PDs to all rating categories. The risk quantification of rating categories using PDs has the potential to make diverging rating methodologies less relevant, as, in theory, a reconciliation would be possible using these PDs as a “common currency”. However, the accuracy and consistency of the mapping process and of the resultant PDs must still be addressed.

Question 29: Methodological approach to assigning ratings.

When asked, “which of the following most accurately describe your bank’s methodological approach to assigning ratings?” surveyed banks responded in the following way:

Table 5.26 Banks’ responses with regard to the methodological approach to assigning ratings

A credit scoring model essentially the sole basis for determining a rating (model-based approach)	40%
Ratings are based primarily on a statistical model, but adjustment based on judgmental factors is allowed (constrained expert judgement-based approach)	40%
Ratings are assigned using considerable judgmental elements (unconstrained expert judgement-based approach)	0%
Did not answer the question	20%

As outlined in chapter 3, banks incorporate a wide range of risk evaluation techniques into their rating processes. In its survey of internal rating systems, the Basel Committee identified three main categories of risk evaluation processes depending on the degree of judgement involved: statistical-based processes, constrained expert judgement-based processes, and

expert judgement-based processes (see section 3.2.4.).

In terms of this classification, about half of the surveyed South African banks would be classified as having (constrained) expert judgement-based processes. This is broadly in line with international experience, as indicated by the McDonald and Eastwood (2000) and Basel Committee (2000c) studies. This implies that the surveyed banks base their ratings primarily on statistical default/credit scoring models or specified objective financial analysis, but allow those assigning a rating to adjust that rating to an explicitly limited degree based on judgmental factors. In one variant of this approach, a scorecard determines the grade but raters may adjust the final grade up or down by no more than one or two gradations based on judgement. In another variant, quantitative and judgmental factors are explicitly assigned a maximum number of “points”, thereby effectively limiting the influence of judgmental considerations on the final rating.

About 40 percent of the surveyed banks indicated that they use a models-based approach to internal risk rating determination. Thus, the survey indicated that nearly all surveyed banks make use of a default probability model or other quantitative tool in assigning and/or reviewing the assignment of internal grades. Such models may be developed internally or by vendors, and typically include both quantitative (e.g., financial ratios) and some qualitative but standardized (e.g., industry, payment history/credit report) factors. Among vendor-provided models, KMV’s CreditMonitor was often cited, being used primarily for large corporate and international borrowers. In general, it appears that the statistically-based approaches have a more prominent role in customer (retail) lending than for middle market or large corporates.

The various model-based assessments cover a wide spectrum of different variables. Most of these variables can be grouped into a few broad categories relating to the obligor’s financial condition and capacity/cashflow, management quality and industry risk characteristics. These categories represent key areas of traditional credit analysis. Virtually all models in use also involve both quantitative and qualitative inputs.

Several banks utilize multiple models and other rating tools; these are either tailored to different parts of the banks’ portfolios or provide different approaches to rating the same

exposures.

None of the banks surveyed reported that ratings are assigned using considerable judgmental elements, where the relative importance given to such elements is not formally constrained. In other words, none of the banks use a rating system classified as “subjective”/ unconstrained expert-judgement based by the Basel Committee study.

Question 30: The loss concept underpinning the rating.

In response to the questions “which of the following most accurately describe the loss concept underpinning the rating?” South African banks responded in the following way:

Table 5.27 Banks’ response with regard to the loss concept underpinning the rating

Separate PD and LGD rating	20%
Expected loss on facilities	60%
Rating is not intended to reflect any specific loss concept, but reflects on ordinal ranking of bank’s exposures	20%

Only one respondent indicated that their rating scale is intended to reflect an ordinal ranking of exposures relative to each other, not reflecting any specific loss concept. All the other surveyed banks assign quantitative default characteristics to their internal ratings.

Banks attempt to quantify the loss characteristics for their risk grades for a variety of reasons. For example, by tracking the ex post performance of ratings, banks seek to test whether their rating systems are effective in differentiating among exposures with different degrees of risk. By linking internal rating scales to numerical estimates of PD, LGD and/or EL, credit risk ratings can also be turned to a variety of quantitative applications, including in more sophisticated pricing, profitability and performance analyses and as inputs in loss provisioning and capital allocation modeling (see also the discussion of questions 46-51).

All these banks indicated that the rating reflects a separate PD and LGD rating, which is then combined to form an expected loss rating. However, about half of the banks indicated that this is done on a fairly limited base.

5.6.1.4 Structure and operating design of internal credit risk rating systems

In terms of their current rating systems' compliance with the requirements set for adopting the IRB approach, most of the banks surveyed indicated that with regard to some of the elements, their compliance is absolute. However, with regard to other elements, they are far from meeting the requirements. Banks also indicated differences in "readiness" for the IRB approach with regard to different sub-portfolios. In general, South African banks seem quite confident about estimation of loss characteristics of their retail portfolios, and data limitations do not seem to be such a big problem in this regard. Also, automation elements of loan applications seem to be most advanced in the retail sector.

Several banks indicated that they are currently busy with a gap analysis, identifying the extent to which their current rating systems comply with IRB requirements. They indicate that they need to discuss the results of this gap analysis with the regulators, so as to realistically determine the way forward for the implementation of the new Accord, and, especially, so as to deal with adoption of the internal ratings based approach.

Regulators admit that they need to increase their own education in this regard. South African bank supervisors have not yet started interrogating banks' rating systems, and consequently do not yet have a clear idea of how the structure of current rating systems differs from requirements set by the Basel Committee. Supervisors plan to start soon with a comparative study of the risk rating systems and credit risk models used by South African banks. These initiatives include a survey of models currently used by South African banks.

Questions 31 -32: Two-dimensional rating systems versus one-dimensional rating systems.

When asked, "which of the following most accurately describe your rating system?" (Question 31) surveyed banks responded in the following way:

Table 5.28 Banks’ responses with regard to two-dimensional versus one-dimensional rating systems

Two dimensional system	80%
One dimensional system	20%

When asked, “ do you combine PD and LGD rating to form an overall indicator of expected risk?” (Question 32) surveyed banks responded in the following way:

Table 5.29 Banks’ responses with regard to combining PD and LGD ratings to form an overall indicator of expected risk

Yes	60%
No	20%
Not applicable	20%

As mentioned, a key element of a bank’s ratings system structure is the extent to which the rating is focused on the characteristics of the borrower (the obligor), as opposed to being focused on the specific details of the transaction, or alternatively being intended as a summary indication of risk that incorporates both borrower and transaction characteristics. In some cases, banks may choose to adopt multiple rating dimensions; in such cases, the same loan or exposure might receive a rating for each of the dimensions. Banks that adopt the IRB approach will need a risk rating system that provides a separate assessment of borrower and transaction characteristics. The Basel Committee concludes that a two-dimensional approach is necessary to provide supervisors with confidence that the assignment of borrower ratings (and, in turn, PDs to borrower grades) is not “tainted” by consideration of the specific structure of the transaction.

By separately assessing default risk and loss given default, two-dimensional systems (and composite rating systems in particular) can:

- improve communication about risk (including by conveying more detailed information about risk profiles and by reducing potential ambiguity over the meaning of risk grades);
- lessen the tendency at some banks to rate primarily on the strength of available security;
- facilitate the development of rating tools to assist in the risk rating process;
- facilitate tracking of the accuracy of risk ratings;
- are conceptually better aligned with the more sophisticated provisioning, capital allocation and risk-based pricing techniques being developed at some institutions; and
- facilitate the alignment of internal and external credit ratings.

South African banks appear, overall, to have moved more quickly in adopting two-dimensional composite approaches to credit risk rating compared to their counterparts in Europe and the US. The majority of the surveyed banks indicated that they have a two-dimensional rating system. Most of these banks also indicated that they combine the PD and LGD ratings to form an overall indicator of expected loss. As indicated by the McDonald and Eastwood study (2000), this is also the case with Australian banks. The results of the latter survey indicated that all 10 of the Australian banks surveyed utilize two-dimensional rating systems. In rating their credit exposures, each of these banks determines a separate customer-level PD rating, a facility-level LGD rating, and a composite EL rating.

Other surveys indicate that only a small (though growing) proportion of European and US banks have similarly structured ratings. The Basel Committee study (2000c) found that about a third of the surveyed banks utilize two-dimensional ratings (of those, most use hybrid ratings, while only “a small number” assign separate PD and LGD ratings), 20 percent use single facility-level ratings that explicitly take into account both obligor and transaction-specific characteristics, while the remainder (about half) assign single obligor-level ratings meant primarily to reflect the risk of the borrower defaulting.

However, the Basel Committee notes that the number of rating dimensions formally used by banks may not completely reflect actual practice. For example, anecdotal evidence suggests that some banks, which claim only to rate the counterparty, may implicitly take into consideration the riskiness of the facility for the purposes of pricing, for profitability analysis, and in the allocation of economic capital. Thus, in light of such practices, it appears that only a small minority of the banks surveyed by the Basel Committee take no consideration of

facility characteristics in their grading processes.

Two US studies, those by Treacy and Carey (2000) and English and Nelson (1998), made similar findings. Treacy and Carey surveyed the top 50 US banks while English and Nelson surveyed over 100 US banks across different size categories. Not unexpectedly, the latter found a higher proportion of smaller banks using one-dimensional systems. Among those institutions using a two-dimensional approach, neither study cited any examples of banks using composite ratings, though Treacy and Carey note that “a few banks” planned to shift in that direction.

The differences in the survey results partly reflect differences in the timing of the surveys (combined with the rapid pace of development in this area) and the smaller number of banks in Australia and South Africa. Nonetheless, South African (and Australian) banks appear overall to have moved more quickly in adopting two-dimensional composite approaches to credit risk rating compared with their counterparts in Europe and the US.

However, discussions with South African banks suggest that the distinction between PD and LGD is not always clear-cut. One of the large banks indicated that collateral and security required for a loan differ between sub-portfolios. Consequently, the distinction between a customer rating and facility rating is not precise for certain sub-portfolios. For example, in the mid-corporate sector, collateral and security plays an important role. On the other hand, in the case of mega-corporate loans, the bank does not really so much on security as credit risk mitigation techniques, but rather on financial covenants. The aim is thus not to limit LGD in the event that LGD do occur, but rather on preventing default in the first place.

Questions 33-36: Number or risk grades assigned.

When asked, “how many different ratings do you assign?” (Question 33) South African banks responded in the following way:

Table 5.30 Banks’ responses with regard to the number of ratings assigned

4-7	20%
8-11	60%
More than 20	20%

When asked, “indicate the number of rating grades for non-pass grades, ” (question 34) South African banks responded in the following way:

Table 5.31 Banks’ responses with regard to the number of ratings for non-pass grades

2 non-pass grades	60%
4 non-pass grades	20%
Cannot give a specific answer	20%

When asked if they include grades intended solely to capture credits needing heightened administrative action as so-called “watch grades” (question 35), South African banks responded in the following way:

Table 5.32 Banks’ responses with regard to “watch grades”

Yes	100%
No	0%

When asked to classify “watch grades” as part of pass-grades or non-pass grades (question 36), surveyed banks responded in the following way:

Table 5.33 Banks' responses with regard to the classification of "watch grades"

As part of non-pass grades	20%
Cannot give a specific answer, it depends on the circumstances	80%

Qualifying risk-rating systems must have a minimum of 6 to 9 grades for performing borrowers and a minimum of 2 grades for non-performing borrowers. Individual supervisors will have discretion in determining whether a bank's risk rating system meets this requirement. However, the minimum of 6 performing borrower grades and 2 non-performing borrower grades represents a floor, which cannot be modified.

With regard to the number of customer risk grades, South African banks are mostly clustered around the middle of the international spectrum. Most local banks have either nine or ten customer PD grades. One bank indicated that it has 100 grades. In general, the surveyed banks have from two to three non-pass grades, one bank has four. All the surveyed banks indicated that their ratings scales include so-called "watch grades" that capture credits needing heightened administrative action. However, the majority of banks indicated that these "watch grades" are not classified as part of either pass or non-pass grades. It was indicated that this classification depends on the type of loan.

This is broadly in line with international experience. The Basel (2000c) study indicated that, across the banks surveyed, the number of grades for performing loans was on average 10, the number for impaired loans was about 3. Within the surveyed banks, the average number of problem grades was reported to be about 3, ranging from a high of 6 to a low of zero. With regard to Australian banks, most banks have either 9 or 10 customer PD grades; one large bank has 22 main grades.

One of the large banks indicated that they have a total of 6 and 7 rating grades for the mid-corporate and large corporate sector respectively. This includes pass and non-pass grades. In the case of the retail sector, the use of behavioural scoring makes a finer differentiation of risk grades possible, with a consequent larger number of risk grades in the retail portfolio. Another bank indicated that they use a total of 9 ratings scales (more grades are regarded as

resulting in too fine differentiation) in the case of a retail portfolio and 21 in the case of corporate lending that mirror the S&P scale.

Tighter clustering in the number of risk grades might reflect the fact that several of the smaller and mid-sized banks have recently (within the past two years) expanded the number of risk grades as part of wider upgrades of their rating systems. A general trend has been for banks to increase the number of pass grades as the range and sophistication of uses to which their ratings are applied has grown. As long as raters can achieve the finer distinctions required, rating systems with more risk grades (i.e.greater granularity) convey more information than systems with fewer grades, and can enhance a bank's ability to analyse and model its portfolio of credit risks.

Larger banks also tend to have more customer risk grades than smaller banks. The cost-benefit analysis of maintaining a larger number of risk grades tends to be more favourable for larger institutions. Such institutions generally have more complex credit portfolios (comprising many more customers, and a wider spectrum of risk) and are more likely to have introduced other sophisticated techniques of portfolio analysis that require ratings as inputs. Also, larger banks are usually better positioned, and have more resources, to develop and support more granular rating systems. Banks, however, need to exercise caution so as to avoid going beyond the point where they can no longer make meaningful distinctions concerning the riskiness of different exposures. Banks that have linked portfolio risk modeling with risk-based pricing and/or profitability measures can face strong pressures in this regard, including pressures from business lines looking for rating scale refinements to assist in meeting pricing and other performance targets.

Question 37: percentage of total rated exposures falling in a single grade.

When asked, "what is the largest percentage of total rated exposures falling in a single grade?" surveyed banks responded in the following way:

Table 5.34 Bank's responses in terms of concentration of exposures in largest grade

20% -29%	60%
Less than 20%	20%
Did not answer	20%

Regardless of the overall number of risk grades, the granularity, and therefore usefulness, of a bank's rating system will be reduced if credit exposures tend to be concentrated in only one or two risk grades. One indication of how well-functioning rating systems differentiate risk within a loan portfolio is the largest percentage of total rated exposures falling in a single grade or grades.

Again, South African banks seem to be broadly in line with current international practice. In the case of most of the banks in the study, a maximum of about a third of rated exposures falls within a single grade. One bank indicated that less than 20 percent of total exposures fall within a single grade, while another indicated this figure to be around 22 percent. The Basel Committee (2000c), Treacy and Carey,(2000) and English and Nelson (1998) studies found similar results. In the case of three of the regional Australian banks, which rely heavily on the judgement of raters, between 50 percent and 70 percent of rated exposures fall within a single grade. On average, the banks surveyed in the Basel Committee study (2000c) have, roughly, a maximum of 30 percent of rated exposure within a single grade. This value ranges from a high of 70 percent to a low of about 16 percent.

It may be concluded from this information that the majority of banks believe their rating systems are capable of differentiating adequately between risks. However, the "appropriate" distribution of exposures among grades for a given bank depends on many factors, including the structure of the loan portfolio, the nature of the exposures in that portfolio, and the uses to which ratings are put within the bank's risk management and business processes.

Questions 38 -39: Reliance on a rating scale that mirrors that of the ratings agencies.

Surveyed banks gave the following response to the question “do you currently rely on a rating scale that mirrors that of the ratings agencies?” (question 38)

Table 5.35 Banks’ responses with regard to reliance on rating scale that mirrors that of the ratings agencies

Yes	20%
No	60%
Yes, to a certain extent	20%

When asked if they attempt to develop criteria that are consistent with such a scale (question 39), South African banks responded as follows:

Table 5.36 Banks’ responses with regard to development of criteria that mirror that of the ratings agencies

Not applicable	20%
Yes	20%
No	20%

In order to facilitate the mapping process, many overseas banks have developed internal rating scales and associated rating criteria that attempt to mirror those of the external agencies (S & P and Moody’s). The models are then used to rate the banks’ customers. The rating scales for both of these agencies comprise 10 main ‘alpha’ grades (including a default category) or 22 grades including “plus” and “minus” modifiers. As some of the lower agency grades tend to fall outside the banks’ stated normal underwriting standards, some of these grades may either be dropped or grouped together when compared with the banks’ internal rating scales.

The McDonald and Eastwood (2002) study indicates that this latter approach has not been adopted by any of the Australian banks, though the technique has been applied by some of the banks to examine how closely their internal processes align with those of the external agencies. This seems to be the case in South Africa as well. A few banks indicated that they rely on an internal rating scale that mirrors that of the ratings agencies (one respondent indicated that such an approach is used “some of the time”). Of the surveyed banks indicating that they do not currently rely on such a scale, one bank is in the process of developing criteria that are consistent with such a scale in order to have the internal rating process replicate that of the ratings agencies.

Question 40: “Point in time” versus “bottom of the cycle scenario/through the cycle” approach.

When asked to characterize their orientation as “point in time” or “through the cycle”, South African banks responded in different ways, as can be seen in the following table:

Table 5.37 Banks’ responses with regard to point in time versus through the cycle approach

Point in time	60%
Through the cycle	20%
No answer	20%

The majority of the surveyed banks indicated that they use a “point in time” approach. As explained in section 3.2.6.1, external ratings agencies usually state that they take a through the cycle approach. Under this approach, observed default frequencies for particular ratings will tend to vary with the economic cycle. Banks, on the other hand, usually say they take more of a point in time approach, i.e. they base their ratings more on the borrower’s current condition so that a borrower is more likely to migrate up and down through the ratings as economic conditions change. Under this approach, observed default rates for particular ratings should tend to be more stable over the economic cycle. This is reflected in the results

of the McDonald and Eastwood (2002), Basel Committee (2002c), Treacy and Carey (2002) and English and Nelson (1998) studies.

As explained in section 3.2.6.1 these differences can have important implications when interpreting ratings-based information, particularly when ratings from different sources are used in combination, e.g when mapping a bank’s internal grades to external agency grades. Failure to take such differences into account can potentially produce substantially biased estimates of default probability, distorting internal analyses of loan loss provisioning requirements, appropriate allocation of credit capital, risk-adjusted performance and pricing.

