THE POTENTIAL IMPACT OF TRADE ON THE ECONOMY OF LESOTHO

by

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DECLARATION

I declare that the thesis hereby submitted by me for the PhD degree in Agricultural Economics at the University of the Free State is my own independent work and has not previously been submitted by me at another university.

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Y.T. Bahta

May, 2007

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ABSTRACT

The potential impact of trade on the economy of Lesotho was assessed using the Lesotho Social Accounting Matrix (SAM) 2000 as a data base to construct a Computable General Equilibrium (CGE) model, to design trade policy scenarios, and to simulate the impact of trade policy scenarios on the Lesotho economy

Since the Lesotho SAM was unbalanced, it was necessary to balance the initial matrix, using the cross-entropy optimization procedure with the aid of GAMS software.

Four simulation sets were carried out. Results from two sets (duty-free access (DFA) and a +10% increase in world prices) indicate significantly increased textile exports and decreased prices for imported commodities. DFA will also be associated with increased textile imports, while a +10% increase in world prices will lead to increased crop imports. Demand and supply prices of textile commodities produced and sold domestically will decrease, as will composite goods prices in the textile sector. Average output price of textiles will decrease with DFA and with a 10% increase in world prices; the aggregated marketed commodity quantity for textiles will increase.

Output prices of fruit and vegetable processing and intermediate aggregate inputs for the textile sector decrease with DFA. An increase of 10% in world prices will lead to increased water service prices. The textile sector will experience increased value added prices in both scenarios. Gross domestic product (GDP) for the textile sector will increase significantly.

Lesotho will gain in welfare, measured in terms of equivalent variation (EV). Effects on labour categories depend on changes in productive activities. In the textile sector, labour demand, labour income, and capital income will increase significantly. Lesotho's net commodity exports and gross government expenditure will also increase.

Erosion of existing preferential access (EEP) and common external tariffs for non-SACU member states (CET) will reduce the quantity of textile products exported; with EEP, the price of imported textiles will increase and the quantity decrease. CET will have similar effects on the skins and hides sector. Demand and supply prices of textile commodities produced and sold domestically (with EEP) and pharmaceutical products (with CET) will increase. Prices of composite textile goods will increase slightly. Average output price for textiles at EEP and pharmaceutical products at CET will increase, and the aggregated marketed commodity quantity for the textile sector will decrease in both scenarios.

With EEP, prices of output and intermediate aggregate outputs of textiles and micro industry outputs will increase. CET effects will be smaller. The textile sector at EEP and accommodation-catering services at CET will experience decreased prices of value added. Gross domestic product (GDP) of the textile sector will decrease. Welfare or equivalent variation (EV) will decline. Employment in the textile sector will decline with a concomitantly small decrease in labour and capital income.

The EEP regime will lead to decreased total government consumption expenditure, while CET will cause a slight increase; this translates into decreased net commodity imports. Effects vary among economic sectors.

Performance in U.S. markets indicates that Lesotho's textile exporters have been competitive under MFA/ AGOA arrangements. This competitiveness can, however, be jeopardized by lower costs in some Asian countries. The policy makers should develop permanent comparative advantage to avoid the risk of losses when temporary tariff preferences are discontinued.

Lesotho's export trade is highly concentrated, both in terms of products (textiles) and markets. Diversification of products and markets is prerequisite for avoiding failure and for sustainable development of the country; considerable manufacturing potential for export diversification exists in furniture, bricks, sandstone and ceramics, wool and mohair products, pharmaceutical products, and the recently revitalised diamond industry. Export trade development and market penetration to non-US destinations should receive attention.

In this process, the government should strengthen the capacity of the private sector to deal effectively with rapid change and growing competition by means of, for example, knowledge dissemination, technological transfers, and negotiations for improved market access for textile and other potential export products.

Key Words: Lesotho, SAM, CGE, Cross-entropy, Trade, Trade policy, DFA, EEP, CET and EV.

DIE POTENSIËLE IMPAK VAN HANDEL OP DIE EKONOMIE VAN LESOTHO

deur

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SAMEVATTING

Die potensiële impak van handel op die ekonomie van Lesotho is bepaal deur die Lesotho Sosiale Rekeninge Matriks (SAM) 2000 as databasis te gebruik vir die opstel van ‘n Berekenbare Algemene Ewewigsmodel (CGE), ten einde die impak van handelsbeleidscenario’s op Lesotho se ekonomie na te boots.

Aangesien die Lesotho SAM nie gebalanseer was nie, was dit nodig om die beginmatriks te balanseer deur gebruik te maak van die kruis-entropie optimeringsprosedure, met behulp van die GAMS sagteware.

Vier stelle simulasie is gedoen. Resultate komende van twee (aksynsvrye toegang (DFA) en ‘n 10%-toename in wêreldpryse) toon aansienlik verhoogde tekstieluitvoere en laer pryse vir ingevoerde kommoditeite. DFA sal ook gepaard gaan met verhoogde tekstielinvoere, terwyl ‘n 10%-toename in wêreldpryse sal lei tot verhoogde invoere van akkerbouprodukte. Vraag- en aanbodpryse van tekstielprodukte wat plaaslik geproduseer en verkoop word sal styg, soos ook dié van saamgestelde goedere in die tekstielsektor.

Met DFA sal gemiddelde produksiepryse van tekstiel afneem, terwyl ‘n 10%-wêreldprystoename die geaggregeerde hoeveelheid bemarkte tekstielgoedere sal laat styg. Produksiepryse van vrugte- en groenteprosessering en van intermediêre geaggregeerde insette vir die tekstielsektor sal met DFA afneem. ‘n 10%-toename in wêreldpryse sal tot verhoogde waterdienstepryse lei. Die tekstielsektor sal met albei scenario’s verhoogde pryse in waardetoevoeging beleef. Die bruto binnelandse produk (BBP) vir die tekstielsektor sal aansienlik toeneem.

Lesotho sal baat in terme van welvaart, gemeet as ekwivalente variasie (EV). Effekte op arbeidskategorieë hang af van veranderings in produksie-aktiwiteite. In die tekstelsektor sal vraag na, en inkomste van arbeid, sowel as kapitale-inkomste beduidend toeneem. Lesotho se netto kommoditeitsuitvoer en bruto regeringsbesteding sal ook toeneem.

Erosie van bestaande voorkeurtoegang (EEP) en gemeenskaplike eksterne tariewe vir SADU-ledelande (CET), sal lei tot verminderde tekstieluitvoere; pryse van ingevoerde tekstielware sal styg en die uitvoerhoeveelheid sal daal met EEP. CET sal ‘n soortgelyke uitwerking op die huide- en vellesektor tot gevolg hê. Vraag- en aanbodpryse van plaaslik geproduseerde en verkoopte tekstielware (met EEP) en van farmakologiese produkte (met CET) sal toeneem. Pryse van saamgestelde tekstielware sal ietwat toeneem. Met EEP sal die gemiddelde produksieprys van tekstielware, en met CET dié van farmakologiese produkte, styg en met albei scenario’s sal die geaggregeerde bemarkte hoeveelheid tekstielware afneem.

EEP sal pryse van uitset en geaggregeerde uitset van tekstielware en mikro-nywerheidsuitsette laat toeneem. CET sal kleiner effekte meebring. Met EEP sal die tekstielsektor, en met CET akkommodasie-verversingsdienste, verlagings in pryse van waardetoevoeging ondervind. BBP van die tekstielbedryf sal afneem en so ook welvaart of ekwivalentevarasie (EV). In die tekstielsektor sal indiensneming daal met ‘n meegaande klein afname in arbeids- en kapitaalinkomste.

Die EEP en CET regimes sal onderskeidelik kleiner en ietwat groter totale regerings-verbruiksbesteding meebring; wat weer tot velaagde netto goedere-invoere sal lei. Effekte varieer tussen ekonomiese sektore.

Prestasies in markte van die VSA toon dat Lesotho se tekstieluitvoerders mededingend was onder MFA/AGOA reëlings. Hierdie mededingendheid kan egter deur laer koste in sommige Asiatiese lande bedreig word. Beleidsvormers behoort, deur mededingende voordeel te ontwikkel, die risiko van verliese by die beëindiging van tydelike tariefvoordele vermy.

Lesotho se uitvoerhandel is hoogs gekonsentreerd in terme van beide produkte (tekstielware) en markte. Diversifisering van produkte en markte is ‘n voorvereiste vir die vermyding van mislukking en vir volhoubare ontwikkeling in ‘n land. Daar bestaan aansienlike vervaardigingspotensiaal vir uitvoer-diversifikasie in meubels, stene, sandsteen en keramiek, wol- en bokhaarprodukte en die onlangs herleefde diamantbedryf. Daar behoort aandag geskenk te word aan uitvoerontwikkeling en markindringing in nie-VSA bestemmings.

Die regering behoort in hierdie proses die kapasiteit van die privaatsektor om effektief snelle verandering en toenemende mededinging te hanteer, te versterk deur byvoorbeeld kennisdisseminasie, tegnologie-oordragte en onderhandelings vir verbeterde marktoegang vir tekstielware en ander potensiële uitvoerprodukte.

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LIST OF ABBREVIATIONS

ACP	African, Caribbean and Pacific countries
ADR	Africa Development Report
AFTA	Asian Free Trade Area
AGE	Applied General Equilibrium
AGOA	African Growth and Opportunity Act
ANON	Anonymous
APEC	Asian Pacific Economic Cooperation
BLNS	Botswana, Lesotho, Namibia and Swaziland
BOP	Balance of Payment
BOS	Bureau of Statistics
CBL	Central Bank of Lesotho
CE	Cross Entropy
CES	Constant Elasticity of Substitution
CET	Common External Tariffs
CET	Constant Elasticity of Transformation
CGE	Computable General Equilibrium
CMA	Common Monetary Union
CMT	Cut-Make-Trim
COI	Countries Oriented Inward
COMESA	Common Market of Eastern and Southern Africa
COO	Countries Oriented Outward
CPI	Consumer Price Index
CRESH	Constant Ratio of Elasticities of Substitution, Homothetic
CU	Custom Unions
DFA	Duty Free Access
EAC	East African Community
EBA	Everything But Arms'
EC	European Community
EEC	European Economic Community

EEP	Erosion of existing Preferential Access
EPA	Economic Partnership Agreements
EU	European Union
EV	Equivalent Variation
FCU	Foreign Currency Unit
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
GAMS	General Algebraic Modelling System
GATS	General Agreements on Trade in Services
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GME	Generalized Maximum Entropy
GNI	Growth National Income
GNP	Gross National Product
GSP	Generalized Scheme/ Systems of Preferences
GST	General Sales Tax's
GTAP	Global Trade Analysis Project
HES	Household Expenditure Survey
IFPRI	International Food Policy Research Institute
ILEAP	International Lawyers and Economists Against Poverty
IMF	International Monetary Fund
IO	Input-Output
ITC	International Trade Centre
ITIS	International institution of Singapore
ITSUR	Iterated Seemingly Unrelated Regression
LAFTA	South America Free Trade Area
LCU	Local Currency Unit
LDC	Least Developing Country
LES	Linear Expenditure System
LESSAM	Lesotho Social Accounting Matrix
LHWP	Lesotho Highlands Water Project

LNDC	Lesotho National Development Corporation
LP	Linear Programming
MCP	Mixed Complementary Programming
ME	Maximum Entropy
MERCOSUR	Southern Common Market
MFN	Most Favoured Nation
MSG	Multi Sectoral Growth
NAFTA	North American Free Trade Area
NDA	National Department of Agriculture
NEPRU	Namibian Economic Policy research Unit
NTB’s	Non-Tariff Barriers
OECD	Organization for Economic Cooperation and Development
PRGF	Poverty Reduction and Growth Facility
PTAs	Preferential Trading Arrangements
REER	Real Effective Exchange Rate
REPA	Regional Economic Partnership Agreement
ROW	Rest of the World
RSA	Republic of South Africa
SACU	Southern African Custom Union
SADC	Southern African Development Community
SADCC	Southern African Development Community Conference
SAM	Social Accounting Matrix
SEM	Single European Market
SITC	Standard International Trade Classification
SMMEs	Small, Medium and Micro Enterprises
SRV	Senqu River Valley
SSA	Sub-Saharan Africa
SUR	Seemingly Unrelated Regression
TCDA	Trade Cooperation and Development Agreement
TIMs	Trade related Investment Measures
TRIPs	Trade Related aspects of Intellectual Property Rights

UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
US	United States
USD	United States Dollar
USITC	United States International Trade Commission
VAT	Value Added Tax
WB	World Bank
WDI	World Development Indicator
WIR	World Investment Report
WTO	World Trade Organization

CHAPTER 1
INTRODUCTION

1.1 Background

Trade analysis and trade policy analysis largely involves analyzing implications of trade policy instruments on production structures of economies at the national and global level. Trade policy instruments such as tariffs and quotas have both direct and indirect effects on the relative prices of commodities produced in a given country. As the mix of goods and services produced change, the demands for factors of production also change. Consequently, it is difficult in any given economy to conceive a situation where the change in trade policy would affect only one sector. As a result of the forward and backward linkages and their related strengths in a particular economy, there is always a relative change in the mix of sectoral outputs. This by extension affects the relative mix of the different factors of production in the different sectors (Karingi, Lang, Oulmane, Perez, Sadni and Ben Hammouda, 2005).

The country-level effects on output mix and demands for factors of production can in the context of international trade be extended to the global economy. Changes in relative prices of outputs and inputs resulting from a given country's change in trade policy are transmitted to the industries and input markets of other economies that the country trades with. Therefore, for trade policy analysis to be meaningful and for robust results to be produced, the interactions that prevail among different sectors as a result of a change in a given or group of countries trade policy instruments must be taken into account. The general equilibrium methodology provides an analytical framework that allows these inter- and intra-sectoral changes in output mix and by extension the demand for different factors of production to be captured.

A wide variety of techniques has been used in attempts to demonstrate that increases in exports, increases in trade, or liberalized trade policies lead to faster rates of economic growth. In-depth comparative country studies, popularized in the 1970s, suggested that developing countries with policies which were relatively open toward international trade enjoyed better economic performance than countries with relatively closed policies. Attempts to establish statistical causation between exports and growth have had mixed success, as have attempts to include measures of trade or trade liberalization in cross-country studies of economic growth.

One difficulty with much empirical literature on trade and economic growth is that there are a variety of measures of openness. These are based variously on ratios of trade to Gross Domestic Product (GDP), measures of tariffs and Non Tariff Barriers (NTBs), measures of exchange rate distortion, subjective assessments of policies, survey data, and econometric measures of the difference between actual trade and statistically expected trade. These measures do not consistently agree with each other, with countries scored as "open" by one criterion appearing to be "closed" by other criteria. This suggests that there may be several types of openness and/or fragility in the available data (USITC, 1997).

One possibility is that more open trade may induce more rapid economic growth indirectly, either by accelerating the accumulation of productive resources or by accelerating the rate of technological change. The evidence is particularly strong that open economies experience higher rates of investment, which in turn influence rates of per capita income growth (USITC, 1997).

An isolated economy is nowadays inconceivable; we live in an era of globalization, characterized by profound structural changes in the economic, political and social aspects derived from world economic integration (Carrillo-Huerta, 2002). The literature about trade opening, globalization and regional integration, emphasizes that trade opening promotes economic growth in countries that participate in such a process. In fact, in order to determine the importance of foreign trade in economic growth, Balassa (1989) studied the economies of countries which had applied either outward-oriented or inward-oriented trade policies during the period 1963-1984. He found that countries oriented outward (COO) consistently had higher economic growth rates than countries oriented inward (COI); he also found a high correlation between growth of GDP and growth of revenue from exports (Balassa, 1989).

Along this line of study, it was found in an analysis of 20 countries carried out after World War II (WW II), that total productivity had grown at annual rates of more than three percent in countries that applied outward oriented strategies, led by exports, while the productivity of the economies that favoured import substitution had grown only around one percent. There is consensus that, *ceteris paribus*, economies that are open to trade will grow faster than countries that are closed (Sachs and Warner, 1995; Dollar, 1992). Wang and Winters (1998) argued that this consensus is especially strong with respect to Africa, where decades of import substitution policies are thought to be partially responsible for the continent's dismal economic performance (Andriamananjara and Hillberry, 2001).

A wide body of economic theory confirms that trade reform can lead to efficiency gains, increased competition, lower prices, knowledge transfers and ultimately higher economic growth. The robustness of this theory, however, has so far been predominantly demonstrated by North-North trade relations, one of the most renowned examples being the internal market of the European Union (EU). Once North-South trade liberalisation is put in a similar framework, it becomes clear that some of the potential gains from a free trade agreement with the EU might not be realised due to a lack of enabling conditions within the African, Caribbean and pacific (ACP) countries. Moreover, some of the costs that will invariably emerge due to trade reform will have more serious consequences for groups in the South.

Both empirical and circumstantial evidence suggests that the process of trade policy-making and reform is likely to be a more crucial determinant of the economic impact than the precise direction of trade policy. That is, the how question outweighs the what question where trade policy and reform are concerned. A growing body of literature is now available with respect to the conditions under which institutions develop and the role that outsiders (donors) can play in the process. Political leadership, ownership, accountability, and a long-term vision appear to be crucial ingredients for sustainable institution building.

Trade policy analysis is more robust when undertaken within a general equilibrium modelling framework. This can be seen as the first-best option as general equilibrium models not only measure the first-round effects of simulated changes, but also the second-round effects which include inter-industry effects and macroeconomic adjustments. Kehoe and Kehoe (1994) succinctly capture what general equilibrium models are. General equilibrium models are an abstraction that is complex enough to capture the essential features of the economy, yet simple enough to be tractable. These models are more popular than their partial equilibrium counterparts because they stress the interactions among different sectors.

1.2 Problem statement

Development policy objectives of many African countries in the 1960s and 1970s stressed rapid economic growth. During this period, the typical African country embedded its development policy goals in a series of national development plans in the context of a development strategy that emphasized the role of the state both in production and the regulation of economic activity. The economic growth goals of most African countries became increasingly difficult to meet, especially from the mid -1970s. Several studies have identified poor macroeconomic and sectoral policies as some of the factors responsible. Trade policy has, in this context, received considerable attention. Liberalization of trade policy, undertaken within a comprehensive development strategy, promotes deeper integration with the global economy which, in turn, may be associated with improved economic growth performance and poverty reduction. But there is also evidence that trade liberalization does not necessarily produce good results in the absence of mutually supportive policies, particularly those enhancing of domestic capabilities and associated supply response (ILEAP, 2004).

Enterprises in many ACP countries face serious constraints in producing goods competitively, because of the developing nature of ACP economies. This is a particular problem for least developed countries including Lesotho, for it is these underlying supply side constraints, which inhibit competitive forms of production, and contribute to their status as least developed countries (ILEAP, 2004). These constraints range from unreliable provision of public utilities (electricity and water supply); distance from international transport and shipping infrastructure (a particular problem for landlocked and island economies); the small size of their economies; the wider cultural context; poor public infrastructure (run down roads and railways, poor telecommunications infrastructure); weak institutional and policy frameworks (leading to fluctuating exchange rates and high inflation and interest rates) and low labour productivity (arising from poor education, health and housing provisions).

It is widely recognized that addressing these supply side constraints on production is one of the keys to the economic development of ACP countries. Trade agreement will promote more effective action in addressing supply side constraints by opening up ACP economies to competition. This, it is argued, will lead to the development of more competitive forms of ACP production, capable of promoting sustainable, poverty focused development. However, it seems highly questionable to suggest that a policy shift in one policy area will have such a profound effect on the underlying causes of the supply side constraints which face ACP producers. Undoubtedly, it will address some of the policy driven constraints on the economic growth or development of ACP economies (Aprodev and Ero, 2003).

In the absence of a deliberate effort to identify the key constraints to economic growth in the country, there is little hope to create the environment to enable the country to take advantage of the favorable international disposition thereby helping it emerge from the ranks of the poor nations. On the basis of a quick search of literature, the following main factors seem obvious and call for attention, but there could be many more. These are the production constraints due to deficiency in economic infrastructure and weak private sector, etc; weak institutional and policy frameworks complexity and implementation of trade arrangements; and weak economic structure.

Theoretically, it is well-known that trade reforms have ambiguous impacts on welfare. This ambiguity generally has two origins. First, the theory of second best holds that in an economy that is not perfectly competitive trade reforms may generate net welfare gains or losses (Lipsey and Lancaster, 1956). No economy in the world is perfectly competitive. Thus, all economies are prone to the uncertain second-best effects of trade reform (Suranovic, 1999). Second, this initial uncertainty may be exacerbated by the distributional impacts of trade reforms. It is also well-known from the Stolper-Samuelson theorem that trade reforms usually generate factor income gains in some production sectors and losses in other sectors (Dixit and Norman, 1980).

In addition to the theoretical uncertainty, empirical evidence also suggests that trade reforms have ambiguous effects on welfare. This is evidenced in studies in Sub-Saharan Africa (Dorosh and Sahn, 2000) and elsewhere (Baustista and Thomas, 1997). In general, the empirical evidence depends on individual country characteristics. For example, Wobst (2002) shows in the context of five Southern African economies that common policy measures may yield dramatically different welfare impacts.

McDonald (2002) studied the impacts of removing preferential access to a market; this study was inspired by the EU's intention of discontinuing the commodity protocols that were part of the Lomé convention. The analysis focused upon the degree of structural change implied by the changes in preferences and the extent to which those changes may or may not be realisable. The analyses were conducted using a Computable General Equilibrium (CGE) model for Botswana under the assumption that Botswana's preferential access to the EU for beef exports would be discontinued, as was the intention under the Cotonou Agreement. The results suggest that the welfare effects will be minor provided the economy is able to achieve the structural transformations required given the changes in prices. However the required structural changes are appreciable and there are reasons to question the speed with which they can be achieved. The impact upon rural incomes is likely to be substantial, given the high dependence of farmers upon cattle production. The extent to which this can be ameliorated is constrained by the limited scope for diversification in a drought prone region.

Another study by (Blake, Mckay and Morrissey, 2002) quantifies the extent to which Uganda would benefit from global liberalisation of agricultural trade versus unilateral liberalisation by Uganda. This is achieved by simulations that assess the impact of changes in export and import prices arising from the Uruguay Round and unilateral reductions in Uganda's tariff barriers. The resultant welfare effects are of interest on several accounts; not least the relatively low proportionate changes in welfare and the mix of positive and negative effects. These results sustain the authors' conclusions that liberalization will make a contribution to welfare.

It is necessary to examine these factors, among many, and determine the extent to which they impact on the economy of Lesotho.

1.3 Motivation

In an increasingly globalized world, international trade is a key enabler for growth and development. The increasing integration of world economies has revived interest in regional integration schemes. In the last two decades the African region has witnessed a growing interest in regional co-operation and regional integration initiatives (World Economic Forum and Gartner Inc., 2002).

Moreover trade polices are constantly evolving in tandem with economic strategy. Policy focuses on three key trade related components, namely, trade promotion (promote bilateral and global trade), trade infrastructure (enhance trade competitiveness) and trade relation (free trade environment). Trade development strategy could be explained more easily with Figure 1.1.

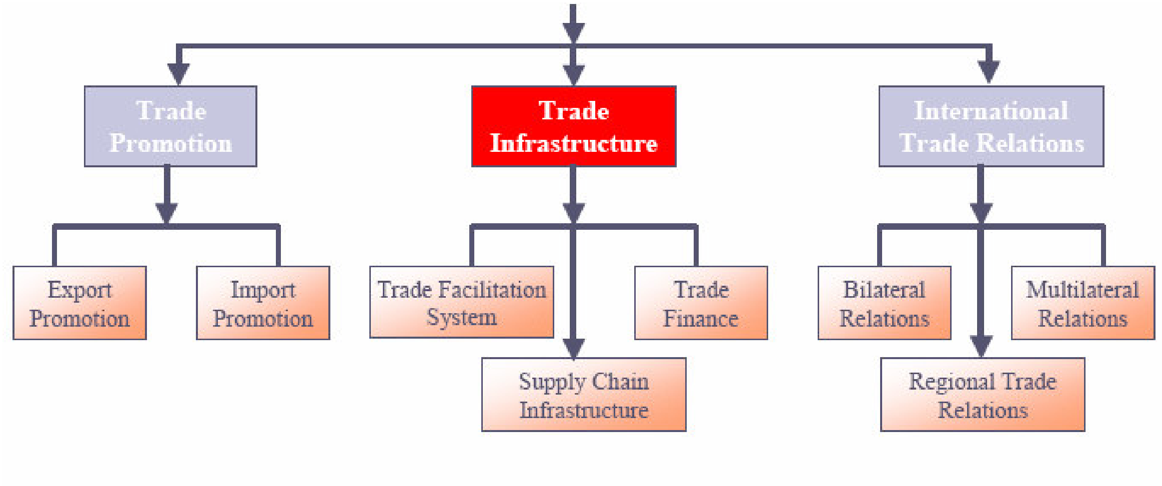

Figure 1.1: Trade development strategy
Source: ITIS (International institution of Singapore) (2001).

Trade initiatives have proliferated around the world, including Africa. Lesotho is one of the poorest countries in the world. For many years after political independence, it was insulated from the harsh realities of its situation by a profuse supply of donor assistance intended mainly as a means to maintain it as a bridgehead in the battle to dethrone the Apartheid Regime in South Africa. With that challenge now over, the magnitude of foreign assistance has declined sharply and the country is facing the reality of its weak and narrow economic base. The hopes that were raised about the potential of the Lesotho Highlands Water Project (LHWP) for job creation and poverty alleviation are now more or less dissipated with the near completion of the project (Obi, 2003).

Even if such potential was high, there would normally be a bias towards highly-skilled professionals of which the country is lacking. Any strategies aiming to generate jobs in magnitudes that will affect the majority of the population, particularly those residing in rural areas, will therefore underpin the trade policy. It is therefore important to examine practical trade policy implications on the economy of Lesotho.

A final point that needs to be made in motivating the study concerns the myriad of on-going initiatives aiming to improve the economic growth of Lesotho. As is well-known, the country is one of 49 countries identified by the United Nations as least developed among the developing countries and it is ranked 139th among 207 developing economies (WDI, 2003). For this reason, Lesotho continues to be a priority country for special interventions by several international bodies providing technical and economic support. If these efforts are to contribute meaningfully to socio-economic development, they must be pivoted on concrete evidence of activities, the promotion of which would have significant value-added effects.

The problem stated above clearly indicates that it is timely to undertake a study with respect to the potential impact of trade policy on the economy of Lesotho.

1.4 Objectives

The primary objective of this study is to assess the potential impact of trade on the economy of Lesotho. Several secondary objectives must be reached in order to meet the primary objective. These are:

- A literature survey on the economy of Lesotho, trade policy, Computation tools to measure the effect of trade (specifically Social Accounting Matrix (SAM) and Computable General Equilibrium(CGE);
- Construction of a Computable General Equilibrium (CGE) model for Lesotho;
- Designing trade policy scenarios based on changes in prices, border protection applied to Lesotho exports by giving special attention to the textile sector, fiscal policy choices and changes in world price of commodities;
- Simulation of the impact of trade policy scenarios in a CGE; and
- Identification of the likely impact of different trade policy scenarios on the economy of Lesotho (i.e. GDP, employment, income distribution, welfare etc).

1.5 Methodology and data used

In terms of methodology, one of the main empirical tools that will be applied is the computable general equilibrium (CGE) model. CGE models are economy wide in the sense that it includes all sectors. Such models have gained increasingly wide acknowledgement in terms of policy evaluation. The underpinning data base used for the model is a social accounting matrix (SAM) of Lesotho constructed on 2000 data (Conningarth Economist and World Bank, 2002). Data manipulations are performed using GAMS (General Algebraic Modelling System) software which is a direct descendant and development of models devised in the late 1980s and early 1990s, particularly those models reported by Robinson, Kilkenny and Hanson, (1990), Kilkenny (1991) and Devarajan, Lewis and Robinson, (1994).

The model is a SAM based CGE model, wherein the SAM serves to identify the agents in the economy and provides the database with which the model is calibrated. The SAM also serves an important organisational role since the groups of agents identified by the SAM structure are also used to define sub-matrices of the SAM for which behavioural relationships need to be defined (Pyatt, 1988).

The SAM is a relatively recent development in the field of National Accounting. In layman's terms, a SAM is a matrix depicting the linkages that exist between all the different role players in the relevant economy i.e. business sectors, households and government. It is very similar to an Input-Output Table in the sense that it reflects all the inter sectoral linkages in an economy. Furthermore, the development of the SAM is very significant as it provides a framework within the context of the National Accounts in which the activities of households are accentuated and distinguished prominently. The household is indeed the basic unit where significant decisions are taken on important economic variables such as inter alia, expenditure and saving. By combining households into meaningful groups, the SAM makes it possible to clearly distinguish between, and study the effect, interaction and the economic welfare of each group (Conningarith Economists and World Bank, 2002).

Accordingly, a SAM serves a dual purpose in the National Accounts of a country. Firstly, it is a reflection of the magnitude and linkages of the stakeholders in an economy. Secondly, once a SAM has been developed, it becomes a powerful econometric tool that can be used to conduct various economic analyses. A SAM can also fulfill a significant role in understanding the reciprocal linkages between natural resources and the economy.

The purpose with the SAMs is to obtain core data bases for a computable general equilibrium (CGE) model of the Lesotho economy that will be used to analyze an array of economic issues related in particular to Lesotho's increasing participation in international trade. This will include analyses of the potential impact of trade policy on the economy of Lesotho.

A SAM provides a comprehensive and consistent description of the transactions taking place in an economy in a given year between production sectors, factors, households, government institutions and the rest of the world (Nielsen, 2002). Properties and advantages of SAMs are well established in the recent literature on policy simulation modelling: they provide a comprehensive and consistent data foundation, and ensure that the share parameters in behavioral functions reflect observed facts. SAMs usefulness has also recently been reflected in the United Nations and joint agency new edition of the manual on national accounts, which dedicates an entire chapter to them (Chemingui, O'connor, and Bussolo, 2002).

A SAM is a square matrix that describes quantitatively the economic transactions taking place in an economy during a specified period of time, generally one year. It consists of row and column accounts that represent the different productive activities, economic agents, institutions, and policy instruments of an economy at a chosen level of disaggregation. By convention, each cell of the matrix represents a payment from the column account to the row account. The underlying principle of double-entry accounting requires that row totals equal column totals for each account in the SAM. In practice, a SAM is the natural extension of the Input-Output (IO) accounting system devised by Leontief more than 50 years ago, and it includes not only inter-industry transactions but also payments to factors of production, expenditures of households, transfers to and expenditures by government, and transactions with the rest of the world. A quite large literature on IO and SAMs now exists and readers interested in more detailed description should start from Pyatt and Round (1985) and the recent Organization for Economic Cooperation and Development (OECD), International Monetary Fund (IMF), United Nations (UN), and World Bank (WB) revised manual on the System of National Accounts (1993) (Chemingui *et al*., 2002).

1.6 Outline of the study

The underlying concern of the study is the potential impact of trade on the economy of Lesotho. This thesis is organized in eight chapters, including the present introductory chapter. The next chapter is devoted to present a review of relevant literature. A general economic overview and the main structural characteristics of Lesotho's economy from a SAM perspective is provided in Chapter 3. Chapter 4 describes the review of the structure of applied CGE models based on SAMs, it includes the advantage and disadvantage of SAM and CGE over input/output and partial equilibrium models respectively; it also incorporates evolution; structure and methodological aspects (Specification; Calibration and closure rules aspect) of CGE. A computable general equilibrium model for analysis of the impact of trade on the economy of Lesotho, including an overall discussion of the Lesotho CGE model, the structure of the model, key equations, and estimation of key behavioural parameters (LES and elasticities of Lesotho) is dealt within Chapter 5. In Chapter 6, the SAM is used as the main database in the structure and entries of a macrosam and microsam of Lesotho; the cross-entropy SAM balancing method is used to balance an unbalanced SAM. Chapter 7 consist of the implementation of the SAM-based CGE model and a discussion of the simulation results. The last chapter (Chapter 8) concludes the thesis.

CHAPTER 2

REVIEW OF LITERATURE

2.1 Introduction

The international economic community has over the past two decades been intensely occupied with the world-wide campaign for economic reforms based on the structural adjustment and economic stabilization programmes under the advocacy and conditionally of the World Bank and the International Monetary Fund. However, during the late eighties and early nineties the structural adjustment and stabilization debate has shifted the emphasis to focus primarily on global economic integration through trade liberalization and fair competition in international markets (Hassan, 1997).

The study of international economics is the oldest branch of the discipline. There have from ancient times been fundamental differences between economic activities within a country and activities between countries. Not only were there differences of custom, consumption, and production, but trade was taxed and currency problems arose. With modern states, the ancient problems persist, but others have joined them. Although the effects of regional and cultural differences form part of the study of international economics, they are often not as important as the effects of different sets of rules and regulations (Hogendron and Brown, 1979).

According to Caves and Jones (1985) some patterns of trade need almost no explanation since nature has placed some commodities in some communities and not in others, for example many countries depend on foreign sources to supply fuel and lubricants for their vehicles. Many items that are exchanged on world markets can, however, be produced in a number of locations. Various factors do therefore bear upon the pattern of trade which is unique to each trading country. These include among others the supply of land and labour. These directly influence the cost of production and hence a country’s competitive position regarding trade in a specific commodity (Jooste, 1996).

Houck (1986) states that with each passing year, the national economies of the world intertwine more closely than ever. This economic interdependence evolves because international trade expands more rapidly than the world's output of goods and services; although the volume of goods and services produced in the world has almost quadrupled since 1953, the total international trade volume has increased almost six fold. It is therefore clear that international trade is becoming a more and more important facet of individuals' lives, since it will directly and indirectly influence their well-being. This is emphasized by Hertel (1993) who stated that over the past decade, there has been tremendous demand for quantitative analysis of trade.

Current changes in the economic, political, social and legal environments, worldwide and in Africa, produced new opportunities, horizons and restrictions to which the marketing system must adapt. Developments all over the world, especially during Uruguay Round of the General agreement on Tariffs and Trade (GATT) negotiations, indicate a more market oriented approach and free markets as opposed to control and central planning. These changes will have a definite effect on polices of Africa (Jooste, 1996).

2.2 Regional Economic Integration

The world came under the tide of new regionalism in the 1990s. Multilateral trade liberalization, sealed by the Marrakech Agreement of 1994 and the establishment of the World Trade Organization (WTO) in 1995, has been paralleled by the proliferation of regional trade blocs, most of which are still engaged in the difficult process of tariff elimination. Regionalism has its critics –indeed, it is generally agreed that the optimal policy for any country is unilaterally to liberalize its trade on a most-favoured-nation basis-and, if it is to be a building block rather than a stumbling block towards free global trade, a regional bloc should ensure that its member maintain the impetus of lowering tariffs against third countries (Maasdorp, 1997).

Market integration in Europe was accelerated in the early 1990s when EC countries formed a single market by lifting various obstacles to the movement of goods and services within the region. This successful attempt is known as EC92. The movement towards new Free Trade Agreement (FTA) is booming all over the world (Goto, 2002).

Trade is restricted by various protectionist measures (Otto, 1990). This state of affairs led to increasing confrontation between trading nations. Economic policies imposed by the governments of different countries affect trade between countries and Pareto optimality is therefore not reached (Van Rooyen, Njobe and Sartorius von Bach, 1995). The highly-protectionist policies of the US, the European Union (EU) and Japan render trade in cereals, sugar, livestock and dairy products highly unstable and politically demanding (Petit and Gnaegy, 1994). These, and other restraints to trade, gave rise to negotiations on trade liberalization under the General Agreement on Tariffs and Trade (GATT) and specifically the Uruguay Round (De Rosa, 1996).

Economic integration drives the existing world trade patterns and this influenced the outcome of the Uruguay round of GATT negotiations. Countries are able to enlarge their markets by integrating their economies with those of neighbouring countries, and to establish common polices.

According to Maasdorp (1995), international economic relations today are characterized by two trends: globalism and regionalism; the Uruguay Round was paralleled by regionalism. He also mentions that there are basically two models of regionalism: Sectoral co-operation and trade integration. The latter can also include sectoral co-operation, while the former does not preclude member countries to pursue trade integration as a separate exercise. According to Armstrong and Taylor (1985), economic integration will result in regional economic disparities, which in turn will have an effect on international trade. There are therefore various forms of economic integration.

2.2.1 Stages of Economic Integration

Recent literature on economic integration pays much attention to the concept of “deep integration” which is contrasted to “shallow integration”. The latter refers mainly to

FTAs and Custom unions (CUs) that eliminate border restrictions such as tariffs and quotas. Deep integration refers to the elimination of constraints that operate within countries such as industrial and environmental standards, government procurement rules, and health and phyto-sanitary regulations. The achievement of a single market in the European Common market (now known as the European Union) can perhaps serve as the best example of deep integration. With progressive declines in tariffs through the multilateral trade negotiations, more advanced technological processes and the increasing importance of environmental standards. Deep integration aspects are becoming evermore prominent. Removal of fiscal disparities, not related to tariffs, is another aspect of deep integration (ADR, 2002).

The drawing together of nations causes the movement of goods and services (and maybe factors of production) to be freer between the members themselves than between members and non members. Some integration of economic, financial, and social policies and institutions may occur in advanced stages of integration. It is important to distinguish between various forms of regional trade liberalization (Smit, Dams, Mostert and Oosthuizen, 1996; Lindert, 1991). The following progression of economic blocs towards increasing economic integration (Otto and Darroch, 1992, Balassa, 1973)**:**

Free-trade area: Members remove or lower trade barriers (tariffs) and perhaps other trade barriers among themselves on broad categories of products, but keep their separate national barriers against trade with the outside world or each maintains its own independent trade policy toward non member nations. No other economic integration occurs among members (e.g. Canada-US Free Trade Area, South America free trade area (LAFTA)) that is, starting point, rule of origin);

Customs union: Members again remove or internal lowering all barriers to trade among themselves, but further adopt a common set of external barriers. No deliberate integration of factor markets or other economic policy occurs (e.g. The Southern African Custom Union (SACU));

Common market: Members allow full freedom of factor flows (migration of labour or capital) among themselves, in additional to having a custom union (e.g. SEM (single European market));

Full economic union: Member countries unify all their economic policies, including monetary, fiscal and welfare polices, as well as policies toward trade and factor migration (e.g. Belgium and Luxembourg); and

Complete Economic Union: This is the final stage of economic integration, where a super-national institution enforces economic policies on member countries.

Table 2.1: Classification of Regional Economic Integration

	Free trade Area	**Custom union**	**Common market**	**Economic union**	**Political union**
Abolishment of tariffs & quantitative restrictions on trade among members	○	○	○	○	○
Common tariff on imports from non-member	*	○	○	○	○
Free factor movements among members	*	*	○	○	○
Harmonization of economic polices	*	*	*	○	○
Unification of polices by a supernational organization	*	*	*	*	○

Source: Balassa (1973).

2.2.2 Benefits of Regional Economic Integration

Some of the important benefits of economic integration are (Schuh, 2003 and ADR, 2002):

1. Helping lagging countries to catch up because it enables individual countries to realize the benefits from the technological breakthroughs that are driving the world-wide process of globalization. Those technological breakthroughs, which have occurred in the transportation, communication, and information technology sectors, have dramatically reduced transactions costs among economic agents around the world. That, in turn, has substantially increased the scope of markets.

This reduction in transaction costs increases the benefits from international trade. These benefits are reflected in lower prices for consumers (including private firms), and tend to be widely dispersed in the economy, and may be offset at least in part with employment losses in other sectors.

2. Helping lagging countries to catch up in that it enables those countries to realize the benefits of the division of labour and specialization that is associated with international trade.

   When international trade is opened up because of the liberalization of past protectionist policies, the competition that comes from abroad leads to a drive for efficiency in both the static and dynamic senses. Protected sectors that in the past had little incentive to be efficient in their production practices suddenly find themselves driven to reduce their costs in order to survive.

   Two induced effects usually follow. First, the pressure for increased efficiency provide strong incentives for those firms using obsolete production practices to adopt new production technology-often from abroad. Second, the increased efficiency also provides incentives for increased capital flows into the sector, also often from abroad. In fact, the increased capital flows from aboard often are the means by which new technology is introduced into the local economy.

3. Economic integration may be a powerful force for peace. It may help to prevent conflict. The countries of Europe, for example, had fought wars with each other for hundreds of years. Since the creation of the European Economic Community at the end of World War II, however, there has not been a single war among the countries of that economic bloc. We can also look to the orient for another example. In the case, the nascent economic integration between China and Taiwan appears to be an important reason those two countries haven't gone to war, despite continuing tensions.

Peace among nations can contribute importantly to closing the gap between the developing and less-developed countries. Peace makes it possible to shift resources from fighting wars to investments that promote economic development. It also makes it possible for international trade to flourish and thus to realize the substantial benefits from specialization. Finally, it creates a less risky and more stable investment climate, so savings from both domestic and foreign sources will flow into the lower income developing countries.

4. It increases global trade through trade liberalization (tariff reduction); it creates the opportunity to increase employment and raise welfare. Full and meaningful participation of countries in global trade and regional integration has become political and economic imperatives for effective participation in a global economy. It moreover, contributes to political stability, policy coordination (promote policy credibility), it generates bigger markets (boost investment) and enhances countries' global competitiveness (Ruiters, 2004).

It is important to consider that despite all the advantage of regional economic integration, there are also serious hazards involved if the global integration process is taken too far. Many of the initial advantages, such as increased competition, could be lost if the world is rearranged into a small number of strong trade blocks. If the Americas (North and South America), the European Community and Asia (also-called Yen block, which could include countries in Eastern Asia, Japan, Australia and New Zealand) were to develop into three large trade blocks, multilateral free trade would be seriously harmed rather than advanced (Smit *et al*., 1996).

Lindert (1991) identifies certain disadvantages of trade bloc formation.

- It may encourage consumers to buy from higher-cost suppliers, because of tariff protection against low-cost competition;
- It also forces some companies to lay off people and thereby induce unemployment, particularly of unskilled people. This can increase the spread between rich and poor within a country;

- Much of the gains arising from global trade may be lost; and
- Possible international friction, because those countries excluded may be at a disadvantage relative to those included in the agreement.

The GATT (and its successor, the WTO) is opposed to trade discrimination in principle (Lindert, 1991), but encourages regional economic co-operation. Trade discrimination is regarded as disadvantageous to the world economy. Despite this, trade bloc formation is on the increase, possibly because countries believe that they have more to gain than to lose.

2.2.3 Customs Unions and Effects of Regional integration

Custom unions are basically concerned with the regional approach to trade liberalization. Two or more countries form a customs union when they abolish all import duties on their mutual trade in all goods (except the services of capital) and when they adopt a common external tariff schedule on all imports of goods (except the services of capital) from the rest of the world (Chacholaides,1981). Common external tariff against the external world will initially reflect exactly or on average the tariff regime which members had formally applied for independently.

The formation of a customs union can either raise or lower welfare, since removing barriers among member countries is a move towards freer trade (Lindert, 1986). Vinter (1950) states that a customs union combines elements of free trade with elements of greater protection, and argues convincingly that it is not clear that such an arrangement increases welfare. Chacholaides (1981) mentions two opposing tendencies of a custom union. On the one hand, “a customs union tends to increase competition and trade amongst members”, which looks like a movement towards free trade; while on the other hand “a custom union tends to provide relatively more protection against trade and competition from the rest of the world” which appears more like a movement towards greater protection. Thus, the formation of a custom union causes some products that were formally produced domestically to be imported from other partner countries since the tariff on such imports have been eliminated, while some products that were formally imported from the rest of the world are now imported from a member country.

Vinter (1950) states that the effects of custom unions on trade must be either “trade creation” or “trade diversion”. Trade creation refers to the shift in production from a higher-cost domestic producer to a lower-cost producer in a partner country while trade diversion refers to the shift in production from a lower-cost producer in the rest of the world to a higher producer in a particular country (Chacholaides, 1981). Trade creation occurs when member countries have the freedom to trade commodities in which they have a comparative advantage. Trade diversion, on the other hand, occurs when imports from the rest of the world are restricted by tariff walls around the customs union (Armstrong and Taylor, 1985).

According to Armstrong and Taylor (1985) regions and member states will experience greater specialization along the lines of their own particular comparative advantage. It is in this sense that trade creation is conceived to be beneficial, and trade diversion detrimental to welfare. Lindert (1986) states that the net welfare effects depend on whether the trade creation gains created exceed trade diversion losses.

Regional integration into a custom union is not always successful because of i) political difficulties, ii) transportation problems and iii) the apprehension among the relatively poorer countries that the relatively more advanced countries of the group may eventually dominate the entire customs union (Jooste, 1996).

2.3 Types of Economic Cooperation Agreements

Although the WTO provides an overall framework for multilateral trade in a world-wide market, most international trade is governed by more specific international political agreements. There are two general types: bilateral trade agreements and regional free trade areas (Goldstein, 2003).

2.3.1 Bilateral Agreements

Bilateral treaties covering trade are reciprocal arrangements to lower barriers to trade between two states. Usually they are fairly specific. For instance, one country may reduce its prohibition on imports on product X (which the second country exports at competitive prices) while the second country lowers its tariff on product Y (which the first country exports).

Part of the motive behind the GATT/WTO was to strip away the maze of bilateral agreements on trade and simplify the system of tariffs and preferences. This effort has only partially succeeded. Bilateral trade agreements continue to play an important role (Yarbrough, 1992). They have the advantages of reducing the collective goods problem inherent in multilateral negotiations and facilitating reciprocity as a means to achieve cooperation. As the Uruguay Round of GATT negotiations bogged down, some state leaders began to favor bilateral agreements as more achievable than the global GATT/WTO agreements. In as much as most states have only few most important trading partners, a few bilateral agreements can go a long way in structuring a state's relations, e.g. the Singapore-Japan New Age Partnership Agreement.

2.3.2 Regional Free Trade Areas

Regional free trade areas are also important in the structure of world trade. In such areas, groups of neighbouring states agree to remove the entire structure of trade barriers (or most of it) within their area. With outside countries, trade continues to be governed by bilateral treaties and the WTO framework. The creation of a regional free trade area allows a group of states to cooperate in increasing their wealth without waiting for the rest of the world. In fact, from an economic nationalist perspective, a free trade area can enhance a region's power at the expense of other areas of the world. E.g. APEC, AFTA, NAFTA, MERCOSUR.

2.4 Preferential trading arrangements (PTAs)

It is an open question whether PTAs create more trade than they divert. The lowering of trade barriers among block members may expose member economies to greater competitive pressures and open up larger markets for producers in member countries. Like other forms of trade liberalization, PTAs can increase competition in domestic industries, which can then spur productive efficiency gains among domestic producers and improve the quality or quantity of inputs and goods available in the economy (Dollar, 1992; Sach and Warner, 1995; Edwards, 1998 and Wacziarg, 2001). Producers can also benefit from the greater market size created through the PTA, which can expand opportunities for exporting products and lead to enterprise and employment growth. PTAs' small size can also ease trade-facilitating "deep integration" such as harmonizing standards or regulatory codes (Clarete, Edmonds and Wallack, 2002).

The main fear, however, is that PTAs may augment intrabloc trade by diverting trade away from non-member economies (Bhagwati and Panagariya, 1996; Schiff, 1997). These policy-diverted trade flows may lead to non-optimal patterns of specialization if the distribution of resources across members is not representative of the distribution of resources in the world. A country that is the relatively capital-rich member of a PTA might be relatively labour-rich in relation to the rest of the world, for example. PTA-induced specialization would not be optimal under global free trade (Panagariya, 1994). Complex and overlapping international and regional trading arrangements can create a spaghetti bowl of complex overlapping regulations and commitments that are difficult to disentangle and make it difficult to proceed in broader trade liberalization (Bhagwati and Panagariya, 1996; Krueger, 1997; Wonnacott, 1996).

In general, the greater the difference in the comparative advantages of member economies to a PTA and the closer the agreement approaches open trade across members, the greater the economic benefits of the agreement. However, in a world where trade interventions and market imperfections are commonplace, the effects of PTAs on trade flows are generally ambiguous analytically. This makes empirical examination of the effects of PTAs on trade flows essential to understanding these effects (Clarete *et al*., 2002).

2.5 Economic reform and trade policy

The majority of African countries have liberalized their trade regime quite significantly over the past two decades. Some countries began the process in the early 1980s, but most have only implemented sustained and significant reduction in barriers to imports since the late 1980s or early 1990s. The major trade liberalization reforms in almost all countries were unilateral reforms by the particular country acting alone, and not implemented as part of an agreement with trading partners. However, various agreements with trading partners have "locked in" the reform efforts. Most obviously, the multilateral negotiations during the Uruguay Round of the GATT that culminated in the establishment of the WTO in 1995 resulted in African countries making commitments to open trade policies. Numerous regional trading agreements, some of more substance than others, exist whereby African countries have agreed to more open trade with other African countries; there are also special agreements relating to trade between groups of African countries and the EU and US. Trade and openness are now high on the policy agenda of most African countries (ADR, 2002).

Rodrik (2002) notes that no country has developed successfully by turning its back on international trade and long-term capital flows. However, he also suggests it is equally true that no country has developed simply by opening itself up to foreign trade and investment without engaging in fundamental institutional reform. Countries that have engaged in trade reform, without the reform of other policies and accompanying institutions, have experienced at least one economic collapse. Examples includes Turkey, Indonesia and Argentina (Haggards, 2000 cited by Roe, 2003).

Trade reform entails some related actions: the importation of institutions from abroad, membership in the WTO requires the adoption of a set of institutional norms that rent seekers find more costly to change; financial integration raises the premium for macroeconomic stability; the freer flow of information encourages civil liberties and political freedom; government enforcement to protect the rights of foreign investors induces a government to become more inclined to protect the basic human rights of its own citizens as well (Roe, 2003).

The central objective of trade policy reform is to make markets more competitive and, thereby, change the behavior and performance of firms, i.e., to introduce greater external competition into the previously protected domestic markets and to increase economic efficiency at the level of individual firms (Harris, 1984). The efficiency gains are achieved both through increased productivity - more efficient use of existing resources in response to increased competition - and a shift in resources from inefficient to efficient sectors, i.e., gains from freer trade. Improved efficiency, in turn, contributes to increased output growth. The transition from a restrictive to an open trade regime, however, can impose short-run adjustment costs in industries newly exposed to external competition. This may be further compounded by efforts to restore macroeconomic stabilization, such as across-the-board reductions in fiscal deficits that could adversely affect the physical and human infrastructure of the country.

In sum, there is no escaping the fact that trade policies do matter for trade performance but they also impact on trade performance indirectly through their impact on growth. This, in fact, is the message of the advocates of openness: trade policy alone may or may not yield the hoped for benefits, but they are an integral part of open economy policies broadly defined.

2.5.1 Importance of Trade Policy

Smit *et al*. (1996) justify the importance of international trade policy as follows:

- To protect local industries, so that a competitive edge can be built. If the local industries are exposed too soon to established and highly competitive foreign business they do not get an opportunity to gain experience and develop a competitive edge.

- To protect job opportunities locally. Importation of cheaper products from outside the country would undermine local business that cannot produce as competitively, and force them to close their doors. Jobs in threatened businesses should therefore be protected.
- The limited availability of foreign exchange and therefore an inability of the importing country to pay (foreign exchange) by means of exports. A chronic shortage in a country's balance of payments is just as harmful to a country's prosperity as a chronically overdrawn account is for an individual.

2.5.2 Trade liberalization reform in Africa

Trade liberalization embraces a wide range of policy changes that affect both imports and exports. Africa is noted not only for its highly restrictive import regims, but also for its artificial barriers to exports, both of which account for the low openness of the region (Ancharaz, 2003).

2.5.2.1 Unilateral trade reform

A broad picture of trade policy reform can be obtained by examining trends in tariffs. The figures in Table 2.2 are simple averages in three senses. First, for each country groupings they are unweighted averages of scheduled tariffs. Second, within each period they are annual averages for each economy (although there is often only one observation for a country in any period). Finally, they are simple averages, not weighted by trade across countries in each of the groups (and are thus affected by individual countries that may have very low, or very high values). African countries are grouped by region, and by "export orientation" whether manufactures, agriculture, mining products or oil are the major export commodities. The classification by export orientation is useful insofar as manufactures and oil are more stable sources of export earning than agriculture or mining (ADR, 2002).

Table 2.2: The Pattern of Tariff Changes in Africa (Average Scheduled Tariffs)

Region	**1980-85**	**1990-95**	**2000-02**
All Africa	32.8	23.6	16.1
Region			
North Africa	31.0	27.2	22.5
West Africa	38.5	22.8	14.2
Central Africa	30.0	21.7	16.7
East Africa	37.3	28.3	15.9
Southern Africa	19.5	19.7	12.7
Export orientation			
Manufacturing	28.1	20.4	16.5
Agriculture	40.2	22.5	14.5
Mining/resource	50.5	18.4	13.2
Oil	30.7	25.2	20.2

Notes: Averages reported are simple averages across countries in each grouping
Source: Ackah and Morrissely (2005).

Average tariffs have been reduced significantly, roughly halved on average, in Africa over the past 20 years. When different regions of Africa are compared, progress varies, although the overall variation or spread in tariffs has been reduced. Southern Africa has consistently had the lowest tariffs (and the trend is influenced by significant reductions in South Africa). Although West Africa appears to show the greatest reduction, the 1980-85 value is distorted by very high tariffs in Guinea. As a region East Africa reduced their tariffs the most.

2.5.2.2 Multilateral Trade reforms

WTO membership will have long-term implications for African countries' trade policies, but has not had significant effects to date for most countries. The most immediate implications of membership have often involved legislation and administration, product standards and customs valuation. The majority of African countries did not offer concessions on tariffs or NTBs in the Uruguay Round, and the bound rates, which they did commit to, were generally higher than the rates they currently apply. This is illustrated in Table 2.3 where the majority of countries are seen to have bound rates above 40 percent (ADR, 2002).

Table 2.3: Range of Bound tariff rates in SSA countries

Bound Rate	Number of Countries	
	Agriculture products	Other products
0-40%	8	9
41-80%	11	24
81-120%	6	4
121-160%	10	0
>160%	1	0

Source: Ackah and Morrissely (2005).

The tariff offers related only to commitments on bound (maximum) rates. Most African countries made general commitments on agriculture, many setting a uniform bound rate above current applied rates. About half of the countries have bound ad *valorem* rates in excess of 80 percent on agricultural products, and twelve countries have a general bound rate of 100 percent or more on agriculture. The bindings are in general lower for non-agricultural products, but this may reflect the absence of a recorded general maximum tariff for other products for many of the countries.

There remain considerable scopes for very high rates of effective protection from tariff escalation, and for policy reversals from less to more protectionist positions. However the specification of bound rates and the increased coverage of bindings may provide some constraints on future behavior. Indeed a few countries have identified quite low general bound rates, e.g. Cote d'ivoire (15 percent), Central African Republic (30 percent), and Congo (30 percent). Rates such as these may well signal commitment to open trade policies, and contribute to increasing inward investment. The bindings may also have more significance (be more constraining) in specific sectors.

2.5.2.3 Bilateral and regional Trade reforms

Unilateral reform has been the dominant influence on trade regimes in Africa in the last two decades. However, when average tariff barriers are quoted, some of the reduction is possibly due to changes in trade preferences and/or changes in the direction of trade (i.e. increasing trade with preferential trading partners). In the present context there are two possible sources of such liberalization of imports, namely imports from preferred intra-regional suppliers and/or from preferred extra-regional suppliers (ADR, 2002).