Question 41: Factors taken into account in assigning ratings to corporate borrowers.

When asked “which of the following factors do you take into account in assigning ratings to corporate borrowers” (question 41), surveyed banks responded as follows:

Table 5.38 Banks’ response with regard to the factors they take into account when assigning ratings

SURVEY ITEM	PERCENTAGE OF BANKS WHO TAKE THE SPECIFIC FACTOR INTO ACCOUNT
Formal industry analysis	100%
Management experience and competence	100%
Country risk	100%
Specific financial ratios	100%

The basis for choosing rating criteria should be a risk factor’s ability to differentiate risk and its predictive power. This must be demonstrated by banks within the framework of validation (Zentraler Kreditausschuss 2001:60). However, the IRB requirements also include a list of specific factors that should be considered in assigning rating grades. The results of the survey suggest that South African banks do take these required factors into account in the rating

assignment process.

In answering question 42, all the surveyed banks indicated that all the financial ratios mentioned are considered in financial ratio analysis. All banks surveyed consider balance sheet (including liquidity), income statement, and cash flow performance of borrowers in determining a rating. Those banks relying heavily on statistical default models use specific types of financial data (e.g., specific ratios that described leverage, debt-service coverage, and the like), while those banks relying on more judgmental analyses may leave much discretion to the rater in how these data are analyzed.

Management experience and competence were cited as important considerations by all banks. Other considerations cited include ownership structure, reputation, quality of financial information provided, the purpose of the loan in question, and, in some instances, the presence of environmental or other liability claims against the borrower. Finally, country risk was universally considered. For example, Standard Bank (2001:21) indicates in its annual report that it has country risk committees based in London and Johannesburg, and that these report to the group credit risk committee. The London committee is responsible for approving limits and ratings of countries outside sub-Saharan Africa, while the Johannesburg committee is responsible for countries in sub-Saharan Africa.

Essentially, all banks indicated that external ratings are considered in assigning internal grades, to the extent that such a rating is available for the borrower in question. Banks indicated that such ratings were rarely available for borrowers other than large corporates and financial institutions.

Question 43 -45: Formal written description of the internal credit rating classification system.

In response to question 43 “do you have a formal written description of the internal credit rating classification system?” surveyed banks answered as follows:

Table 5.39 Banks’ responses with regard to formal written description of the internal credit rating classification system

Yes	80%
No	20%

In response to question 44, “which elements are included in such a rating history?” South African banks responded as follows:

Table 5.40 Banks’ responses with regard to elements included in a rating history

SURVEY ITEM	PERCENTAGE OF BANKS WHO INCLUDE THE SPECIFIC FACTOR IN THE RATING HISTORY
What each rating means in terms of PD	75%
Model inputs	75%
Model maintenance	75%
Exceptions to data inputs	50%
Model overrides	50%
Ex post evaluation	50%

In response to question 45 “which of the following criteria for each risk grade is explicitly included in your credit risk policies?”, South African banks answered as follows:

Table 5.41 Banks' responses with regard to criteria for risk grades that is explicitly included in credit risk policies

SURVEY ITEM	PERCENTAGE OF BANKS WHO INCLUDE THE SPECIFIC FACTOR IN CREDIT RISK POLICIES
Factors that should be considered in assigning a grade	100%
How these factors should be weighed in arriving at a final grade	0%
Explicit quantitative target ratios or ranges	100%
Verbal qualitative criteria in case of less measurable factors	20%

The IRB requirements mandate banks to document their assessment criteria and also to track when an assigned grade deviates from that indicated by the application of the criteria. The IRB requirements state that a grade should only qualify as such if bank management has provided specific rating criteria that distinguishes the grade from others. Risk rating systems that have overly broad grade definitions, which result in borrowers of significantly different risk characteristics being assigned the same grade, are not acceptable. Likewise, risk rating systems that materially assign borrowers of comparable risk to different grades are also unacceptable.

The requirements are designed to promote the consistent application of the risk rating criteria, a conservative credit evaluation when greater uncertainty exists, a comprehensive assessment of the borrower's financial condition over the future horizon, and the use of risk rating models that have statistical power and encompass all significant variables.

Most of the surveyed banks indicated that they have a formal written description of the internal rating classification system. One large bank indicated that they do not have such a

formal written description. Elements such as what each rating means in terms of default probability, model inputs, model maintenance, model overrides and ex post evaluation are included. Only two of the surveyed banks indicated that the issue of exceptions to data inputs are addressed in the written description of the rating system. All banks indicated that factors that should be considered in assigning a grade are explicitly included in credit risk policies. In the case of explicit target ratios and ranges, the corresponding figure is 75 percent of surveyed banks. How these factors should be weighed in arriving at a final grade is not included in formal credit risk policies of any bank at the time of the study. However, some of the surveyed banks indicated that they plan to include these aspects in credit risk policies in the future and that the enhancement of information content of credit risk policies is considered to be a work in progress.

5.6.1.5 Applications/uses of ratings

As mentioned, the Basel Committee does not wish banks to develop risk-rating systems simply for IRB purposes. To be in a position to demonstrate to supervisors that an internal rating system should be used for the purpose of determining minimum regulatory capital requirements, a bank must first demonstrate that the rating system is an integral part of its current business- and risk management culture. Due to the many functions that risk ratings impact upon, considerable time and effort needs to be committed to adequately implement risk rating systems. As a result, the requirements are that banks use a risk rating system which broadly meets the minimum requirements for at least three years prior to implementing the IRB approach.

In their survey of rating practices at large US banks, Treacy and Carey (2000) grouped these uses broadly into analytic and reporting, as well as credit administration applications. Analytic and reporting uses can include: monitoring and reporting of risk positions; communication of differentiated credit risk acquisition and portfolio management strategies; policy limits (e.g. large exposure limits); as inputs in loss provisioning, economic capital allocation and risk-adjusted performance measures; and in risk-based pricing and employee compensation arrangements. Administrative uses include such things as setting delegated credit approval thresholds and trigger points for more intensive and/or specialist management

of impaired and other problematic (e.g. watchlist) loans.

Table 5.42 Administrative uses of ratings

RATING APPLICATION	PERCENTAGE OF BANKS
Delegated credit approval authorities	80%
Problem loan management	100%

Table 5.43 Analytic uses of ratings

RATING APPLICATION	PERCENTAGE OF BANKS
Portfolio management/ monitoring	100%
Provisioning/capital allocation modeling	80%
Risk-based pricing	80%

South African banks' internal risk ratings are used in varying degrees in a wide range of applications. Most of the banks surveyed indicated that rating information is used widely in risk management, management reporting, and in the setting of limits and provisions. Increasingly, ratings are also used as a basis for economic capital allocation decisions, and as inputs for portfolio management and pricing applications.

With the exception of one, all the larger banks utilize their internal risk grading systems to assign delegated credit approval authority to lending personnel. At these banks, the maximum amount that each lending/credit officer may approve for any particular obligor varies by risk grade; i.e. delegated lending authority is more common for less risky grades, and vice versa. Use of this technique affords the banks greater flexibility in tailoring lending delegations to the skills and circumstances of particular lending officers. Among the smaller banks, ratings are used more simply in the delegation process. Typically, lending personnel are prohibited from authorizing new lending below a certain threshold rating; above that threshold, lending

authority is typically restricted to a fixed dollar amount, irrespective of the obligor's rating.

All of the banks surveyed also use their rating systems to facilitate problem loan management. Typically, when an exposure is assigned certain (low) grades, it becomes subject to requirements for more frequent monitoring and reporting on the condition of the obligor and the prospects for repayment, for the development of a formal rehabilitation or exit strategy, and/or for transfer to a specialist asset management unit.

None of the banks indicated that they currently use ratings in performing stress tests to assess capital adequacy and ensure an adequate capital buffer. This is indicated as a major challenge, due to the highly complex nature of such a process. Stress testing of capital adequacy necessitates, among other things, industry analysis and macroeconomic analysis, resulting in uncertain estimates. One bank indicated that they are working on the implementation of such a system for the last two years. The budget implications of implementing such a system is also considerable, amounting to about R40-50 million, according to this particular bank's estimates.

This is one of the areas where significant challenges remain for South African banks. Stress testing of capital adequacy should form part of an overall capital adequacy strategy. Banks need to ensure they have a demonstrably robust process for:

- Assessing their overall capital in relation to their risk profiles, as well as allocating economic capital. Directors should ensure that banks have a strategic plan that outlines economic capital needs and anticipated capital expenditures, desired capital levels and sources of external capital.

- Maintaining their capital levels. These policies should cover among other things how the bank adjust capital targets and requirements over time and in response to events, increases in perceived risk and any capital buffers that may be in place to cover systems and information deficiencies

Questions 46 -48: Inclusion of ratings information in reports to senior management for the purpose of monitoring the risk composition of the rated portfolios.

In response to question 46 “do you include ratings information in reports to senior

management, all surveyed banks answered “yes”.

In response to question 47 “which of the following elements are included in such reports?” South African banks responded as follows:

Table 5.44 Banks’ responses with regard to elements included in reports to senior management

SURVEY ITEM	PERCENTAGE OF BANKS INCLUDING THE SPECIFIC ITEM IN MANAGEMENT REPORTING
Aggregate exposures for all rating classes	100%
Limits assigned according to rating classes	80%
Borrower specific information	40%
Risk profile by grade	40%
Migration across grades	60%
Quantification of loss estimates per grade	20%
Comparison of realized default rates against expectations	20%

In response to question 48 “are you confident that such reports are specific enough to allow third party assessment of the ratings assigned?” surveyed banks responded in the following way:

Table 5.45 Banks' responses with regard to confidence that management reports are specific enough to allow third party assessments

Yes	60%
No	20%
Did not answer	20%

All of the South African banks utilize ratings for portfolio monitoring and management purposes. Among other things, the banks' internal rating systems are used to report to top management the following things: total asset balances, large exposures, and relative changes in distributions for each risk grade. This information provides management with analyses of the mix of loans within the bank's portfolios and various sub-portfolios (including data sorted by business line, industry, or product type), data on problem assets and the risk profile of assets within pass grades. Ratings are also used to communicate risk-differentiated business acquisition strategies such as in developing customer target profiles for particular products.

The frequency of such reporting differ from a monthly to a quarterly basis. All respondents indicated that such reporting is done in a comprehensive way. Although some banks indicated that such reports do not currently include a comparison of realised default rates against expectations, they are working on including such analysis.

Use of rating information for pricing analysis purposes

The vast majority of banks use rating information for pricing analysis purposes. The types of applications ranged from calculating the cost of funds to assigning grade-specific risk premiums. At some of the more sophisticated institutions, the cost of capital is explicitly considered in pricing decisions. In all cases, these banks calculate the cost of funds and assign grade-specific premiums.

All the surveyed banks reported that they directly relate the level of reserves to the rating classes. The banks also indicated that limits are set, based on rating categories. Furthermore, the rating process appears to be well integrated into the credit-authorization process at most

of the banks surveyed; in particular, a few banks explicitly noted that loan approval authority is tied to rating categories. All the banks surveyed use rating information for attributing economic capital to products or business lines.

Question 51: Use of ratings in determination of compensation for relationship managers.

One of the banks surveyed indicated that the compensation for relationship managers is explicitly based on ratings. Other respondents indicated that compensation is tied to realized losses and profitability and not to rating categories.

5.6.1.6 System development and enhancement

Question 52: Development of rating systems.

When asked if they developed their rating systems internally or in cooperation with outside consultants, surveyed banks responded as follows:

Table 5.46 Banks’ responses with regard to development of credit risk rating systems

Developed internally	40%
A combination of internal development and cooperation of outside consultants	60%

Two of the surveyed banks reported that their systems had been developed internally. Other banks indicated a combination of internal development and systems purchased from a third party.

Question 53: Recent upgrades of rating system.

In answering the questions “did you recently update your rating system?” South African banks answered as follows:

Table 5.47 Banks’ responses with regard to recent changes in their credit risk rating systems

Yes	80%
No	20%

The majority (80 percent) of the surveyed banks reported recent changes in their rating systems. These ranged from minor changes to significant revisions in the process and methodology behind the system, including the introduction of revised rating scales.

Many of the banks emphasized that their systems continue to undergo additional enhancements, and some reported plans to introduce system changes in the near future. These include the addition of new grades, and the adoption of a two-dimensional rating system that provides ratings to both the borrower and the facility.

Question 54: Use of rating assessment tools to assist staff in rating determinations.

In response to the question “does your bank use any of the following rating assessment tools to assist staff in rating determinations?” South African banks responded as follows:

Table 5.48 Banks’ responses with regard to rating assessment tools to assist staff in rating determinations

SURVEY ITEM	PERCENTAGE OF BANKS WHO UTILIZE THE SPECIFIC RATING ASSESSMENT TOOL
Use of external ratings	100%
More detailed rating definitions	80%

All the surveyed banks indicated that they use external ratings (where available) to assist staff in rating determinations. The majority of banks (80 percent) use more tailored definitions providing explicit guidance to raters (incorporating detailed quantitative and qualitative rating

benchmarks) in this regard.

5.6.1.7 Review of rating systems and assigned rating grades

The Basel Committee requires that banks must have an explicit policy for the frequency of rating reviews. The results of the current (South African) survey indicate that credit assessments and related ratings are subject to formal periodic review, at least annually by an independent credit review unit. Most banks seek to enhance the timeliness of credit reviews, and any associated rating adjustments, by also specifying early review events and/or more frequent periodic reviews for lower-rated exposures. At some banks, early review policies are supported by centralized and/or automated monitoring systems. Most surveyed banks indicated that their credit risk committees are responsible for the overall review of the internal credit risk rating system, including things such as ratings methodologies. In the case of one bank, it was indicated that such review process is the responsibility of the enterprise-wide risk management risk committee.

The proposal also specifies operational requirements for banks' internal audit and credit risk control units. The requirements are designed to ensure that these areas employ adequate scope and frequency to their control responsibilities that test the proper functioning of the risk rating system.

Control functions, such as credit risk or internal and external audit, are at the center of identifying and resolving risk rating system deficiencies threatening its proper operations. Ultimately, it is the responsibility of senior bank management and the board of directors to ensure integrity of the risk rating system.

To this end, the proposal makes specific recommendations regarding the responsibilities of banks' boards of directors and senior management. They include the approval of the material aspects of the rating and PD estimation process, frequency and content of risk rating management information reports, documentation of risk rating determinations and statistical model methodologies, interaction with and evaluation of control functions, and provision of adequate resources to the control functions.

Question 55: Control measures applicable to rating systems.

When asked, “which of the following control measures is applicable to your rating system?” surveyed banks responded as follows:

Table 5.49 Banks’ responses with regard to control measures applicable to their rating systems

SURVEY ITEM	PERCENTAGE OF BANKS WHO UTILIZE THE SPECIFIC CONTROL MEASURE
Internal ratings can only be amended using specific procedures	100%
Ratings are made available throughout the firm to allow users to flag inconsistencies	20%
The rating and rating review processes are reviewed by senior management	80%
The assignment of credit ratings is integrated into the bank’s normal credit approval/ review process and subject to checks and balances built into these systems	80%

Question 56: Review and monitoring measures that are used.

In response to question 56, “which of the following review and monitoring measures are used in your bank?” surveyed banks answered as follows:

Table 5.50 Banks' responses with regard to review and monitoring measures used

SURVEY ITEM	PERCENTAGE OF BANKS USING THE SPECIFIC REVIEW AND MONITORING MEASURE
Monitoring by those who assign the initial rating of a transaction	100%
Occasional reviews by an independent loan review unit	40%
Formal periodic review	80%
Early review events supported by centralized monitoring systems	60%
More frequent reviews for lower-rated exposures	60%

Surveyed banks indicated that their rating systems incorporate a range of features into their rating processes - features which are designed to enhance the accuracy, integrity, and consistency of ratings throughout their operations. The majority (80 percent) of the surveyed banks indicated that the assignment of credit ratings is integrated into the banks' normal credit approval/review processes and that it is subject to the checks and balances built into those systems. All the surveyed banks also indicated that internal ratings could only be amended using specific procedures. All the banks indicated that the rating and rating-validation processes are reviewed by senior management, but one bank indicated that this is only true for certain areas.

Question 57: Aspects addressed as part of the ratings review process.

When asked, "which of the following is addressed as part of the ratings review process?" banks responded as follows:

Table 5.51 Banks’ responses with regard to aspects addressed as part of the ratings review process

SURVEY ITEM	PERCENTAGE OF BANKS WHO INCLUDE SPECIFIC MEASURE IN RATINGS REVIEW
Review of override decisions	20%
Seek to track potential instances of “gaming” rating models	20%
Review quality, completeness and appropriateness of data inputs on regular basis	100%

The majority (80 percent) of banks regularly undertake centralized monitoring of model override trends. Such monitoring can help indicate potential problems in the way rating models are being used within a bank, and/or deterioration in model performance. Some systems also seek to track potential instances of “gaming” rating models whereby loan officers might alter customer information and re-enter it several times in order to obtain a better rating recommendation. As a further means of enhancing rating consistency, efficiency, and overall accuracy at some banks where industry characteristics form an important input into rating models, an economics (or other specialized) unit, rather than individual lending/credit officers, is responsible for inputting relevant industry assessments.

All the surveyed banks indicated that such reviews include reviewing the quality, completeness and appropriateness of data inputs. A review of override decisions and tracking potential instance of “gaming” models is only reported at 20 percent of the surveyed banks.

Question 58: Measures to ensure the accuracy and integrity of data inputs in the rating system.

South African banks responded in the following way to the question “does your bank use any

of the following measures to ensure the accuracy and integrity of data inputs in the rating system?”

Table 5.52 Banks’ responses with regard to measures used to ensure the accuracy and integrity of data inputs in the rating system

SURVEY ITEM	PERCENTAGE OF BANKS USING THE SPECIFIC MEASURE
Automated data transfer linkage	80%
Specialized unit responsible for relevant industry assessments	40%

In addition, all the banks have established, or are considering establishing, automated data transfer linkages to minimize or eliminate re-keying of ratings input data. The aim is to improve system efficiency, by reducing inconsistencies in different data management systems caused by transcription error, failure to update databases, or potential manipulation of ratings information.

One of the surveyed South African banks indicated that it felt safe from the above-mentioned problems, but only for its consumer/retail portfolio. Only a fully automated rating process makes it possible to implement “firewalls” to protect data and thus prevent changes to inputs. With regard to other sub-portfolios, the relatively limited extent of automation makes it more problematic to prevent, for example, re-keying of data inputs. The bank also indicated that it is currently working on ways to make control measures more robust. All the surveyed banks also indicated that where industry characteristics form an important input into rating models, a specialized unit is responsible for inputting relevant industry assessments.

Question 59: Implications of poor credit process ratings received from the review teams.

In response to the question “does a poor credit process rating received from the review items have implications for credit authority and remuneration?” surveyed banks responded as

follows:

Table 5.53 Banks' responses with regard to implications of a poor credit ratings review

Yes/ uncertain	40%
No	60%

The majority of banks indicated that poor credit process ratings received from these review teams neither lead to a reduction or cancellation of delegated credit authority nor directly affect staff remuneration. However, banks were hesitant to give a definite answer to this question and 40 percent gave a response of “uncertain/do not know”.

5.6.1.8 Validation of credit risk rating systems

As a result of its importance, validation will likely receive significant supervisory attention prior to allowing a bank to adopt the IRB approach. It is one of the most important requirements for banks to properly execute if they are to credibly estimate their level of credit risk and the resulting regulatory capital requirements.

Consequently, a bank should also be able to readily demonstrate these capabilities to its supervisor prior to adoption of the IRB approach and on an ongoing basis. As such, validation procedures can involve comparing evolving credit migration statistics against expectations and/or comparing internal ratings with other available rating alternatives, e.g. external agency ratings and/or externally developed rating models.

Question 60: The use of backtesting to assess accuracy and consistency of each grade's loss characteristics.

When asked, “do you perform backtesting to assess the accuracy and consistency of each grade's loss characteristics?” surveyed banks responded in the following way:

Table 5.54 Banks' responses with regard to backtesting

Yes	100%
No	0%

As can be seen from the table, all the surveyed banks claimed to perform some degree of backtesting, but provided little additional information on how this was conducted. They indicated that they use the results gained from backtesting to modify either the rating process or the PDs associated with each grade. However, some acknowledged that the lack of data limits the statistical reliability of these evaluations. Specifically, most banks indicated that backtesting is only possible in the case of retail portfolios. In the case of corporate portfolios, data limitations remain a serious impediment.

Question 61: Other approaches to validation.

In response to the question “which of the following approaches to validation do you use?” South African banks responded in the following way:

Table 5.55 Banks' responses with regard to approaches to validation

SURVEY ITEM	PERCENTAGE OF BANKS WHO USE THE SPECIFIC APPROACH
Monitoring of credit migration data against expected outcomes	100%
Comparing internal ratings with other available alternatives	80%

Several banks discussed using external sources of data to assist in maintaining the accuracy and consistency of each grade's loss characteristics (PD and/or EL), including historical bond performance by agency grade, PDs provided by vendor models, and other databases of

default frequencies.

All the banks surveyed indicated that they track the migration of loans between rating grades. A few banks relied on this data in checking the calibration of PD and LGD, and in validating the internal consistency of the rating process. The banks regularly review credit migration data, and from time to time undertake comparison studies of alternative rating systems. Most of the banks are currently building up their internal default histories, and have, to date, gathered insufficient data to form valid conclusions as to the efficacy of their rating systems.

5.6.1.9 Specific aspects regarding preparation for the implementation of the proposed new Basel Accord

Questions 62 -63: Chosen (likely) approach to compliance.

Pending completion of the planning phase and the release of the final version of the proposed new Capital Accord, the decision as to which approach to take has yet to be made formally by some banks. A study by Carratu, Lake and Greenlees (2001) found that 55 percent of banks surveyed in Europe plan to implement the advanced IRB approach, while 28 percent aim for adoption of the foundation IRB and only 9 percent are opting for the standardized approach. A 2001 study by KPMG found that all the surveyed South African banks aim to adopt the foundation IRB approach. This approach is also the approach favoured globally, according to the KPMG survey. In the present study, all the large banks surveyed indicated that they aim to adopt the advanced IRB approach. These differences in findings may be ascribed to the inclusion of different South African banks in the samples used, as well as to differences in the timing of the surveys (bearing in mind the rapid pace of developments in this area).

It seems as most of the South African banks prefer to adopt the IRB approach for the sake of international competitiveness. Another reason why South African banks favour the IRB approach is the fact that very few South African corporate borrowers have an external rating. The implication is that adoption of the standardized approach of the proposed new Capital Accord gives banks no advantage in terms of finer risk differentiation between different borrowers or possible capital savings in the case of a bank with a higher quality portfolio.

However, while South African banks aim to eventually adopt the advanced IRB approach (and while they seem to have the impression that the South African regulators expect the largest banks to adopt this approach), one of the respondents indicated that it is not currently in the position to do so, mainly due to data limitations. One of the smaller banks indicated that they are planning to eventually adopt the advanced IRB approach. However, they would not have built up the required track record by 2005 for the advanced IRB approach. The current stipulation that each unit (on both a product and geographic basis) will be required to follow the same approach is seen as problematic in adopting the IRB approach. In the case of several South African banks, it seems that the use of credit scoring techniques and the quantification of loss concepts is more advanced for retail portfolios than other portfolios. In contrast, the Firststrand Group indicated that "...the credit risk management framework developed in the last two years is fully compliant with the advanced internal ratings based approach for credit risk of the new Basel Capital Accord" (FNB Annual Report 2001:81).

Concerns were also raised about whether South African bank supervisors are currently in the position to evaluate and approve banks' internal credit risk rating systems for the purposes of using the IRB approach to regulatory capital determination. Specific mention were made of the skills shortage in this regard.

Question 64: Estimated impact of the proposed new Accord on overall capital levels.

In response to question 64, "what is your estimation of the likely impact of Basel II on the level of regulatory capital that you are required to hold?" surveyed banks answered in the following way:

Table 5.56 Banks' responses with regard to the likely impact of the new Basel Accord on the levels of regulatory capital

Will lead to an increase	67%
Will lead to a decrease	0%
Not sure	33%

Interviews with South African bank supervisors indicate that they have, at this stage, no specific ideas about the possible impact of adoption of the new Accord on the absolute capital levels of South African banks. It seems as if the regulators want to follow the Basel guidelines very closely. This means that banks with advanced credit risk measurement and management systems, where supervisors are convinced that systems are sound, will be allowed lower capital levels under the advanced IRB approach, in line with the Basel Committee's stated intention with the IRB approach.

More than half of the banks surveyed indicated that their estimation of the likely impact of Basel II is that it will lead to an increase in the level of regulatory capital held. These banks estimate that any benefit of a possible reduction in the level of regulatory capital held against credit risk will be more than offset by the operational risk requirement. This is broadly in line with the results of the Basel Committee's quantitative impact studies, QIS 1 and QIS 2. In line with these results, one of the larger South African banks indicated that it is very difficult to make an accurate estimation of the effect on absolute capital levels at this stage. Partly due to the fact that the regulators did not indicate whether they would allow a decrease in capital levels is indicated as a main reason for this.

The remainder of the surveyed banks indicated that they are uncertain about the impact of the proposed new Basel Accord on overall capital levels. For example, one bank indicated that they estimate that the new proposals will lead to a reduction in capital requirements for their retail portfolio, due to the large secured/collateralized nature of their retail portfolio. However, in the case of corporate portfolios, the impact on capital levels is not certain.

Question 65: Perceived benefits of adoption of preferred approach.

Most respondents indicated that they perceive all potential benefits listed in the question as important and thus difficult to rank in order of importance. However, several surveyed banks indicate that they feel the adoption of their preferred approach will add the most value by refining the process for allocating and charging capital, and thus lead to a potential reduction in capital levels. The introduction of more sophisticated risk-adjusted pricing, as well as an enhanced reputation (or better rating) due to the use of advanced risk management techniques

were also mentioned. It is interesting to note that the same banks who indicated that they expect an increase in regulatory required capital levels when adopting the IRB approach, were often the ones who considered refining the process for allocating and charging capital (and thus gaining a potential reduction in capital levels) as the main benefit of adopting the IRB approach. This discrepancy probably points to the difficulty of accurately estimating the effect of the IRB approach on regulatory capital levels at this stage.

Question 66: Perceived obstacles in adoption of preferred approach.

In response to the question “which of the following do you consider the biggest obstacles to implementation of the preferred approach?” surveyed banks indicated the following:

Table 5.57 Banks’ responses with regard to the biggest perceived obstacles in the implementation of the new Basel Accord

PERCEIVED OBSTACLE	RANK (1 INDICATING “BIGGEST PERCEIVED OBSTACLE”)
Missing data for estimation of LGD	1 (83%)*
Missing data for estimation of PD	2 (83%)
Resources required for data collection	3 (83%)
Required business process re-design	4 (33%)

**The number in brackets indicates the percentage of banks who allocated the rank to the specific factor.*

With the exception of one, all the surveyed banks indicated that data issues are considered to be the biggest obstacle to implementation of their preferred approach to compliance (the IRB approach in most instances). More specifically, the rigorous capture of loss given default (LGD) information (especially with the implementation of a standardized definition of “default”) was singled out by all the respondents as the biggest data. Missing data for the determination of probability of default (PD) were also indicated as an obstacle by all the banks, as were the resources required for data collection, and the required redesign of

business processes.

This is in line with international experience. As indicated by the Basel Committee, the Australian Prudential Regulatory Authority study on credit risk rating practices of Australian banks, as well as the survey(s) by KPMG and Carratu, Lake and Greenlees, meeting historical data requirements remains a key issue for banks aiming to adopt the IRB approach.

Aspects such as the capture and treatment of collateral information and other credit mitigation techniques, the cost of compliance with Basel II, and dealing with the volatility of a more risk-sensitive capital regime are not seen as important obstacles by most of the surveyed banks. However, one of the banks indicated the latter two aspects, as well as required business process re-design as the biggest obstacles.

Question 67: Assessment of current risk information systems.

In response to the question “ have you done any assessment of your current risk information system to determine whether it will meet the tests of being subject to external verification, regulatory scrutiny and transparency of the new disclosure requirements?” banks responded in the following way:

Table 5.58 Banks’ responses with regard to the assessment of current risk information

Yes	67%
No	33%

South African banks are very conscious of the need to start building up a track record with regard to loss data. At the moment, there are many initiatives on the quantification of loss concepts being taken by South African banks. Most of the surveyed banks indicated that they have already completed an assessment of their current risk information systems in order to determine whether they would meet the test of being subjected to external verification, regulatory scrutiny and transparency of the new disclosure.

One of the smaller banks, as well as one of the large banks, admitted that it has not done any such assessment. Some of the large banks indicated that such assessment is an ongoing process. As mentioned above, South African banks realize the limitations of their current risk information systems.

Questions 68 -70: Basel II projects.

In response to question 68 “have your bank already started Basel II projects?” banks answered in the following way:

Table 5.59 Banks’ responses with regard to Basel II projects

Yes, credit risk project	100%
Yes, operational risk project	100%

In response to question 70 “if yes, what phase is your project at?” surveyed banks indicated the following:

Table 5.60 Banks’ responses with regard to the phase of the Basel II project

SURVEY ITEM	PERCENTAGE OF BANKS WHO INDICATED THE SPECIFIC RESPONSE
Pre-study/ diagnostic review	100%
Establishing the team	40%

Banks need to assess how they are going to position themselves for optimal benefit, bearing in mind the regulatory criteria and greater disclosures on the one hand, and time and resource constraints on the other. All banks reported having done some preliminary high-level review work on Basel II, with all banks at the very least having established a project team and being busy with project planning.

The Carratu, Lake and Greenlees study (2001:30) found that, in general, smaller banks seemed happier to defer serious work at the time of their study and tended not to have done much serious planning at all. The primary reasons for delaying preparations were that the banks were awaiting the greater clarity that would come from the publication of finalized proposals, as well as deadlines and resource shortages, both in terms of management and in terms of risk know-how. At the time of the survey, UK banks had a major resource conflict due to the burden of preparing for the move to a single regulator under the Financial Services and Markets Act of 2000 (Carratu, Lake and Greenlees 2001:15).

This seems not to be the case in South Africa (at least not with regard to projects aimed at credit risk). All surveyed banks, including smaller banks included in the sample, were busy with Basel II projects. The differences in the timing of the surveys can again explain some of the differences in the results. However, all surveyed South African banks' credit risk projects were only just commencing at the time of the study, and were usually in the pre-study/diagnostic review stage. Most banks consider these projects as ongoing assessments, or as work in progress. Again, South African respondents also indicated a lack of serious communication with the regulators. This is a problem. Banks indicated that they feel uncertain about what the regulators really expect from them, as well as about the proposed time frames for implementation of the proposed new Accord.

Question 71: The use of cost/ benefit analysis.

Uncertainty remains regarding certain aspects of the Basel proposal, which makes precise cost-benefit estimates difficult. Furthermore, the compliance and disclosure requirements that accompany the various approaches have cost implications that will take some time to assess.

The Carratu, Lake and Greenlees study found that few European banks had done any serious thinking on the overall costs/benefits arising from the project, at the time of the study. Such a cost/benefit project typically includes the on-going cost of regulatory compliance compared with the *status quo ante*. Larger banks surveyed by Carratu, Lake and Greenlees tended to foresee a lower future cost (predicated on a convergence of economic and regulatory capital, enabling banks to run the two outputs from one common process), whilst smaller banks tended to see much higher compliance costs. None of the banks surveyed had as yet

established the net cost/benefit of the project, although several were working on it.

In response to question 71 “does your Basel II project include cost benefit analysis?” surveyed banks responded in the following way:

Table 5.61 Banks’ responses with regard to cost-benefit analysis

Yes	100%
No	0%

As can be seen from the above table, all the surveyed South African banks indicated that they were busy with a cost/benefit project in this regard. As indicated earlier, several South African banks are concerned about compliance costs, and many perceive these costs to outweigh the potential benefits of lower regulatory capital charges (at least in the short run). No South African bank had as yet established the net cost/benefit outcome of the project. This is to be expected in the light of the above-mentioned uncertainty regarding certain aspects of the Basel proposals at this point in time.

Questions 72 -73: Qualitative requirements regarding risk-rating systems.

Surveyed banks answered as follows in response to question 72 “are you familiar with the qualitative requirements regarding risk rating systems as set out by Basel II?”

Table 5.62 Banks’ responses with regard to familiarity with the new Basel Accord’s qualitative requirements regarding risk-rating systems

Yes	100%
No	0%

Surveyed banks answered as follows in response to question 72 “do you perceive compliance with these standards as a major challenge to your bank?”

Table 5.63 Banks’ responses with regard to compliance with qualitative standards as a major challenge

Yes	17%
No	83%

All the surveyed banks indicated that they are familiar with the qualitative requirements regarding risk-rating systems as set out by the Basel II proposals. Furthermore, the majority do not perceive compliance with these standards as a major challenge (only one respondent answered “yes” to question 73). The question is whether this is a true reflection of South Africa banks’ preparedness for the IRB approach, or merely an indication of their ignorance with regard to these requirements.

Question 74: Planned use of consultants.

Surveyed banks responded as follows to the question “ do you use or plan to use external consultants to assist in the planning and delivery of the Basel II project ?”

Table 5.64 Banks’ responses with regard to the use of consultants

Yes/ have not made a formal decision yet	67%
No	33%

With regard to the planned use of consultants, a variety of responses were received from surveyed banks. Two (large) banks indicated that they do not plan do use external consultants at all. Other banks (both large and small) are planning on using consultants to meet specific requirements, both for their know-how, and for additional short-term resources. All the other banks indicated that they were at least contemplating the use of external consultants. One bank indicated that the issue is currently being investigated. The bank is trying to decide whether international or local consultants should be used, and also in what specific areas consultants should be used. None of the banks indicated that it was presently looking to appoint a firm of consultants to work with the institution for the duration of the Basel II

projects.

Questions 75 -76: Challenges posed by cultural buy-in and organizational changes.

Surveyed banks answered as follows in response to question 75 “did you experience any difficulty in obtaining buy-in from senior executives and business heads ?”

Table 5.65 Banks’ responses with regard to experiencing any difficulty in obtaining buy-in from senior executives and business heads

Yes	0%
No	100%

Surveyed banks answered as follows in response to question 76 “do you perceive any cultural and organizational challenges in bringing Basel II center stage in the way the organization is managed going forward?”

Table 5.66 Banks’ responses with regard to cultural and organizational challenges in bringing Basel II center stage in the way the organization is managed going forward

Yes	17%
No	83%

The Carratu, Lake and Greenlees study found problems in establishing buy-in for this large compliance project; this was a common theme coming from both senior executives and business heads. Alongside buy-in, a (relatively small) number of institutions highlighted the challenge posed by the necessary cultural and organizational changes that will be required to bring Basel II center-stage in the way the organization is managed.

A more cynical bank surveyed by Carratu, Lake and Greenlees mentioned that there seems

limited benefit to the bank; rather, its view is that Basel II is no more than an increase in the cost of being in the game of banking. The bank's approach is, therefore, to achieve an adequate level of compliance at minimum cost.

In general, South African banks seem to be more positive in this regard. All banks surveyed indicated that they did not experience any difficulty in obtaining buy-in from senior executives and business heads. Furthermore, the majority of banks do not perceive any cultural and organizational challenges in bringing Basel II center-stage in the way the bank is managed. One bank indicated that although buy-in from senior management is not a problem, they do foresee considerable organizational challenges in implementing Basel II, especially with regard to the operational risk requirements. These requirements will have a big organizational impact and might necessitate substantial changes in business operation systems.

The foregoing analysis shed some light on the implementation challenges with regard to Pillar one of the proposed new Basel Accord in the South African context. In this regard, specific attention was given to the current risk rating management practices of South African banks and to what extent these comply with the requirements for adaption of the IRB approach. Pillar three (the role of market discipline and disclosure practices) also implies potential implementation challenges. These are evaluated in the next section, which start with a brief evaluation of private sector monitoring of banks in South Africa. The second part of the section compares the current disclosure practices of South African banks with the requirements set out in the proposed new Basel Accord.

5.7 MARKET DISCIPLINE AND DISCLOSURE OF FINANCIAL INFORMATION IN THE SOUTH AFRICAN BANKING SECTOR

As explained in section 4.7.4, the potential for effective market discipline varies both within and across countries. This section intends to shed some light on the potential for market discipline in the South African context. Specific attention is paid to the disclosure requirements under Pillar 3 of the proposed new Basel Accord and South African banks' "readiness" to meet these requirements.