The liberalization and expansion of intra-regional trade is a potentially important factor as African countries display a high propensity to join regional economic groupings. Most belong to two groupings simultaneously, and a few to three. The overlapping nature of these agreements and the complexities this creates for rules of origin and preference is an issue for future trade policy. For the moment, the issue is whether the commitments to liberalize intra-regional trade embodied in the protocols of the regional groupings have been a significant source of trade liberalization. The general consensus is that they have not been which are in line with evidence on intra-regional trade volumes; by 2000 only 7.6 percent of Africa's exports were to other African countries. A similar conclusion may be drawn about the impact of extra-regional preferential agreements on trade policy openness in Africa (ADR, 2002).

2.5.3 The WTO and African Trade Policy

The WTO is the successor to the GATT, which was established in 1947 as an interim organization to oversee world trade issues after the failure of the US Congress to ratify the Havana Treaty on the International Trade Organization. The main functions of the WTO are to facilitate the implementation, administration and operation of the Uruguay Round Agreements; and provide a forum for negotiations among members concerning their multilateral trade relations (ADR, 2002).

WTO membership has not to date required African countries to make major new direct commitments on access to their markets, and tariff bindings agreed under the Uruguay Round are not a real constraint. However, the WTO does have many implications for developing countries in general, and for Africa in particular. Although actual progress has been slow, the most important in principle is market access to developed market economies, especially for specific sectors (textile and clothing, agriculture and natural resources). African countries have enjoyed preferential access to developed countries.

Negotiation of greater access may actually reduce the margin of preferences extended to Africa. Consequently, African countries, especially the least developed, can find themselves in an ambiguous situation during WTO market negotiations.

There are also ambiguities regarding the effect of reducing or eliminating agricultural subsidies in developed country markets. African countries that are net food importers, of which there are many, have legitimate concerns about the impact of removing export subsidies on world food prices. Against this much be balanced the impact on African countries that are potential food exporters. While the removal of export subsidies is in general to be supported as welfare is increasing, it is appropriate that special measures are in place to compensate food deficit countries such as Lesotho for any increase in world prices (ADR, 2002).

Many of the new issues covered by the Uruguay Round Agreement have, or may have, important policy implications for Africa (even if they do not relate directly to trade barriers). The Agreement on Trade Related Investment Measures (TIMs) limits the types of performance requirements governments can impose on investors. The agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs) is contentious. The General Agreements on Trade in Services (GATS) was limited in scope but took an important first step in bringing discipline to the area and providing a schedule for progressive liberalization. Detailed schedules were provided for financial services, telecommunications and air transport services. Although GATS operates as a "menu" agreement, with countries choosing what commitments to make and request in each sector, it is important in an environment of privatizing services sectors in African countries. All of these are trade-related issues, but do impose costs on government officials who have to find out what an agreement means and whether there are relevant concerns for the country (ADR, 2002).

Many of the commitments under the WTO actually relate to technical and administrative issues such as standards and customs valuation. Thus, while the WTO may not have been a major source of trade liberalization in Africa, it is central to the detail of trade policy.

2.5.4 Changing Trade Policy

According to Otto and Van der Merwe (1997) the changing trade policy environment, both globally and domestic, is characterized by several features:

***Liberalization*:** Industries need to be exposed to global markets, as this will force them to increase their global competitiveness. Any protection afforded should be of a temporary nature aimed at smoothing the transition process towards a globally competitive industry. Comparative advantages should be the guiding factor in this regard. Producers involved in an industry that can show no comparative advantage, either regionally or globally, have to devise strategies leading towards such an advantage, including the identification of niche markets, or look for production alternatives in order to ensure their long term survival.

***Tariffs*:** Tariffs are no longer regarded as an instrument of government revenue collection (Otto and Van der Merwe, 1997). They should furthermore become the only forms of protection against foreign competition. They should, however, ensure protection against unfair trading practices by the country's trading partners.

Deregulation: Deregulation of domestic markets has been done by several countries, sometimes painful changes, while even highly protected economies like the EU are forced to reform their domestic polices, due to the fact that existing policies are incompatible with the changing global environment. This again highlights the global move towards a freer agricultural trading system.

***Trade agreements- a strategic approach*:** The trend worldwide is to engage in strategic trade negotiations to secure improved and equitable market access among countries. A feature of trade agreements is that almost all of them require some form of reciprocity. This implies that while they promise improved access for domestic producers to certain foreign markets, it will require the country to offer concessions in terms of improved access to domestic markets.

Export promotion strategies and foreign economic relations: A break is necessary from the traditional pattern of developing countries mainly supplying primary and intermediate products to northern markets and importing manufactured goods. The emphasis should fall on value adding by generating investment in secondary and tertiary industrial sectors. This requires liberal financial and macroeconomic policies, including free entry to markets (also for imports) and a deregulated foreign exchange system.

2.6 Overview of Issues in Africa's Trade performance

Trade is an engine of growth and crucial for Africa's development. There is now a very broad consensus that open economies grow faster than closed ones and nowhere is this message more important than in Africa. While opinions differ about exactly what constitutes openness and integration with the world economy, there is also little disagreement that most African economies need to liberalize their international trade regimes significantly over the next decade. Multilateral trade negotiations cannot lead or force that process of reform but they can almost certainly assist it (ADR, 2002).

Many scholars have analyzed the impact of openness on economic growth and the majority have concluded that more open or liberal regimes achieve higher rates of economic growth than closed ones. Among the studies are Dollar (1992), Sachs and Warner (1995), and the World Bank (1996). These have studied different countries; different periods and different measures of openness, but all have concluded that outward orientation fosters growth. All also argue that one element of openness is the trade regime and that at some level, having lower and fewer barriers to trade is likely to enhance growth and nowhere are growth-enhancing policies more important than in Africa.

The emphasis on trade liberalization and export orientation in the past decade has led to a phenomenal growth in world merchandise trade, which has consistently grown faster than output (UNCTAD, 2003). Africa has also witnessed some increase in its trade relative to GDP, despite the general assertion that Africa is trade-averse. However, Africa's share in world exports fell from about 6 per cent in 1980 to 2 per cent in 2002, and its share of world imports from about 4.6 per cent in 1980 to 2.1 per cent in 2002 in value terms (Table 2.4) (UNCTAD, 2003 and NDA, 2004). This phenomenon has as much to do with the structure of international trade as with the composition of merchandise trade of Africa, the trade policies applied in the continent in the past 20 years, and market access and agricultural policies in industrial countries (Kousari, 2004).

Table 2.4: Annual Average growth rate of export by product category 1980-2002(%)

Region	**All merchandise**	**Primary commodities [a]**	**Non-fuel primary commodities**	**Manufactures**
Developed countries [b]	5.9	3.3	2.9	6.4
Developing countries	6.0	1.4	3.3	12.4
Africa	1.1	0.6	0.6	6.3
America	5.9	2.2	2.9	11.5
Asia	7.1	1.3	5.0	13.6
Sub-Saharan Africa	1.3	1.3	0.4	5.6

Source**:** UNCTAD (2003).

[a] Primary commodities (0-4) sections SITC Revision 3

[b] Less South Africa

While the value of Africa's manufactures increased by 6.3 per cent annually, this seemingly high growth rate is about half the growth of the rate recorded by Asia (14 per cent) and Latin America (about 12 per cent) and is from a relatively low base. It is also the result of significant growth in labour-intensive and resource-based semi-manufactures from a few countries, in particular Mauritius (garments) and Botswana (rough diamonds). Mauritius increased the value of its manufactured exports from $115 million to $1.2 billion between 1980 and 2000, while Botswana, which earned nothing from manufactures in 1980, exported $4.6 billion worth in 2000. There were also increases in the value of manufactured exports from Lesotho, Namibia and Swaziland in Sub-Saharan Africa (SSA), and from Morocco and Tunisia in North Africa. The North African countries increased the value of their manufactured exports from under $2 billion in 1980 to almost $5 billion in the case of Morocco and $4.5 billion in the case of Tunisia in 2000. On the other hand, there were steep falls in the value of manufactured exports from the Democratic Republic of the Congo, Nigeria, Sierra Leone and Zambia over the period (UNCTAD, 2003).

In manufactures exports, Africa recorded an average annual growth rate of 6 per cent, less than half the developing country average in the same period. Moreover, this growth has been concentrated in a handful of African countries (Kousari, 2004). The value of Asia's total exports recorded 7 per cent average annual growth over the period under review, compared to a mere 1 per cent for Africa. While the value of Asia's non-fuel commodity exports increased by 5 per cent per year, those of Africa rose by only 0.6 per cent. Africa recorded the worst performance in terms of the annual growth rate of merchandise exports, as well as in the other categories of exports – primary and non-fuel primary commodities, and manufactures (UNCTAD, 2003).

Table 2.5: Export Structure of Africa and other Developing Regions by product category (percent)

	1980		2000	
	All merchandise[a]	Manufactures [b]	All merchandise [a]	Manufactures [b]
Africa Share in:				
Global exports	6.3	0.8	2.5	0.8
Developing countries exports	20.3	7.8	7.9	3.0
Developing America share in:				
Global exports	5.9	1.9	5.9	4.6
Developing countries exports	19.1	18.1	18.9	16.8
Developing Asia Share in :				
Global exports	18.1	7.1	22.4	21.5
Developing countries exports	58.5	66.9	72.0	79.0
Developing countries Share in:				
Global exports	31.0	10.6	31.1	27.2

Source**:** UNCTAD (2003).

[a] Standard International Trade Classification (SITC) 0-9

[b] SITC 5-8,less 68

While in 2000, 70 per cent of developing country merchandise exports consisted of manufactures and 30 of per cent primary commodities, the opposite held true for Africa's export structure. More than any other developing region, Africa's heavy dependence on primary commodities as a source of export earnings has caused the continent to remain vulnerable to the vagaries of the market and weather conditions. Price volatility arising mainly from supply shocks and the secular decline in real commodity prices of export interest to Africa and the attendant terms-of-trade losses have exacted heavy costs in terms of incomes, indebtedness, investment, poverty and development (Kousari, 2004).

UNCTAD reports on economic development in Africa have extensively discussed some aspects of these issues, including capital flows and debt, the region's overall economic performance and prospects, and adjustment and poverty reduction (UNCTAD, 2000a; 2001 and 2003).

Even though Africa has remained commodity-dependent, it has fallen behind other regions of the world in terms of exports of non-fuel primary commodities. For other developing regions as well as OECD countries, income derived from such trade has doubled in the past 20 years, while that of Africa has remained stagnant (Kousari, 2004).

In a ranking developed by UNCTAD of the 225 most dynamic products in world trade (UNCTAD, 2002) in terms of growth in export value, sub-Saharan Africa produces and exports only two products among the first 50, i.e. undergarments (fifth in ranking) and outer garments (fiftieth in ranking) and these are concentrated in Mauritius, Lesotho, Swaziland and Botswana. This analysis reveals that SSA barely participates in trade in market-dynamic products (Kousari, 2004).

2.6.1 External Barriers

External barriers have been labeled as the sole explanation for Africa's poor performance in external trade. This view is contested by some World Bank economists (Amjadi, Reinke and Yeats, 1996; Ng and Yeats, 1996) who argued that the tariff barriers facing the African countries in the EU, the principal destination for African exports, are considerably diluted because of the Generalized Scheme of Preferences (GSP) and the EU's Lome Convention covering the ACP countries. Both of these long standing schemes have provided substantial tariff concessions on a range of designated imports into the OECD countries under the GSP and into the EU under the Lome Convention.

The least developed countries, a group that includes several African countries, receive substantially higher level of preference than other developing countries under the GSP. Although the preference granted to African countries by the EU, for example, has appeared quite generous, rules of origin and other factors have impeded the positive impact that such trade concessions could have had on African economies (Mailafiya, 1997).

It is also evident that tariff escalation does deter export of processed goods from Africa. Tariff escalation occurs when tariffs of final processed goods exceed those on unprocessed raw materials. Such escalation increases the effective rate of protection, the protection afforded to value added on products subject to escalation in the importing countries. Such escalation limits the opportunities for exporters to diversify their exports into processed products and thereby increase the value added content of their exports with beneficial effects on employment generation. This would be so especially in the case of African countries whose exports include a substantial proportion of unprocessed agricultural and mineral products.

Amjadi *et al*. (1996) conclude that "tariffs do not appear to have been a major general constraint to the further processing and export of African commodities (provide the eligible commodities actually get "due" preferences), although escalation - which would work against further processing-is evident in several "MFN covered chains" (ADR, 2002). If unprocessed materials enter duty - free. As World Bank economists acknowledge, there are opportunities for OECD countries to improve market access conditions for some processed commodities and one way to do this is to extend existing preference.

2.6.2 Subsidies

One impediment to exports of developing countries, including Africa, is the heavy domestic subsidies - including export subsidies for agriculture - provided by the US, Japan and the EU for their own farmers and other producers. The failure of the Cancun negotiations resulted from the intransigence of the EU and the US with regard to the sizeable subsidies they pay their farmers. The WTO agreement on agriculture uses a “traffic light” approach to categorize different types of domestic support polices. The amber box polices are subject to limitations, while green box and blue box polices, which are aimed at limiting production, are exempt from limitations. The amber box polices are deemed to be the most trade-distorting. According to the WTO (2003), total domestic support of the amber kind was around US$104 billion, of which the Quad countries (U.S., EU and Japan) accounted for 84 percent. The major products affected by the support measures include meat, dairy, cereals and sugar. Between 60 percent and 80 percent of exports of countries such as Benin, Burkina Faso, Burundi, Malawi, Mali, Rwanda, Tanzania, Uganda, and Zimbabwe are affected by the domestic subsidies for agriculture in the Quad (WTO, 2003).

These small, EU-dependent, exporters are also the countries whose exports suffer because of the export subsidies, as distinct from general subsidies to agriculture, offered by the developed countries for their agricultural products. According to the WTO the total value of agricultural subsidies offered by member countries between the years 1995 and 1998 amounted to US$ 10 billion. Reduction of these subsidies would increase the world prices and benefit net exporters and also raise the incomes of the producers. However, consumers would have to pay more for the imports of the commodities that now enjoy subsidies (ADR, 2002).

There is thus reason to believe that the sum of tariff and non-tariff barriers and various sorts of subsidies in the quad countries do compound the problems faced by the African exporters. Substantial reduction if not elimination of these barriers should facilitate the expansion of exports from these countries. However, to take advantage of the opportunities for trade that an elimination of trade barriers could provide them with, African countries have to set their own house in order, by eliminating domestic distortions, and by improving the productivity and growth of their export sectors (ADR, 2002).

2.6.3 Trends in imports and exports

2.6.3.1 Imports

The most obvious trade policy liberalization measures are reducing the average tariff, reducing the dispersion of tariffs and reducing or eliminating non-tariff barriers to imports. African countries implemented all such forms of import liberalization in the 1990s. The most immediate effect is to make it easier to import and specifically, to reduce the domestic price of imports. One would therefore expect to observe an increase in imports following liberalization, and this was indeed the case. For Africa overall, imports (measured relative to GDP) increased by some 12 percent during the decade of the 1990s (WTO, 2003).

All regions of Africa, with the exception of North Africa recorded increased imports over the decade (Table 2.6). North Africa is the region that reduced tariffs the least (proportionally) and had the highest average tariffs at the end of the decade. Southern Africa, the region that had consistently the lowest average tariffs, also had the highest import/GDP ratio. The high starting point may explain why the percentage increase in imports was relatively low.

Table 2.6: The Pattern of Import Performance in Africa (Country Groups)

	Imports (%GDP)		**Change**	
	1990-92	1998-00	% point	%
All Africa	39.8	44.7	4.9	12.3
Region				
North Africa	34.1	32.1	-2.0	-5.7
West Africa	35.8	40.8	5.0	14.0
Central Africa	35.4	44.6	9.2	26.0
East Africa	41.9	45.2	3.3	7.9
Southern Africa	51.4	54.1	2.7	5.3
Export orientation				
Manufacturing	33.2	37.2	4.0	12.0
Agriculture	33.2	35.1	1.9	5.7
Mining/resource	35.3	42.0	6.7	19.0
Oil	30.8	35.1	4.9	15.9

Note: Changes between 1990-92 and 1998-2000 averages is given in percentage points and in percentage terms.
Source: WTO (2003).

For the other three regions, there is no evidence of correlation of tariffs and tariff reduction to growth in imports. West Africa reduced tariffs the most and to the lowest level (of these three regions), but did not have the highest import growth and actually has the lowest import/GDP ratio of the three regions. There is some indication that imports are highest and grow faster in countries with low and declining tariffs, whereas imports are least in countries with relatively high (or slowly declining) tariffs. However, the performance of exports is likely to be a more important determinant of import growth (WTO, 2003).

The immediate effect of import liberalization is losses in some sectors offset by gains in other sectors; the net impact is indeterminate. The longer-term impact will depend on how effectively the export sector responds to improved incentives (WTO, 2003).

2.6.3.2 Exports

There is a growing volume of empirical evidence that trade causes increases in a country's income (Edwards, 1998; Greenaway, Morgan and Wright, 2002; Irwin and

Tervio, 2002). The poor performance of many African economies has been associated with low growth of exports (Soderbaum and Teal, 2003).

Although trade liberalization does not usually affect actual export prices (as these are typically determined on a world market), it increases the return to exportable relative to the return to importable products. Producers of importables face increased competition from cheaper imports, reducing the profits of those that remain competitive. The competitive position of producers of exportables is not adversely affected, and may be improved if they can access cheaper inputs and/or if the trade reform included specific export promotion measures. Thus, the relative incentives to producers of exportable are improved an adequate export response is usually sufficient to ensure that the net impact of trade liberalization is favorable.

Table 2.7: The Pattern of export Performance in Africa (Country Groups)

Region	**Exports (%GDP)**		**Change**	
	1990-92	**1998-00**	**% point**	**%**
All Africa	27.3	32.4	5.1	18.7
Region				
North Africa	29.5	29.9	0.4	1.4
West Africa	25.3	28.6	3.2	12.6
Central Africa	22.2	35.2	13.0	58.6
East Africa	25.8	28.9	3.1	12.0
Southern Africa	35.5	39.1	3.6	10.1
Export orientation				
Manufacturing	26.6	31.2	4.6	17.3
Agriculture	21.9	25.7	3.8	17.4
Mining/resource	29.7	33.0	3.3	11.1
Oil	34.4	38.3	3.9	11.3

Note: Change between 1990-92 and 1998-2000 averages is given in percentage points and in percentage terms.
Source**:** WTO (2003).

Table 2.7 shows that overall export growth in Africa was quite strong over the decade, with the export/GDP ratio increasing by almost 20 percent. The lowest growth was in North Africa, the least liberalized region, whereas the highest export/GDP ratio (with moderate growth) is in Southern Africa, the most liberalized region. There are many factors affecting export performance. Domestic trade policy is only one, and would rarely be the most important, at least in the short to medium term.

2.7 Lesotho's integration into the regional economy and preferential market access

Lesotho's integration into the regional economy is an inescapable fact. Lesotho's economy is inextricably linked with those of its regional partners, particularly South Africa, through flows of goods, services, labour and capital. Trade, exchange rate and monetary policies are similarly integrated, as is appropriate when economies are so intertwined. From Adam Smith onwards, economist have pointed out that the benefits of the division of labour are limited by the extent of the market. Lesotho's integration into the largest regional market yield economic benefits it could not otherwise hope to enjoy, given its location, resources, and small size. There remain important barriers that prevent the customs union from attaining the level of a single market, however (Anon, 2003).

Lesotho has not ignored the broader world outside of the region - it has cultivated FDI to build an entirely new and dynamic industry, which in turn has gained a foothold in the world's largest economies. Although one might dismiss the emergence of the garment industry as opportunistic behaviour by footloose foreign investors (who will leave Lesotho as swiftly as they arrived), Lesotho took advantage of these opportunities while other countries did not. Clearly the country's investment climate offers some unique features, such as some favorable regulations, a relatively stable democracy and the like. But more can be done to improve the internal business climate, as well as to reduce the costs of trading within the region (Anon, 2003).

Preferential market access provided under trade arrangements with the EU and the United States is the critical factor that has determined the flow of FDI in to the garments sector. In addition, the global quota regime under the MFN has also influenced the evolution of the industry. In other words Lesotho's foreign trade in textile and clothing is directed by four important trade agreements namely the AGOA, the Cotonou Agreement, the

Southern African customs Union and the SADC Free Trade Agreement. The trade agreements and the nature of market access are summarized in the next section (IMF, 2004).

2.7.1 Lesotho's Integration with the South Africa

Lesotho borders only one country, South Africa, which has the most developed economy in Africa. One cannot discuss Lesotho's economic structure and performance without mentioning its close economic integration with South Africa. The level of economic interaction with South Africa is high for three main reasons: the size differential, proximity and the customs union. Because of its size and relatively high level of economic development, South Africa supplies more than 90 percent of Lesotho's import needs (equivalent to 70 percent of GDP in 2000 (Table 2.8)). It absorbs just under half of Lesotho's exports (24 percent of GDP) (Anon, 2003).

However, trade in goods alone does not fully capture the level of integration of Lesotho's economy into South Africa. In addition to the monetary and trade linkages their capital and labour markets are closely linked as well. Capital can move freely across borders and South African banks operate in Lesotho. Although East Asian investors have probably invested more in Lesotho's economy, South African owned firms play an important role in service and manufactures. Finally, and importantly, South Africa provides markets for many services, including water royalties and power (Anon, 2003).

In addition to trade and investment links, there is also substantial labour market integration. The South African economy has traditionally created employment opportunities for the Basotho. This peaked in the late 1980s when around one-third of Lesotho's male force worked in South Africa, mainly in gold mines. With the restructuring of the South African mining sector, the demand for Lesotho labour declined dramatically. Remittances from miners' wage have steadily declined and while employment is growing in other sectors of the South African economy, it has not filled the gap. The share of miners' wage in labour income fell from 99 percent to 90 in the period 1996/97 to 2000/01 (Anon, 2003).

Table 2.8: Exports of goods and labour, 1996-2000 (million of US Dollars)

Goods and labour	1996/7	1997/8	1998/9	1999/00	2000/01
Exports of goods: Total	191	197	192	188	222
To South Africa	103	141	117	98	113
Imports of goods : Total	989	1019	781	796	705
From South Africa	890	917	703	717	635
Labour income: Total	302	319	239	245	216
Miners' wages	300	316	231	234	194
Miners' wages (%)	99	99	97	96	90
Total export to South Africa	405	460	355	343	329
Water royalities and power sales (RSA)	34	14	13	13	12
Exports of services (water and power)	35	34	27	33	30
Labour remittances (% of total exports to RSA	75	34	27	33	30
Total per capita exports of goods and labour to South Africa (in $)	193	219	169	163	157
Total exports of goods (% of GDP)	43	44	41	37	38
Imports of goods (% of GDP)	95	88	80	77	73

Source: IMF (2001).

South Africa's GDP per capita is almost six times higher than that of Lesotho. Consequently, Lesotho is not as geographically isolated as many least developed countries but is well-positioned to take advantage of South Africa's modern transport infrastructure as well as other opportunities offered by its markets. Furthermore, since both are members of SACU, the oldest customs union in the world, Lesotho has preferential access to South Africa's markets. This arrangement, falling into the "North-South" type, is a source of not only trade, but other benefits as well (Anon, 2003).

While SACU, or more precisely South Africa, accounts for around 90 percent of total imports to Lesotho, it only receives approximately 50 percent or less of Lesotho's exports of goods. South Africa's position as a dominant supplier is easily explained by it proximity and economic size. Lesotho's exports to South Africa, on the other hand, were dominated by footwear (according for almost 40 percent) and other light manufacturing (Anon, 2003).

2.7.2. The Southern African Custom Union (SACU)

The Southern African custom union is a free trade area, with a common outside border while the sovereignty of each state is recognized. Stoneham (1994) and Davies (1994) suggest that intra-SACU trade is of major significance to members of the SACU. In order to overview any form of intra-SACU trade, it is important to have a good knowledge of its working and the aims of the Custom Union Agreement (ITC, 2001).

The Southern African Customs Union (SACU) is the oldest customs union in the world. The Customs Union Agreement, signed in 1910, was later replaced by the SACU Agreement of 1969 and more recently, by the SACU Agreement of 2002. The aim of the customs union is to maintain the free interchange of goods between member countries, as well as to provide for a common external tariff and a common excise tariff to the customs union. The current member states of SACU are Botswana, Lesotho, Namibia and Swaziland (the so-called BLNS countries) and South Africa. Following its independence from South Africa, Namibia became a contracting party to the 1969 Agreement in 1990 (Leevashni, 2003).

The agreement consists of a memorandum of understanding, 22 articles and a general memorandum of understanding. The objective of the SACU is defined in the Southern Africa Customs Union Agreement (1969) and boils down to the following:

- To maintain the 'free interchange of goods" between the member countries;
- to enforce 'the same tariffs and commercial regulations regarding goods imported from outside the common tariff area'; and
- to ensure 'continual economic development of the common customs area as a whole and to ensure in particular that arrangements encourage the development of less advanced members of the customs union and the diversification of their economies, and afford to all parties equitable benefits arising from trade among themselves and with other countries (Jooste, 1996).

The new SACU Agreement of 2002 substantially reforms the 1969 Agreement which placed South Africa in a very dominant position. The new Agreement has sought to create a more democratic structure and to enable the BLNS to participate more actively in the SACU decision-making process.

A key issue in negotiations was the common revenue pool of the SACU member states. The 1969 Agreement provided that all customs and excise duties collected in the common customs area would be paid into South Africa's National Revenue Fund, with the BLNS countries being allocated their share of the revenue and South Africa, as custodian of the pool, receiving the residue.

In contrast, the new Agreement provides that the revenue share accruing to each member state be divided into three components (a customs pool, excise pool and a development component) with each following its own method of distribution. The customs component will be allocated according to each country's share of total intra-SACU trade, including re-export; the excise component will be shared on the basis of GDP; and the development component is to be fixed at 15% of the total excise pool and distributed to all member states in inverse proportion to each country's GDP/capita (Leevashni, 2003).

The new Agreement also provides for a Council of Ministers, represented by one minister from each member state, to be the highest decision-making body and for decisions to be taken only by consensus (Leevashni, 2003).

In terms of coverage of trade policy instruments, the 2002 SACU Agreement is not fundamentally different from the 1969 one. Indeed, applied customs tariffs, excise duties, customs valuation, rules of origin, and contingency trade remedies remain the only domains of trade policy that, so far, are formally harmonized throughout SACU. Nevertheless, democratization of SACU's trade policy formulation is to significantly increase, with the discretion to set customs tariffs moved from South Africa's Board on Tariffs and Trade to the SACU Tariff Board. In addition, further policy harmonization, as recommended by the 2002 SACU Agreement, will increase regional trade and, if combined with multilateral liberalization and outward-orientation, will foster the integration of SACU into the world economy (WTO, 2003).

2.7.2.1 Lesotho's Integration with the SACU

Theory suggests that Lesotho's participation in SACU would be potentially beneficial. First, unlike a free trade agreement, a custom union does not require costly rules of origin among members, as all products entering the customs union are subject to common external tariffs (CET) and other taxes and charges collected by customs. SACU offers this advantage to Lesotho with one caveat-the rule of origin requirement is maintained on some electronic and leather products (Anon, 2003).

Second, a custom union offers the opportunity to completely remove border formalities. This significantly cuts transaction costs, as inefficient customs clearance procedures can often be more costly than tariffs. However, Lesotho maintains economic border controls for two reasons. Its tax rates differ from South Africa's and its status as a LDC obliges it to trace origins of inputs in order to enjoy preferential access in USA and EU markets. These border controls raise - no matter how efficient customs procedures are - transaction costs. Consequently, the potential benefits from operating in markets beyond Lesotho's borders have been somewhat undermined.

Overall, however, Lesotho's participation in SACU appears to have had a positive impact on the country's economic development. Although the SACU - CET is neither neutral nor close to the first best option of free trade, average tariffs and dispersion have fallen, hence reducing their distortion impact on the patterns of domestic production and consumption. The SACU - CET is now well below rates in countries at a similar level of economic development (WDI, 2001). Liberalization in CET combined with institutional change envisaged in the new SACU agreement provides a credible mechanism to lock-in tariff liberalization and assure neutrality of foreign trade policy. With the discretion to set tariff rates moved from South Africa's Board of Tariffs and Trade to a SACU Tariff Board, the ability of domestic producers from any member country (not only South

Africa) to obtain tariff protection is likely to be significantly reduced. Moreover, Lesotho's membership in SACU makes it part of a large market. The challenge is to maximize benefits offered by the existing arrangement (Anon, 2003).

Lesotho should take advantage of its sovereign status to pursue two parallel strategies: one to lower the "costs of trading" with South Africa and other SACU partners, and another aimed at establishing a competitive business environment vis-à-vis other countries in the region. The former calls for the removal of various remaining barriers to trade and movement of capital and labour within SACU and thereby transforming it into a full-fledged single market. The latter calls not only for the removal of various administrative barriers that impede the conduct of business activity, but also the effective provision of public services including public order and good governance. These two strategies complement and reinforce each other (Anon, 2003).

Lesotho has several special assets. Leaving aside its status as a LDC, which confers preferential trade treatment and access to foreign assistance, SACU membership and proximity to South Africa are assets. The challenge is how to exploit them, i.e., to 'negotiate a better, growth conducive regional environment (Anon, 2003).

Lesotho can use regional integration and most importantly integration with South Africa (and SACU) as a springboard to greater integration into the world economy. This can be achieved through supporting measures that increase the contestability of SACU markets and regional regulatory coordination. The former calls for liberalization of SACU's common external tariff where it is beneficial for Lesotho and limitations on the use of non-tariff barriers, whereas the latter calls for regional cooperation in the introduction of trade facilitating measures (Anon, 2003).

While the SACU common external tariff rates declined in the post-Uruguay Round environment, they remain dispersed and high especially in products (e.g., textiles) where Lesotho has shown a competitive edge in international markets. Moreover, RSA has resorted extensively to anti-dumping as a tool of protecting its domestic industries. The results are higher prices also for Lesotho's consumers of these products. The new SACU Treaty opens the decision process to its smaller members, and Lesotho should take advantage of it. It should focus its negotiating resources on lowering SACU common external tariffs on these items that are critical to Lesotho's export competitiveness as well as influencing South Africa's proclivity to use anti-dumping actions as its preferred tool of protectionism (Anon, 2003).

Table 2.9: Complexity of SACU tariff structure, 1997 vs. 2001

SACU tariff structure	1997	2001
Share of tariff lines that are compound, formula, mixed, specific	24.6%	25.6%
Number of bands	45	40
Maximum ad valorem rate	57.5%	55%
Share of tariff lines with zero rates	44%	45%

Source**:** WTO (1998, 2003).

SACU's relatively high tariffs on textiles, clothing and inputs, has perhaps the greatest consequence with respect to Lesotho's integration into the world economy. The high tariff creates an anti-export bias for Lesotho as a garment exporter, raising the costs of garments in domestic markets (WTO, 1998). Even though South Africa has accelerated tariff liberalization on clothing and textile duties on most finished garments are 24-47 percent, which is extremely high (more than double U.S. rate, for example). The 2002 CET lists duties of 18 percent on yarns, 24 percent on many types of fabrics, labels, elastic, badges, lace, and so on. Moreover, many South Africa anti-dumping actions focus on clothing and textiles. The CET remains complex despite progress in reducing overall tariffs and their escalation since the 1980. Table 2.9 illustrates that progress in reducing complexity in the CET stalled.

Rebates or duty drawback provisions for inputs used to make garments for export rarely fully offset the export-bias inherent in the tariff schedule. The existing tariffs work against Lesotho's competitiveness by raising domestic and regional prices for these items. Furthermore, a system of first setting a high tariff rate but then rebating or exempting exporters using a duty drawback system is far less transparent than simply setting a low tariff rate on imported garment inputs. After 2004, when AGOA will require to use either U.S. or regional inputs, this protectionism will adversely affect Lesotho's competitiveness. In general, such high import tariffs on inputs and finished products undermine the goal of increasing garment exports (Anon, 2003).

Another area in which SACU offers an opportunity worth exploring is regional regulatory cooperation transforming the SACU market into a genuine single market with as little impediment to border flows as possible. Approaching regulatory reform from a regional perspective makes sense only insofar as it is a stepping-stone towards greater integration into the world economy and offers opportunity to realize economies of scale in policy implementation and/or reducing the costs of policies on international trade. Examples include meeting WTO rules concerning customs clearance and valuation, standards and technical regulations, sanitary and phytosanitary measures, intellectual property rights. These would be more effectively dealt with at a regional level. In these areas, the SACU framework may provide a useful arena in which to harmonize, provided that the outcomes are WTO compatible. This would not only minimize trading costs across borders but also lower the cost of their implementation and compliance. While not related to WTO commitments, a similar argument applies to harmonization of VAT/sales tax rates: different tax structures encourage smuggling and distort trade flows (Anon, 2003).

2.7.3 The Southern African Development Community (SADC)

In facing of the globalization phenomena, growing fears of African marginalization caused regionalism to receive much more attention, especially in Africa. Regional trade integration is generally seen as a means of fostering economic growth and development through increased intra-regional trade and cross border investment. Nevertheless the debate on trade liberalization and growth is still open among academicians. Indeed, neither theory nor empirical results provide a clear-cut answer to the question (Rodriguez and Rodrik, 1999; Collier and Dollar, 2001).

With the attainment of political independence by the majority of Southern African states by the 1970's, the stage was set for economic liberation and regional co-operation. One of the most important initiatives towards realizing regional cooperation in Southern Africa occurred following the Lusaka Declaration Conference (SADCC) in Lusaka, Zambia, on 1 April 1980 (SADC, 1994; Brown, 1989). The aims of the SADCC were to reduce dependence on South Africa, increase regional integration and foster regional development (Mhone, 1991). However, the liberation of Namibia and democratization of South Africa led to the establishment of the Southern African Development Community (SADC) which replaced the SADCC (Jooste, 1996 and ITC, 2001).

The declaration and Treaty establishing the SADC was signed at the summit of heads of state on 17 July 1992, in Windhoek, Namibia (SADC, 1994). The establishment of the SADC meant a movement away from "conference" to a "community" which in turn meant a change in orientation. Firstly, the "conference" was an ad hoc co-ordination of projects and infrastructure development to oversee integration in a number of areas including security, peace, democracy, and conflict resolution as well as areas of energy, trade promotion, investment promotion and information and culture (Tostensen, 1993).

The SADC currently consists of 14 member countries namely, Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe, Mauritius, Democratic Republic of Congo and Seychelles (Jooste,1996), representing a total population of approximately 200 million people, and covering an area of 9.2 million square kilometres (World Bank, 2001). Three countries (the Democratic Republic of Congo, South Africa and Tanzania) account for almost two thirds of the total population (64.4%), while the six smallest members (Seychelles, Swaziland, Mauritius, Botswana, Namibia and Lesotho) comprise only 4% of the total population. The total SADC Gross Domestic Product (GDP) was around US$182bn in 2000, and average GDP per capita US$1,761. Detail figures illustrated in Table 2.10. However, there are wide variances in aggregate and per capita GDP, and countries are at highly divergent levels of development. Seven SADC countries are classified as least-developed economies (Angola, the Democratic Republic of Congo, Lesotho, Malawi, Mozambique, Tanzania and Zambia). The poor countries of SADC have larger agricultural sectors relative to non agriculture. In 1999, the agricultural sector contributed 38% to GDP in the case Malawi, 32% in Mozambique and 48% Tanzania (World Bank, 2001).

Table 2.10: GDP at market price of SADC member countries, 1999

Country	Population (Million)	Area (000 Sq Km)	GDP (Current US $m)
Angola	12.4	1247	5861
Botswana	1.6	567	5996
DRC	49.8	2267	7752
Lesotho	2.1	30	874
Malawi	10.8	94	1820
Mauritius	1.2	2	4233
Mozambique	17.3	784	4166
Namibia	1.7	823	3075
Seychelles	0.1	0.45	545
South Africa	42.1	1221	1311127
Swaziland	1.0	17	1223
Tanzania	32.9	884	8777
Zambia	9.9	743	3325
Zimbabwe	11.9	387	5716
SADC Total	194.7	9067	184494
S. Africa Share of SADC (%)	21.6	13.5	71.1

Source: Lewis, Robinson and Thierfelder (2001).

Taken separately, many member states of the SADC are characterized by small, weak and underdeveloped economies which are unable to provide adequate employment, goods and services to citizens. None of them are able to compete successfully in the global marketplace and their exports remain vulnerable to fluctuations in world prices. Although the region is relatively poor with respect to human capital, the region is rich in natural and human resources. Therefore, the countries of Southern Africa, as a collective group, are thought to have the potential to become a powerful economic bloc. This can be achieved by pooling resources and capitalizing on each other's comparative advantages (SADC, 1994).

The SADC will in future play an important role with respect to trade in southern Africa as well as trade with the rest of the world. The objectives of the SADC as stated in Article 5(1) of the treaty are to (SADC, 1992):

- Achieve development and economic growth, alleviate poverty, enhance the standard and quality of life of the peoples of Southern Africa and support the socially disadvantaged through regional integration;
- evolve common political values, systems and institutions;
- promote and defend peace and security;
- promote self-sustaining development on the basis of collective self-reliance, and the interdependence of member States;
- achieve complementarities between national and regional strategies and programmes ;
- promote and maximize productive employment and utilization of resources of the region;
- achieve sustainable utilization of natural resources and effective protection of the environment; and
- strengthen and consolidate the long-standing historical, social and cultural affinities and links among the peoples of the region.

According to Blumberg and Wentzel (1994) Article 5(2) sets out the obligations of the SADC for the achievement of its objectives and includes among others:

- The harmonization of the political and socio-economic policies and plans of member states;
- encouragement of the development of economic, social and cultural ties; and
- the development of policies aimed at the progressive elimination of obstacles to free movement among member states of capital and labour, goods and services, and the people of the region generally.

The primary role of the SADC is to help define regional priorities, facilitate integration, assist in mobilizing resources and to maximize the regional impact of projects. The approach is to address national priorities through regional action within the scope of the SADC's programme of action. Each member state has been allocated a sector to co-ordinate which involves proposing sector polices strategies and priorities and processing projects for inclusion in the sectoral programme, monitoring progress and reporting to the council of ministers (SADC, 1994).

2.7.3.1 Lesotho's Integration with the SADC

The members of SADC have signed a Free Trade Agreement (FTA). The FTA is asymmetrical in nature. In other words, the SACU countries will reduce tariff barriers at a faster rate than the other SADC states. SACU has a period of five years to reduce tariffs while the other member states have eight years. Essentially 85% of trade will be duty free by 2008, with total liberalization in effect by 2012. Effective 1 August 2001, all SADC state excluding the Seychelles, Angola and the DRC have lodged their instruments of implementation. On an operational level this means that trade between all SADC countries with the three exceptions, benefit from the scheduled tariff reduction (ITC, 2001). Table 2.11 shows that Lesotho trades very little with the non-SACU SADC member (less than one percent of Lesotho's trade). A similar story holds for other SACU members with the exception of Swaziland. Its exports to non-SACU members of SADC represent 13.4 percent of its total exports (Anon, 2003).

The FTA should help Lesotho to integrate its garment industry into a regional supply chain. Consultants commissioned by SADC report that there is capacity to develop regional supply chains for cotton-based fiber/finished garments and artificial suppliers that will enable Lesotho to continue receiving preferential treatment in the U.S. market after 2004. At this time, Lesotho's garments produced will need to source inputs from either the U.S or from another regional AGOA participant (Anon, 2003).

Table 2.11: Lesotho's trade with SADC, 1998 (percent)

Direction of Trade	Imports	Exports
With SACU	89.6	53.1
With rest of SADC	0.2	0.7
With rest of World	10.2	46.3

Source: Flatters (2001).

The emergence of a regional supply chain is constrained by the kinds of regional problems such as a non-transparent business and investment climate, inadequate infrastructure, and poor training facilities that also plague Lesotho. But additional impediments can be found in restrictive trade practices among SADC members (including SACU's tariff and anti-dumping policies).

Most of the trade within SADC occurs among SACU member countries, on account of the Common External Tariff (CET) and the difficulty SACU members have in negotiating trade agreements with third parties. This is indicative of the fact that the SACU countries have a history of trading with each other. In 1996, 77% of exports of SACU countries to Africa were to SADC countries, and the imports of SACU from SADC countries constituted 60% of the total imports from African countries (NEPRU, 2001).

Total intra-SADC trade equalled 12% in 1996, as opposed to 88% trade with the rest of the world. SADC statistics for 1995 show that South Africa's trade with SADC accounted for 27% of total intra-SADC trade, followed by Botswana and Zimbabwe, with 19% and 15% respectively (NEPRU, 2001).

Table 2.12 shows that in 1995, South Africa accounted for 52% of intra-SADC exports, while only absorbing a mere 8% of intra-SADC imports. Simply put, this means that South Africa, which has the biggest economy within the SADC grouping, exports more to SADC countries than it sources imports from SADC countries. Zimbabwe accounted for 61% of South Africa's imports from SADC, followed by Zambia and Malawi, with 17% and 13% respectively. South Africa's population was estimated at close to 43 million, and its Gross Domestic Product (GDP) was US$ 136 035 million in 1995. With the exclusion of the Seychelles and the Democratic Republic of Congo, the rest of the SADC population was estimated at 176 million during the same year, whereas its GDP was estimated at US$ 34 150 million. South Africa's GDP was therefore almost four times higher than the rest of SADC, although its population accounted for less than one fourth of the SADC population (NEPRU, 2001).

Table 2.12: Overview of Intra-SADC Trade Distribution in 1995

SADC Members	% of intra-SADC imports	% of intra-SADC exports
Botswana	25	11
Lesotho	1	0
Malawi	4	2
Mauritius	4	0
Mozambique	4	2
Namibia	10	7
South Africa	8	52
Swaziland	18	12
Tanzania	2	1
Zambia	5	1
Zimbabwe	19	12
Total	100	100

Note: The Democratic Republic of Congo and the Seychelles are not included in this analysis, since the figures in the table refer to 1995. Data on Angola are also not available.

2.7.4 AGOA

AGOA was enacted by the US government in 2000 and covers the 8-year period from October 2000 to September 2008. It is a non-reciprocal trade preference program - rather than a trade agreement and is designed to provide 37 eligible countries in Sub-Saharan Africa with improved duty - free and largely quota-free access to the US market (Naumann, 2004).

AGOA is built on the US' Generalized System of Preferences (GSP), a program that saw the abolishment of duties and quotas for lesser developed countries on approximately 4,500 product tariff lines. Whereas the GSP is subject to annual review and change, AGOA locks in these product specific benefits until at least September 2008. But AGOA goes further, and contains an additional 1,800 tariff line items of products not previously eligible under the GSP. These include apparel, certain agricultural products commonly produced in Africa, footwear, motor vehicles and components, chemicals, iron and steel goods and so forth.

While most exports under AGOA are duty and quota free and subject to straightforward minimum value-added based rules of origin, a special set of conditions governs the traditionally sensitive apparel sector. Direct exports of textile per se are specifically excluded from AGOA, and access to apparel goods is subject to additional safeguard measures on the part of US (Naumann, 2004).

2.7.4.1 Lesotho's Integration with the USA

Lesotho presently enjoys duty-free access to the United States market through the African Growth and opportunity Act (AGOA). The program has a likelihood to be extended to 2015 (originally, it was set to expire in 2008) and, importantly for Lesotho, expands duty-free access to textiles and apparel products, which is one of the most highly protected markets in the U.S. As a LDC, Lesotho enjoys the additional benefit of a temporary exemption from what are otherwise rather restrictive rules of origin (Mattoo, Roy, and Subramanian, 2002). Until 2004 Lesotho was free to use fabric and other inputs made anywhere in the world; it could buy them from the cheapest suppliers. After 2004, inputs have had to be sourced either from the U.S or from another AGOA beneficiary (CBL, 2005).

Lesotho exported garments before AGOA, but the preferential treatment under that program has dramatically affected the garment industry and Lesotho's integration into the world economy (Anon, 2003).

The law provides for non-reciprocal, preferential treatment of exports from qualifying countries. It also calls for expanded U.S foreign direct investment in sub-Saharan Africa and directs the U.S. president to negotiate "reciprocal and mutually beneficial agreements, including the possibility of establishing free trade areas" with those countries. There is no evidence of any concrete progress to date on either front, although two preliminary steps are encouraging. First, in October 2001, the U.S. government established a $200 million facility to be run by the overseas private investment corporation to facilitate U.S. private investment in Sub-Saharan Africa under AGOA (Anon, 2003).

Lesotho was the first of the BLNS countries, the second in SACU and the fifth of the 35 sub-Saharan African countries to qualify for the enhanced benefits under AGOA. Its exports have since enjoyed duty-free access into the US market. The export-led economic growth strategy has been promoted with an emphasis on the manufacturing sub-sector which has seen great growth levels in textiles and clothing. These exports grew from 16 per cent of GDP in 2000 to 30.6 per cent in 2003. Of course, the positive spill-over effects from this are many, and range from: Export growth, GDP growth, improvement in employment levels, and improvement in foreign exchange earnings, to mention a few. The increase in employment from 21 886 in December 2000 to 51 160 in December 2003 underscores the improvement due to AGOA benefits. As a result, this sector is the biggest employer in the country. The contribution of the manufacturing sector is truly significant because it accounts for around 20 percent of GDP (CBL, 2005).

In 2002, it emerged as a major exporter of apparel to the US, the largest market for apparel in the world, and the largest supplier from SSA. With exports of US$ 260 million in April 2001-April 2002 (or US$129 per capita), it surpassed South Africa (US$ 167 million) and Mauritius (US$ 244 million). It accounted for 25% of total apparel exports to the U.S. originating in SSA over April 2001-April 2002. It currently accounts for 0.50 percent of U.S imports of apparel and is ranked the 33rd supplier in terms of value of exports. The value of exports increased over the entire AGOA- covered period, i.e. between April 2001 and April 2002, from US$ 155 million to US$ 261 million, or 68 percent was 45 percent higher than the value of its total exported in 1999 (Anon, 2003).

Bi-lateral trade between the United States and Lesotho is characterized by the latter country's rapid expansion of its exports to the US. In 2001, Lesotho recorded a $ 215 million trade surplus with the U.S.; double that of two years previously. By the end of 2002, this had risen further to $ 319 million. Lesotho imports only a very small amount of goods from the U.S. (AGOA, 2002).

More detail of the bilateral trade profile of US-Lesotho is explained in table 2.13. Trade data is grouped according to product section.

Table 2.13: Bilateral trade profile between United States and Lesotho

	Value (1,000 dollars)			**Year-to-date Jan.-Jun.**	
	2001	**2002**	**2003**	**2003**	**2004**
Agricultural products:					
US Exports to Lesotho	30	614	2,631	145	1,088
US Imports from Lesotho	0	0	0	0	0
Forest products:					
US Exports to Lesotho	7	3	27	13	8
US Imports from Lesotho	27	0	0	0	0
Total AGOA including GSP provisions of AGOA	23	0	0	0	0
- US imports under GSP from Lesotho	23	0	0	0	0
Chemicals and related products:					
US Exports to Lesotho	0	0	0	0	8
US Imports from Lesotho	144	274	326	180	99
Total AGOA including GSP provisions of AGOA	39	226	74	42	91
- US imports under GSP from Lesotho	39	226	74	42	91
Textiles and apparel:					
US Exports to Lesotho	0	221	166	151	11
US Imports from Lesotho	216,776	321,049	392,490	169,825	204,019
Total AGOA including GSP provisions of AGOA	129,523	317,803	372,600	166,455	198,097
- US imports under GSP from Lesotho	0	0	57	35	75
- US imports of duty-free items added under AGOA	129,523	317,803	372,544	166,420	198,023
Minerals and metals:					
US Exports to Lesotho	6	0	3	3	38
US Imports from Lesotho	31	0	0	0	1,846
Total AGOA including GSP provisions of AGOA	8	0	0	0	0
- US imports under GSP from Lesotho	8	0	0	0	0
Machinery:					
US Exports to Lesotho	16	31	1,714	9	1,235
US Imports from Lesotho	0	0	0	0	0
Transportation equipment:					
US Exports to Lesotho	350	365	333	333	57
US Imports from Lesotho	0	0	0	0	0
Electronic products:					

Table 2.13. Continuous

US Exports to Lesotho	354	525	141	96	52
US Imports from Lesotho	4	0	9	0	0
Miscellaneous manufactures:					
US Exports to Lesotho	20	3	4	4	0
US Imports from Lesotho	55	0	39	0	0
Special provisions:					
US Exports to Lesotho	34	56	78	17	94
US Imports from Lesotho	127	152	193	76	305
All sectors:					
US Exports to Lesotho	817	1,818	5,098	772	2,593
US Imports from Lesotho	217,165	321,475	393,056	170,080	206,269
Total AGOA including GSP provisions of AGOA	129,592	318,029	372,674	166,497	198,189
- US imports under GSP from Lesotho	69	226	130	77	166
- US imports of duty-free items added under AGOA	129,523	317,803	372,544	166,420	198,023

Source: US Department of Commerce, www.agoa.info.

US data on imports from Lesotho do not support the view that special preferences under the African Growth and Opportunity Act (AGOA) have been solely responsible for the emergence of Lesotho as the largest exporter of garments among Sub-Saharan countries. Under AGOA-1, which runs from 2000 to 2004, exporters from the least developed countries of SSA have duty and quota free access to the US market.

Of Lesotho's exports to the U.S., 99.7 percent consist of clothing and apparel (SITC 84). Lesotho's clothing exports to the U.S. were highly concentrated in a very narrow range of products, with one four-digit SITC product (men's trousers and overalls) accounting for more than one-third of total exports in 1999. The export share of the three largest products accounted for 77 percent (Anon, 2003).

The high product concentration of clothing exports is not necessarily a weakness as the existing equipment and labour force in these factories run by Asian companies (from Singapore and Taiwan) are capable of switching to substitute garments. These operations are large production units clearly geared for mass production of commodity type garments. Given the commodity nature of these garments, they tend not to be subject to sharp changes in fashion with demand remaining steady throughout the year. Therefore, lengthy transport times (up to 40 days) by sea to the U.S. market from this land-locked country are not very relevant (Hyvarinen, 2002).

2.7.5 The European Union

What is known today as the European Union started of as the European Economic Community. This organization was originally created only for economic co-operation. Other organizations were later brought under the same umbrella (such as the European Social Organization) and the European Economic Community (EEC) also received some new responsibilities (i.e. environment, political decisions, etc.). This led to the creation of a new name, European Community, which was, however, still an organization of independent states collaborating (forming a community), but still with borders (economically, but also personally i.e. with passport control). In 1992, with the Treaty of Maastricht, the states took the decision to increase this collaboration and let the borders between the independent states disappear as much as possible (i.e. passport control disappeared for European citizens; there is free economic movement of goods and capital, etc.).To emphasize this they changed the name to its current form, the European Union (EU) (Jooste, 1996).

The treaty which led to the establishment of the European Economic Community was signed in Rome in March 1957 (Fottorino, 1992; Kindleberger and Lindert, 1978). In the earlier years the European Economic Community (EEC) was often called the European Common market. This relates to the definition of a common market where countries decide to integrate more fully, which normally implies freedom of movement, not only of goods but also of factors of production namely labour and capital (Matthews, 1987). The introduction of a common market in agricultural products promised a number of substantial advantages to the whole community, advantages that could hardly have been available within the narrow geographic boundaries of the individual member states (Fottorino, 1992). This eventually led to the decision of the member States to form an economic union that implies not only a common market but also common policies in various fields of economic activity such as agriculture, transport, etc. (Matthews, 1987).

The European Union or EU is a supranational organization of European countries, which currently has 25 member states, these are (EU, 2006): Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, UK; note - Canary Islands (Spain), Azores and Madeira (Portugal), and French Guyana, Guadeloupe, Martinique, and Reunion (France) are sometimes listed separately even though they are legally a part of Spain, Portugal, and France; candidate countries: Bulgaria, Croatia, Romania, Turkey.

The main objectives of the Treaty of Rome included the elimination of all customs duties and other trade barriers to the movement of goods between member countries. It also entails a common external tariff against goods imported from outside the community. This was the basis for a customs union that took about 10 years to establish. To comply with Article 24 of GATT, the EU tariff was derived from the arithmetic mean of the member countries' tariffs (Matthews, 1987).

Freedom of movement within the community for persons, services and capital was another objective. It means that EU citizens are free to work in any part of the community, and to live in any member country after being employed there. Discrimination on grounds of nationality as regards to employment, salary and working conditions is not allowed. Neither are restrictions on the free supply of services allowed, since nationals of one member country are free to establish businesses in all other countries (Jooste, 1996).

2.7.5.1 Lesotho's Integration with the European Union

The ACP - EU Partnership Agreement, which was signed in Cotonou in June 2000, provides for negotiating "economic partnership agreements" (EPA) between ACP countries and the EU. These will comply with WTO rules on regional agreements and replace the non-reciprocal preferences that grew out of the Lome convention. The EU begun negotiations September 2002 and is scheduled to conclude them at the end of 2007 (Anon, 2003).

Lesotho was a signatory of the Lome' convention, which allowed duty - free access of clothing originating in ACP (Africa, Caribbean and pacific) countries to the EU. Initially, the manufactures were allowed to buy their inputs (mainly fabrics) from the cheapest source (e.g. East Asia). In the late 1980s, however, the EU began to apply "cumulation" to all ACP countries, requiring at least two stages of production (e.g., fabric making and garment manufacturing) to be carried out in the country of origin or another qualifying ACP country (Anon, 2003).

Lesotho received a special dispensation for eight years, and a new wave of FDI, mainly by Taiwanese companies, followed. After the end of the dispensation, several foreign investors downsized or closed their factories. Others who shifted their exports had to pay a duty of 17% on average, which applied to all exporters from developing countries, but they were allowed to buy their raw materials from the cheapest sources.

Even though Lesotho's trade with the European Union is relatively small, the Cotonou Agreement has important ramifications. First, trade and other polices can still affect the country. For example, some fear that the EU-South Africa Trade Cooperation and Development Agreement (TCDA), which was negotiated without the participation of the BLNS, will complicate Lesotho's trade and customs collection. It has given rise to suspicions of dumping of good by EU producers through the South African Markets. South Africa's tariff cuts have had a significant impact on Lesotho's treasury (Yeats, 2002). The EU has set up a fund to compensate the BNLS countries for potential adverse effects of the EU-South Africa TCDA (Anon, 2003).

A second important issue relates to rule of origin. Lesotho - and developing countries generally have not benefited as much as they could have from past and present EU trade preferences because of restrictive rules of origins and bureaucratic requirements. Lesotho is potentially losing preferential access in some products. Documenting this loss would be a useful exercise and lay the foundation (in lobbying with other LDCs) for a reconsideration of the rules of origin (either an outright derogation of the current rules or alternatively simpler cumulation rules or proof of origin as argued in Brenton and Mianchin (2002). Moreover, it should not be forgotten the firms spend real resources complying with rules of origin and documenting their compliance (Anon, 2003).

A third issue is the nature of the EPAs and how Lesotho can benefit from it, given that the EU-South Africa FTA/TDCA is already determined. The EU has proposed regional economic partnership (REPAs) that can be signed with different ACP regions or countries as a replacement for existing non-reciprocal trade preferences. While REPA optimists posit they will bring prices down and foster trade, REPA skeptics fear future shrinking of domestic industry and falling revenues. In the case of Lesotho, given its LDC status (Lome-equivalent access under the Generalized Systems of Preferences (GSP)), it has little to gain from membership of a REPA in the short-term. In the longer-term, to the extent that the REPA helps to lock SADC/SACU in to their free trade path, it is likely that increased investment into the region would support its development and benefit lower cost producers in SADC (Anon, 2003).