5.7.1 Private monitoring of banks in the current South African financial environment

The Barth, Caprio and Levine (2001) study includes an index of private monitoring variables intended to capture to some degree the extent to which market or private “supervision” exists in different countries. South Africa obtained a score of six out of a possible seven. This indicates a relatively high degree of private oversight. The index is calculated using different measures of this type of variable, based essentially on information that is disclosed and thus available to the public. These measures are as follows:

Private monitoring variables

1. Certified audit required: This variable captures whether an external audit is required of the financial statements of a bank and, if so, whether it has to be administered by a licensed or certified auditor. Such an audit would presumably indicate the presence or absence of an independent assessment of the accuracy of financial information released to the public. If both factors exist a 1 is assigned, otherwise 0 is indicated.

South Africa obtained a score of one in this regard. External audit is compulsory, but there are no specific requirements for the extent of the audit. Auditors are licensed and the auditor’s report is given to the supervisory agency. Supervisors can meet external auditors to discuss the report without the bank’s approval. Auditors are legally required to report misconduct by managers/directors to the supervisory agency. However, legal action cannot be taken against external auditors by supervisory agency for negligence.

2. percentage of 10 biggest banks rated by international ratings agencies: The greater the percentage of the 10 biggest banks rated by international ratings agencies, the more the public may be aware of the overall condition of the banking industry, as viewed by an independent third party. In the case of South Africa, a 70 percent figure is recorded in the Barth, Caprio and Levine study.

3. Accounting disclosure and director liability: This deals with whether or not the income statement includes accrued or unpaid interest or principal on non-performing loans, and

whether or not banks are required to produce consolidated financial statements, which include non-bank financial affiliates or subsidiaries. The release of this type of information, or its absence, affects the ability of private agents to monitor and hence influence bank behavior. This variable also covers whether bank directors are legally liable if information disclosed is erroneous or misleading. If all three factors exist a 1 is assigned, otherwise 0 is indicated. South Africa obtained a score of one, since directors are legally liable for erroneous or misleading information, although no specific penalties are stipulated.

4. *No explicit deposit insurance scheme*: This variable takes a value of 1 if there is no explicit deposit insurance scheme and if depositors were not wholly compensated the last time a bank failed, and indicates 0 otherwise. A higher value would indicate more private monitoring. South Africa obtained a score of one.

The Barth, Caprio and Levine study showed that, in general, the degree of private monitoring increases as one moves from lower-income countries to high-income countries. This confirms concerns that market discipline will not play the role intended by the Basel Committee in emerging markets. However, results from the present study indicate that this will not necessarily be a problem in the South African context.

5.7.2 Current disclosure practices of South African banks

The disclosure practices of South African banks are also evaluated, based on the Basel Committee's Transparency Group's surveys of the public disclosure practices of internationally active banks headquartered in its member countries (Basel Committee 2000c).

The areas covered by the survey generally coincide with those identified in the proposed third pillar of the new Basel Capital Accord. The survey reviewed the disclosure of both quantitative information and the qualitative strategic and methodological disclosures that should enable the market to better evaluate the banking organization. The survey was conducted by national supervisory authorities who assessed the extent of disclosure by banks in their jurisdiction.

The survey includes questions on capital structure, capital adequacy, market risk internal modeling, internal and external credit ratings, credit risk modeling, securitisation activities, credit risk, credit derivatives, other derivatives, risk diversification, accounting and presentation policies, and other risks. Some of these areas, deemed as most relevant for the objectives of this paper, were surveyed for the five biggest South African banks (ABSA, First National Bank, Investec, Nedcor, and Standard Bank).

The results of the Basel Committee (2000c) survey show that the most basic information relating to capital structure and ratios, accounting and presentation policies, credit risk, and market risk, is well disclosed, with disclosure rates typically over 80 percent for these survey questions. Disclosure rates generally decrease, however, as the sophistication, complexity, or degree of proprietary of the information increases. For example, information about credit risk modeling and credit derivatives disclosed by fewer than half of the banks. These areas are of particular importance under Pillar three (market discipline) of the proposed new Basel Accord.

To a large extent, similar results were found for South African banks. However, with regard to credit risk modeling and credit risk ratings, South African banks' disclosure is less material than in the case of the Basel study's banks. Disclosure practices of the South African banks in the sample are discussed in the following section. The section contains a list of tables with disclosure rates for different survey items. In every instance, disclosure rates for international banks surveyed by the Basel Committee are compared to disclosure rates for the five biggest South African banks. Following each table is a discussion of disclosure practices of South African banks, including an international comparison (provided by the Basel (2000c) study) and comments on possible improvements in disclosure practices to ensure compliance with the requirements under the proposed new Basel Accord.

Table 5.67 Capital structure

SURVEY ITEM	DISCLOSURE RATE (%): BASEL STUDY	DISCLOSURE RATE (%): SOUTH AFRICAN BANKS
Disclose the amount of common shareholder equity	100	100
Disclose the amount of tier one capital	100	100
Disclose the amount of perpetual non-cumulative preference shares	97	40
Disclose deductions from tier one and tier two capital	67	40
Disclose the amount of tier two capital (split between upper and lower level two) with separate disclosure of material components	56	20
Disclose the total capital base	98	100
Disclose the amount of innovative or complex capital instruments, including the percentage of total tier-one capital	83	0
Disclose key “trigger” events	33	0

Overall, all surveyed South African banks disclose quantifiable items within capital structure. All banks disclosed the amount of shareholder equity and tier one capital. As is evident from the information in table 5.67, this is in line with international practice. All the banks disclosed the amount of tier-two capital, but only one bank provided separate disclosure of material components. Virtually all the banks disclosed the amounts of shareholder equity, preferred shares, and other aspects of their total capital base. One of the banks included a comprehensive shareholder analysis in its annual report. Also, 40 percent of the banks disclosed the amount of minority interests in subsidiaries. One area that could be improved is the disclosure of deductions from tier one and tier two capital, which was disclosed by only

40 percent of the banks surveyed. None of the banks disclosed information concerning key “trigger” events that might affect the nature or cost of capital instruments. Consideration of such events requires stress testing of capital adequacy. As discussed in section 5.6.1.8 South African banks perceive such stress testing to be a problem.

Table 5.68 Capital adequacy

SURVEY ITEM	DISCLOSURE RATE (%): BASEL STUDY	DISCLOSURE RATE (%): SOUTH AFRICAN BANKS
Disclose the risk-based capital ratio calculated in accordance with the methodology prescribed in the Basel Capital Accord	95	100
Disclose the risk exposure of balance-sheet assets (specifying book value and risk-weighted amount for each bucket)	27	40
Disclose the risk exposure of each off-balance sheet instrument (specifying nominal amount, credit equivalent amount, and risk-weighted amount for each risk bucket)	44	40
Provide analysis of changes in the bank’s capital structure and the impact on key ratios and overall capital position	69	40
Disclose whether the bank has an internal process for assessing capital adequacy and for setting appropriate levels of capital	45	60

In terms of the disclosure of capital adequacy, the disclosure practices of South African banks are broadly in line with those of the Basel study (2000c:15). All the banks surveyed disclosed the calculation of their risk-based capital ratio in accordance with the methodology prescribed in the Capital Accord. Two of the five banks provided information on changes in their capital

structures and the impact of such changes on key ratios. Only about one half of the banks disclosed whether their institutions possessed an internal process for assessing capital adequacy and setting appropriate levels of capital. With regard to the latter two aspects, disclosure is very brief.

Although all banks disclosed their risk-based capital ratios, fewer than one half provided information on the credit and market risks against which the capital serves as a buffer. Without this information, it is difficult for the public to evaluate capital adequacy prospectively – that is, as conditions change. Furthermore, the lack of assurance that the bank itself has an internal process for assessing capital adequacy should be disquieting for investors. Over half of the survey population did not provide such assurance.

Table 5.69 Internal and external ratings

SURVEY ITEM	DISCLOSURE RATE (%): BASEL STUDY	DISCLOSURE RATE (%): SOUTH AFRICAN BANKS
Discuss the process and methods used to assess credit exposures on both an individual counterparty and portfolio basis, including a description of the internal classification system (e.g., what each rating means in terms of default probability, degrees of risk being distinguished, performance over time and ex-post evaluation)	52	0
Provide summary information on the quality of on- and off-balance sheet credit exposures, based on the internal rating process or external ratings	17	0
Provide summary information about the internal ratings process	58	60
Describe how internal ratings are used in the bank's internal capital allocation process	14	0

The adequacy of disclosures related to the use of internal ratings will be an area of increased importance under the new Basel Capital Accord. Adequate disclosure of key information regarding the use of internal ratings will be necessary for banks to qualify for the internal ratings based approach being considered in Pillar one of the new Basel Capital Accord.

As can be seen from table 5.69, South African banks currently disclose very little information in this regard. None of the banks discussed their internal credit classification system. Sixty per cent of the banks provided summary information about the internal ratings process. This information is very cursory, however. None of the banks described how internal ratings are used in the bank's capital allocation processes. Similarly, no bank provided summary information on the quality of on- and off-balance sheet credit exposures, based on the internal ratings process or external ratings. This is an important area where disclosure practices could be improved.

Table 5.70 Credit risk modeling

SURVEY ITEM	DISCLOSURE RATE (%): BASEL STUDY	DISCLOSURE RATE (%): SOUTH AFRICAN BANKS
Disclose whether credit risk measurement models are used, and if so, provided descriptive information about the types of models, portfolio(s) covered, and size of portfolios	41	0
Disclose how the bank has incorporated historical default experience for different asset categories, current conditions, changes in portfolio composition, and trends in delinquencies and recoveries	45	0
Disclose its process for stress testing, and how testing is incorporated into its risk management system	28	0
Disclose quantitative and qualitative information about the credit risk measurement models used, including model parameters (e.g., holding period, observation period, confidence interval, etc.), performance over time, and model validation and stress testing	11	0
Disclose whether credit scoring is used when granting credit, and if so, provided descriptive information about the credit scoring model and how it is used	42	0

As in the case of information on internal and external ratings, disclosure levels in terms of credit risk modeling is also very low. Where banks use credit risk models, the associated level of disclosure is very low. Banks in the sample only mention the use of credit risk models. Loss concepts that are calculated are also mentioned. No banks provided qualitative

or quantitative information concerning the credit risk models used, such as the parameters of the models, model validation, and stress testing. All the banks disclosed whether or not credit scoring is used; however, no bank provided descriptive information about the credit scoring model and how it is used. Slightly more than one half of banks disclosed information regarding the types of credit exposures that are individually evaluated for impairment. These low disclosure rates must be seen in the light of the fact that the new Basel proposals does not envisage that credit risk models (as distinct from an internal ratings based methodology) may be used for the calculation of regulatory capital. It must also be noted that all the disclosure rates in the Basel study (2000c:19) are also very low.

Table 5.71 Credit risk allowances

SURVEY ITEM	DISCLOSURE RATE (%): BASEL STUDY	DISCLOSURE RATE (%): SOUTH AFRICAN BANKS
Disclose information on the impact of non-accrual and impaired assets on the financial performance of the bank, including information on charge-offs and provisions	85	100
Disclose the amount of any charge-offs and recoveries that had been recorded directly in the income statement	88	100
Describe how the level of allowances compared with historical net-loss experience	53	100
Disclose how the allocated and (any) unallocated portions of the allowances are determined	76	20
Discuss practices and procedures used for evaluating the adequacy of credit loss provisions and credit loss allowances	58	80
Discuss the techniques used to monitor and manage past due or impaired assets/credit relationships	53	40
If the institution uses collateral, covenants, guarantees or credit insurance to reduce risk exposure, the impact on credit exposure should be disclosed	13	20

The information in table 5.71 indicates that, in terms of credit risk allowances, disclosure practices of South African banks are broadly in line with international practice, as evidenced by the results of the Basel study (2000c:20). The level of quantitative information concerning

allowances, charge-offs, and impaired assets continued to be well disclosed. Disclosures of qualitative information, namely policies, procedures, and practices are generally very brief, and are less common than the quantitative disclosures.

Overall, all banks in the sample disclose the level of quantitative information concerning credit risk exposures, charge-offs, impaired assets and allowances. Disclosures that would compare the level of the allowances with historical net-loss exposure could be improved, as could disclosures regarding the impact of collateral, guarantees, or credit insurance on credit exposures. Only 40 percent of the banks provided a qualitative discussion on the techniques used to monitor and manage past due or impaired credits. This analysis is very cursory.

It must be noted that African Bank, not included in the sample, provides extensive disclosure on the areas of how allowances are determined, on practices and procedures used for evaluating the adequacy of credit loss provisions and credit loss allowances, and on the techniques used to monitor and manage past due or impaired assets or credit relationships.

Table 5.72 Geographic and business line diversification

SURVEY ITEM	DISCLOSURE RATE (%): BASEL STUDY	DISCLOSURE RATE (%): SOUTH AFRICAN BANKS
Provide information on market activity by broad risk category (e.g. foreign exchange, interest rate, precious metals, other commodities and equities)	80	100
Provide information on trading revenues by major risk category (foreign exchange, interest rate, commodity, equity), or by major product (bonds, swaps, foreign exchange, equities)	69	0
Provide a breakdown of past due assets by asset category	33	60
Disclose credit exposure information by business line	62	80
Disclose summary information about the geographic distribution of credit exposures, including domestic and international credit exposures	57	80
Provide a breakdown of impaired assets by geographic area	44	60

The majority of banks disclosed information regarding the diversification of their credit exposures geographically, by product, and across business lines, which indicates an improvement compared with information available on previous years. A majority of banks provided information on market activity by broad instrument category. However, fewer banks provided information on impaired assets by geographic area or by a breakdown of past due assets by counterparty type or asset category.

Table 5.73 Accounting policies

SURVEY ITEM	DISCLOSURE RATE (%): BASEL STUDY	DISCLOSURE RATE (%): SOUTH AFRICAN BANKS
Disclose the basis of measurement for assets at initial recognition and subsequent periods, e.g. fair value or historical cost	100	100
Describe the accounting policies and method of income recognition used for trading activities (using both cash instruments and derivatives) and non-trading activities	89	100
Disclose income and expense information grouped by nature or function within the bank	98	100
Disclose the basis for determining when assets are considered past-due and/or impaired for accounting and disclosure purposes (number of days where appropriate)	80	80

As can be seen from the table, the disclosure rates for South African banks and banks included in the Basel survey is almost identical. Overall, accounting and presentation policies were generally well disclosed. The basis of asset valuation was universally disclosed. All banks grouped their income statement information by nature or function within the bank. About one fifth of the banks did not disclose how they determine when credits are impaired

or past due. This is true for the South African banks, as well as the banks included in the Basel survey.

The results suggest that under Pillar three of the new Accord, South African banks will need to disclose a significant amount of additional quantitative and qualitative information on its risk profile that is currently not disclosed. This is especially true for banks aiming to adopt the IRB approach. Thus, disclosure practices, as required under Pillar three of the proposed new Basel Accord, poses significant challenges to South African banks. Banks need to identify gaps between current disclosures (including frequency) and those required under the new Basel framework. Institutions need to identify where they will obtain the required data, and if they do not already capture it, how they will do so.

While South African supervisors will certainly be enforcing these disclosure requirements when the new framework is fully introduced, it might be advisable to encourage banks to commence reporting of the full range of information as soon as possible. This might include the amount of the bank's total credit exposure segregated by risk grade, estimated economic capital assigned to each risk grade and the resultant total economic capital required for credit risk.

Providing such information ahead of the formal implementation of the new Accord should help ease the transition from the old framework to the new, particularly insofar as the new Accord results in significant changes in reported capital ratios. By providing the market with information that allows investors to better understand the risk profile of each institution, the transition to the new regime should be much more smoothly achieved.

5.8 CONCLUSION

As explained in chapter 4, the proposed new Basel Accord represents a root and branch reform of the 1988 Basel Accord and poses significant challenges to banks and supervisors alike. These challenges have lead many supervisors to comment that important preconditions for implementation of the Accord are absent in most emerging market countries like South Africa. The findings of this chapter suggest that this is not the case in South Africa. South African bank supervisors are efficient, as evident in the findings of the FSAP. The factors

that seemingly render minimum capital requirements an efficient tool to enhance bank system soundness in many emerging market countries, namely the lack of a sufficiently deep and liquid capital market that makes the raising of low quality capital possible, the lack of complimentary policy such as loan-loss provision regulations that complement minimum capital requirements do not seem to characterize the South African banking sector. Indeed, the regulatory framework in South Africa was recently amended to be in line with international best practices, and address any limitations pointed out by the FSAP. The sophisticated nature of South Africa's banking sector constitute another important precondition for the successful implementation of the proposed new Basel Accord, especially the more advanced approaches such as the internal ratings based (IRB) approach.

Regardless of the efficient regulatory framework of bank supervision and the sophisticated nature of the banking sector, several challenges remain in the implementation of the new Basel Accord in the South African context, in terms of all three pillars. For example, in terms of Pillar two, the Bank Supervision Department expressed concern over the level of skills and resource requirements that the new Accord will impose on the Department. Some concerns were raised regarding recent failures of South African banks and the way regulators handled these failures. For example, there has been much controversy surrounding the refusal of the South African authorities to assist Saambou with liquidity, forcing it into curatorship. Some observers also indicate that the extent of recent bank failures might indicate that South African supervisors are not in a position to successfully implement a more complicated approach to bank supervision, such as the proposed new Basel Accord.

The new Accord also represents new ground for South African supervisors in several aspects, such as with the evaluation of banks' internal credit risk rating systems. South African bank supervisors have already started with specific measures to address challenges posed by the implementation of the new Accord. The Banking Supervision Department admits that it will have to develop its internal capacity to enable it to meet these and other challenges posed by the new Accord. The Department has allocated a staff member to the task of assessing and implementing the new Capital Accord and providing guidelines to the banking industry. Current plans are to conduct a detailed study of the new Accord and to determine the changes required to the current banking supervisory process. Once the Basel Committee has finalized the new Accord, South African supervisors will need to convert the Basel Committee's

documents into prudential standards for South African banks. At the same time, the supervisors will need to begin work towards approving the internal ratings systems of the banks seeking to use the more advanced approaches. It is anticipated that a comprehensive project plan will be in place when the final Accord is released.

However, at the time of the study, the South African bank supervisors provided very little specific information on preparations for the implementation of the new Accord. Discussions between banks and supervisors were fairly limited. South African banks perceive this to be a problem and indicated that they will appreciate more guidance from and communication with supervisors. The establishment of a time frame for the implementation of the proposed new Accord is also a priority. Aspects such as an indication of when supervisors intend having substantially completed the approval process for banks seeking to adopt the more sophisticated IRB approaches, as well as when supervisors plan the new regime to be fully operational might be included in such a time frame.

Furthermore, South African supervisors provided no indication on specific aspects of the proposed new Accord where national discretion can play an important role. South African supervisors need to further explore these issues, as well as others that will undoubtedly arise during the period of finalizing the Accord and setting to work on implementation. Over the coming months, supervisors will need to start (and continue) discussions with banks, with a view to establishing a regulatory framework, which is sensible and effective in the South African environment.

An overview of the general financial environment in which South African banks operate suggests that the South African banking sector is inherently sound. In general, the credit risk management practices of South African banks seem to be sophisticated and in line with international best practice. The survey results suggest that the large South African banks have recognized the challenges posed by the changes in the credit risk environment and have been working for some time on identifying, modifying, developing and implementing sophisticated credit risk models and the organizational context for a portfolio-oriented approach to credit risk management. This constitutes a useful platform from which to implement the proposed new Basel Accord.

The results of the survey suggest a sophisticated approach to credit risk measurement and management. The surveyed banks are confident that credit risk management is effectively covered in their training programs, that all personnel understand the bank's approach to granting credit and can be held accountable for complying with established policies and procedures, that their bank have a corporate culture and values which aligns well with their credit risk management objectives. They are also confident that their credit risk policies and procedures address credit risk in all the bank's activities at both the individual credit and portfolio levels and that credits are priced in such a way as to cover all of the imbedded costs and compensate the bank for the risk incurred. However, the surveyed banks are less confident about having sufficient staff resources and skills for effective credit risk management.

Banks seem to be less confident with regard to information systems and analytical techniques that enable management to measure the credit risk inherent in all on-and off-balance sheet activities. In particular, the large banks surveyed were not very confident that their information systems provide adequate information on the composition of credit portfolios. This might be a reason for concern, since management information systems that support the loan approval process should clearly indicate the composition of the bank's current portfolio to allow for consideration of whether a proposed new loan (regardless of its own merits) might affect this composition sufficiently to be inconsistent with the bank's risk appetite.

The survey also outlined the current state of play regarding credit risk rating among South African banks, and provided some international comparisons. Generally speaking, South African banks' credit risk rating practices appear to be in line with those of their international peers. As a group, the local banks have moved relatively quickly to adopt two-dimensional credit risk rating approaches whereby customer default probabilities and expectations of loss in the event of default are rated separately. In other respects, as elsewhere in the world, considerable differences exist among the banks' rating systems, particularly in relation to the detail of how ratings are determined, the associated quality control processes that have been established in each institution, and the way in which quantitative values have been assigned to risk grades.

These differences reflect many influences deriving from the particular circumstances of each

institution, including differences in the size and nature of banks' rated portfolios, the intended applications of ratings, the capabilities of banks' available resources and systems, the legacy of past decisions, and costs of change.

Although banks in general take the same set of issues into account in assigning internal ratings, the broadly different approaches used by banks in doing so will probably require different approaches to supervisory review and validation. Market discipline and disclosure can play a role in this process, by bringing about greater consistency among bank practices, and further promoting sound banking procedures.

Generally speaking, South African banks' credit risk rating practices appear to be in line with those of their international peers. The current sophisticated approach to credit risk management and the use of sophisticated models in this regard, constitute a useful platform for this to take place from. However, current practices do not conform to all the requirements set by the Basel Committee and substantial logistical challenges remain. In terms of the structure of rating systems, the number of grades, the integrity of the ratings assignment and review approach, as well as the applications of ratings, the majority of surveyed South African banks conform to most of the requirements set for the adoption of the IRB approach. However, the results of the survey does suggest that one of the large banks fall short of most requirements for the IRB approach at this stage. This include several aspects regarding the structure of the bank's rating structure. Furthermore, currently internal validation of ratings systems remains problematic, mainly due to data limitations.

In terms of the implementation of Pillar one and specifically the IRB approach, data limitations seem to be the biggest challenge. The widespread lack of good long run data on the performance of banks' loans is a key challenge faced world-wide by virtually all developers and users of internal credit risk rating systems. This include prudential supervisors looking to utilize banks' internal ratings for regulatory capital and other purposes. While many banks have implemented data warehousing processes aimed at improving this situation, given the length of a typical credit cycle, it will be some years yet before these banks have data covering one full credit cycle let alone several different cycles.

The lack of such data can impact on the ability of an institution to develop effective rating

tools. It can also impede efforts to verify the accuracy and robustness of institutions' rating systems, to assign reliable quantitative loss estimates to risk grades, and to make reliable comparisons of ratings from different institutions: all important tasks, not only from the perspective of the banks themselves, but also from the point of view of their prudential supervisors (particularly in the context of proposals to utilize banks' internal ratings for regulatory capital purposes).

It seems, as most of the South African banks prefer to adopt the IRB approach for the sake of international competitiveness. Another reason why South African banks favor the IRB approach is the fact that very few South African corporate borrowers have an external rating. The implication is that adoption of the standardized approach of the proposed new Capital accord gives banks no advantage in terms of finer risk differentiation between different borrowers or possible capital savings in the case of a bank with a higher quality portfolio.

However, while South African banks aim to eventually adopt the advanced IRB approach (and while they seem to have the impression that the South African regulators expect the largest banks to adopt this approach), data limitations remain an important impediment at this stage. Concerns were also raised about whether South African bank supervisors are currently in the position to evaluate and approve banks' internal credit risk rating systems for the purposes of using the IRB approach to regulatory capital determination.

Interviews with South African bank supervisors indicate that they have, at this stage, no specific ideas about the possible impact of adoption of the new Accord on the absolute capital levels of South African banks. It seems as if the regulators want to follow the Basel guidelines very closely. This means that banks with advanced credit risk measurement and management systems, where supervisors are convinced that systems are sound, will be allowed lower capital levels under the advanced IRB approach, in line with the Basel Committee's stated intention with the IRB approach. More than half of the banks surveyed indicated that their estimation of the likely impact of Basel II is that it will lead to an increase in the level of regulatory capital held.

The majority of surveyed banks indicate that they feel the adoption of their preferred approach will add the most value by refining the process for allocating and charging capital

and thus lead to a potential reduction in capital levels. The introduction of more sophisticated risk-adjusted pricing, as well as an enhanced reputation (or better rating) due to the use of advanced risk management techniques were also mentioned.

All of the surveyed banks indicated that data issues are considered to be the biggest obstacle to implementation of their preferred approach to compliance (the IRB approach in most instances). This is in line with international experience. South African banks are very conscious of the need to start building up a track record with regard to loss data. At the moment, there are many initiatives on the quantification of loss concepts being taken by South African banks. Most of the surveyed banks indicated that they have already completed an assessment of their current risk information systems in order to determine whether they would meet the test of being subjected to external verification, regulatory scrutiny and transparency of the new disclosure requirements.

All banks reported having done some preliminary high-level review work on Basel II, with all banks at the very least having established a project team and being busy with project planning. Most banks consider these projects as ongoing assessments, or as work in progress. Again, South African respondents also indicated a lack of serious communication with the regulators. This is a problem. Banks indicated that they feel uncertain about what the regulators really expect from them, as well as about the proposed time frames for implementation of the proposed new Accord.

In terms of Pillar three, the survey highlighted another important aspect where current South African practice lags behind Basel requirements: disclosure regarding credit risk modeling and specifically rating systems. This would be one of the key areas that need to be addressed before the IRB approach can be implemented.

CHAPTER 6: CONCLUSION

On 16 January 2001, the Basel Committee on Banking Supervision followed up its First Consultative Document of 3 June 1999 by presenting its Second Consultative Document on a revision of the 1988 Capital Accord. The proposed new Basel Capital Accord is one of the key initiatives for strengthening bank soundness, and thus financial sector stability. This is both a wide-ranging and ambitious reform that seeks to better align regulatory capital with economic risk. It represents a real advance on the 1988 Capital Accord, and the proposals mark a decisive step away from a “one size fits all” supervisory approach to capital. Rather than imposing a single method for calculating capital requirements, institutions will be able to select from a range of approaches for capturing, measuring, and controlling credit and operational risks. More sophisticated control structures will be rewarded by lower capital charges. If the Basel proposals are implemented as planned, they will have important effects both on individual banks and on financial markets as a whole.

This study is mainly concerned with the credit risk proposals of the new Accord, and the impact of the proposed new Accord on the credit risk management practices of South African banks. The effective management of credit risk is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking organisation. Credit risk is often regarded as the prime risk in banking and therefore has historically been attributed with the most advanced level of risk management techniques. This includes risk mitigation techniques such as netting, setting position limits and diversification.

However, the major cause of serious banking problems world-wide continues to be directly related to credit risk exposure. Severe credit losses in a banking system usually reflect simultaneous problems in several areas. This includes “traditional” areas of credit risk management, such as failures of due diligence and inadequate monitoring and credit concentrations.

In addition to problems in these “traditional” areas of credit risk, the banking sector is passing through a period of substantial structural change under the combined and inter-related

pressures of internal competition, declining entry barriers, changes in regulation, new information, trading and delivery technology and global competitive pressures. This implies formidable challenges. Banks are losing some of their past monopolies and comparative advantages which have underpinned their dominant position in the financial system. In particular, as entry barriers into banking services are eroded, banks are increasingly facing competition from a wider range of actual and potential suppliers of banking services.

This technological, financial and institutional changes fundamentally altered the environment in which banks operate, leading to a change in the nature, scope and scale of the risk they need to manage. In response to the increasing volume and complexity of financial instruments and products, credit risk measurement and management methodologies have evolved dramatically. This includes sophisticated quantitative approaches to credit assessment and credit pricing, as well as a new approach to credit management- evaluating credit decisions in an integrated risk/return framework and actively managing credit in a portfolio context. This trend towards better risk management is reinforced by shareholder pressure in terms of return on economic capital.

Confronted with conflicting pressures of increased risk exposure and the demands of the regulatory community for stronger defences against risk, bankers in recent years have responded by developing and making use of a wide variety of risk management tools, including such devices as securitization of loans, loan sales, standby credit letters and credit derivatives. It also includes the implementation of portfolio credit risk models, enabling banks to identify and implement risk-mitigating strategies for portfolios of counterparty exposures. These models allow a portfolio approach to credit risk modeling, enabling a company to consolidate credit risk across its entire organization, and provides a statement of Value-at-Risk (VaR) due to credit upgrades, downgrades, and defaults.

On the one hand, these new instruments enhanced the credit risk management capabilities of banks. On the other hand, they created new risk management challenges. The complexity of derivative instruments raised concerns about the ability of regulators and market participants to understand the risk associated with their use. Moreover, the proliferation of complex financial instruments has created uncertain and market-sensitive counterparty exposures that are significantly more challenging to manage than traditional instruments such as bonds.

While the use of sophisticated risk management tools and the transition to active portfolio management is likely to result in a more profitable, specialized, and risk-efficient business, banks will need to overcome considerable challenges along the way. This includes unique organizational questions that cut across risk classes and business areas, such as the relevant scope for portfolio optimization. Achieving the change in responsibilities implied by the new portfolio model without de-motivating existing account and credit officers, represents another challenge. Each institution will have to determine a “best fit” solution that is responsive to its business mix, market position, organization culture and competitive advantage.

Any reversal of the trend toward increasingly complex and interdependent financial markets is highly unlikely. Change and innovation are constant and healthy aspects of a market-based competitive financial system. With that innovation will come a reminder of the need for continuous enhancements to risk management practices, such that, in time, today’s emerging best practices will have to be reviewed and strengthened further. However, risk management is not simply a matter of better computer models to measure volatility and correlations more rapidly and precisely. Indeed, too much public focus has been placed on the sophistication and precision of risk estimation models, and not enough on the more important managerial and judgmental elements of a strong risk management framework. In the end, experience, market knowledge, management discipline, internal risk transparency and strong internal controls will be the more important determinants of how well financial institutions fare when the next storm comes.

The proposed new Capital Accord recognizes this principle and to this end, the new framework proposes to shift from a rules-driven approach to a process-oriented one through the adoption of internal capital allocation mechanisms for regulatory purposes. The Accord is an attempt to narrow the widening gap between regulatory and economic capital, driven by the increasing sophistication of risk management techniques and capital allocation systems. In this regard, a three-pillared approach is introduced. Supervisory review (Pillar two) and market discipline (Pillar three) are introduced as essential elements to minimum capital requirements (Pillar one), especially where banks’ internal systems form the basis of capital allocation.

Each of these proposed “pillars” are designed to introduce greater risk sensitivity into the

Accord and offer significant potential advantages over the old Accord. However, each of them poses significant implementation challenges. On the first pillar, the hallmark proposal to place greater reliance on internal processes to set capital charges creates a direct link between the regulation of capital requirements and banks' internal structures for assessing, pricing and monitoring the risks involved in individual operations.

The potentially greater accuracy and coverage that could result from the use of internal ratings systems would have far-reaching implications both for banks and their supervisors. Banks would need to demonstrate the strength of their rating systems and the accuracy and consistency of their risk measurement. The role of supervisors in this regard will be a critical component to the substance and the credibility of an internal ratings approach. This is especially important since the inclusion of banks' internal credit risk ratings as an explicit element in the evaluation of capital adequacy introduces new stresses on internal credit risk ratings systems. That is, incentives would arise to grade optimistically and to alter the rating system to produce more fine grained distinctions of risk. Such conflicts could overwhelm the checks and balances currently provided by internal review functions. This necessitates external reviews and validation of the rating system.

Furthermore, the difficulty of ensuring their accurate and consistent application within and across national borders should not be underestimated. Deliberate underestimation of credit risk is even more likely to occur in some banking markets where supervision is weak. The efforts of the IMF to establish rules of conduct for supervisory authorities, to provide training and to publish evaluations of national supervisory authorities could play a valuable role in reducing the scope for favored treatment of banks. However, serious doubts remain whether supervisory authorities around the world are able and/ or willing to detect and correct those banks presenting an overoptimistic credit risk profile based on their internal ratings. In addition, banks and supervisors should both be aware that the additional stress imposed by external uses, if not properly controlled, could impair the effectiveness of internal rating systems as a tool for managing the banks' credit risk.

As an alternative to the internal ratings approach, a refinement of the existing capital framework, based on ratings assigned by external ratings agencies, is proposed. It provides for transparency and comparability in the risk adjustment process, based especially on the

extensive public disclosure of the criteria, methodology, process and actual credit decisions of agencies. However, the use of ratings in the regulatory process has been subject to some controversy, and the major ratings agencies have concerns about using ratings in this way. Most significantly, the successful use of external ratings in capital standards requires rigorous approval criteria and a robust approval process.

Under the new proposals the second pillar, supervisory review of capital adequacy and supervisory judgement, will move to the centre stage of capital regulation. A key component of the supervisory process is to ensure that banks have in place a disciplined internal process for assessing capital adequacy that transcends the calculation of regulatory ratios. This pillar adds a discretionary, and therefore flexible, layer of control above the minimum capital requirements. The high degree of discretion and subjective judgement involved in a supervisory review, especially in evaluating process-oriented capital allocation systems, creates room for wide inconsistencies in the application of capital standards.

Ensuring that this pillar functions effectively will also require substantial investment in the human capital of supervisors in the developed world, and even more obviously in developing countries. For many countries it will be difficult to make supervisory review a major pillar of the assessment of banks' capital adequacy without significant enhancement of their existing supervisory capacity. Most supervisory agencies in emerging economies are already understaffed, and supervisors underpaid. Relying on supervisory review to a greater extent than hitherto may involve these staff in making important judgements that they may be technically ill-equipped to make, or which they find hard to maintain in the face of opposition from powerful and well-connected senior bankers. Successful implementation of Pillar two will only be possible with strong political support and the requisite degree of regulatory independence.

These considerations suggest that supervisory review will probably have a limited role under the new capital adequacy framework. The most likely outcome is that extensive use of supervisory review will only be found where bank regulators have the capacity and the expertise to be able to exercise it, and where the institutions that are subjected to supervisory review have a sense of themselves as forming a "club" with quasi-self-regulatory aspects. These conditions are most likely satisfied in the regulation of the main internationally active

and diversified banking groups. One result will be a capital standard that is more obviously two-tier than at present. On the one hand, supervisory review will play a central role in the risk assessment of large complex banking organisations. On the other hand, the rest of the global banking system will be primarily dependent on Pillars one and three for the assessment of its capital adequacy.

Market discipline (Pillar three) may also perform a limited function under the new framework. Increased disclosure requirements, as envisaged under the new Accord, is not sufficient to secure market discipline. An array of governance structures, including proper accounting standards, an incentive-compatible safety net and good corporate governance are also equally vital prerequisites. While there may be a case to incorporate specific market based instruments, among them subordinated debt and rating requirements, specific instruments and guidelines cannot substitute for basic elements of good governance and the political will to effect them.

These challenges have lead many observers to comment that important preconditions for implementation of the Accord are absent in most emerging market countries. The findings of this study suggest that this is not the case in South Africa. South African bank supervisors are efficient, as evident in the findings of the FSAP. The factors that seemingly render minimum capital requirements an efficient tool to enhance bank system soundness in many emerging market countries, such as a lack of loan-loss provision regulations that complement minimum capital requirements, do not seem to characterize the South African banking sector. Indeed, the regulatory framework in South Africa was recently amended to be in line with international best practices, and address any limitations pointed out by the FSAP.

The sophisticated nature of the South African banking sector constitutes another important precondition for the successful implementation of the proposed new Basel Accord, especially the more advanced approaches such as the internal ratings based (IRB) approach.

An overview of the general financial environment in South Africa suggests that the South African banking sector is inherently sound. The survey results suggest that the large South African banks have recognized the challenges posed by the changes in the credit risk environment and have been working for some time on identifying, modifying, developing and implementing sophisticated credit risk models and the organizational context for a portfolio-

oriented approach to credit risk management. In general, the credit risk management practices of South African banks seem to be prudent, sophisticated and in line with international best practice.

Regardless of the efficient regulatory framework of bank supervision and the sophisticated nature of the banking sector, several challenges remain in the implementation of the new Basel Accord in the South African context. This is true for the implementation of all three pillars. In terms of Pillar two, the Bank Supervision Department expressed concern over the level of skills and resource requirements that the new Accord impose on the Department. Some concerns were also raised regarding recent failures of SA banks and the way regulators handled these failures. This includes concerns about the ability of South African supervisors to successfully implement a more complicated approach to bank supervision, such as the proposed new Basel Accord.