Given a long ‘phase-in’ period, one can only make some inferences based on 1999 EU and Lesotho exports to SACU and the existing SACU tariff protection. Both are only rough indicators, as high SACU tariff rates may effectively suppress imports from the EU and the export mix will change over time reflecting change in the competitiveness of various products. Lesotho has 34 six-digit HS items directly competing with the EU in SACU markets. Altogether, these 34 products account for about 96 percent of Lesotho’s exports to SACU. They benefit from varying preferential tariff margins over non-preferential suppliers. One assumes that the most vulnerable to displacement by EU exports are Lesotho’s suppliers of products enjoying high levels of tariff protection and the least affected will be products subject to zero or very low tariff rates (Anon, 2003).

The overall conclusion that one can draw from Table 2.14, which offers a breakdown of EU and Lesotho’s exports at corresponding levels of MFN tariff rates, is that the potential for EU displacement of Lesotho's exports is likely to be low. First, the potential for EU displacement of 20 percent of Lesotho's SACU-oriented exports is nonexistent, as they already compete with EU products at zero applied MFN tariffs (Anon, 2003). Second, although 13 percent of Lesotho's exports enjoy tariff protection of 40 percent ad *valorem* or more, these are garments in which Lesotho is likely to remain competitive even without extra protection. Lesotho's garment producers already compete successfully against domestic producers in both the EU and U.S. markets. They are unlikely to be displaced by EU suppliers, especially when 'protected' by transportation costs. One could also include denim (subject to protective tariffs with rates of 22 percent and higher) in this group, which accounts for three percent of Lesotho's exports. Thus, around 40 percent of Lesotho's exports to SACU are unlikely to be affected by improved EU-access to SACU markets (Anon, 2003).

Table 2.14: Vulnerability of Lesotho's Exports to South Africa, to imports from the EU in the post-TDCA Environment

MFN Rate	EU exports to SACU (million of US dollars)	Lesotho exports to SACU (million of US dollars)	Share in Lesotho's exports to SACU (percent)	Cumulative share (percent)
40(*)	1.4	10.1	12.7%	-
40	0	0.3	0.4%	13.1%
30(*)	0.3	7.8	9.8%	22.9%
30	3.8	17.2	22.1%	45%
22(*)	0.4	2.3	2.9%	47.9%
20	0.1	2.4	3%	50.9%
18.3	0.8	2.4	1.2%	52.1%
17.5	0.9	1	4.5%	56.6%
12.5	4	9.8	12.3%	68.9%
5.3*	0	1.2	1.5%	70.4%
(**)	0	3.8	4.7%	75.1%
0	0	16.3	20.5%	95.6%
Lesotho imports from EU in million of Euros,1995-98				
Total imports	Imports from r.o.w	Imports from EU	Intra-SADC import	EU*
-	3160	37,773	33.9	-
Lesotho's main exports to the EU in million of Euros ,2000				
Product	Value	Percentage		
71.Diamond	20.5	89.5%		
61.jerseys T-Shirts	1.6	7.0%		
03.Dried Fish	0.2	0.7%		

Notes (*)-The tariff on this item includes an additional fixed charge per unit whose nominal equivalent could not be estimated :(**)-The tariff on this item consists solely of a fixed charge per unit whose nominal equivalent could not be estimated.
Source: for Lesotho import from EU, Eurostat (1999), as quoted by the University Consultancy Bureau and for Lesotho export European Research office (2003).

One can only speculate about the remaining 60 percent of Lesotho's exports. Products protected by 30 percent tariff rates are unskilled-labour intensive products in which the EU is unlikely to have a competitive edge. Despite the relatively large trade base the EU has been able to establish in the presence of the existing high MFN tariffs for footwear, exporters from these two countries probably operate in different market niches. Thus, one would expect that footwear (accounting for 35 percent of total exports to SACU) would survive. Similarly, color television receivers, accounting for 12 percent of Lesotho's

SACU-oriented exports, involve labour-intensive assembly operation and are unlikely to be displaced. In all, at least three-quarters of Lesotho's exports do not appear to face the prospect of extinction by imports from the EU (Anon, 2003).

In all, leaving aside the fiscal pressures arising from declining SACU customs revenue, TDCA should also bring several benefits to Lesotho. It is likely to increase FDI inflows into South Africa with potentially positive spillovers for Lesotho as well as directly to Lesotho. The intensity of competition will increase with benefits to Lesotho's users of imports. For instance, as a net importer of agricultural products, Lesotho will undoubtedly benefit from the elimination of tariffs on 46 percent of South African imports of these products from the EU by 2005 (Anon, 2003).

2.7.6 Lesotho's Integration with the rest of the World Economy

One would expect Lesotho to have strong economic ties with other countries in the region given its size, resource base, and level of development. What is surprising is that the economy also has strong links with the world economy through the inflows of foreign direct investment from East Asia and the (related) expansion of garments exports to the United States (Anon, 2003).

The expansion in FDI inflows began in the 1990s. In 1990, Lesotho's stock of FDI was the lowest among SACU member-countries at $155 million. By 2000, the value of FDI stock in Lesotho was higher than all SACU countries except South Africa (higher than Swaziland and Resource-rich Botswana and Namibia). Lesotho FDI stock on a per capita basis is higher than South Africa's despite the huge disparity in GDP per capita between the two countries (Anon, 2003).

Table 2.15: Total FDI stock in SACU and Sub-Saharan Africa, 1999-2000 (Million of US Dollars and percent)

	1990	1995	1999	2000	Index 2000, 1990=100	Percent of GDP,1999	Per capita, 2000
Botswana	1309	1126	1387	1226	94	23.1	613
Lesotho	155	1343	2296	2519	1625	262.7	1260
Namibia	2047	1708	1520	1644	80	49.4	822
South Africa	9221	15016	51777	52654	571	39.5	1254
Swaziland	336	535	559	414	123	45.7	414
Total SACU	13068	19728	57539	58457	447	51.7	1218
Share of Lesotho in SACU total	1.2%	6.8%	4%	4.3%	363		
Total Sub-Saharan Africa	33389	49577	108527	114688	343	29.9	
Share of SACU in total of Sub-Saharan Africa	39%	40%	53%	51%	130		

Source: WIR (2001).

In 2000 the total Stock of FDI in Lesotho estimated by UNCTAD at $2,519 million, was the fifth highest in Sub-Saharan Africa. Lesotho is also one of the leaders in Sub-Saharan Africa in terms of the share of FDI in gross fixed capital formation. Only Angola (92% of gross fixed capital formation in 1999), a country with a strong natural resource base, had a higher FDI contribution to capital formation. Within the category of non-resource endowed developing countries across the world, Lesotho was among the top three in the 1990s in terms of the contribution of FDI to domestic investment (Anon, 2003).

Lesotho has done very well in attracting FDI, with its per capita FDI stock well above the average for LDCs. Lesotho still stands out in terms of its success in attracting FDI to manufacturing activity compared to most other African countries. More than ninety percent Lesotho FDI (excluding LHWP) has gone into export-oriented garment manufacturing, especially a “cut-make-trim” (CMT) operation using imported fabrics (Slam, Frant, Green, Haycok and Raimondo, 2002). This sector was responsible for the spectacular expansion of export to the United States in 2000-01 and has emerged as an engine of growth of Lesotho’s economy.

The link between FDI and foreign trade has been particularly strong and foreign-owned firms have transformed the geographical pattern of Lesotho's trade. The rapid expansion of garment exports to the U.S. was a direct result of FDI. Beginning in the 1980s, Asian industrialists established garment assembly factories in Lesotho to take advantage of Lesotho's favorable access to EU and then to U.S. markets.

Lesotho has attracted an unusually large amount of foreign investment, which has been used to expand garment exports to the U.S. These factors have led to the creation of the substantial number of private sector jobs and have contributed materially to macroeconomic growth. Admittedly, part of Lesotho's success derives from temporary preferences granted by the U.S. (Anon, 2003).

Lesotho can use bilateral arrangements to integrate into the world economy or to take advantage of its LDC status. Based on the level of exports as well as existing preferential trade agreements, the most important bilateral relations are with the United States and the European Union (Anon, 2003).

2.8 Conclusion

No country has developed successfully by turning its back on international trade and long-term capital flows. The world came under the tide of new regionalism in the 1990s. Multilateral trade liberalization was sealed by the Marrakech Agreement of 1994 and the establishment of the World Trade Organization (WTO) in 1995. Developments all over the world, especially during Uruguay Round of the General agreement on Tariffs and Trade (GATT) negotiations, indicate a more market oriented approach and free markets as opposed to control and central planning. These changes will have a definite effect on policies of Africa including Lesotho.

Economic integration drives the existing world trade patterns and this influenced the outcome of Uruguay round of GATT negotiations. Countries are able to enlarge their markets by integrating their economies with those of neighbouring countries, and to establish common policies.

Lesotho's integration into the regional economy is an inescapable fact. Lesotho's economy is inextricably linked into the regional economy of its regional partners, particularly South Africa through flows of goods, services, labour and capital. Trade, exchange rate and monetary policies are similarly integrated, as is appropriate when economies are so intertwined.

Lesotho has not ignored the broader world outside of the region-it has cultivated FDI to build an entirely new and dynamic industry, which in turn has gained a foothold in the world's largest economies. Although one might dismiss the emergence of the garment industry as opportunistic behaviour by footloose foreign investors (who will leave Lesotho as swiftly as they arrived), Lesotho took advantage of these opportunities while other countries did not.

Preferential market access provided under trade arrangement with the EU and the United States is the critical factor that has determined the flow of FDI in to the garments sector. In addition, the global quota regime under the MFA has also influenced the evolution of the industry. In other words Lesotho's foreign trade in textile and clothing is directed by four important trade agreements namely the AGOA, the Cotonou Agreement, the Southern African Customs Union and the SADC Free Trade Agreement. The Lesotho economy also has strong links with the rest of the world through the inflows of foreign direct investment from East Asia.

CHAPTER 3

GENERAL ECONOMIC OVERVIEW AND STRUCTURE OF LESOTHO'S ECONOMY FROM A SAM PERSPECTIVE

3.1 Introduction

Lesotho is one of the 14 Southern African countries that make up the Southern African Development Community (SADC). Lesotho is a constitutional monarchy with a democratic government completely surrounded by South Africa. The Kingdom of Lesotho achieved independence from the United Kingdom in 1966, whereupon its name was changed from Basutoland. Constitutional government was restored in 1993 after 23 years of military rule (UNCTAD, 2003).

More than most countries, Lesotho today is a product of its geography. It is a small country covering about 30,000 sq.km or nearly 12, 000 sq. miles (approximately the size of Israel or Belgium or the American state, Maryland), completely landlocked and uniquely surrounded by only one other country: the Republic of South Africa and forms part of the Southern African region. The capital city is Maseru. Other major towns are Mafateng and Leribe. For that reason, the history and the socio-economic development of this nation is invariably intertwined with that of its larger and more powerful neighbour- from the Boer wars of the 18th and 19th centuries, to the rise and fall of apartheid in the 20th, to the challenges of political transformation, economic revival and global integration during the 21th century (UNDP, 2000).

From the inside, Lesotho's geography is no less unique. Popularly referred to as the "kingdom in the Sky" or "Mountain Kingdom", three quarters of the country is made up of highlands which rise to nearly 3,500 meters in the Drakensberg/Maluti mountain range. The remaining one-quarter of the country are lowlands with altitudes between 1,500 and 2,000 meters. The Capital of Maseru lies in this region. The mountainous topography of Lesotho presents difficult terrain: arable land is limited, and less than 10% of country is cultivated. Lesotho's climate is moreover harsh. Temperature fluctuates from -10 to more than 30 degrees Celsius in the lowlands. In the highlands, winters are more severe with heavy snowfalls that often cut off the population from essentials such as basic health services and food supply. The summers are hot and rainfall is uneven. Hailstorms are a common hazard during the summer throughout the country, and recurrent prolonged droughts have contributed to progressive desertification of the Southern areas. Of 300,000 hectares of arable lands, gullies and dongas –caused by soil erosion-occupy 60,000 hectares. It is estimated that 15 million tons of topsoil from arable lands is lost annually. Lesotho, once more than self sufficient, has now become a net-importer of food (UNDP, 2000).

According to government sources, approximately 2.2 million people populated Lesotho in 2000. (1.96 million according to the 1996 census), including about 100,000 absentee workers, most notably migrants working in the South African mining industry. Compared to the previous census of 1986, the population has grown from 1.59 million or 23% over the decade. This increase represents an average annual growth rate of 2.1%. By regional standards the rate of growth in the population of Lesotho is fairly moderate. The Lesotho population is characterized by a high proportion of young people. The 1996 Census indicates that 30% of the total populations are below 10 years of age and more than 40% are below 15 years, while those above 64 years constitutes less than 4%.

The people of Lesotho are known as Basotho (singular Mosotho) and the language is called Sesotho but English is widely spoken in business and commerce. Unlike most other countries in the region, the Lesotho society is almost homogenous in terms of ethnicity.

3.2 Lesotho’s Economy and Sectoral Descriptions

Lesotho’s historic economic dependence on South Africa, especially in terms of migrant labour remittances, has meant that it has been affected by the country’s economic policies. The slow growth of the South African economy and falling commodity prices have meant fewer employment opportunities for Basotho workers in South Africa’s mines. Further, the historically high levels of protection afforded to South Africa's industries, have increased the cost of manufacturing inputs as well as consumer goods in Lesotho. This has had an adverse effect on the country's production base, and also on consumers (www.finance.gov.za/documents/fiscu/summits/1999/lesotho.pdf).

The economy of Lesotho is small, increasingly open and market oriented. It is comparatively poor in natural resource endowments, with few natural resources other than water. Most of the population is engaged in subsistence agriculture and about one third of the male labour force works in South African mining industry and in other industries, remitting earnings to their families, and indirectly funding significant parts of country's public sector development and import needs. Since the late 1980s the country has gone through a veritable economic boom, largely driven by foreign investments in the massive Lesotho High-lands Water Project (LHWP), a surge in export manufactures and receipts from the Southern African Custom Union. Moreover, the country has been a favourite destination for foreign aid, especially during apartheid years, when Lesotho sought to distance itself from its pariah neighbour. However, a combination of factors is changing the environment once so conducive to Lesotho's economic development. Internal pressures are building up too, as the country proceeds to reform and diversify the economy, consolidate a fragile democracy and step-up the fight against poverty (UNDP, 2000).

The local currency is the Loti (plural Maluti) which is linked to the South African Rand. The Loti is pegged to the South African rand at parity under the Common Monetary Union (CMA) agreement which allows access to the South African capital market for the Lesotho banking system. Thus the Rand is legal tender in Lesotho. The CMA countries comprise South Africa, Lesotho, Swaziland and Namibia. Lesotho is a member of the Southern Africa Customs Union with Botswana, South Africa, Namibia and Swaziland, and there are generally no import restrictions on goods moving between the five countries while imports from countries outside the SACU are usually licensed in conformity with South Africa's import regulations (www.finance.gov.za/documents/fiscu; UNDP, 2000).

The country does not have its own exchange rate policy and there are no controls on exchange flows within the area. There are no controls on exports except for diamonds, for which a license is needed.

The Lesotho Highlands Water Project, which sells water to South Africa, has aided the economic growth in the country. There has also been growth in the manufacturing sector of the economy.

The Lesotho oil industry is one of the key elements in the economy of the country. While the country does not have any commercial oil or natural gas deposits, its downstream oil industry is well-developed, with a few international oil companies active in the market. There is a fledgling mining industry in Lesotho which has known deposits of uranium and a diamond mine. Electricity is provided by the parastatal utility, Lesotho Electricity Corporation (www.finance.gov.za).

The Government of Lesotho is pursuing an export-led economic growth strategy documented in the Poverty Reduction and Growth Facility (PRGF) programme signed in collaboration with the International Monetary Fund (IMF). Under the PRGF, developing countries receive financial assistance from the IMF in the form of loans that carry an annual interest rate of 0.5 percent. The Fund provides loans primarily to support countries' balance of payments, while technical assistance is geared towards advising on prudent macro-economic policies. The entire PRGF programme is wholly consistent with the country's overall poverty reduction strategy (SADC, 2006).

Lesotho's export promotion strategy takes advantage of duty-free access and exemptions on the rules of origin offered for the United States of America market under the Africa Growth and Opportunity Act (AGOA).

With a gross national product (GNP) per capita estimated at US$ 500 in 2001 (down from US$ 580 in 2000). Agriculture contributes about 18% of GDP, but has remained a supplementary source of income. Agriculture accounted for 18.3% of GDP in 2002, industry 52.2% and services 29.5%. In 2002 total GDP stood at US$729.9 million. FDI in 2001 amounted to US$117 million. Lesotho is a poor country, as approximately more than half of the population lives below the poverty line. In a World Bank study Chandra , Anderson, Kolavalli and Nganou (2002) reported that, based on an absolute poverty line equivalent to the international threshold of 2200 kilograms calories needed for a healthy and active life, approximately 58% of population of Lesotho could be classified as poor in 1986; this proportion was virtually unchanged in 1994 (Nganou, 2004).

Inflation fell from 11.2 percent in 2002 to 7.3 percent in 2003. The slowdown in inflation enabled the government to introduce value added tax (VAT) at a higher rate of 14 percent from General Sales Tax's (GST) (10 percent) without causing significant erosion of the purchasing power of people's income. This will bolster the efficiency and transparency of revenue collections and help to address budget pressures. Important food items were zero-rated under VAT to minimise its negative impact on the poor (SADC, 2006).

Lesotho's external debt decreased from 54.2 percent of GNI in 2002 to 42.5 percent in 2003. This was a result of the continued appreciation of the loti against major world currencies (US$, UK£ and the Euro). The external debt service ratio was estimated to increase from 3.1 percent in 2002 to 5.0 percent in 2003. At 42.4 percent of GNI external debt was significantly less than the 60 percent of GNI level which is the threshold for classification of less indebted countries. Concessional borrowing constituted about 72.3 percent of foreign debt in line with government's debt management policy of limiting external borrowing to concessional term (SADC, 2006).

3.2.1 Agriculture

Agriculture includes crop production, the keeping of livestock, forestry and related activities. Only 13% of all land is arable and Lesotho is only able to produce 30-50% of total food requirements. Agriculture remains an important economic sector as 80% of the population live in the rural areas, 60% work in the sector, and 50% derive their livelihood off the land (www.finance.gov.za/documents/fiscu).

In 1980, agriculture contributed 31% of country's GDP. In 1997 the share had halved to 16% (BOS, 1999). The underlying causes for this decline are a series of interrelated factors that have contributed to a decrease in the availability and quality of the country's arable land. Factors include wide-spread soil erosion, overgrazing by an increasing population of livestock, expanding urban settlements and unfavourable weather conditions that led to prolonged periods of drought, the latter being exacerbated by recent adverse El Nino –related effects. Consequently, it is estimated that the area of arable land had decreased to less than 10% compared to 13% in the 1960s. Agricultural sector performance has moreover been hampered over the past three decades by an inadequate policy framework, weak institutional capacity and land tenure constraints, as well as an uncoordinated and fragmented approach to agricultural development assistance. The ramifications of the adverse development in the agricultural sector are significant as more than half of the total working population are subsistence farmers (BOS, 1999).

Lesotho's main staple food crops are maize (grown on nearly 60% of the cultivated area), sorghum (20%) and wheat (10%). Livestock, which include sheep, cattle and Angora goats, contributes substantially towards rural income. Lesotho's terrain is highly suited to animal production, although the sector has suffered because of the drought in recent years. Wool and mohair are major exports, although cattle exports are also important. A national abattoir was established in Maseru in 1985 and has created the capacity for export to the regional market. Lesotho also exports fresh and canned asparagus to Europe (www.finance.gov.za/documents/fiscu and UNDP, 2000).

Production trends for major crops reveal a disturbing pattern of decreased yields since the mid 1970's. In the case of maize, three-year yield averages have fallen from 1.2 tons per hectare in 1975 to 0.6 tons in 1995. This compares with stable average yields for maize in South Africa of 2.5 tons over the same period. Similar drops in yields have occurred for sorghum and wheat, despite a doubling of fertilizer use over the period (UNDP, 2000).
The government has also instituted a series of market-oriented reforms, such as privatization and deregulation, in order to encourage private sector investment in agriculture (www.finance.gov.za/documents/fiscu).

3.2.2 Manufacturing

The manufacturing sector is made up of large and small, medium and micro enterprises (SMMEs). Government policy focuses on creating an attractive investment climate for this sector. The industrialisation programme has resulted in significant growth. Manufacturing output has risen on average by 15% per annum since 1993. The reason for the growth has been the creation of export markets, and significant FDI inflows, mainly from Hong Kong, Singapore, Taiwan, South Africa and Europe (www.finance.gov.za). The high growth in the sector is primarily a result of a strong expansion in the textile and clothing exports, driven by the combined effects of comparatively low labour costs and the lifting of quotas by the United States on textile products produced in Lesotho (UNDP, 2000).

Clothing and footwear companies have led the way in growth terms. Companies export to the United States, Europe and South Africa. Other goods for export include bricks, ceramic tiles, pottery, handicrafts, furniture and tapestries. Companies producing for import substitutions are brick-making, candles, beer and beverages, canned food, bread and milled products industries (www.finance.gov.za/documents/fiscu).

Moreover, since 1979, the Lesotho National Development Corporation (LNDC) - a parastatal - has been offering access to developed industrial sites to private foreign investors. In addition, it offers to supply factory shells as well as a series of market and tax incentives. These efforts have been successful in attracting producers and foreign investments from the Far East and South Africa, especially in textile, clothing, leather and footwear. The combined contribution to GDP of these industries has grown from less than 1% in 1980 to more than 6% in 1997 (UNDP, 2000).

3.2.3 Other sectors

Building and construction increased significantly after 1986, when one of the largest civil engineering projects in Africa, the Lesotho Highlands Water Project (LHWP), got underway. The purpose of the project has been to harness and export water to South Africa. Lesotho has been receiving royalties from water sales since January 1998. The upward trend in growth due to this project is now decelerating after the completion of Phase 1A of the project in 1997, and the economy is expected to return to long run average growth. In addition to building the project itself, surrounding infrastructure has also had to be improved. Roads have been constructed and upgraded, improvements made to border crossing facilities, and power supply, camps and communications were developed. All these projects have created employment opportunities (www.finance.gov.za/documents/fiscu).

Mining activity is currently undertaken on a small to medium scale, with an estimated 1,000 Basotho having been employed in the sector from 1993-97. Most of Lesotho's minerals are exported to South Africa. Large deposits of clay are being mined for brick manufacturing and for the manufacture of ceramic ware and tiles. Road metal and ornamental stones are also mined.

Tourist activities are targeted at those who enjoy outdoor events – like hiking and horse riding in summer and skiing in winter. Tourist accommodation is continually being developed, albeit on a small scale. The scenic Lesotho Highlands are considered the main tourist attraction. The development of the Katse Dam will become a further attraction, offering a fjord-like landscape unique in Southern Africa, as well as water sports, bird watching and trout fishing (www.finance.gov.za/documents/fiscu).

In summary general information of Lesotho economic and social indicators is given in Table 3.1 and Table 3.2.

Table 3.1: Gross Domestic Product (Total (M m))

	1999	2000	2001	2002	2003[a]
At current prices	5,564.9	5,963.5	6,608.6	7,773.1	8,617.9
At constant (1995) prices	3,846.4	3,897	4,022.1	4,175.1	4,312.2
Real change (%)	0.2	1.3	3.2	3.8	3.3
Per capita at constant (1995) prices					
Real change (%)	-1.7	0.6	0.9	3.3	2.8

[a] CBL projection.
Source: Central Bank of Lesotho and BOS.

Table 3.2: Gross Domestic Product by Sector (M Maloti, constant 1995 prices)

Sector	1999	2000	2001	2002	2003[a]
Agriculture	667.6	686.5	690.1	662	659.5
Mining and quarrying	2.7	3.2	3.4	3.5	3.6
Manufacturing	540.1	563.8	608.1	650.2	682.7
Electricity and water	226	219.9	230.2	236.5	242.4
Building and construction	534.9	586.7	594.6	635.9	661.3
Wholesale and retail trade	294	281.6	288.6	301.5	321.1
Government and services	1157.1	1156.6	1181.3	1,216.5	1251.4
GDP at factor cost	3422.4	3,498.3	3596.3	3706.1	3822.1
Net indirect taxes	424	398.7	425.8	469	490.1
GDP at market prices	3846.4	3897	4022.1	4175.1	4312.2

Source: Central Bank of Lesotho and BOS.

3.3 Foreign trade

Manufactured goods (predominantly from the textile and leatherwear industries) constituted 76.3% of total exports in 1997. Lesotho has also recently started to earn revenue from the sale of water to South Africa, as part of the LHWP. The SACU countries are Lesotho's major export market (49% in 1997), followed by North America under the GSP scheme (37%), and Europe under the Lomé Convention (9%).

Lesotho is diversifying its markets, so as to reduce its reliance on SACU. North America has been identified as a target market. Lesotho exported USD 101million worth of clothing to the US in 1998. Lesotho's network of trade preferences has played a crucial role in providing favourable access to markets such as these. Main export products besides clothing, textiles and footwear are in furniture, mohair, chemicals and wool (www.finance.go.za/documents/fiscu).

The SACU countries remain the largest source of imports for Lesotho (89.5%), followed by Asia (7.4%), Europe (1.6%), and North America (1.1%). Lesotho's main imports are maize, clothing, building materials, vehicles, machinery and medicines (www.finance.go.za/documents/fiscu).

3.4 Economic Growth

In terms of economic growth, Lesotho has performed remarkably well over the past two decades, as illustrated in Figure 3.1. According to the BOS (1999), annual growth in GDP averaged 4.2 percent in the period from 1980-1989. For the period 1990-1997, GDP average growth rates accelerated to 5.2 percent, placing Lesotho among the fastest growing economies in Sub-Saharan Africa. Growth in the late 1980s and early 1990s was fuelled by expansion in manufacturing and services. Since the mid 1990s economic growth was driven by the construction sector and in particular the LHWP which is designed to exploit the vast Orange/Sengu river system by exporting water to South Africa and providing hydroelectricity to the domestic market.

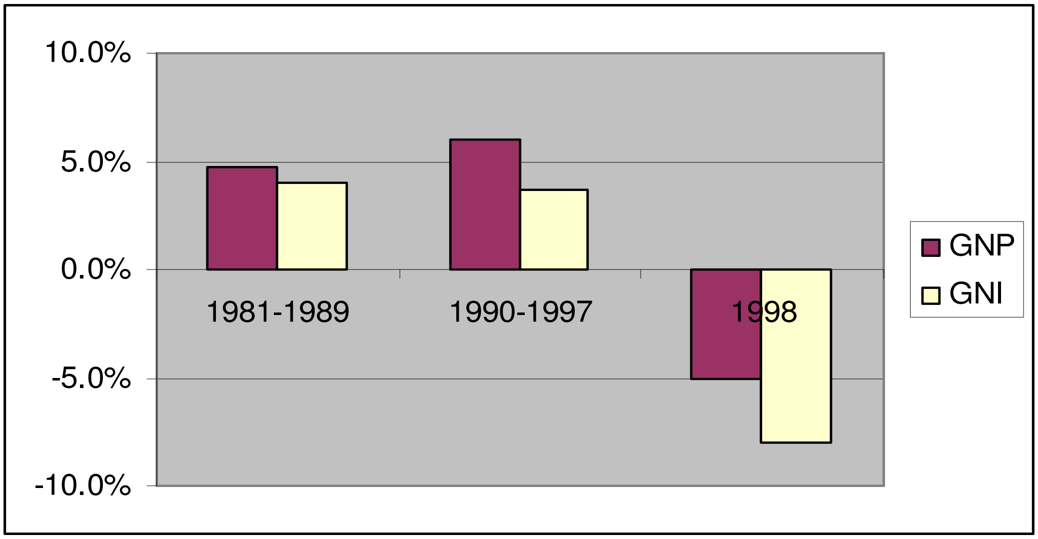

Figure 3.1: Economic Growth (Annual average change)
Source: BOS (1999).