The new Accord also represents new ground for South African supervisors in several aspects - such as with the evaluation of banks' internal credit risk ratings systems. The Banking Supervision Department admits that it will have to develop its internal capacity to enable it to meet these and other challenges posed by the new Accord. Specific measures in this regard have already been implemented. This includes the allocation of a staff member to the task of assessing and implementing the new Capital Accord and providing guidelines to the banking industry.

However, at the time of the study, the South African bank supervisors provided very little specific information on preparations for the implementation of the new Accord. Discussions between banks and supervisors were fairly limited. South African banks perceive this to be a problem and indicated that they will appreciate more guidance from and communication with supervisors. The establishment of a time frame for the implementation of the proposed new Accord is also a priority. Aspects such as an indication of when supervisors intend having substantially completed the approval process for banks seeking to adopt the more sophisticated IRB approaches, as well as when supervisors plan the new regime to be fully operational might be included in such a time frame.

Furthermore, South African supervisors provided no indication on specific aspects of the

proposed new Accord where national discretion can play an important role. South African supervisors need to further explore these issues, as well as others that will undoubtedly arise during the period of finalizing the Accord and setting to work on implementation. Over the coming months, supervisors will need to start (and continue) discussions with banks, with a view to establishing a regulatory framework which is sensible and effective in the South African environment.

The survey also outlined the current state of play regarding credit risk rating among South African banks, and provided some international comparisons. Internal bank rating practices, both locally and overseas, continue to evolve as the experience of ratings institutions mounts up. Generally speaking, South African banks' credit risk rating practices appear to be in line with those of their international peers. However, current practice does not conform to all the requirements set by the Basel Committee, and substantial logistical challenges remain. In terms of the structure of the ratings system, the number of grades, as well as the integrity of the ratings assignment and review approach, the majority of the surveyed South African banks conform to most of the requirements set by the Basel Committee for adoption of the IRB approach. Furthermore, internal validation of ratings systems remains problematic, mainly due to data limitations.

Indeed, data limitations seem to be the biggest challenge in terms of the implementation of Pillar one and specifically the IRB approach. This problem is not unique to the South African banking sector. The widespread lack of good long-run data on loss concepts such as PD and LGD is a key challenge faced worldwide by virtually all developers and users of internal credit risk ratings systems. The lack of such data can impact on the ability of a bank to develop effective rating tools. It can also impede efforts to verify the accuracy and robustness of institutions' rating systems, to assign reliable quantitative loss estimates to risk grades, and to make reliable comparisons of ratings from different institutions: all important tasks. This is not only from the perspective of the banks themselves, but also from the point of view of their prudential supervisors.

It seems as most of the South African banks prefer to adopt the IRB approach for the sake of international competitiveness. Another reason why South African banks favor the IRB approach is the fact that very few South African corporate borrowers have an external rating.

Consequently, adoption of the standardized approach of the proposed new Capital Accord gives banks no advantage in terms of finer risk differentiation between different borrowers or possible capital savings in the case of a bank with a higher quality portfolio. While South African banks aim to eventually adopt the advanced IRB approach (and while they seem to have the impression that the South African regulators expect the largest banks to adopt this approach), data limitations remain an important impediment at this stage. Concerns were also raised about whether South African bank supervisors are currently in the positions to evaluate and approve banks' internal credit risk rating systems for the purposes of using the IRB approach to regulatory capital determination. Banks also indicated that they feel uncertain about what the regulators really expect from them, specifically the proposed time frames for implementation of the proposed new Accord.

The absolute calibration of overall capital levels or the appropriate quantum of capital that banks should hold is one of the most actively debated aspects regarding the proposed new Basel Accord. The new framework intends to maintain the overall level of regulatory capital in the banking system, although the Basel Committee recognizes the difficulty in assessing the "average" impact of its proposals across a diverse range of internationally active banks. Estimates by banks, academics (as presented in empirical studies) and the results of the first two quantitative impact studies (QIS1 and QIS2) of the Basel Committee confirm that the impact of the new proposals on the overall capital levels in the banking system is uncertain. The results of this survey suggest that it is also the case in South Africa. Surveyed banks' estimation of the likely impact of the proposed new Basel Accord on regulatory capital levels differ widely. Interviews with South African bank supervisors indicate that they also have, at this stage, no specific ideas about the possible impact of adoption of the new Accord on the absolute capital levels of South African banks. The results of QIS3 (in which South African banks will also participate) might give a clearer indication of the impact of the proposed new Capital Accord on the regulatory level of capital held in the South African banking sector.

The majority of surveyed banks indicate that they feel the adoption of their preferred approach will add the most value by refining the process for allocating and charging capital – and thus lead to a potential reduction in capital levels. The introduction of more sophisticated risk-adjusted pricing, as well as an enhanced reputation (or better rating) due to the use of advanced risk management techniques were also mentioned.

All of the surveyed banks indicated that data issues are considered to be the biggest obstacle to implementation of their preferred approach to compliance (the IRB approach in most instances). This is in line with international experience. South African banks are very conscious of the need to start building up a track record with regard to loss data. At the moment, there are many initiatives on the quantification of loss concepts being taken by South African banks. All banks reported having done some preliminary high-level review work on Basel II, with all banks at the very least having established a project team and being busy with project planning. These projects are considered as ongoing assessments, or as work in progress. Again, South African respondents also indicated a lack of serious communication with the regulators.

In terms of Pillar three, the survey highlighted another important aspect where current South African practice lags behind Basel requirements: disclosure regarding credit risk modeling and specifically ratings systems. This would be one of the key areas that need to be addressed before the IRB approach can be implemented.

In summary, the results of the survey suggest that although many factors might inhibit the successful implementation of the proposed new Basel Accord in an emerging market context, this is not the case in South Africa. The inherent soundness of the South African financial system, the efficiency of bank supervisors and South African bank's sophisticated approaches to credit risk management constitute a useful platform to implement a more sophisticated approach to bank supervision and the determination of regulatory capital requirements, such as the proposed new Basel Accord.

However, significant implementation challenges remain, in terms of all three pillars of the Accord. In terms of Pillar one, the current risk rating systems of South African banks do not conform to all the requirements set out for the adoption of the proposed new Basel Accord. As mentioned, data limitations pose the most significant challenge. In terms of Pillar two, several aspects regarding the implementation of the IRB approach constitute new ground for South African supervisors. Although they have already started with specific preparations for the implementation of the new Accord, several issues raised by the new Accord have not been addressed by South African supervisors yet. Another problem is the fairly limited nature

of discussions between banks and supervisors at the time of the study. In order to address these challenges, supervisors will need to start (and continue) discussions with banks, with a view to establishing a regulatory framework which is sensible and effective in the South African environment.

In order to address these Pillar one challenges, South African banks will need to continue with data gathering efforts, as well as gap analysis. The latter is intended to identify deviations between their current risk rating systems and the requirements set by the Basel Committee for the adoption of the IRB approach. South African banks will also need to develop strategies to deal with the deviations between their current ratings disclosures and the requirements as described under Pillar three of the proposed new Basel Accord.

Apart from implementation challenges in individual countries, there exists concern over the impact of the proposed new Basel Accord on global financial system stability. This include concerns regarding the impact on capital flows to emerging market countries, and the potential pro-cyclical impact of the new Accord. The latter can be addressed using several possible policy measures. The former concern highlights the need for greater coordination within the international community on the reform agenda in an increasingly integrated international financial system. This includes greater coordination at the regional level, as well as intensified collaboration with the private sector.

The complexity of the new Accord, as well as the flexibility allowed to national supervisors, poses the risk of regulatory forbearance, as discussed in chapter 4. Regulatory capital levels that are not sufficient relevant to risks in a banking system, is another risk in this regard. This all serves to underline the importance of effective and accountable bank supervision. This is not only applicable to the regulatory institutions, and the human resources capacities of supervisory agencies, but it also encompasses aspects such as appropriate accounting standards and reporting systems, and a sufficient legal framework, which is able to enforce supervisory actions when a bank's performance is deemed faulty. These aspects underpin the efficiency of both supervisory review (Pillar two) and bank capital ratios (Pillar one). Efficient markets that send appropriate signals and corporate governance structures that respond to them, are another important aspect in this regard.

It must be kept in mind that the Basel Committee is largely comprised of representatives from the G-10 countries. By developing the original Accord, and now its replacement, this group has performed a great service in promoting a more stable international financial system. However, as with any attempt to develop international consensus on a complex matter, it is inevitable that the new Accord will involve a degree of compromise, and a need to trade-off differing national objectives. Although there are important benefits from conforming to an internationally-agreed standard, the new Accord will not be perfectly suited for South African conditions. At this stage, it seems as if South African supervisors intend to conform with the internationally agreed framework wherever possible. However, it might be advisable/necessary to exercise national discretion where this is clearly in South Africa's national interest.

APPENDICES

APPENDIX ONE: Measures of supervision efficiency

This appendix includes measures of supervision efficiency included in the Barth, Caprio and Levine (2001) study and the resulting scores for South African supervisors (see section 5.4.3).

Overall capital stringency: This measure gives an indication of whether there are explicit regulatory requirements regarding the amount of capital that a bank must have relative to various guidelines. This particular measure of capital stringency is to some degree capturing whether or not regulatory capital is solely an accounting concept or at least partially a market-value concept. Several guidelines are considered to determine the degree to which the leverage potential for capital is limited. These are as follows:

- (1) Does the minimum required capital-to-asset ratio conform to the Basel guidelines? Of 107 countries, 100, including South Africa, said yes and seven said no.
- (2) Does the minimum ratio vary with market risk? Of 105 countries, 24 said yes and 81, including South Africa, said no.
- (3) Is the market value of loan losses deducted from reported accounting capital? Of 104 countries, 57, including South Africa, said yes and 47 said no.
- (4) Are unrealized losses in the securities portfolio deducted from reported accounting capital? Of 104 countries, 60, including South Africa, said yes and 44 said no.
- (5) Are unrealized foreign exchange losses deducted from reported accounting capital? Of 102 countries, 62, including South Africa, said yes and 40 said no.

A value of 1 is assigned to each of the above questions if the answer is yes and a 0 otherwise. In addition, a value of 1 is assigned if the fraction of revaluation gains that is allowed to count as regulatory capital is less than 0.75. Otherwise, a value of 0 was assigned. By adding together these variables the overall capital stringency variable is

created. It ranges in value from zero to six, with higher values indicating greater stringency. In the survey, the South African score is indicated as five (due to the “no” answer in (2)). However, current capital regulations in South Africa do vary with market risk, indicating the maximum score of six.

Initial capital stringency: This measure gives an indication of whether the source of funds counted as regulatory capital can include assets other than cash or government securities and borrowed funds, as well as whether the sources are verified by the regulatory or supervisory authorities. More specifically, the measure is based on the following three questions:

(1) Can initial and subsequent infusions of regulatory capital include assets other than cash or government securities? Of 102 countries, 45 said yes and 57, including South Africa, said no.

(2) Can the initial infusion of capital be based on borrowed funds? Of 101 countries, 34 said yes and 67, including South Africa, said no.

(3) Are the sources of funds that count as regulatory capital verified by the regulatory or supervisory authorities? Of 105 countries, 86, including South Africa, said yes, and 19 said no. For those questions that were answered “yes”, a value of 1 was assigned. Otherwise, the value of 0 was assigned. Adding these three variables together created a variable that may range from a low of zero to a high of three, with a higher value indicating less stringency. Consequently, South Africa obtained a score of 1.

Capital regulatory index: This is the sum of the previous two measures of capital stringency. It therefore may range in value from zero to nine, with a higher value indicating greater stringency. South Africa obtained a score of six. The UK and Australia both obtained the highest score of nine.

Official supervisory power: This measure gives an indication of whether the supervisory authorities have the authority to take specific action to prevent and correct problems. This variable is based upon yes or no responses to the following 16 questions:

- (1) Can supervisors meet with any external auditors to discuss their reports without bank approval? Of 107 countries, 78, including South Africa, said yes and 29 said no.
- (2) Are auditors legally required to report any misconduct by managers or directors to the supervisory authorities? Of 107 countries, 65, including South Africa, said yes and 42 said no.
- (3) Can the supervisory authorities take legal action against external auditors for negligence? Of 107 countries, 55 said yes and 52, including South Africa, said no.
- (4) Can the supervisory authorities force a bank to change its internal organizational structure? Of 107 countries, 78 said yes and 29, including South Africa, said no.
- (5) Can the deposit insurance agency take legal action against bank directors or officers? Of 59 countries, 20 said yes, and 39 said no. This question is not applicable to South Africa.
- (6) Are off-balance sheet items disclosed to the supervisory authorities? Of 106 countries, 104, including South Africa, said yes and two said no.
- (7) Does failure to abide by a cease-desist type order lead to the automatic imposition of civil and penal sanctions on the directors and managers of a bank? Of 102 countries, 63 said yes and 39 said no. This question is not applicable to South Africa.
- (8) Can the supervisory authorities order a bank's directors/managers to provide provisions to cover actual or potential losses? Of 102 countries, 88 said yes and 14 said no. This question is not applicable to South Africa.
- (9) Can the supervisory authorities suspend the directors' decision to distribute dividends? Of 106 countries, 84 said yes and 22, including South Africa, said no.
- (10) Can the supervisory authorities suspend the directors' decision to distribute bonuses? Of 103 countries, 62 said yes and 41, including South Africa, said no.
- (11) Can the supervisory authorities suspend the directors' decision to distribute management fees? Of 103 countries, 54 said yes and 49, including South Africa, said no.
- (12) Can the supervisory authorities supersede shareholder rights and declare a

bank insolvent? Of 101 countries, 74 said yes and 27, including South Africa, said no.

(13) Can the supervisory authorities suspend some or all ownership rights of a problem bank? Of 103 countries, 85, including South Africa, said yes and 18 said no.

(14) Regarding bank restructuring and reorganization, can the supervisory authorities supersede shareholder rights? Of 102 countries, 81 said yes and 21, including South Africa, said no.

(15) Regarding bank restructuring and reorganization, can the supervisory authorities remove and replace management? Of 105 countries, 94 said yes and 11, including South Africa, said no.

(16) Regarding bank restructuring and reorganization, can the supervisory authorities remove and replace directors? Of 105 countries, 91 said yes and 14, including South Africa, said no.

The answers to these 16 questions collectively constitute a measure of “official supervisory power”. A value of 1 was assigned to a “yes” answer and a value of 0 to a “no” answer. This variable is the sum of these assigned values and therefore may range from zero to 16, with a higher value indicating more power. South Africa obtained a score of 4.

Barth, Caprio and Levine (2001:23) also decompose the official supervisory power variable into three constituent parts. The resulting three variables are as follows:

(1) *Prompt corrective action*: This is an indication of whether a law establishes pre-determined levels of bank solvency deterioration that forces automatic enforcement actions such as intervention. If this is indeed the case, a value of 1 is assigned, otherwise 0 is indicated.

This is then multiplied by (4), (7), (8), (9), (10) and (11) as described immediately above. The prompt corrective action variable may therefore range from zero to six, with a higher value indicating more promptness in responding to problems. South Africa, and most other countries included in the survey, obtained a score of zero.

(2) *Restructuring power*: This is an indication of whether the supervisory authorities have the power to restructure and reorganize a troubled bank. This variable is simply the sum of (14), (15) and (16) as described above. It may range in value from a low of zero to a high of three, with a higher value indicating more power. South Africa obtained a score of zero.

(3) *Declaring insolvency power*: This is an indication of whether the supervisory authorities have the power to declare a deeply troubled bank insolvent. This variable is simply the sum of (12) and (13) as described above. It may range in value from zero to two, with a higher value indicating greater power. South Africa obtained a score of one.

Other indicators of supervisory power in the Barth, Caprio and Levine study (2001) include the following:

Supervisory forbearance discretion: Even when authorized, supervisory authorities may engage in forbearance when confronted with violations of laws or regulations or with other imprudent behaviour on the part of banks. To capture the degree to which this type of discretion is allowed, a variable was constructed, based on the following questions:

(1) Regarding bank restructuring and reorganization, can the supervisory authorities or any other government agency forbear certain prudential regulations? Of 101 countries, 84, including South Africa, said yes and 17 said no.

(2) Are there pre-determined levels of solvency deterioration that force automatic actions, such as intervention? Of 104 countries, 49 said yes and 55, including South Africa, said no.

(3) Must infractions of any prudential regulations be reported? Of 104 countries, 103, including South Africa, said yes and one said no.

(4) With respect to (3), are there any mandatory actions to be taken in these cases? Of 103 countries, 81, including South Africa, said yes and 22 said no.

A value of 1 is assigned when the answer is no and a value of 0 is otherwise assigned, except for (1) where the reverse takes place. This variable is calculated as the sum of these assigned values. It may therefore range in value from zero to four, with a higher value indicating more discretion. South Africa obtained a score of three.

Liquidity/diversification index: This variable captures the degree to which banks are encouraged or restricted with respect to liquidity, as well as asset and geographical diversification. In particular, the index was based on the following three questions:

(1) Are there explicit, verifiable, and quantifiable guidelines for asset diversification? Of 107 countries, 38, including South Africa, said yes and 69 said no.

(2) Are banks prohibited from making loans abroad? Of 106 countries, 15 said yes and 91, including South Africa, said no.

(3) Is there a minimum liquidity requirement? Of 103 countries, 77, including South Africa, said yes and 26 said no.

On the basis of “yes” or “no” answers to these questions, a liquidity/diversification index was calculated. A value of 1 was assigned to “yes”, except in the case of question (2) where a 1 was assigned to “no”, since this response is associated with greater diversification. These three values are summed and may range in value from zero to three, with a higher value indicating greater liquidity and diversification. South Africa obtained a score of three.

Official supervisory resource variables: This variable captures the official actions that the supervisory authorities are required to take, or may take, in response to various banking situations. But it is also important to know the official supervisory resources available to take these actions. More especially, this index attempts to measure the “quantity and quality” of bank supervision. This is done on the basis of five other variables:

Official supervisory resource variables: This variable captures the official actions that the supervisory authorities are required to take, or may take, in response to various banking situations. But it is also important to know the official supervisory resources available to take these actions. More especially, this index attempts to measure the “quantity and quality” of bank supervision. This is done on the basis of five other

variables:

(1) Supervisors per bank: This variable is the number of professional bank supervisors per bank.

For South Africa, the score is three. Other results include the USA 0.1, Denmark 0.2, Ireland 0.3, Egypt 8, Honduras 12, Botswana 9, and Bangladesh 8.

Some economies have relatively high ratios of professional supervisors per bank, such as Taiwan (China) with 18 and Honduras with 12. Others like the USA and Turkey have relatively low ratios – 0.1 and 0.4, respectively. In the case of South Africa, the figure is indicated as three professional supervisors per bank. However, since Barth et al do not specify “bank”, these figures can be misleading. For example, the relatively low figure for the USA can be explained by the USA’s unit bank system, as compared to a branch bank system in South Africa.

(2) Bank supervisor years per bank: This variable is the total number of years of experience for all professional bank supervisors per bank. The total number for South Africa is 26.

(3) Supervisor tenure: This variable is the average years of tenure of professional bank supervisors. For South Africa, the result is four.

(4) Onsite examination frequency: This variable is the frequency of onsite examinations conducted in large and medium-sized banks, with 1 denoting yearly, 2 denoting every 2 years, and so on. For South Africa, the result is one.

(5) Likelihood supervisor moves into banking: This variable is the fraction of supervisors employed by the banking industry subsequent to retirement, with 0 denoting never, 1 denoting rarely, 2 denoting occasionally, and 3 denoting frequently. South Africa’s score is three.

Other supervisory information for South Africa included in the Barth, Caprio and Levine study is that supervisors are not legally liable for their actions; infraction of any prudential regulation found by a supervisor must be reported; and there are no important differences between expectations from the supervisory agency and what is mandated by law.

APPENDIX TWO: List of registered South African banks - locally controlled

ABSA

African Bank Limited

African Merchant bank

BOE Bank Limited

Cape of Good Hope Bank limited

Capitec Bank Limited

CORPCAPITAL Bank Limited

Firstrand Bank Limited

Gensec Bank Beperk

Imperial Bank limited

Investec Bank limited

Marriot Merchant Bank Limited

MEEG Bank limited

Mercantile Bank Limited

MLS Bank Limited

Nedcor Bank Limited

Nedcor Investment Bank Limited

Old Mutual Bank Limited

Peoples Bank Limited

PSG Investment Bank Limited

Rand Merchant

Real Africa Durolink Investment Bank Limited

Regal Treasury Private Bank Limited

Rennies Bank Limited

Saambou Bank Beprek

Sasfin Bank Limited

Securities Investment Bank Limited

TEBA Bank Limited

The Standard Bank of South Africa Limited

Unibank Limited

Source : Bank Supervision Department of the South African Reserve Bank

Available at: www2.Resbank.co.za/.../ViewTemplate+for+Banks+Locally+Controlled

25 September 2002.

APPENDIX THREE: QUESTIONNAIRE

IMPACT OF THE PROPOSED NEW BASEL ACCORD ON THE CREDIT RISK MANAGEMENT PRACTICES OF SOUTH AFRICAN BANKS

The following questionnaire was send to representatives of the surveyed banks.

The following questionnaire is intended to analyze the current situation within the bank's credit risk management area. The questionnaire should be completed based on the current situation and any possible or probable changes should be ignored unless specifically asked for.

To make the questionnaire as easy as possible to complete, it has been structured on the basis of multiple choice type responses as far as possible. Please answer all questions, and if there are any additional comments please attach an additional sheet.

All information will be treated as strictly confidential and will only be used for the purposes of the study.

GENERAL ASPECTS REGARDING CREDIT RISK MEASUREMENT AND MANAGEMENT

1. When did you last benchmark your credit risk management practices against industry best practices? (Please check only one.)

-Never.

-Over a year ago.

-Within the last year.

-Plan to do so in the next year.

2. Does your bank have a function that is responsible for credit risk management at the enterprise level. (Please check only one.)

-Yes.

-No, but we plan on doing so within the next two years.

-No, and we do not plan on doing so in the next two years.

3. Please indicate how strongly you agree with the following statements using a scale from 1

to 5, with 5 indicating “strongly agree” and 1 disagree.”

-We have sufficient staff resources and skills for effective credit risk management.

-All relevant personnel clearly understand the banks approach to granting credit and can be held accountable for complying with established policies and procedures.

-Credit risk management is effectively covered in our training program.

4. Please indicate how strongly you agree with the following statement using a scale from 1 to 5, with 5 indicating “strongly agree” and 1 indicating “strongly disagree.” I am confident that we have a corporate culture and values which aligns well with our credit risk management objectives.

-I am confident that our incentive compensation is well aligned with our credit risk management objectives.

-Senior management has communicated and demonstrated an affirmative commitment to credit risk management.

5. Do you have a written credit risk strategy that reflect the bank

s tolerance

level of profitability the bank expects to achieve for incurring various credit risks?

-Yes.

-No.

6. Do you have written policies in place regarding the information and documentation needed to approve new credits, renew existing credits and/or change the terms and conditions of previously approved credits.

-Yes.

-No.

7. Do you sometimes rely solely on credit scoring techniques in approving loan applications?

-Yes, for certain types of exposures. (Please specify.)

-Yes, for certain small exposures. (Please specify.)

-No, our bank always perform detailed analysis of all individual loans applications.

8. Which of the following most accurately describe your bank's approach to profitability analysis and loan pricing?

- Profitability analysis is based on the overall banking relationship with a customer.
- Profitability analysis is orientated to loans on a stand-alone basis, in other words, the profitability of every loan application is based on own merit, regardless of the total relationship with the customer.

9. Do you base loan price terms on obligor's risk?

- Most or all of the time, based on the obligor's assigned risk grade.
- Most or all of the time, based on a less formal assessment of the obligor's risk .
- Sometimes terms are based on the obligor's assigned risk grade .
- Sometimes terms are based on a less formal assessment of the obligor's risk .

10. Do you base loan non-price terms on obligor's risk?

- Most or all of the time, loan non-price terms are based on the obligor's assigned risk grade.
- Most or all of the time, loan non-price terms are based on a less formal assessment of the obligor's risk.
- Sometimes, loan non-price terms are based on the obligor's assigned risk grade.
- Sometimes, loan non-price terms are based on a less formal assessment of the obligor's risk.

11. Please indicate how strongly you agree with the following statement using a scale from 1 to 5, with 5 indicating "strongly agree" and 1 indicating "strongly disagree."

- I am confident that credits are priced in such a way as to cover all of the imbedded costs and compensate the bank for the risks incurred.
- I am confident that our bank have taken appropriate steps to identify and control or mitigate the risks of connected lending.
- I am confident that over-reliance on collateral does not compromise other elements of sound counterparty credit risk management such as the due diligence process.

Measurement of credit risk

12. Please indicate how strongly you agree with the following statements using a scale from 1 to 5, with 5 indicating “strongly agree” and 1 indicating “strongly disagree.”

-We have a clear definition of credit risk.

-I am confident that our credit policies and procedures address credit risk in all of the bank’s activities and at both the individual credit and portfolio levels.

-I am confident that our bank have information systems and analytical techniques that enable management to measure the credit risk inherent in all on- and off-balance sheet activities.

-I am confident that the management information system provides adequate information on the composition of the credit portfolio, including identification of any concentrations of risk.

13. In measuring credit risk, which of the following approaches do you use?

-Transaction methods, where total credit risk with a counterparty is simply the sum of current and potential exposure of each transaction with the counterparty.

-Portfolio methods, computing the potential exposure of all the firm’s transactions with a counterparty at once, considering correlations between potential exposures of multiple transactions with the counterparty.

-A combination of transaction and portfolio approaches. (Please specify.)

Quantification of loss concepts and data issues

14. Do you have a rating history for each borrower, in other words, do you have loss experience data by borrower/facility grade

-Yes.

-No.

15. If you have a rating history for each borrower, which of the following elements are included?

-Rating since inception.

- Methodology and key data used to derive the rating.
- Key borrower characteristics.
- Date rating was assigned.
- Person/model who assigned the grade.

16. Do you compute long-run average probability of default rates solely based on historical experience of borrowers in each internal risk grade?

- Yes, for all sub-portfolios.
- Yes, only for retail portfolios.
- Yes, only for corporate portfolios.
- No.

17. What is the length of the underlying historical observation period used for the calculation of PD estimates?

- Less than 2 years.
- 2- 3 years.
- 3-5 years.
- More than 5 years.

18. If you do not compute PD's from historical data (internal default experience), can you compute PD's with any one of the following methods? (Please mark all applicable.)

- The use of external data and pooled data (eg data from major rating agencies, national credit registeries , loss data from trade association reports).
- Statistical default models.
- A combination of the above techniques.
- A combination of the above techniques and internal default experience.

19. Do you review your PD estimates at least annually?

- Yes.

-No.

20. Do you have a history of estimated PDs and realized defaults associated with each grade?

-Yes.

-No.

21. Do you compute long-run average loss given default (LGD) rates which explicitly evaluates likely recovery rates for each transaction in the event of default?

-No.

-Yes, and we are confident about the accuracy of estimates.

-Yes, but we do not find the estimations to be reasonable.

22. Which of the following most accurately describe your approach to the estimation of LGD?

-Standard valuation procedures and discount factors based on type of security set out in the bank's policy documents, based largely on management judgmental industry benchmarks/ rules of thumb.

-Directly estimating an expected recovery percentage - e.g. in the case of impaired assets.

-Applying a generic classification based on the type of exposure for certain types of exposure, for example exposures secured over residential property.

-Based on historical data.

-Other. (Please specify.)

23. If you do compute LGD based on historical data, what is the length of the underlying historical observation period used for the calculation of PD estimates?

-Less than 2 years.

-2-3 years.

-3-5 years.

-More than 5 years.

OPERATING DESIGN FEATURES OF INTERNAL CREDIT RATING SYSTEMS

24. Approximately what percentage of the rand value of your bank's total loans has an internal credit rating?

- Less than 5 percent.
- Between 5 and 25 percent.
- Between 26 and 50 percent.
- Between 51 and 75 percent.
- Between 76 and 95 percent.
- More than 95 percent.

25. Approximately what percentage of the rand value of your bank's corporate loans has an internal credit rating?

- Less than 5 percent.
- Between 5 and 25 percent .
- Between 26 and 50 percent.
- Between 51 and 75 percent.
- Between 76 and 95 percent.
- More than 95 percent.

26. Approximately what percentage of the rand value of your bank's consumer/ retail loans has an internal credit rating?

- Less than 5 percent.
- Between 5 and 25 percent.
- Between 26 and 50 percent.
- Between 51 and 75 percent.
- Between 76 and 95 percent.
- More than 95 percent.

27. If you do not rate all exposures, on what does the decision to rate/ not to rate depends?
(Please mark all that are applicable.)

-Amount of exposure. (Please specify.)

-Type of exposure. (Please specify.)

-Other. (Please specify.)

28. Which of the following most accurately describe your rating system?

-The use of identical rating methodologies for all sub- portfolios subject to rating.

-Specific applications are used for different customer groups and
-sub-portfolios.

29. Which of the following most accurately describe your bank's methodological approach to
assigning ratings?

-A credit scoring model or other quantitative tool is essentially the sole basis for determining
a rating for counterparties/ exposures.

-Ratings are based primarily on a statistical model or objective financial analysis, but
adjustment of ratings based on judgmental factors is allowed (to a limited degree).

-Ratings are assigned using considerable judgmental elements, where the relative importance
given to such elements is not formally constrained.

30. Which of the following most accurately describe the loss concept underpinning the rating?

-Reflecting counterparty default probability.

-Separate PD and LGD rating.

-Expected loss on facilities.

-Rating is not intended to reflect any specific loss concept, but reflects an ordinal ranking of
banks' exposures relative to each other.

31. Which of the following most accurately describe your rating system?

-A two-dimensional system in which separate ratings, one focused on the characteristics of the borrower (obligor rating) and another rating focused on the specific detail of the transaction (facility rating) are assigned.

-A one-dimensional system in which only a single rating, intended as a summary indication of risk that incorporates both borrower and transaction characteristics.

32. If you assign separate PD and LGD estimates, do you combine PD and LGD ratings to form an overall indicator of expected risk?

-Yes.

-No.

Structure of the rating system

33. How many different ratings do you assign? In other words, how many rating grades in total? (Please check only one.)

-3 or fewer.

-4 to 7.

-8 to 11.

-12 to 20.

-More than 20.

34. From this total number of ratings, indicate the number of rating grades for:

-Pass grades (quality borrowers/ exposures).

-Non-pass grades (for non-performing borrowers).

35. Do you include grades intended solely to capture credits needing heightened administrative action, such as so-called “watch” grades?

-Yes.

-No.

6. If you include “watch grades”, are they classified as part of :

-Pass grades.

-Non-pass grades.

37. What is the largest percentage of total rated exposures falling in a single grade?

-Less than 20%.

-20 - 29%.

-30 - 50%.

-More than 50%.

38. Do you currently rely on a rating scale that mirrors that of the ratings agencies?

-Yes.

-No.

39. If no, do you attempt to develop criteria that are consistent with that scale in order to have the internal rating process replicate that of the rating agencies?

-Yes.

-No.

40. Is your rating based on:

-Assessment of borrower’s current condition and/ or most likely future condition (point in time quality of issuers/ exposures)?

-Assessment of borrower’s riskiness based on a worst-case, “bottom of the cycle scenario”, (through the cycle approach)?

41. Which of the following factors do you take into account in assigning ratings to corporate borrowers? (Please mark all that apply.)

- Formal industry analysis.
- Management experience and competence.
- Country risk.
- Specific financial ratios.

42. If you use financial ratio analysis, which of the following specific types of ratios is included?

- Historical and projected cash flow capacity.
- Capital structure.
- Quality of earnings.
- Quality and timeliness of information about the borrower
- Degree of operating leverage
- Financial flexibility resulting from its access to the debt and equity markets to gain additional resources.

43. Do you have a formal written description of the internal credit rating classification system?

- Yes.
- No.

44. If yes, which of the following elements are included ? (Please mark all that apply.)

- What each rating means in terms of default probability.
- Model inputs.
- Model maintenance (changes to calculations, ratings system, etc).
- Exceptions to data inputs.
- Model overrides.
- Ex post* evaluation.

45. Which of the following criteria for each risk grade is explicitly included in your credit risk policies?

- Factors that should be considered in assigning a grade.
- How these factors should be weighed in arriving at a final grade.
- Explicit quantitative target ratios or ranges.
- Verbal qualitative criteria in case of less measurable factors.

Applications/ uses of ratings

46. Do you include ratings information in reports to senior management for the purpose of monitoring the risk composition of the rated portfolios?

- Yes, routine (at least monthly) and comprehensive reporting including both quantitative risk measures and qualitative perspectives.
- Yes, routine reporting (at least monthly), but limited in scope.
- Yes, *ad hoc*, event-driven reporting.
- None.

47. Which of the following elements are included in reports to senior management?(mark all that are applicable.)

- Aggregate exposure for all rating classes.
- Limits assigned according to rating grades.
- Borrower specific information, such as major shifts in rating classes for a single customer.
- Risk profile by grade.
- Migration across grades.
- Quantification of loss estimates per grade.
- Comparison of realized default rates against expectations.

48. Are you confident that such reports are specific enough to allow third party assessment of the ratings assigned and the associated calibration of average PD per grade?

- Yes.
- No.

49. For which of the following applications do you use your ratings? (Mark all that are applicable.)

- To identify deteriorating or problem loans.
- Used in computing internal profitability measures.
- For pricing analysis purposes.
- Attributing economic capital to products or business lines.
- Credit approval authorities and limits.
- Analysis of bank's capital adequacy, reserving and profitability.
- Performing stress tests to assess capital adequacy.

50. If you engage in stress testing, which of the following is included in your stress testing?

- Economic or industry downturns.
- Market risk events.
- Liquidity conditions.

51. Do you base compensation for relationship managers explicitly on ratings?

- Yes.
- No.

System development and enhancement

52. Did you develop your rating system ...

- internally;
- in cooperation with outside consultants;
- purchased from a third party?

53. Have you recently (within the past two years) expanded the number of risk grades as part of wider upgrades of your bank's rating system?

- Yes.

-No.

54. Does your bank use any of the following rating assessment tools to assist staff in rating determinations? (Please mark all that are applicable.)

-Use of external ratings (where these are available).

-More tailored rating definitions providing explicit guidance to raters (incorporating detailed quantitative and qualitative rating benchmark).

55. Which of the following control measures is applicable to your rating system? (Please mark all that apply.)

-Internal ratings can only be amended using specific procedures.

-Internal ratings are made available throughout the firm to allow users to flag inconsistencies and play the role of control officers.

-The rating and rating-validation processes are reviewed by senior management, i.e. managers with sufficient seniority and authority to enforce reductions in a bank's overall risk exposure.

-The assignment of credit ratings is integrated into the bank's normal credit approval/review processes and is subject to the checks and balances built into those systems.

-None of the above.

Review of ratings

56. Which of the following review and monitoring measures are used in your bank? (Please mark all that apply.)

-Monitoring by those who assign the initial rating of a transaction.

-Occasional reviews of a business unit's rating assignments by independent loan review unit.

-Formal periodic review, at least annually by an independent credit review unit.

-Early review events supported by centralised and/or automated monitoring systems.

-More frequent periodic reviews for lower-rated exposures.

-Other. (Please specify.)

57. Which of the following is addressed as part of the ratings review process? (Please mark all that apply)

-Review of override decisions

-Seek to track potential instances of “gaming” rating models whereby loan officers might alter customer information and re-enter it several times in order to obtain a better rating recommendation.

-The quality, completeness and appropriateness of data inputs into the model is reviewed on a regular basis.

58. Does your bank use any of the following measures to ensure the accuracy and integrity of data inputs in the rating system?

-Automated data transfer linkages to minimize/eliminate rekeying of ratings input data (e.g. financial ratios from financial spreading packages) and of completed ratings.

-Where industry characteristics form an important input into rating models, an economics or other specialized unit, rather than individual lending/credit officers, is responsible for inputting relevant industry assessments.

-Other. (Please specify.)

59. Does a poor credit process ratings review received from the review teams have implications for credit authority and staff remuneration?

-Yes.

-No.

Validation

60. Do you perform some degree of backtesting to assess accuracy and consistency of each grade’s loss characteristics?

-Yes.

-No.

61. If yes, which of the following approaches to validation do you use? (Please mark all that are applicable.)

-Regular monitoring of credit migration data against expected outcomes.(For example, comparing expected default rates vs. actual defaults).

-Comparing internal ratings with other available rating alternatives, e.g. external agency ratings and/or externally developed rating models.

-Other. (Please specify.)

PREPARATION FOR IMPLEMENTATION OF THE NEW CAPITAL ACCORD (BASEL II)

Pillar 1: Chosen (likely) approach to compliance

62. Which of the following approaches for the calculation of regulatory credit risk capital charges are you aiming to adopt?