However, the underlying economy remained weak. Throughout the macro-economic boom in 1998, 10 years of continuous output expansion came to an abrupt end, and GDP contracted by an estimated -5%. Contributing to this sharp reversal were several internal and external factors, the chief among them civil unrest that led to disruption of activities in all productive sectors. Other factors which contributed to the poor performance of the economy in 1998 were a decline in capital inflows, particularly due to the completion of the first phase of the LHWP, and continued negative impacts on agricultural production from droughts and adverse El Nino-related weather conditions. Highly preliminary evidence suggests that GDP is set to grow by around 2% in 1999, but the renewed growth comes from a low base and several challenges lie ahead in assuring that the economy of Lesotho returns to a path of long-term sustainable rates (UNDP, 2000).

3.5 Structure of Lesotho's economy: a SAM perspective

A social accounting matrix provides a comprehensive and consistent description of the transactions taking place in an economy in a given year- between production sectors, factors, households, government institutions and the rest of the world. Each transactor or macro account in the SAM is represented by a column and a row, with columns tracking expenditures and rows tracking incomes. A SAM follows the principles of double-entry accounting. This has two implications: any purchase, expenditure or financial outlay by one account is a sale, income or financial inflow to one or more other accounts and for each account total income must be equal to total expenditure (Nielsen, 2002).

Lesotho's economy has traditionally been based on agriculture and animal husbandry, as well as migrant labour remittances. Industrial exports have become increasingly important. The government recognizes the need that in Lesotho industries must become the driving force in the economy.

This section of chapter three provides an overview of the main structural characteristic of the Lesotho's economy from the perspective of the 2000 LESSAM (Lesotho's social Accounting Matrix), which is constructed by Conningarth Economist and World Bank, (2002).

3.5.1 Activities

Table 3.3 shows the sectoral contributions to employment, value added and output in 2000. As in many other developing countries, the agricultural sector holds a dominant position both in terms of income generation and production value. Agriculture contributes about 23% to GDP at factor cost (almost M938.21 million), and 12% of the total value of production (Table 3.3). Food processing is also important and makes up 8% of the total value of production. The manufacturing sector contributes 11% of total GDP and 20% of total value of production.

Although a large share of the labour force is employed in the agricultural sector (7.61% of skilled and 62.60% of unskilled labour) it contributes only 26% of total labour value-added, due to the low wages in this sector. This also reflects the poverty incidence, particularly in rural areas, where many people rely on subsistence practices for survival. Table 3.3 also shows the estimates of skilled and unskilled labour demand in 2000. Manufacturing and construction are the second and third largest employers of unskilled labour (12% and 7% respectively), followed by trade and transport services (5%), food processing (4%), and electricity and water (0.98%). Most skilled labour is used in trade and transport services (28%), construction (21%) and other services such as finance, business and insurance (21%).

The capital column of Table 3.3 shows the distribution of the capital stock. Agriculture dominates with 24% of capital stock, followed by trade and transport services (18%), other services (finance, insurance and business) (17%) and construction (16%). Manufacturing industry and electricity and water rank fifth and sixth respectively. Finally, it can be seen in the last column that about 34% of the construction industry's costs are on intermediate inputs. Manufacturing is responsible for 24% of intermediate input costs. The service industries use proportionately less intermediate commodities in the production process than construction, manufacturing and other goods producers.

As indicated above, Agriculture still provides livelihoods for the majority of the population of Lesotho and absorbs a large portion of the labour force. Potential for development in the agricultural sector is small, as only 13% of Lesotho's land is arable. The government has instituted a series of market oriented reforms to encourage private sector investment in agriculture. The main crops are maize and wheat, although there has been a move towards diversifying into high value, high yield crops. Lesotho is exporting quality asparagus, peaches, and strawberries.

Livestock production is a substantial contributor to rural income. Much of Lesotho's terrain is suited to animal production. Cattle, wool and mohair are the major exports of this sector.

A high proportion of skilled labour appears to be employed by the government service industry (assumed to include nurses and teachers, and this would account for significant portion of government employment). The capital column of Table 3.3 shows the shares or the distribution of the capital stock in Lesotho. After agriculture, the highest proportion of capital stock is captured by trade and transport, followed by other services (finance, insurance and business) and construction. Manufacturing industry and electricity and water ranked fifth and sixth respectively.

No evidence could be found there an input-output table has been compiled for Lesotho. This made the construction of the SAM an even more daunting task than would otherwise be the case. Probably the most serious problem with the National Account Statistics for the purpose of compiling a SAM for Lesotho is that industry surveys do not exist. Industry surveys form the basis of detailed intermediate input structures for various activities and their absence made the compilation of the SAM extremely difficult (Conningarth Economist and World Bank, 2002). Luckily, data on the output and value added of the economic sectors of Lesotho was available from BOS (Bureau of Statistics). Per definition:

Output = Production = Intermediate demand + value added;

Thus, Intermediate demand = Production –Value added

Finally, it can be seen in the last column that about 34% of the construction industry's costs are spent on intermediate inputs, with the rest involving the production factors of capital, labour and so on, followed by the manufacturing sector which spends 24% of expenditure on intermediate inputs.

The service industries use less intermediate commodities in their production process than construction, manufacture and other goods producers.

Table 3.3: Sectoral contributions to value added, production, employment, capital and material inputs, 2000

	Value added (GDP) in production		Production		Labour				Capital	Intermediates
	Value (M mill)	Share of total (%)	Value (M mill)	Share of total (%)	Share of skilled (%)	Share of unskilled (%)	Value of total, labour (M mill)	Total share of labour (%)	Share of total (%)	Share of total (%)
Primary Agriculture	938.21	23.26	1167.99	12.18	7.61	62.60	563.00	25.83	24.01	4.11
Forestry	8.25	0.21	12.08	0.13	0.30	0.11	5.52	0.23	0.16	0.07
Fisheries	2.89	0.71	4.03	0.04	0.02	0.00	0.26	0.01	0.14	0.02
Mining	6.56	0.16	8.10	0.08	0.18	0.13	3.66	0.17	0.15	0.03
Food processing	275.70	5.02	960.80	7.81	5.13	4.37	106.33	4.01	6.04	12.30
Manufacturing	381.64	11.28	1731.88	20.26	10.10	12.36	236.49	11.72	10.48	24.20
Electricity and water	292.21	7.24	424.60	4.43	6.77	0.98	105.84	4.86	9.79	2.37
Construction	621.68	15.41	2509.80	26.16	21.37	6.61	359.35	16.48	13.78	33.77
Trade and transport service	783.68	19.84	1450.20	15.12	27.89	5.09	443.31	20.34	17.88	11.92
Other services	692.23	16.87	1326.50	13.80	20.63	7.74	356.61	16.36	17.57	11.31
Total	4002.05	100.00	9595.98	100.00	100.00	100.00	2179.97	100.00	100.00	

Source: Derived from a 2000 SAM for Lesotho, which is constructed by Conningarth Economist and World Bank (2002).

Within the combined agriculture, forestry and fisheries component of the Lesotho economy, production of field crops, vegetables and fruit dominate the scene. These branches together contribute 63.5% of the sector's share of GDP, 66% of its production value, 64.5% of its employment and 63% of its capital usage. Livestock production accounts for 31.73% of total primary sector GDP, with sheep and goat is the largest contribution followed by cattle (see Table 3.4).

Table 3.4: The agriculture, forestry and fisheries sector, 2000 (M, m)

	GDP	Production	Labour	Capital
Field crops	27.4	26.5	29.1	25.2
Other agricultural crops	3.5	3.4	3	4
Vegetable production	23.8	26	23.3	24.9
Fruit production	12.3	13.5	12.1	12.9
Cattle production and feedlot cattle	11.5	10.5	11.49	11.4
Dairy cattle	0.6	0.7	0.6	0.6
Sheep and goats	15	13.6	14.9	14.8
Horse and donkey	2.3	2.04	2.2	2.3
Poultry layer	0.31	0.34	0.3	0.3
Poultry broiler	0.62	0.68	0.6	0.7
Chicken and pigs	1.4	1.54	1.5	1.6
Forestry	0.87	1.02	0.9	0.7
Fishers	0.3	0.34	0.05	0.63
Total	100	100	100	100
Values	949.34	1184.11	568.36	463.14

Source: a 2000 SAM for Lesotho, constructed by Conningarth Economist and World Bank (2002).

Table 3.5 shows the relative sizes of the various types of manufacturing industries

Table 3.5: Percentage of production, GDP and factors of manufacturing sector, 2000

					Aggregate manufacturing			
	Prod.	**GDP**	**Labour**	**Capital**	**Prod.**	**GDP**	**Labour**	**Capital**
Food products and beverage								
Large scale	84%							
Licensed millers	1%							
Local brew	15%							
Total	100	100	100					
Value	**960.8**	**353**	**106.59**	**169.37**				
*butchery	40%	40	45	34	14	18	14	18
*Fruit,veg.processing	12%	10	12	11	4	4	4	5.88
*Dairy	8%	7	8	7	3	3	2.5	4
*Grain milling	18%	15	17	16	6	7	5	9
*Beverage commercial	7%	3	2	10	3	1	0.5	5
*Beverage traditional	15%	25	16	22	5	11	5	12
Textile, clothing and wool								
Wool & mohair shearing sheds	3	0.6	0.6	0.6	1	0.2	0.4	0.1
Wool & mohair processing	1	0.1	0.1	0.1	0.5	0.1	0.1	0.02
Other textile and clothing	82	81.3	87	64.3	34	27	50.6	12
Leather, footwear	14	18	12.3	35	6	6	7	7
Total	100		100	100				
Value	**1111.48**	**261.53**	**199.64**	**61.04**				
Other manufacturing								
Wood,furniture,paper	35	15	48	28	8	3.4	5.2	8
Chemicals, pharmaceutical	15	10	11	15	4	2.3	1.2	4
Brick production	18	20	20	18	4	4.5	2.1	5
Other non-metal minerals	8	15	7	10	2	3.4	0.8	2
Steel, metal prod. machinary	8	10	6	8	2	2.3	0.7	2
Micro-ind.craft…	7	25	3	5	1.5	5.7	0.4	1
Other manufacturing	9	5	5	16	2	1.1	0.5	4
Total	100	100	100	100				
Value	**620.42**	**180.8**	**36.87**	**84.11**				
Aggregate manufacturing								
Total	100	100	100	100				
Value	**2692.70**	**795.33**	**343.1**	**314.52**				

Source: Calculated from SAM, 2000 constructed by Conningarth Economist and World Bank (2002).

The program of industrialization through private enterprise has brought significant growth in the manufacturing sector. The main activities in this sector are clothing and footwear for export, developed through direct foreign investment (FDI) from the Far East. Other export goods include ceramics, handcrafts and furniture. Companies producing for import substitution operate in the areas of brick-making, beer and beverages, canned food, bread and milled products.

Manufacturing is by far the most important production sector in Lesotho, with a production figure of M 2,692.7 million for the year 2000. The largest branch within the food product and beverage sector is butchery. It constitutes 40% of the food processing industry, followed by grail milling (18% of total production).

The textile, clothing and wool industries are dominated by the textile and clothing industry contributing 82% of total production followed by leather and footwear (14%). Within the total manufacturing sector, the dominant sector is the textile and clothing sector, contributing 34% of total production value followed by food products and beverages.

3.5.2 Commodities

Lesotho has traditionally had a structural imbalance in external trade, its imports far exceeding its exports. The trade pattern is shown in Tables 3.6 and 3.7.

Table 3.6: Trade pattern by sector, 2000

	Exports of goods at basic price (Maloti)	**Imports**
Field crops	0.22	18.82
Vegetable production	1.12	47.56
Cattle production	5.22	13.53
Sheep & goats	0.06	13.53
Poultry broilers	1.76	-
Mining	1.7	224.21
Butchery	2.02	125.12
Dairy & other food processing	13.19	169.62
Grain milling	31.84	468.07
Beverage commercial	65.84	569.39
Wool &mohair shearing sheds	32.24	-
Wool & mohair processing	0.84	-
Other textile clothing	885.2	441.41
Leather &foot wear	0.93	134.86
Other manufacturing	195.34	2766.44
Other commercial trade whole seller	166.33	-
Water	7.45	-
Informal trade	0.38	-
Road &Air transport	56.32	-
Skins & hides	-	54.86
Eggs	-	3.13
Value	1468	5050.53

Source: SAM of Lesotho, 2000 constructed by Conningarth Economist and World Bank (2002).

In terms of commodity structure Table 3.7 reveals that Lesotho's exports are dominated by manufacturing and food processed products, which together constitute over three fourth of total foreign exchange earnings. Agricultural products 0.6% and mining make up 0.1% of exports respectively. Lesotho's imports are dominated by manufactured goods and processed foods. More detail of the export portfolio can be observed from Figure 3.2.

Table 3.7: Lesotho's exports and imports, 2000

	Agricultural products	**Mining product**	**Processed food**	**Manufacturing**	**other**	**Total**	**Value**
Export	0.6	0.1	8	76	16	100	1468
Import	1.9	4.4	26.4	66	1.1	100	5055.53

Source: SAM of Lesotho, 2000 constructed by Conningarth Economist and World Bank (2002).

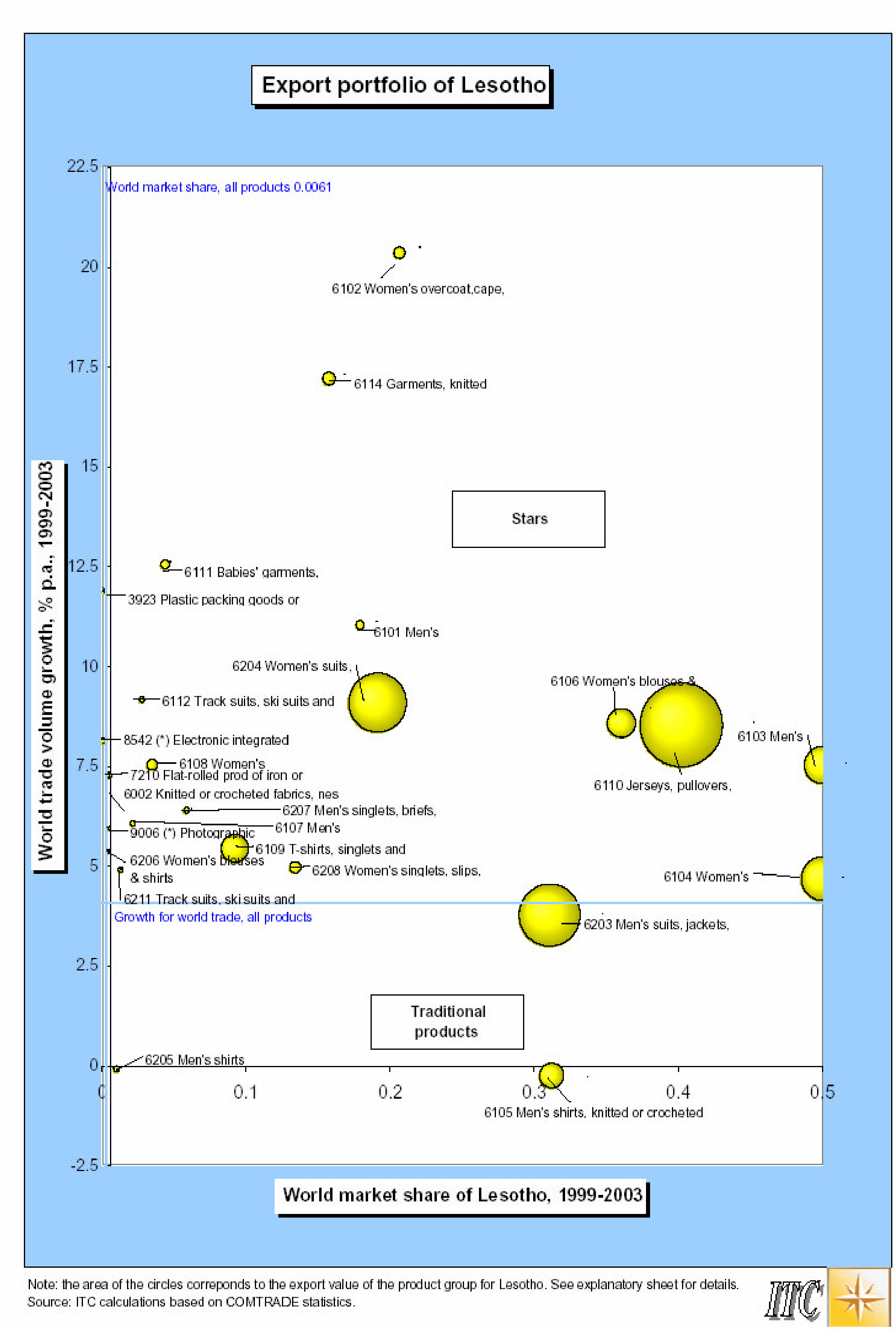

Figure 3.2: Export Portfolio of Lesotho, all products 0.0061.

3.5.3 Household income and expenditure

Lesotho is one of the least developed countries with more than 58% of the population living below the poverty line (1994/5 Household Budget Survey). Despite government poverty alleviation attempts, the poverty depth seems to be increasing over the years, increasing from 32.8% in 1986/7 to 35.4% in 1994/5 (May, Robert, Moqasa and Woolard, 2002). Hence, it is critically important to pay attention to the household income and expenditure patterns as covered by the SAM.

The households were first disaggregated into five groups: (i) the urban areas, (ii) the rural lowlands, (iii) the rural foothills, (iv) the rural mountains and (v) the rural Senqu River Valley (SRV). Disparities do exist not only between urban and rural, and between regions, but also between different income groups. To account for this, the households' classifications were further disaggregated into low and high-income groups. The threshold levels used were taken from the Consumer Price Index Report (BOS (2001)) and were based on the 1994/95 Household Budget Survey. Low-income households comprise all households with a monthly income of less than 500 Maloti, while high-income households have a monthly income equal to 500 Maloti or above.

The household expenditure pattern for each household group distinguished in the SAM is given in Table 3.8. Based on the expenditure shares, spending on consumption is 88% of total households' expenditure among urban households (high and low income), 94% in the case rural lowlands (high and low income) households, 93% for rural foothills (both low and high), 96% for rural mountain households and 94% for the rural Senqu River Valley households.

Table 3.8: Consolidated Household Expenditure Patterns, 2000 (M, m)

Agro-ecological zone	Urban Household		Rural Lowlands		Rural Foothills		Rural Mountain		Rural SRV	
Income group	High	Low	High	Low	High	Low	High	Low	High	Low
Consumption	0.88	0.88	0.94	0.94	0.93	0.93	0.96	0.96	0.94	0.94
Household transfers	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.03	0.02	0.02
Direct tax	0.07	0.07	0.05	0.05	0.04	0.04	0.01	0.01	0.04	0.04
Savings	0.04	0.04	0.00	0.00	0.02	0.02	0.00	0.00	0.00	0.00
Foreign transfers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Note: high income group where income >=500, low income group where income <500, and SRV= Senqu River Valley

Source: SAM of Lesotho, 2000 constructed by Conningarth Economist and World Bank (2002).

As shown in Table 3.8, urban households pay disproportionately more direct taxes than other households. They spend 7% of their income on direct taxes while rural lowland households spend 5% of their income on direct taxes and rural foothills and Senqu River Valley households devote 4% of their income towards taxes. Rural mountain households spend only 1% of their income in direct taxes. Rural mountain households spend most on transfers to other households (3%) followed by Senqu River Valley households (2%). All the remaining households spend only 1% of their income on household transfers. Foreign transfers constitute an insignificant part of all household expenditures. Finally, urban households contribute the most to savings (4% of their income) followed by rural foothills households (2%). The remaining households save very little or zero proportion of their income (Bahta, Ramos, Groenewald and Van Schalkwyk, 2006).

An important piece of information relates to the sources of household income. Table 3.9 summarises this information on household income sources.

Table 3.9: Source of household income, 2000 (%)

	Urban Households		Rural Lowlands		Rural Foothills		Rural Mountains		Rural SRV	
Income group	High	Low	High	Low	High	Low	High	Low	High	Low
High Skilled labour	62.40	5.10	44.40	0.30	45.30	0.30	31.80	0.30	32.20	0.30
Low skilled labour	29.10	73.40	34.00	86.00	33.00	84.40	46.20	79.20	46.00	79.10
Enterprise profit	8.20	0.00	21.10	0.00	21.20	0.00	21.10	0.00	21.10	0.00
Household transfer	0.00	12.50	0.20	4.70	0.20	6.30	0.60	11.50	0.40	11.60
Government transfer	0.00	8.70	0.00	8.70	0.00	8.70	0.00	8.70	0.00	8.70
Foreign transfer	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Total	100	100	100	100	100	100	100	100	100	100

Source: a 2000 SAM for Lesotho constructed by Conningarth Economist and World Bank (2002).

As Table 3.9 indicates, low-income households receive the bulk of their income from unskilled labour wages. This is followed by household transfers and government transfers for low income urban households, low income rural mountain households and low income rural SRV households. For the low income rural lowland and rural foothills households, the second most important source of income is government transfers, followed by household transfers. For all the low income households, foreign transfers and enterprise profits contribute a negligible amount to income. The income sources for high income households display some variation. High income urban, rural lowlands and rural foothills households derive most of their income from skilled labour wages, followed by low skilled wages. On the other hand, high income rural mountains and rural SRV households derive most of their income from low skilled labour wages, followed by high skilled labour earnings. Unlike their low income counterparts, high income households derive a significant amount of income from enterprise profits, which is their third most important source of income. Transfers form an insignificant part of high income households.

3.5.4 Macroeconomic profile

A coherent 2000 macroeconomic profile of the Lesotho economy can be derived from the SAM. From the SAM we can discern that GDP (from the expenditure side) is Maloti 5534 million at 2000 market prices. The proportion of household consumption to GDP is 0.86 (Maloti 4736 million), that of total investment is 0.45 Maloti 2479 million), total government expenditure 0.23 (Maloti 1288 million), export 0.32 (Maloti 1776 million) and import 0.86 (Maloti 4745 million). According to Table 3.10, the private sector and parastatals account for the bulk of savings (57.89%) and investment (51.59%).

Table 3.10: Saving and investment balance, 2000

		M million	Percentage
Saving	General government	489.00	17.53
	Lesotho high land water project	685.79	24.58
	Private sector & parastatals	1615.05	57.89
	Total	2789.84	100.00
Investment	General government	800.00	28.67
	Lesotho high land water project	550.58	19.73
	Private sector & parastatals	1439.42	51.59
	Total	2790.00	100.00

Source: Derived from a 2000 SAM of Lesotho constructed by Conningarth Economist and World Bank (2002).

The government income pattern is shown in Table 3.11. Custom (SACU) taxes (44.28%) form the largest source of government income, followed by direct taxes (31.55%).

Table 3.11: Government income patterns, 2000

	M million	Percentage
Direct taxes	824.34	31.55
Indirect taxes	329.87	12.62
Customs (SACU)	1156.99	44.28
Water royalties	68.32	2.61
Subsidies	-81.90	-3.13
Transfers	262.80	10.06
Other national government income	52.57	2.01
Total	2612.99	100.00

Source: Derived from a 2000 SAM of Lesotho constructed by Conningarth Economist and World Bank (2002).

Government expenditure patterns are shown in consolidated form in Table 3.12. The largest expenditure payment (27.74%) is on the general public service. This includes commodities, factor payments (labour) and government capital account. Education services received 22.44% and other economic services accounts for 11.02% of total government expenditure.

Table 3.12: Government expenditure pattern per function (Maloti million) ,2000

	M millions	Percentage
General public service	720.38	27.74
Public order and safety	305.88	11.78
Education service	582.68	22.44
Health service	213.62	8.23
Social community	177.29	6.83
Other economic service	286.14	11.02
Rural development service	0.00	0.00
Public debt	311.00	11.98
Total	2596.99	100.00

Source: Derived from a 2000 SAM for Lesotho constructed by Conningarth Economist and World Bank, (2002).

3.6 Conclusion

Agriculture still provides livelihoods for the majority of the population of Lesotho, contributing significantly to GDP, value of production and employment generation. However, the potential for development in agriculture is small due to scarcity of arable land. Yet despite this, agricultural development is the main way of providing a livelihood for the majority of the population.

Lesotho's historic economic dependence on South Africa, especially in terms of migrant labour remittances, has caused it to be severely affected by the country's economic policies. The economy of Lesotho is small, increasingly open and market oriented. It is comparatively poor in natural resource endowments and has few natural resources other than water. Most of the population is engaged in subsistence agriculture and about one third of the male labour force works in South African mining industry and in other industries remitting earnings to their families, and indirectly funding significant parts of country's public sector development and import needs.

Manufactured goods (predominantly from the textile and leatherwear industries) the main export of Lesotho, it also recently started to earn revenue from the sale of water to South Africa, as part of the LHWP.

CHAPTER 4

REVIEW OF THE STRUCTURE OF APPLIED CGE MODELS BASED ON SAMs

4.1 Introduction

Two works which may be considered as milestones in the empirical development of multisectoral models were published in the early 1960s: the first presented the social accounting matrix (SAM), developed by the Cambridge Growth Project (1962-74), and the other presented the first empirical general equilibrium model with endogenous prices (Johansen, 1960). The 1970s saw the introduction of "modern" applied multisectoral models (both single and multi -country): linear models based on SAMs, computable general equilibrium models (CGE) and applied general equilibrium models (AGE). Originally, the difference between the CGE and AGE models consisted there of that the former attempted to combine Walras with Keynes, in other words, traditional microeconomic theory of general equilibrium with Keynesian macroeconomic theory, whilst the latter were "pure" neoclassical models. Nowadays, both terms CGE and AGE tend to be used interchangeably (Muro and Salvatici, 2001).

4.2 Models based on SAMs

CGE models are based on numerical data describing the structure of a real-world economy. In order to accomplish this it is convenient to organize data in the form of a social accounting matrix (SAM) (Bergman, 2003).

A SAM is a simple and effective method to demonstrate the fundamental economic principle that for every income there is a corresponding outlay or expenditure (Pyatt, 1988). A SAM is not an economic model, but simply a method to represent a model; therefore, every model may be designed by a SAM. To a certain extent, a SAM may be considered an expansion or a generalisation of Leontief's input-output table, in other words, an input-output table characterized by a higher degree of closure. While the productive system in that case receives the main focus of attention, a SAM allows for a much broader perspective. An input-output table describes, in brief, the relationships which exist: a) between productive activities; b) between productive activities and what we call "primary factors"; c) between productive activities and final demand; d) between productive activities and the rest of the world. The basic flaw of this method is that it fails to describe the direct linkages between production factors and final demand, thereby making it impossible to study the manner in which income from production factors is allocated (Muro and Salvatici, 2001).

The first natural extension of an input-output table would therefore, be the construction of an account in order to record flows from production factors and to agents of expenditure, i.e. economic and social institutions. This requires the creation of a series of accounts registered in the name of institutional agents present in the economic system: households, enterprises and the public sector (see Table 4.1). Such accounts would record as input any income generated by each institution, in other words, payments received from production factors and productive activities, including those derived from other institutions; and the accounts would record as outputs the manner in which such income is spent e.g. consumption, savings, payments of taxes, etc. This procedure would generate a series of accounts which would be much more comprehensive and detailed than just the one account simply consisting of an input-output table. Accounting principles would remain unchanged, while attention would no longer be exclusively focused on production, but would also take into account other components of an economic system. A SAM, therefore, is a general economic model of interdependence in the broadest sense of the word. Analytically speaking it is a square block matrix (and "sparse", since many blocks are made up of zeros), which provides a method for re-organizing appropriately disaggregated national income accounts (Muro and Salvatici, 2001).

Another advantage of a SAM is its flexibility: the number and type of accounts (i.e. blocks) that can be opened depends solely on the nature of the economic system to be analysed, and the goals of the researcher. If, for instance, we are looking at the economy of a developing country which is primarily agricultural, then it would be appropriate to have the household sector broken down into urban and rural, in order to study the differences in income formation and participation in productive activities. Furthermore, rural households could be disaggregated on the basis of land ownership: owners, tenants, farmhands, etc.; or, the size of farms. If we wish to examine labour market issues, accounts of production factors may be disaggregated on the basis of manpower categories: factory workers, office workers, technicians, professionals, self-employed and so forth, depending on the level of “human capital”. In other words, a SAM lends itself to a host of different configurations, and, naturally, a higher degree of sectoral disaggregation will require and generate a greater quantity of data (Muro and Salvatici, 2001).