-Advanced IRB.

-Foundation IRB.

-Standardized approach.

-Undecided.

63. If you have decide not to choose the internal rating based approach, please state your reasons.

64. What is your estimation of the likely impact of Basel II on the level of regulatory capital that you are required to hold?

-Will lead to an increase.

-Will lead to a decrease.

-Not sure.

65. Where do you consider the adoption of your preferred approach will add the most value?

-Reduction in capital requirements/refining the process for allocating and charging capital.

- The introduction of more sophisticated risk-adjusted pricing.
- Enhanced reputation/ better rating due to advanced risk management techniques.
- Expansion of eligible collateral.
- Improved rating system.
- Improved process quality.

66. Which of the following do you consider the biggest obstacles to implementation of the preferred approach? (Please mark from 1 to 8, with 1 indicating “biggest perceived obstacle” and 8 “smallest obstacle.”)

- Missing data for determination of probability of default (PD).
- Missing data for determination of loss given default (LGD).
- Resources required for data collection.
- Required business process re-design.
- Missing capacity for credit risk management experts.
- Cost of compliance with Basel II.
- Capturing of information about collateral and other credit risk mitigation techniques.
- Dealing with volatility of more risk sensitive capital regime.

67. Have you done any assessment of your current risk information system in order to determine whether it would meet the tests of being subject to external verification, regulatory scrutiny and transparency of the new disclosure requirements?

- Yes.
- No.

68. Has your bank initiated any review work regarding compliance with the requirements of Basel II? In other words, did your bank already started Basel II projects? (Please mark all applicable.)

- Yes, credit risk project.
- Yes, operational risk project.

69. If you are delaying preparations, what are your reasons for this?

-Waiting for greater clarity that will come from the publication of finalised proposals and deadlines.

-Resource shortage, both of management and risk know-how.

-Basel II not a priority/ other more pressing challenges.

-Other. (Please specify.)

70. If yes, what phase is your project at?

-Establishing the team.

-Project planning.

-Pre-study/diagnostic review.

-Detailed assessment.

-IT assessment.

-Implementation.

71. If your bank does have a Basel II project, does it include cost-benefit analysis?

-Yes.

-No.

72. Are you familiar with the qualitative requirements regard risk rating system as set out by Basel II?

-Yes.

-No.

73. Do you perceive compliance with these standards as a major challenge for your bank?

-Yes.

-No.

74. Do you use or plan to use external consultants to assist in the planning and delivery of the Basel II project?

-Yes.

-No.

75. Did you experience any difficulty in obtaining buy-in from senior executives and business heads?

-Yes.

-No.

76. Do you perceive any cultural and organizational challenges in bringing Basel II center stage in the way the organization is managed going forward?

-Yes.

-No.

THANK YOU

APPENDIX FOUR: Issues raised in a non-scheduled interview with representatives from the Bank Supervision Department of the South African Reserve Bank

Summary of issues raised in a non-scheduled interview with Dries Smal and Jay Tikam from the Bank Supervision Department of the South African Reserve Bank on 12 April 2002.

The first part of the interview dealt with general issues of bank supervision and regulation in South Africa. The following questions were posed to the representatives of the Bank Supervision Department in this regard:

1. Please comment on the recent decision to increase the minimum capital requirements for South African banks to 10% of risk-weighted assets.
2. Please comment on the latest developments regarding the proposed deposit insurance scheme for South Africa.
3. Please comment on recent changes to the regulatory framework of bank regulation and supervision in South Africa.
4. Please comment on the safety and soundness of the South African banking sector, seen in the light of recent failures and turmoil in the banking sector.

The second part of the interview dealt with specific issues regarding the implementation of the proposed new Basel Accord. The following questions were posed to the representatives of the Bank Supervision Department in this regard:

1. Do you foresee that the majority of South African banks will adopt the internal ratings based (IRB) approach to the calculation of minimum regulatory capital requirements? Please state reasons for your answer.
2. What do you perceive to be the biggest obstacles in the implementation of the internal ratings based approach in the South African context? Please state obstacles and challenges for both the banking sector and the Bank Supervision Department.

3. Did you already start with any evaluation of South African banks' internal credit risk rating systems? Do you have any idea of the extent of deviations between South African banks' current internal credit risk rating system practices and the requirements set for adoption of the IRB approach?

4. Do you regard the recent implementation of the system of on-site reviews as a useful stepping stone to implement the proposed new Basel Accord? Please refer specifically to the emphasis placed on the risk management process at banks in the new Accord.

5. What is your estimation of the likely impact of Basel II on the overall levels of regulatory capital held in the South African banking sector?

6. Briefly explain your "plan of action" with regard to preparation for the implementation of the proposed new Basel Accord.

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KEY WORDS

Credit risk

Basel Capital Accord

Minimum capital requirements

Credit risk ratings

Credit risk models

ABSTRACT

In the current environment of globalization and increasing competition in the financial services industry, risks are larger in scope and scale than ever before. Keeping pace with the changes in the risk environment, as well as with the latest developments in risk management practices, poses significant challenges to regulators and banks alike. For supervisors, the most important challenge involves developing an approach to capital regulation that works in a world of diversity and near-constant change. Financial institutions face the challenge of implementing advances in risk modeling in a coherent and systematic fashion, and of coping with conceptual difficulties regarding model specification and data limitations. The New Capital Adequacy Framework proposed by the Basel Committee is an attempt to address these challenges.

The proposed new Basel Capital Accord is one of the key initiatives for strengthening bank soundness, and thus financial sector stability. This is both a wide-ranging and ambitious reform that seeks to better align regulatory capital with economic risk. It represents a real advance on the 1988 Capital Accord, and the proposals mark a decisive step away from a “one size fits all” supervisory approach to capital. Rather than imposing a single method for calculating capital requirements, institutions will be able to select from a range of approaches for capturing, measuring, and controlling credit and operational risks. More sophisticated control structures will be rewarded by lower capital charges. If the Basel proposals are implemented as planned, they will have important effects both on individual banks and on financial markets as a whole.

However, implementation of the proposed Accord creates additional challenges, especially in an emerging market context. The main aim of the study is to identify the challenges posed by the implementation of the proposed capital adequacy framework to South African banks and bank supervisors, and to see how prepared they are for these challenges. This study is mainly concerned with the credit risk proposals of the new Accord, and the impact of the proposed new Accord on the credit risk management practices of South African banks.

Against the background of South Africa's sophisticated and efficient financial markets, and yet its vulnerability as an emerging market, an overview is given of the structure of the South African banking sector. This includes quantitative indicators of financial system soundness, like various indicators of credit risk and capital adequacy. An overview is given of the risk management practices of South African banks, as well as of the supervisory approach of the South African Reserve Bank. All of this is compared to international “best practice” policy

guidelines.

Although a review of annual reports of South African banks suggests a relatively sophisticated approach to credit risk management and the use of internal credit risk ratings, the rating systems of South African banks do not meet all the requirements set out by the Basel Committee for the internal ratings-based approach to setting regulatory capital requirements.

Several observers warn that the preconditions for implementing important components of the Basel Accord are absent in most emerging market economies. The findings of this study suggest that this is not the case in the South African situation. South African bank supervisors are efficient, as evident in the findings of the FSAP. The factors that seemingly cause minimum capital requirements to be an inefficient tool in enhancing bank system soundness in many emerging market countries do not seem to be present in the South African banking sector. These factors are the lack of a sufficiently deep and liquid capital market that makes the raising of “low quality” capital possible, and the lack of policy measures such as loan-loss provision regulations that complement minimum capital requirements. Indeed, the regulatory framework in South Africa was recently amended so as to be in line with international best practice standards, and to address any limitations pointed out by the FSAP.

However, the new Accord does represent new ground for South African supervisors in several aspects, such as with the evaluation of banks’ internal credit risk rating systems. South African bank supervisors have already started with specific measures to address challenges posed by the implementation of the new Accord. South African banks have also started with preparations for the implementation of the Accord. All the surveyed banks indicated that they want to adopt the advanced IRB approach. The current sophisticated approach to credit risk management and the use of sophisticated models in this regard, constitute a useful platform for this to take place from. However, current practice does not conform to all the requirements set by the Basel Committee, and substantial logistical challenges remain.

In general, the credit risk management practices of South African banks seem to be sophisticated and in line with international best practice. The survey has shown that the large South African banks have recognized this challenge and have been working for some time on identifying, modifying, developing and implementing sophisticated credit risk models and the organizational context for a portfolio-orientated credit risk management. The survey also

outlined the current state of play regarding credit risk rating among South African banks, and provided some international comparisons. Generally speaking, South African banks' credit risk rating practices appear to be in line with those of their international peers.

A key challenge faced worldwide by virtually all developers and users of internal credit risk rating systems, including prudential supervisors looking to utilize banks' internal ratings for regulatory capital and other purposes, is the widespread lack of good long-run data on the performance of banks' loans. The lack of such data can impact on the ability of an institution to develop effective rating tools. It can also impede efforts to verify the accuracy and robustness of institutions' rating systems, to assign reliable quantitative loss estimates to risk grades, and to make reliable comparisons of ratings from different institutions: all important tasks, not only from the perspective of the banks themselves, but also from the point of view of their prudential supervisors (particularly in the context of proposals to utilize banks' internal ratings for regulatory capital purposes).

The survey highlighted one important aspect where current South African practice lags behind Basel requirements: disclosure regarding credit risk modeling and specifically rating systems. This would be one of the key areas that need to be addressed before the IRB approach can be implemented.

Apart from implementation challenges in individual countries, there is concern over the impact of the proposed new Basel Accord on global financial system stability. This includes questions about its impact on capital flows to emerging market countries and the potential pro-cyclical impact of the new Accord. These concerns highlight the need for greater coordination within the international community on the reform agenda in an increasingly integrated international financial system.

OPSOMMING

Die omvang van risiko's in die finansiële dienste-industrie is groter as ooit tevore in die huidige omgewing van globalisering en toenemende mededinging. Om in pas te bly met veranderings in die risiko omgewing sowel as met die nuutste ontwikkelings in risiko-bestuurspraktyke, word aansienlike uitdagings aan beide banke en bankreguleerders gestel. Vir banktoesighouers is die grootste uitdaging om 'n benadering tot kapitaalregulering te ontwikkel wat vir 'n diverse en dinamiese omgewing geskik is. Vir finansiële instellings is die grootste uitdaging om verbeterings in risikometing en bestuurspraktyke op 'n sistematiese wyse te implementeer en terselfertyd konsepsuele probleme rakende risiko-modelspesifikasie en databeperkings te hanteer. Die Nuwe Kapitaal Reguleringsraamwerk, soos voorgestel deur die Baselse Komitee is 'n poging om hierdie uitdagings aan te spreek.

Die voorgestelde nuwe Baselse Ooreenkoms is 'n sleutelinisiatief om bankveiligheid en gevolglik ook stabiliteit in die finansiële sektor te versterk. Dit is beide 'n verreikende en ambisieuse hervorming gemik op die belyning van regulerende kapitaalvereistes en ekonomiese risiko. Die nuwe kapitaalraamwerk hou besliste voordele in bo die bestaande benadering. Die voorstel beweeg weg van 'n "one size fits all" benadering tot die toesighoudende benadering tot kapitaalvereistes. In plaas van die gebruik van slegs een opsie vir die berekening van kapitaalvereistes, bestaan daar nou 'n keuse tussen 'n verskeidenheid benaderings tot die berekening en bestuur van kapitaal. Banke wat 'n gesofistikeerde benadering tot risikometing en -bestuur volg, sal uit laer kapitaalvereistes kan voordeel trek. Die implementering van die voorgestelde Baselse Ooreenkoms sal verreikende implikasies vir beide individuele banke en finansiële markte inhou.

Die implementering van die voorgestelde Baselse ooreenkoms sal egter verskeie uitdagings daarstel, veral in 'n ontluikende markte konteks. Die doel van hierdie studie is om die uitdagings wat die implementering van die voorgestelde kapitaal ooreenkoms aan Suid-Afrikaanse banke en banktoesighouers stel, te identifiseer. Die mate waartoe Suid-Afrikaanse banke en banktoesighouers voorbereid is om hierdie uitdagings die hoof te bied, word ook aangespreek. Die studie konsentreer op die kredietrisikovoorstelle van die nuwe Kapitaal Ooreenkoms, asook die impak van hierdie voorstelle op Suid-Afrikaanse banke se krediet-risikobestuurspraktyke.

'n Oorsig van die struktuur van die Suid-Afrikaanse bank sektor word teen die agtergrond van die gesofistikeerde en effektiewe Suid-Afrikaanse finansiële markte gegee en die kwesbaarheid van Suid-Afrika se status as 'n ontluikende mark word ook aangetoon.

Kwantitatiewe indikatore van die veiligheid van 'n finansiële sektor, soos verskeie aanduiders van kredietrisiko en kapitaaltoereikendheid word gegee. Die studie sluit ook 'n oorsig in van Suid-Afrikaanse banke se benadering tot kredietrisikobestuur, sowel as die toesighoudende benadering van die Bank Toesighoudings Departement van die Suid-Afrikaanse Reserwebank.

Hoewel Suid-Afrikaanse banke 'n gesofistikeerde benadering tot kredietrisikobestuur en kredietrisikograderings volg, voldoen huidige risiko graderingstelsels nie aan al die vereistes gestel deur die Baselse Kommittee om vir die interne graderingsbenadering ("IRB") vir die berekening van kapitaalvereistes te kwalifiseer nie .

Verskeie waarnemers waarsku dat belangrike voorvereistes vir die suksesvolle implementering van belangrike komponente van die Baselse Ooreenkoms in verskeie ontluikende markte afwesig is. Die resultate van hierdie studie dui daarop dat dit nie die geval in Suid-Afrika is nie. Die FSAP missie beskou Suid-Afrikaanse banktoesighouers as bekwaam en effektief. Die faktore wat die effektiwiteit van minimum kapitaalvereistes in die bevordering van bank veiligheid en stabiliteit in verskeie ontluikende markte bemoeilik, is skynbaar afwesig in die Suid-Afrikaanse banksektor. Hierdie faktore sluit die gebrek aan 'n likiede kapitaalmark in, wat dit moontlik maak om "lae kwaliteit" kapitaal te verkry, asook 'n gebrek aan beleidsmaatreëls soos voorsiening vir leningsverliesregulasies wat minimum kapitaalvereistes komplimenteer. Die regulerende raamwerk ten opsigte van Suid-Afrikaanse banke is inderdaad onlangs gewysig ten einde dit in ooreenstemming met internasionale praktyke te bring en om enige beperkings, soos aangedui deur die FSAP, aan te spreek.

Implementering van die voorgestelde Baselse Ooreenkoms verteenwoordig nuwe terrein vir Suid-Afrikaanse bankreguleerders, insluitende die evaluering van banke se interne risiko-graderingstelsels. Suid-Afrikaanse bankreguleerders het reeds begin met spesifieke maatreëls om uitdagings, gestel deur die implementering van die nuwe Ooreenkoms die hoof te bied. Suid-Afrikaanse banke het ook reeds met voorbereidings vir die implementering van die nuwe Ooreenkoms begin. Al die banke wat in die steekproef ingesluit is, het aangedui dat hulle beplan om die gevorderde interne risikograderingsbenadering ("advanced IRB") te volg. Die huidige gesofistikeerde benadering tot kredietrisikobestuur en die gebruik van gesofistikeerde modelle in hierdie verband, verteenwoordig 'n waardevolle platform vir die implementering van die IRB benadering. Die huidige struktuur van Suid-Afrikaanse banke se interne risiko- graderings en die algemene benadering tot die toekenning van risikograderings voldoen egter nie aan al die vereistes gestel deur die Basel Komitee vir kwalifisering vir die gebruik van die interne risiko-graderingsbenadering nie en verskeie wesenlike logistiese

uitdagings bly oor.

Oor die algemeen blyk dit dat Suid-Afrikaanse banke 'n gesofistikeerde benadering tot kredietrisikobestuur volg, in ooreenstemming met internasionale standaarde. Die bevindinge van die studie dui daarop dat die groot Suid-Afrikaanse banke die uitdagings voortspruitend uit veraderings in die krediet risiko omgewing aanvaar en reeds geruime tyd besig is met die indentifisering, ontwikkeling en implementering van gesofistikeerde kredietrisiko-modelle en die organisatoriese konteks vir portefeulje-georiënteerde kredietrisikobestuur. Die studie het ook die huidige benadering van Suid-Afrikaanse banke tot interne krediet risikograderings geskets en verskeie internasionale vergelykings getref. Oor die algemeen lyk dit of Suid-Afrikaanse banke se risikograderings praktyke in lyn is met hulle internasionale eweknieë.

Die gebrek aan betroubare langtermyn data rakende banklenings is 'n sleutel uitdaging vir alle gebruikers van interne krediet-gradering stelsels wêreldwyd. Gebruikers sluit in banktoesighouers wat die risikograderingstelsels moet evalueer vir regulerende kapitaalvereistes. Die gebrek aan sodanige data het negatiewe implikasies vir die vermoë van banke om effektiewe graderingsinstrumente te ontwikkel. Dit bemoeilik ook die verifikasie van die akkuraatheid van banke se gradering stelsels, ten einde onder andere betroubare kwantitatiewe beanderings van waarskynlikheid van wanbetaling te bereken. Al hierdie toepassings is belangrik, nie net uit die oogpunt van banke nie, maar ook uit die oogpunt van bankreguleerders (spesifiek in die lig van die voorstelle om banke se interne risikograderings vir regulerende kapitaalvereistes te gebruik).

Die empiriese studie beklemtoon veral op een aspek waar die huidige Suid-Afrikaanse bankpraktyke agterweë bly by internasionale praktyke: die bekendmaking van inligting rakende krediet- risikomodelering en veral kredietrisikograderingstelsels. Dit verteenwoordig 'n sleutel aspek wat aangespreek behoort te word alvorens die IRB benadering suksesvol geïmplementeer kan word.

Behalwe die implemteringsuitdagings in individuele lande, bestaan daar kommer oor die impak van die nuwe Baselse Ooreenkoms op die stabiliteit van wêreldwye finansiële stelsels. Spesifieke faktore wat hierby ingesluit word, is die vrae oor die impak op kapitaalvloeie na ontluikende markte en die potensiële pro-sikliese impak van die nuwe Baselse Ooreenkoms. Die behoefte aan verhoogde koördinasie binne die internasionale gemeenskap ten opsigte van die agenda vir verandering in 'n toenemend geïntegreerde internasionale finansiële stelsel word uitgelig.