Each row of the SAM represents the incomes of a sector, factor or institution. The corresponding column represents the outgoings of the sector, factor or institution. A key feature of a SAM is that the sum of the row elements is equal to the sum of the corresponding column elements. Thus the incomings and the outgoings of each sector, factor and institution have to be equal (Bergman 2003 and Round, 1981a).

The SAM is an approach for data organisation, reconciliation, and descriptive analysis of the structure of the economy. “The most important feature of a social accounting matrix is that it provides a consistent and convenient approach to organising economic data for a country and it can provide a basis for descriptive analysis and economic modelling in order to answer various economic policy questions” (Pleskovic and Trevino, 1985).

Table 4.1: Example of a social accounting matrix

		Expenditures							
		Activities	**Factors**	**Households**	**Enterprises**	**Government**	**Capital account**	**Rest of world**	**Total**
Receipts	**Activities**	Intermediate inputs		Household consumption		Government consumption	Investment	Exports	Total demand
	Factors	Value added							Factor income
	Households		Wages	Transfers	Distributed profits	Transfers		Foreign remittances	Household income
	Enterprises		Gross profits			Transfers		Profits received from abroad	Enterprise income
	Government	Indirect taxes		Direct taxes	Enterprise taxes				Government receipts
	Capital account			Household savings	Retained earnings	Government savings		Net capital inflow	Total saving
	Rest of world	Imports	Factor incomes to abroad	Imports	Profits distributed abroad		Asset purchases from abroad		Payment to abroad
	Total	Gross output	Value added	Household expenditure	Enterprise expenditure	Government expenditure	Total investment	Foreign exchange inflow	

Source**:** Muro and Salvatici (2001).

A SAM provides a conceptual basis to analyse both distributional and growth issues within a single framework. For instance, a SAM shows the distribution of factor incomes of both domestic and foreign origin, over institutional classes and re-distribution of income over these classes. In addition, it shows the expenditure of these classes on consumption, investment and savings made by them. King (1988) points out that a SAM has two main objectives: first, organising information about the economic and social structure of a country over a period of time and second, providing the statistical basis for the creation of a plausible model capable of presenting a static image of the economy along with simulating the effects of policy interventions in the economy (Sen, 1996).

A SAM provides comprehensive one-period information on variables, such as the structure, composition and the level of production, the distribution of income among households, and the factorial value-added. It can similarly provide statistical information on consumption and production pattern of the economy, imports, exports, investment and so on. Moreover, it may have more detailed information, depending on the data availability and particular interest, on income distribution, tax structure and monetary variables. Therefore, SAMs can be used to improve the capabilities of countries to obtain descriptive analysis of the economy, indicating its income distribution picture, institutional and industrial structure. In a SAM, the information which takes place in public sector statistics is represented as a component of whole economy. A SAM can thus provide a comparison opportunity for the public sector with either the private sector or the economy as a whole (Sen, 1996).

A SAM can also be used as a database for macroeconomic policy modelling in developing countries. Its framework may contribute to arrangement of different sources of data in a consistent manner. Different sources of data, such as national accounts, taxation data, household surveys and input-output tables can be arranged into an economy-wide data framework. In most LDCs economic planning suffers from a number of problems such as insufficient, unreliable and poor quality of data. Therefore, the best use of available information becomes increasingly important. King (1988) argues that the logical consistency in a SAM is useful in improving the quality of available data in LDCs (Sen, 1996).

It is possible to build more than one macroeconomic model on the basis of a SAM. For instance, multiplier analysis (it shows how changes in one or more elements of a SAM generate changes elsewhere in the matrix) can be considered as a policy modelling application of a SAM. Multiplier analysis estimates the effects of one-time increases in exogenous variables on endogenous variables in the accounting framework and it is used for short-term policy analysis (Pleskovic and Trevino, 1985). Such an analysis is very useful in estimating the effects of exogenous variables, such as increases in exports, on outputs, employment and incomes, with each of these being disaggregated in relation to the classification system embodied in the social accounts (Round 1981b; Pleskovic and Trevino, 1985). The ripple effects, for instance, of an exogenous increase in the autonomous investment on household sector, public sector, production account and combined capital accounts can be seen easily through SAMs. The resultant flow of income in the SAM captures the dynamics of the impact of a single exogenous change throughout the entire economy (Sen, 1996).

A SAM, by its disaggregation to lower levels, ensures consistency between information at all levels and from different sources (Hayden and Round, 1982). By this way any inconsistencies in presented data can be detected and can be corrected. This consistency allows a SAM to be used in filling the gaps in data. On the other hand, behavioural assumptions of institutions and sectors within an economy tend to be relatively stable, and are therefore predictable with respect to exogenous changes in the short-term. Therefore, the coefficients of a SAM (which reflect these behavioural assumptions) would also be relevant in a similar time period. If some coefficients change, and these are consistent with economic theory, the SAM would still be effective. Here a SAM would therefore be useful in making predictions about the way economy is evolving due to the effects of exogenous changes. It is therefore useful in updating economic statistics in a fairly consistent manner (Sen, 1996).

Pyatt and Round (1985) argue that a SAM informs the economic policy debate and should not be seen as a 'once and for all effort'. This is because, underlying each macro-economic model, there is assumed to be a SAM. They suggest that the coefficients of its rows and columns, and consistency of the same are essential to testing the validity of macro-economic models. For instance, if the model assumes certain relationships between sectors or institutions, the SAM could be used to test the validity of these based on the coefficient relationships which must hold ex post. That is the sum of the resultant proportional distribution of the coefficients in the rows and columns must be equalled to one.

Let us suppose that there is an exogenous increase in external demand. This would first have an impact on the production account. This would result in the need for more factors of production from the household and private corporate sectors who own them. Their sale to the productive process would result in more income accruing to, and subsequently more demand from, the owners of the these factors. This would generate additional demand from the productive process; more direct and indirect taxes would accrue to the government; there may be more demand for imported inputs into the production process or for general consumption. One may see a whole chain of events 'rippling' through the economy, each change generating further changes, and so on. These are adequately captured by a SAM because of its consistency requirements. The end result of all these changes, which have less impact in later rounds, is to produce a new SAM for the economy (Sen, 1996).

Since a SAM is concerned with basic needs (Hayden and Round, 1982; Chowdhury and Kirkpatrick, 1994), it is important to distinguish the impact of exogenous changes due to public sector activities on functional and institutional disposable income. This will 'shed' light on how progressive or regressive the tax system is. This could be done with aid of a SAM by looking at the net of all interactions between the public sector and other sectors. So one would be able to tell the impact of policy changes on income distribution.

LDCs frequently deal with the external sector for a number of reasons, which are adequately captured in a SAM. LDCs generally experience unsustainable balance of payments equilibria with the external sector; a SAM, by distributing dealings with external sector to the various sectors and institutions, would tell which sectors are contributing the most to LDCs unsustainable balance of payments (BOP) positions. When used in the context of the 'multiplier' we can see how BOP could change over time. This would then inform policy responses to improve BOP positions (Sen, 1996).

4.3 General Equilibrium model

General equilibrium theory is a formalization of the observation that real world markets are interdependent; changes in supply or demand conditions usually have repercussions on supply and demand conditions, and thus equilibrium prices, on several other markets (Bergman, 2003).

The concept of general equilibrium modelling has developed over the past two centuries. Adam Smith's description of the behaviour of capitalists, motivated by considerations of profitability in the selection of economic activities, and John Stuart Mill's treatment of international trade and agents' responses to changes in taxes and import duties, can be viewed as the source of inspiration for this type of modelling framework. However, work by Leon Walras in 1854 allowed general equilibrium modelling to reach a more mature form when he provided a general description of the functioning of a complex economic system based on the interaction of a number of interdependent economic units. Walras' work was expanded, and solutions to some of the caveats in his formulations of a general equilibrium were provided by the increase in activity in mathematical economics that took place in the 1940s and 1950s under mathematical economists such as Arrow (1954). The most significant contribution by mathematical economists was in the mathematical confirmation of the consistency of the general equilibrium model (Scarf, 1984 cited by De Wet, 2003).

In the text describing their equilibrium model for the US economy, Ballard, Fullerton, Shoven and Whalley (1985) introduce the usefulness of this type of model by stating: "Many questions of economic policy can be analyzed within a partial equilibrium framework. When policy changes being considered are relatively small, it may be appropriate to neglect general equilibrium interactions among many different markets. However, when large policy changes are considered, partial equilibrium analysis becomes painfully inadequate. In recognition of this fact, a vast increase has occurred in the past twenty years in the number of economists who use general equilibrium models" (Ballard *et al*, 1985 cited by De Wet, 2003).

Scarf (1984) also mentions the imperfections of a general equilibrium model. General equilibrium models have difficulty in allowing for money and financial institutions; they have difficulty with the incorporation of unemployed resources into their frameworks and are unable to cope with large-scale industrial enterprises that are capable of exerting significant pricing power on an economy. However, there are currently no computing formulations that can avoid these shortcomings and until economic theory is capable of providing compelling alternative formulations, general equilibrium modelling will retain its usefulness.

It is therefore hardly surprising that general equibrium models have been used to analyze policy issues such as:

- Changes in tariffs, exchange rates and other trade;
- Changes in tax policy;
- Changes in energy prices or environmental and energy polices, and
- Change in the development process.

4.3.1 A description of General Equilibrium modelling

A general equilibrium model is an economic model, based on the economic theory of general equilibrium. The distinguishing characteristics of a general equilibrium model of an economy can be summarized as follows (Mansfield, 1991; Clements and Greig, 1994; Shoven and Whalley, 1984):

- There are n markets for n produced commodities.
- Every consumer chooses a consumer basket subject to a budget constraint, which is determined by the prices of inputs and the prices of products.
- Every consumer supplies whatever amount of inputs he or she chooses, given the input of product prices that prevail.
- Every firm maximizes profits subject to a budget constraint imposed by the available technology, the demand for its product, and the supply of inputs in the long run. However, economic profits are zero.
- There is usually a constant or non-increasing return to scale technology (Increasing returns to scale and imperfect competition can also be incorporated into general equilibrium models) (Harris, 1984).
- The quality demanded equals the quantity supplied at the prevailing prices in all product and input markets (Mansfield, 1991 cited by De Wet, 2003).
- The demand for any commodity market depends on all prices and is continuous, non-negative, homogenous of degree zero and satisfies Walras' Law.

Shoven and Whalley (1984) confirm the above conditions by summarizing a general equilibrium as a state in which all markets clear. This is supported by Varian's (1993) comments that, in a general equilibrium, all prices are variable, and equilibrium requires that all market clear. The existence of such a state in the economy was first proven by Leon Walras.

From Walras' work it has been shown that:

- An equilibrium set of prices will only exist if there is no good for which there is positive excess demand (Walrasian equilibrium);
- For any set of equilibrium prices that value of the excess demand is identically zero (Walras' law);

- If demand equals supply in k-1 markets, and the price of the good in the k th market is positive, then demand must equal supply in the k th market;
- If a set of prices results in Walrasian equilibrium and some goods are in excess supply at this equilibrium, it must be a free good (Varian, 1993).

From the above it appears that it is a feature of a general equilibrium model that a set of prices, levels of production and consumption exist in each industry and household, so that market demand equals supply for all commodities.

A very descriptive summary of what a general equilibrium entails is given by Scarf (1984). According to him, the fundamental theme of a general equilibrium model lies within the heart of economic theory. The production side of the economy, engaged in the transformation of certain commodities into other commodities, is distinguished from the consumption side, whose goals are the acquisition and eventual consumption of goods and services. Households' own stocks of commodities may be consumed directly, maintained as inventories for eventual use, or offered as factors of production in a physical form, or by means of a variety of financial instruments. A consumer's income or wealth is determined by evaluating his stock of commodities in terms of those prices at which the commodities can be sold. Income and knowledge of relative prices permit the consumer to express has demands for goods and services as well as his offerings of labour and other stocks that are made available for the productive side of the economy. The decisions of the production and consumption sides of the economy need not be consistent with each other if they are based on an arbitrary set of prices. If the prices of a desired commodity are too low, consumers may be motivated to demand large quantities of this commodity, and producers may be averse to supplying that commodity, of which sales generate insufficient revenue to cover the costs of manufacturing the commodity. Equilibrium prices are therefore those prices that equate demand and supply in all markets. Once these prices are known, economic decisions are made based on them (Scarf, 1984).

4.4 A Computable General Equilibrium Model (CGE)

Computable general equilibrium (CGE) modelling is an attempt to use general equilibrium theory as an operational tool for empirically oriented analyses of resource allocation issues in market economies (Bergman, 2003).

A CGE model works by simulating the interaction of various economic agents across markets subject to behavioural and institutional constraints (Dervis, de Melo and Robinson, 1982 and Shoven and Whalley, 1992).

CGE models are general models in that they represent the economy in its entirety, albeit at a high level of abstraction and aggregation, as composed of a set of inter-related markets. CGE models are equilibrium models because they embody the assumption that each market clears, through the movement of prices that equate supply and demand. CGE models are computable in that they use equations specified with parameters that assume real values (Typically, some parameters are based on econometric estimates reported on the literature, while others are computed when the model is calibrated to a set of benchmark data) (Bernow, Rudkevich, Ruth and Peters, 1998).

Most CGE models have another feature, which is not reflected in their name. They are "consistent with micro-foundations" i.e. the demand and supply functions contained in the models are consistent with (in other words: can algebraically be derived from) the utility and profit maximization calculus which is the core of the neoclassical economic theory of consumer and producer behavior. This theory rests on a number of assumptions, pertaining to technologies, behavior, and institutional factors (Bernow *et al*., 1998).

According to Robinson (1989), a CGE model must contain four components: (i) Specification of the economic agents whose behaviour is to be analysed; (ii) identification of the behavioural rules and conditions under which they operate, e.g., optimization behaviour of producers and consumers; (iii) specification of the signals such as prices used in economic agents' decision-making; and (iv) identification of the "rules of the game" that characterise the institutional structure of the economy, e.g., the assumption of perfect competition. Borges (1986) describes a CGE model as follows:

Based on the Walrasian tradition, applied general equilibrium models describe the allocation of resources in a market economy as the result of the interaction of supply and demand, leading to equilibrium prices. The building blocks of these models are equations representing the behaviour of the relevant agents - consumers, producers, the government, etc. Each one of these agents' demands or supplies goods, services and factors of production, as a function of their prices. Assuming that market forces will lead to equilibrium between supply and demand, the general equilibrium model computes the prices that clear all markets, and determines the allocation of resources and the distribution of incomes that result from this equilibrium.

4.4.1 The evolution of CGE modelling

In terms of their theoretical origin, modern CGE models are part of a stream of economic theory stretching back to Walras' (1874) work. The modern contributions to theoretical general equilibrium analysis appear in the work of Arrow and Debreu (1954).

Arrow and Hahn (1971), Debreu (1959) and Scarf (1967a, 1973), the main focus of which is on the existence, uniqueness and stability of equilibrium (Bandara, 1991). As an empirical counterpart of these theoretical developments, the CGE approach also relies heavily upon Leontief's (1936) invention of input-output analysis in the 1930s. Since the multi-sectoral aspects of this type of model can be used to capture the interactions between different sectors of the economy, the popularity of input-output models as a planning tool lasted for more than three decades, until the early 1970s. The shortcomings associated with input-output models include their extreme demand orientation and unsatisfactory treatment of international trade. As a result, in the early 1960s linear programming (LP) models were developed to provide another class of multi-sectoral models. Linear programming introduces a great deal of flexibility into the basic input-output structure by allowing inequality constraints and introducing the explicit maximization of a planner's preference function into economy-wide planning models. This makes it possible for LP models to be able to allow endogenous choice of capacity utilization and the import/export decision (Dervis *et al*., 1982). LP models thus represented a major improvement in the area of economy-wide modelling.

A shortcoming common to both input-output and LP models is that they do not directly incorporate the sorts of price-incentive variables such as indirect taxes, subsidies and exchange rate that represent the essential tools of decision-makers in mixed economies (Dervis *et al*., 1982). As a result, these models are inherently limited in their ability to reflect the workings of a multi-market economy in which prices play an important role in resource allocation and in which there are important substitution possibilities in both production and demand (Robinson, 1989). To capture the interactions between supply and demand in a mixed economic system, new models incorporating prices were required. In his influential doctoral thesis A Multi-Sectoral Study of Economic Growth, Johansen (1960) constructed a multi-sectoral growth model which later became known as the "MSG model". This model is now commonly regarded as the first CGE model in the world (see, e.g., Bergman, 1985; Dixon and Parmenter, 1996).

The development of CGE modelling can be treated as a natural extension of input-output and LP models with the inclusion of an endogenous price system, neoclassical substitutability in production and demand, optimization behaviour of individual agents and a complete treatment of income flows in an economy. However, Johansen's work was not built upon until the early 1970s. A number of factors account for this apparently surprisingly long pause in the development of CGE modelling. Firstly, the relative importance of the sectoral dimension of economic growth was insignificant during the 1960s when most countries experienced a period of stable economic growth. Secondly, leading general-equilibrium economists concentrated on developing and refining theoretical propositions on the existence, uniqueness, optimality and stability of solutions to general equilibrium models (see, e.g., Scarf, 1967a). With the benefit of hindsight, this theoretical focus is understandable given the dearth of efficient solution algorithms and the absence of cheap computing facilities which provided practical limitations until the early 1970s. Thirdly, applied economists were obsessed with the philosophy of the econometric approach in the 1960s of "letting the data speak". Consequently, they paid more attention to time-series data than to economic theory, such as optimizing behaviour, which underlies CGE modelling (Bandara, 1991; Bergman, 1985; Dixon and Parmenter, 1996).

In the early 1970s, the situation described above changed. As discussed by Dixon and Parmenter (1996) and Bandara (1991), the work by Scarf (1973) established a direct link between theoretical general equilibrium analysis and CGE modelling. Work by Scarf's students Shoven and Whalley (1972, 1973, and 1974) further stimulated interest in the CGE approach. In the meantime, advances made in efficient numerical solution techniques removed the computational constraints on the implementation of CGE modelling. Many new, improved computer programs have been developed since the 1970s. These include GEMPACK (Pearson, 1988; Codsi and Pearson, 1988; Harrison and Pearson, 1996), GAMS (Bisschop and Meeraus, 1982; Brooke, Kendrick, Meeraus and Raman, 1998), HERCULES (Drud, David and Alexander, 1986), MPS/GE (Rutherford, 1985a) and CASGEN (Rutherford, 1985b). These software packages provided convenient tools for solving general equilibrium systems so that economists interested in CGE models no longer required expert knowledge of programming and mathematics. Furthermore, the unprecedented first oil shock, sharp changes in the international monetary system and rapid growth in real wage rates during the 1970s could not be explained by conventional macro econometric models that lacked adequate micro foundations and which placed heavy dependence on historical time-series data. Only CGE models with tight theoretical specifications could offer insights into the likely effects of these sorts of shocks for which there was no historical experience (Dixon and Parmenter, 1996).

CGE modelling is now a well established field of applied economics and there are two dominant schools in the area - the Norwegian/Australian linearizers school and the North American levels school. Linearizers follow the Johansen tradition of linearized solution technique, i.e., the equations of the model are written down in their log-linearized form to permit the model to be solved by inverting a single matrix. The ORANI model of the Australian economy (Dixon, Parmenter, Ryland, Sutton and Vincent, 1982) is a leading example of this approach. The levels school is represented mainly by Scarf's students (most notably, Shoven and Whalley). This school distinguishes itself by solving non-linear general equilibrium problems in levels rather than in log differential form. According to Hertel, Horridge and Pearson (1992), both the levels and linearized version of a non-linear CGE model offer a valid starting point for obtaining accurate solutions to non-linear problems and the two traditions have a great deal in common. Though levels offer a more natural starting point for expressing accounting identities, the linearized representation has some appealing properties which make it an attractive alternative in many instances. These include: A more straightforward representation of behavioural relationships and indifference to implicit versus explicit representations of preferences and technology. In addition, Johansen-style solutions are easier to explain to policy makers than their levels counterparts and can be easily decomposed into effects which are specific to the individual component shocks (Powell and Lawson, 1990).

4.4.2 Overview of CGE model

A computable general equilibrium model (CGE) is nothing more than a general equilibrium model that can be used to provide quantitative analysis of economic policy problems. A CGE model therefore also needs, apart from the theoretical structure provided by a general equilibrium model, data concerning the economy. Once the general equilibrium model and data have been integrated, an actual solution method is needed in order to solve the equilibrium prices and decision variables in the equilibrium system (Dixon and Parmenter, 1994).

The development of an applied general equilibrium model typically includes the following steps:

1. Development of the theoretical general equilibrium model which consists of :

- Equations representing household and other final demands for commodities.
- Equations for intermediate and primary factor inputs.
- Pricing equations relating commodity prices to costs.
- Market clearing equations for primary factors and commodities.

2. Use of SAM/input-output data to provide estimates for the relevant cost and sales shares.

4.5 Approaches of CGE model

There are different approaches to general equilibrium models; notwithstanding their common Walrasian roots, general equilibrium models are a fairly diverse group. Schubert (1993) makes a distinction between five different approaches: the Johansen approach, the Harberger-Scarf-Shoven-Whalley (HSSW) approach, the structuralist approach (to which several World Bank researchers have contributed), the Jorgenson econometric approach and the Ginsburgh-Waelbroeck and Manne approach. The empirical development of Walrasian general equilibrium models began with Johansen's model (1960) for the Norwegian economy. Johansen linearised the general equilibrium model in logarithms, and, in this way, he managed to reach a solution through a simple matrix inversion which provided growth rates for the endogenous variables. One important aspect of this model is that it gave rise to a procedure which is now adopted by the majority of CGEs: the value of parameters is obtained by a method currently called "calibration" and hence, the model is entirely deterministic. One of the most interesting extensions of Johansen's model was the subsequent ORANI model for the Australian economy (Dixon, Parmenter, Ryland and Sutton, 1977).

The HSSW approach is derived from the tradition of welfare economics and is generally applied to public finance problems. It is essentially based on Scarf's algorithm (1967) which calculates the equilibrium of a Walrasian model numerically, as well as on Shoven's and Whalley's demonstration (1973) of the existence of a general equilibrium with taxes, and the publication of an algorithm which makes it possible to attain this equilibrium. The HSSW models are strictly based on Walrasian theory. They exclude any ad-hoc specification (i.e. unrelated to the "standard" theory of general equilibrium) that tends to make the model closer to reality, but which, according to these authors, would have the disadvantage of obscuring the interpretation of results. Johansen, on the contrary, while not departing from the neoclassical paradigm, conceived his own model as an approximation of the "true" unknown model of the economy, and this involved the addition of specifications incompatible with Walrasian theory (for example, the assumption of intersectoral wage differentials, even though for only one type of employment) (Muro and Salvatici, 2001).

The first important structuralist model was developed by Adelman and Robinson (1978) for South Korea, and was mainly designed to study income distribution issues. It is in this work that the term "computable general equilibrium" was used for the first time. Even Adelman's and Robinson's model, like Johansen's, departs from a strictly Walrasian framework, although in a different direction: this model incorporates inflation and certain rigidities in goods and labour markets (Muro and Salvatici, 2001).

Structuralist CGE models were designed mainly by the World Bank, and, while maintaining a Walrasian approach, they often incorporate assumptions originating outside the neoclassical tradition. Since these models have been mostly conceived for developing countries, their authors generally justify such "contaminations" by claiming that the rigidities and distortions found in these countries cannot be dealt with by the Walrasian model without modifications to reflect the anomalies. These departures from Walras vary among different authors: some limit themselves to modifications of a more microeconomic nature (e.g. price rigidity in certain markets), others go further and introduce changes in the macroeconomic structure of the model (investment as an autonomous component of final demand) (Muro and Salvatici, 2001).

According to Robinson (1989), three types of structuralist models may be distinguished. Firstly, those remain within the structure of the traditional neoclassical model, but specify limited elasticities of substitution in several important relationships. This type of model may be defined as “elasticity structuralist”. A second type of model – which may be defined as “microstructuralist” –is based on the assumption that several markets do not function properly or are even absent. The assumption, therefore, is that restrictions to factor mobility, rigid prices, rationing, and neoclassical imbalances exist in one or more important markets. “Macro structuralist” models are the third type, these focus on the issue of how to attain equilibrium among different macro aggregates, in particular, savings and investment, exports and imports, and government spending and revenue (Muro and Salvatici, 2001).

Jorgenson, together with various co-authors, has distanced himself from the traditional approach, by constructing CGE models that are calculated econometrically and are not calibrated. Econometric calculation is theoretically more satisfactory than calibration, but it also raises many questions. First of all, an average size CGE model includes a huge number of parameters that need to be calculated, which grow quickly with the number of sectors and households treated; an extremely high number of observations are required in order to estimate all the parameters of the model at the same time. Secondly, simultaneous calculation of a CGE model requires the use of sophisticated econometric techniques; an alternative may be separate estimation for each of the model’s sub-systems (e.g. a block for production, a block for demand); yet it may still not be possible to include all equilibrium conditions in the model (Muro and Salvatici, 2001).

The approach of Ginsburgh-Walbroeck and Manne is derived from linear programming planning models used in the 1960s and 1970s. The main characteristic of this approach is its representation of models in the Negishi format (or methodology), instead of the usual Arrow-Debreu format (which uses optimisation problems for consumers and enterprises) (Gunning and Keyzer, 1995).

4.6 The basic structure of a CGE model

Table 4.2 discusses the silent features of CGE models and sets out the equations of a simplified version of a stylised model for an open economy, which also includes the public sector (Dervis *et al*., 1982, ch.6, 7). This model is not written in an Arrow-Debreu format, nor in a Negishi format, but, like most applications, is written in a "CGE" format, i.e. it contains explicit (Marshallian) functions of consumer demand and inputs. In the table, variables with a tilde denote nominal magnitudes, whereas those with a bar are exogenous. The superscripts d, m, e, *x* and *q* refer to domestic welfare, imports, exports, output and composite welfare respectively *(*D, M, E, *X* and Q). The superscripts *D* and *S* refer to demand and supply. The apexes *L* and *K* refer to labour and capital. The superscripts *P* and *G* refer to the private and the public sectors. A dot denotes multiplication. The model examines just one sector producing only one good *(*X). This good is then transformed into an export good *(*E) and into a good for the domestic market *(*D). Equation (1) represents the production function, which uses labour, intermediate input and capital, and generally assumes a CES (constant elasticity of substitution) form, nested at two levels. Equation (2) represents the function of output transformation into different goods for export and the domestic market; usually this is a function with constant elasticity transformation (CET). In a multisectoral model, goods from the same domestic sector and from foreign markets are assumed to be of different quality or tradable composition. The CET function enables the composition of sectoral production for domestic and foreign markets to be modified.

Table 4.2: An example of a CGE model

Real flows	**Nominal flows**	**Price equation**
(1)$X(L^D,V^D,K^D)$production	(16)$\tilde{Y}^L=W.L^s.(1-\overline{T}^L)$labour income	(23)$P^w=r.\overline{P}^{SW}$ import price
(2)$X(E,D^s)$export transformation	(17)$\tilde{Y}^K=R.\overline{K}^S.(1-T^k)$capital income	(24)$P^e=r.\overline{P}^{Se}$ export price
(3)$Q^D(M,D^D)$ import aggregation	(18)$\overline{Y}^G=\overline{T}^L.W.L^s+\overline{T}^K.R.\overline{K}^S$ government income	(25)$P^q(P^m,P^d)$ compoite price
(4)$M/D^D=f_1(P^w,P^d)$ import demand	(19)$\tilde{C}(\tilde{Y}^L,\tilde{Y}^K)$consumption function	(26)$P^x(P^e, P^d)$ output price
(5)$E/D^s=f_2(P^e, P^d)$ export supply	(20)$\tilde{S}^P=\tilde{Y}^L+\tilde{Y}^K-\tilde{C}$ private saving	**Nominal system Constraints**
(6)$C^D(P^q,\tilde{C})$ consumption demand	(21)$\tilde{M}=\overline{P}^{SM}.M$ dollar import	(27)$\tilde{S}^P+\tilde{S}^G+r.\overline{B}-\tilde{Z}=0$ savings-investment
(7)$Z^D(P^q,\tilde{Z})$ investment demand	(22)$\tilde{E}=\overline{P}^{SE}$ dollar export	(28)$\tilde{Y}^G-P^q.\overline{G}^D-\tilde{S}^G=0$ government balance
(8)$V^D(R,W,P^q,P^s)$ intermediate demand	**Real system constraints**	(29)$\tilde{M}-\tilde{E}=\overline{B}$ balance of trade
(9)$Q^D=C^D+Z^D+V^D+\overline{G}^D$ total demand	(13)$D^D-D^s=0$ product market	(30)$f_3(P^d,P^m,P^e,W)=\overline{P}$ numeraire
(10)$L^s(W,P^q)$labour supply	(14)$L^D-L^s=0$ labour market	
(11)$L^D(R,W,P^q,P^s)$ labour demand	(15)$K^D-\overline{K}^S=0$ capital market	
(12)$K^D(R,W,P^q,P^s)$capital demand		
Accounting identities		
(31)$P^s.X=P^e.E+P^d.D^s$ value of output= value of sales		
(32)$P^q.Q^D=P^m.M+P^d.D^D$ value of composite goods =absorption		
(33)$P^s.X=W.L^D+R.K^D+P^q.V^D$ value of composite goods = absorption		
(34)$P^q.C^D=\tilde{C}$ consumption demand = expenditure		
(35)$P^q.Z^D=\tilde{Z}$ investment demand = expenditure		
	Exogenous variables	
$\overline{G}^D$=real government demand	$\overline{T}^K$=tax rate on capital income	$\overline{P}^{Se}$=world price of exports
$\overline{K}^S$=aggregate capital supply	$\overline{B}$ =balance of trade (in dollars)	$\overline{P}$ =numeraire price index
T^L=tax rate on labour income	$\overline{P}^{Sm}$=world price of imports	
	Endogenous variables	
X=aggregate output	C^D=real consumption	P^q=price of composite good
D^S=supply of domestic output	Z^D=real investment	W=wage of labour
D^D=demand for domestic output	$\tilde{Y}^L$=nominal income	R=rental rate of capital
E=export	$\tilde{Y}^K$=capital income	R=exchange rate
M=imports	$\tilde{M}$ =dollar value of imports	$\tilde{Y}^G$=government income
Q^D=composite good demand	$\tilde{E}$ =dollar value of exports	$\tilde{S}^P$=private savings
V^D=intermediate demand	P^M=domestic price of imports	$\tilde{S}^G$=government savings
L^S=labour supply	P^e=domestic price of exports	$\tilde{C}$ =nominal consumption
L^D=labour demand	P^x=price of aggregate output	$\tilde{Z}$ =nominal investment
K^D=capital demand	P^d=price of domestic sales	

Source: Robinson (1989).

On the import side, domestic goods sold in the domestic market are assumed to be imperfect substitutes of imports (the Armington assumption). Intermediate and end consumers want a composite commodity, which consists of a CES aggregation of domestic and imported goods. Equation (3) represents the import aggregation CES function, often at two levels. Given equations (2) and (3), and traditional assumptions on maximising profits and minimising costs, the relative levels of exports and imports desirable are, therefore, functions of domestic and foreign prices.

These functions are represented by equations (4) and (5). Equations (25) and (26) define the price of the two composite goods, *X* and Q, and correspond to the cost functions duals for equations (2) and (3). The homogeneity of CES and CET functions ensures that the accounting identities of equations (31) and (32) are met.

Equations (8), (11) and (12) are the respective demand functions for intermediate goods, labour and capital, based on the best conditions for maximising profit and minimising costs. In many models, intermediate demand is assumed to be given by fixed input-output coefficients; in such a case, equation (8) is a function only of output.

Unlike the orthodox theory of trade where all goods are tradable and all tradable goods are perfect substitutes, the model specification described here assigns a significant degree of autonomy to the domestic pricing system. There are some seven prices associated with a single sector: P^x, P^q, P^d, P^m, P^e, $P^{\$m}$ and $P^{\$e}$**.** The model follows the traditional "small country" assumption, i.e. that world export and import prices are exogenous. It should be stressed, however, that trade policies which incorporate a "wedge" between global prices and domestic and import prices, will be less effective than in a traditional trade model.

This model presents some additional system constraints for the trade balance, (equation 29), and government accounts (equation 28). Furthermore, another cost, the exchange rate, acts as a variable to ensure equilibrium in the trade balance. Since the model represents no assets and the level of the trade balance in equation (27) is exogenous, the exchange rate will adjust to ensure that flows remain in equilibrium. This balancing mechanism functions through changes in the real exchange rate, which in this model is the ratio between the price of a non tradable domestic good, D, and the prices of tradable goods, *E* and M. Equation (30) defines the numeraire.

According to traditional neoclassical theory, investment is assumed to be determined by savings; aggregate consumption is given by equation (19), public sector savings are determined residually in equation (28), and equation (27) serves to determine aggregate investment. Accounting identities {equations (31) - (35)} are derived from behavioural equations and ensure that the model complies with the Walras Law; the sum of the nominal values of equations (13) - (15) and (27) - (29) is equal to zero.

In conclusion, there are 29 endogenous variables and 30 equations in the model. The equations, however, are functionally dependent and represent 29 independent equations.

4.7 Methodological aspects

The methodological aspects include model specification, calibration and closure rules**.** These are discussed in more detail in the following sections.

4.7.1 Specification

The principal specifications of a CGE model involve the selection of the functional forms, in view of the crucial role they play in terms of final results, and the choice of the level of disaggregation.

The two main requirements when selecting the functional forms to specify production and utility functions are that they must:

a) be compatible with the theoretical approach; and
b) be manageable from the analytical standpoint.

The conditions required to ensure compatibility with the theoretical approach are the following:

1) Utility functions must be such that the demand functions derived are not negative, continuous and homogeneous of zero degree with respect to prices; and

2) Production functions must present constant returns to scale. This condition applies to a pure Walras framework; if imperfect competition and increasing returns to scale are introduced, then this condition is no longer applicable.

Analytical manageability is the criterion which usually determines the selection of one of the following functional forms: Cobb-Douglas, CES (Constant Elasticity Substitution), LES (Linear Expenditure System), CRESH (Constant Ratios of Elasticities of Substitution, Homothetic), and Translog. The decision on which of these to select will depend on how sophisticated the description of the substitution phenomena in the model needs to be, and how the elasticities are used. For a description of the advantages and disadvantages of the various functional forms see Taylor (1990).

Specifications of functions in the CGE models make extensive use of nested production and utility functions. Figure 4.1 gives an example of a nested production function. The lower part combines intermediate goods of different geographical origin, on the one side, and different labour skills on the other. The upper part combines composite intermediate goods, aggregate labour and capital. In this way, the production structure is broken down into a number of cascade decisions which allow a wide range of possible substitutions to be made.

The selection of level of disaggregation is not an easy one to make. It is generally reached through a compromise between the desire to have a model with as much detail as possible to ensure the best results, on the one hand, and limitations connected with the quantity of information available, the cost of constructing a very large model and the risk that the understanding of the principal mechanisms may be obscured by too much detail, on the other.

One recent approach to this problem is to use the same data at different levels of aggregation: for instance, during the first stage one may construct a model with a high level of aggregation; subsequently, one may introduce a higher level of disaggregation depending on the specific questions considered. A solution of this type, known as "flexible aggregation", was proposed by Reinert and Roland-Holst (1997) and Blonigen, Flynn, Reinert (1997): these researchers started with a very high level of sectoral disaggregation (487), and, subsequently – depending on applications – began to aggregate sectors of no interest.

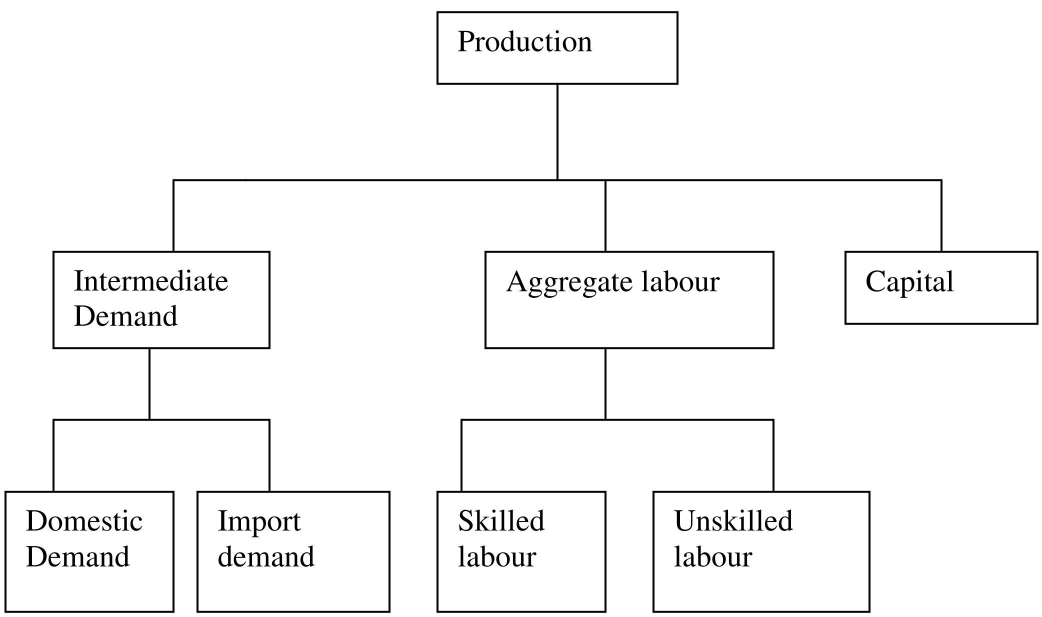

Figure 4.1: Nested production function
Source: Muro and Salvatici (2001).

4.7.2 Calibration

The procedure CGE modellers (with the exception of Jorgenson and his collaborators) normally use to estimate some of the parameters required is a deterministic one called "calibration". It consists of three stages. Stage one involves the construction of a database that is consistent for all the variables contained in the model, with respect to a base year; in other words, a SAM will be needed.

The second stage consists of the actual calibration of the unknown parameters of the model. Once the database – which has to establish the benchmark equilibrium for the economy-has been constructed, a "reverse" solution of the model will need to be introduced in order to determine the values of the parameters that are compatible with the exogenous variables and the endogenous variables of the base year; in other words, those parameter values which will make it possible, once the model has been made to function "correctly", to find the initial database, i.e. the equilibrium attained. It is not always possible to find a single set of parameter values to meet this criterion. If that is the case, then it will become necessary to impose the value of certain parameters and leave the model to do a "reverse turn" in order to calculate the value of the remaining parameters.

Finally, the third stage of calibration requires a verification to ensure that the SAM associated parameters determine a position of equilibrium within the economy once simulations are undertaken. At any rate, in view of the fact that the benchmark period is normally represented by one observation (reference year), it is worth noting that calibration procedures do not generally make it possible to evaluate the "statistical robustness" of the results obtained.

4.7.3 Closure rules

As in the case of SAM based linear models, CGE models also require the selection of a "closure rule". In the case of general equilibrium models it will require a decision on which variable needs to be adjusted in order to obtain equivalence ex post of any macroeconomic function considered to be important, mostly between investment and savings. The problem was initially raised in more general terms by Sen (1963), and has been addressed in at least four different ways in the CGE literature through:

- Keynesian closure, which permits the existence of unemployment. Equilibrium is ensured by the presence of unemployment, which is the adjustment variable. Labour demand, therefore, becomes endogenous. Some structuralists adopt a variant of Keynesian closure: enterprises are on their labour demand curve and nominal wages are fixed, the macroeconomic variable that is adjusted is the general price level;

- Kaldorian closure, which assumes that factors are not paid for according to their marginal productivity (therefore, equivalence between marginal labour productivity and real wages does not apply) and equilibrium is achieved through a re-distribution of income which influences the savings rate;

- Johansen closure, which attributes a decisive role to investment, to which savings are adjusted; similarly consumption is determined by sales. This specification has also been adopted, (in addition to Johansen), by Adelman and Robinson in their model for South Korea (1978);

- Neoclassical closure, which attributes a propulsive role to savings; investment varies to ensure equivalence ex post. In one of the variants, investment and savings are both endogenous and equilibrium is ensured by the adjustment of an additional variable, the interest rate (Fisherian closure): in this way, a capital market is often implicitly introduced.

The type of closure rule chosen is important because it greatly influences the functioning of the model. As Targetti Lenti (1989) has observed: "the choice of one rule over another, as well as the numeraire, is linked to specific behavioural assumptions of the agents in the system, and ultimately influences the configuration of equilibrium values including functional and personal income distribution". Some authors have shown, through simulation with CGE models, that the results that are obtained are not only heavily dependent on the type of closure rule chosen, but in some cases, may even be in conflict with each other.

With respect to the general equilibrium models used to analyse agricultural policies, the neoclassical closure rule is the choice most frequently found in the literature.

4.8 The advantages and disadvantages of CGE modelling

A key strength which CGE modelling enjoys over most alternatives lies in its solid micro foundations. The formal structure of a CGE model allows investigation of the consequences of using various functional forms (e.g. for production functions and utility functions). However, the very complexity of large CGE models precludes exhaustive investigations. To be more specific, the demand side of a CGE model is typically fairly simple. In many instances it is assumed that there is just one 'representative' consumer; even where different groups are specified, the number is rarely large. An analysis of the effects of changing the specification of preference functions (say from CES to LES) may not be too time-consuming. Similarly, examination of the effects of changing the elasticity of substitution between imports and domestically produced goods is straightforward. On the other hand, a sensitivity analysis of the production structure of the economy, which typically has many sectors, will be much more laborious (Reed, 1996).

The process of constructing a CGE model will give some assistance in identifying those functions and assumptions that should be investigated, since the modeller will have some 'feel' for the robustness of the judgments made at various points. Nevertheless, some general guidelines may be offered on those that should be considered. These are assumptions about: (a) the market structure (e.g. whether perfectly or imperfectly competitive); (b) the structure of government taxation and disbursements (between production sectors and between consumer groups); (c) the closure specified by the model (Reed, 1996).

The very essence of general equilibrium is that 'everything depends on everything else'. Interdependencies and feedbacks, between policy instruments as well as sectors, have an important impact on outcomes, but in practice are difficult to model in anything other than a general equilibrium framework. Clearly, any approach which is partial equilibrium in flavour faces the 'other things being equal' constraint. The CGE approach not only exposes interdependencies, it offers a facility for modelling them, if necessary in alternative ways. Closely related to this is the ability to bring instrument constraints into play more readily. This clearly gives the analyst greater flexibility, especially when evaluating the impact of alternative policy reform packages (Reed, 1996).

Since CGE modelling is directed at evaluating the response of the economy, and agents therein, to alternative policy shocks, it is an approach that facilitates simulation of alternatives. This of course is also an attribute of macroeconometric models, but the CGE approach offers at least two advantages over such models. First, macroeconometric models are designed to 'explain' the pattern of economic activity in the economy as a whole, or some sub-sector(s) thereof. The second is that it is relatively difficult to incorporate certain policy measures within the macroeconomic framework, in particular those that have not been in place during the sample period (Reed, 1996).

The most distinctive and most important attribute of CGE modelling is that it gives us the ability to assess the impact of policy changes on both 'efficiency' and on 'equity'. Economic theory provides us with the tools to rank policy instruments on efficiency grounds, and gives us guidance on their likely distributional aspects. There are however instances where an a priori ranking is not possible, and others where the available theoretical results are based on a limited range of economic structures. CGE allows us to model alternative structures and to compare outcomes numerically (Reed, 1996).

It is very important to note that CGE models facilitate the ranking of second best changes. Much theoretical discussion of policy intervention is blighted by the nihilism of second best theory. By imposing the constraint that the benchmark data set represents some kind of general equilibrium, a range of deviations from that situation can be explored. Of course, there is an obvious objection that the initial representation of general equilibrium may be highly misleading, particularly where markets are imperfectly competitive (Reed, 1996).

Generally, CGE models attempt to model welfare changes explicitly through the use of indicators such as compensating and equivalent variation. Thus, rather than just identifying the price or quantity effects of a given policy shock, we can use the framework to identify the net welfare benefits of alternative strategies/scenarios using a measure of welfare which has firm theoretical foundations. In the context of providing advice on policy, this is an invaluable attribute (Reed, 1996).

Related to this, since most CGE models are built up from explicit models of the sub-structure, we can assess the impact of policy changes on particular sub-sectors. Since all policy changes have distributional consequences – whether deliberate or unintentional – the ability to identify and compute distributional changes at the micro level is an attractive feature of this approach. Not only is the information interesting in its own right, it may also be helpful in informing discussions about appropriate adjustment assistance. From the standpoint of appraising policy, this is probably the most distinctive and valuable feature of CGE modelling (Reed, 1996).

There are of course a number of potential weaknesses with this approach. In principle CGE models can accommodate any functional form. In practice the solution methods and parameterisation considerations constrain modellers to work with a small number of relatively straightforward/tractable functional forms. Of course, if the world is CES or Cobb-Douglas (or if agents' behaviour is consistent with these) then that does not matter. But, we do not know. Moreover, we do not have any facility for testing the appropriateness of particular functional forms, and indeed model structures more generally, within the CGE model. We cannot compare actual and fitted values, or apply a battery of diagnostic test statistics as a basis for deciding how well a particular model 'fits' and what degree of confidence we should have in its output. Alternatives such as macroeconomic modelling do have the facility for diagnostic testing. On the other hand, there is a substantial body of microeconomic literature on the fitting of various functional forms to production and consumption data, and the functional forms most often assumed by CGE modelers reflect the overall judgment that such functions as CES, LES etc. perform well in econometric studies (Reed, 1996).

Parameterisation and calibration of the chosen functional forms are related problems. Many of the parameters used in calibrating a CGE model to the benchmark data set are point estimates from secondary sources, or are based on the modeler's judgment. This is especially common in respect of elasticities. Often the resulting estimates are drawn from different time periods, or different countries than the time period/country to which the model pertains. Then, to get the model to reproduce the benchmark data set, some parameters need to be calibrated. The justification for the values which emerge from the calibration process is that they are consistent with the benchmark data set, and that since that reproduces a state where the economy is in equilibrium, the values are defensible. Equilibrium is a heroic assumption and we have no means of checking on the validity of calibrated values (Reed, 1996).

Two other structural features of CGE models are potential weaknesses – the uniqueness of particular solution values, and the closure rules used. The former is essentially technical – the modelling framework presumes a unique equilibrium. In principle there could be multiple equilibria. However, there is no reported case of this, and the 'well-behaved' nature of the functional forms usually employed makes it unlikely that they would exist. The one extensive search for multiple equilibria that has been reported in the literature failed to find more than one solution (Reed, 1996).

Closure is more serious. This is often effected via the imposition of a balanced budget, or balanced trade, or a savings-investment identity. Not only are results typically sensitive to the closure rule adopted, its choice can constrain the model in important respects. If for example we close via a savings-investment identity and treat 'savings' as if it were just another bundle of consumer goods (as some models do), we get a passive investment function. This raises a further weakness: intertemporal flows are typically not well handled in these models. This does not only apply to savings-investment decisions, but also to growth processes more generally. If the model is being used for simulation purposes, this is a serious shortcoming, (well illustrated in fact in the context of 'green models'). Expectations are generally either ignored, or modelled mechanistically.

Depending on the nature of the problem being addressed, this too can be a serious deficiency (Reed, 1996).

The most serious problem, however, in the application of CGE modelling to actual economies is the shortage of data from which a Social Accounting Matrix may be constructed. The core of a SAM is an Input-Output table, from which may be obtained information on outputs, intermediate inputs, factor use and so on. This is augmented by the use of data from national income accounts etc. to construct the SAM. However, although the latter information is usually available on an annual basis, with a tolerable time lag before publication, Input-Output tables are at best usually published every 5 or 10 years. Such gaps are to be expected given the nature of the work involved in their construction, but for many countries the most recent table may be some 10 or 15 years out of date, and for others no such table exists. Given the pace of technological change in many sectors in developed countries, and the increasing speed of adoption of such technologies by the developing economies, the shortage of such information imposes a serious constraint on the construction of CGE models and on the interpretation of their results (Reed, 1996).

Table 4.3 summarizes present usage of CGE modelling by governmental and by non-governmental agencies. The OECD and World Bank have a relatively large number of in-house modellers, and a tradition of building and maintaining a range of models. The OECD for example has used the approach to inform their analysis of agricultural reforms, CO_2 emissions abatement, and of the consequences of the Uruguay Round. The World Bank has, for some ten years or so, used the approach as an input to policy appraisal in a large number of developing countries and policy reform scenarios. CGE analyses of the impact of policy reforms in LDCs have now been applied in scores of cases. The technique is used more extensively and more routinely by the World Bank than by any other organization (sees Greenaway and Milner, 1993). Both the World Bank and OECD appear to have a long-term commitment to the approach (Reed, 1996).

Table 4.3: CGE Modelling and Government/Non-Governmental Agencies

Country/Ministry	Model focus	Special features
AUSTRALIA Industries Assistance commission-on reference from various ministries	Multiple policy analysis	Flexible multi-purpose capability
BELGIUM Various ministries	Trade reforms & labour market policies	Unemployment & fixed price eqilibria
CANADA Ministry of Finance Ministry of Finance MacDonald Commission/Economic council of Canada	Trade Policy (US-Canada, GATT) Tax policy (GST) Regional polices	Scale economies/market structure Household & commodity detail Interregional migration/trade
GERMANY Lander government	Impacts of EC tax harmonization	Multiple country analysis of within-EC effects of tax changes
ITALY Tax ministry	Italian tax reform	Tax detail
MEXICO Finance Ministry	Tax & trade policies & reforms	Endogenous unemployment
SPAIN Finance Ministry	Tax reforms	Detailed commodity/household treatment
SWEDEN Environmental & Trade Ministries	Environmental policies – impacts of acid rain	Explicit environmental modelling
UK Scottish Office	Scottish agricultural sector	
US Office of Tax Analysis, US Treasury Department of Agriculture USITC	Tax policy Agricultural/Trade Trade policy	Dynamics, commodity & household detail Detail of agriculture programmes VERs, other NTBs
OECD Economic Studies	Agriculture/GATT Environment/carbon taxes Global trade/GATT Uruguay round	Inter-country effects Dynamic Multicountry
WORLD BANK Regional Operations	Trade, tax, price reform, energy policy & other areas: multiple model	Focused models on particular country policy issues

Source: Greenaway and Milner (1993).

Table 4.3 indicates that a large number of other government agencies are consumers of the output of CGE models. The issues addressed are primarily tax policy, (e.g. Canada, Mexico, Spain and Italy); environmental policy (e.g. Sweden and Australia); trade and integration (e.g. Canada, Mexico and Germany). The output from these exercises are reported in policy documents and used to underpin policy positions (Reed, 1996).

4.9 A review of some CGE models of Egypt, Morocco and Tunisia

Decaluwé and Martens (1988) report on four CGE models for Egypt (Eckhaus, Mccarthy and Mohdie-Eldin, 1979; Eckhaus and Mohdie-Eldin; 1980; Ahmed, Bhattacharya, Grais and Plekovic, 1985), one for Morocco (Mateus, 1988), and three for Tunisia (Cherif, 1984; Bousselmi, Decaluwe, Ennaifar and Monette, 1985). What follows is a brief summary of the essential elements of their model structures and of their main experiments and results. In this section only the Tunisia case is discussed:

4.9.1 Tunisia

Cherif has 18 sectors, with labour disaggregated according to qualifications/schooling, and nested Cobb-Douglas production functions; both Bousselmi models have 15 sectors with sector-specific capital and labour, and nested CES production functions. All use one household, Cherif with a Stone-Geary utility function, Bousselmi *et al.*, with a Carvalero specification. All assume that imports are imperfect substitutes for domestic varieties, employing a CES function, and that exports face non-infinite demand elasticity; Cherif assumes exports are exogenously determined. Cherif uses both the classical and Johansen closure, Bousselmi *et al.* a fixed nominal exchange rate (Reed, 1996).

4.9.2 Main results

Cherif (1984), using 1980 data, considers the effects of (i) a 20 % depreciation of the dinar, which he concludes will increase domestic prices, reduce consumption and investment; (ii) imposition of an uniform 10% tariff, which will improve the current account and give a smaller increase in domestic prices; (iii) a decrease in the consumption subsidies on oil, food and manufactures, which leads to increased growth, an improvement in the current account, and higher real wage rates; and (iv) a fall in the investment rate, resulting in an adverse effect on the current account and on growth.

Bousselmi *et al*. (1985), using 1983 data, look at the effects of (i) a 10% cut in real investment – leading to a need for additional foreign savings and little growth; (ii) a 25% increase in the price of bread – insignificant impact overall; (iii) an overall 10% increase in tariffs – increased external deficit, little impact on growth; (iv) a 10% increase in import quotas – little overall impact; (v) a 10% devaluation – 3.7% increase in GDP; (vi) 10% devaluation coupled with removal of domestic price controls – little growth effect but significant impact on current account; (vii) simultaneous 10% devaluation, removal of domestic price controls and an overall 10% increase in tariff – comparable with impact of (vi).

Bousselmi, Decaluwe and Leduc (1987), again using 1983 data, consider the impact of (i) a 10% decrease in oil production – GDP falls by 1.6%, 10.5% increase in current account deficit; (ii) a 10% decrease in international price of oil products coupled with fixed prices in the domestic market – GDP falls by 0.5%, 4.5% increase in current account deficit (Reed, 1996).

4.10 Conclusions

Computable general equilibrium modelling provides a useful (and widely used) tool for applied policy analysis. Although it is particularly suited to the analysis of tax and trade policy issues (at both the national and the international level), it has also been employed in other policy areas. Its greatest strengths are that it provides a clear focus on issues of efficiency and of distribution, that it allows the analysis of simultaneous changes in many policy instruments (and so a route through the complexities of second-best issues), and that those changes need not be marginal. Its principal weaknesses (some of which are being addressed in recent work) are in its treatment of dynamics and of monetary sectors.

Several arguments may be advanced for a government supporting the development of CGE modelling skills, whether within the civil service or in universities. First, CGE modelling facilitates both ex ante and ex post analysis of the likely impact of its own proposed policy changes and of changes elsewhere (as in the investigation reported elsewhere in this volume of the effects on Egypt of the Uruguay Round). Second, since major international agencies, such as the World Bank, make use of such models in formulating policy advice, familiarity with such models, and ideally the availability of an 'in-house' model, will inform domestic policymakers. Third, the construction and use of even low-dimension CGE models is a useful tool for developing the analytic skills of economics students.

However, the usefulness of such models for applied policy analysis and advice is dependent on the availability of reasonably up-to-date data, particularly Input-Output tables and the Social Accounting Matrices to which they contribute. The development of CGE modelling skills should therefore, in an ideal world, be accompanied by the production of such invaluable data resources.

CHAPTER 5

A COMPUTABLE GENERAL EQUILIBRIUM MODEL FOR ANALYSIS OF THE POTENTIAL IMPACT OF TRADE ON ECONOMY OF LESOTHO

5.1 Introduction

Computable general equilibrium (CGE) models have proven to be one of the most valuable methods to analyse macro economic change (Dervis *et al*., 1982; Sadoulet and de Janvry, 1995; Wobst, 2001; 2002). It is now well accepted that CGE models "have become a standard tool of empirical policy analysis" (Lofgren, Harris and Robinson, 2002). Trade is particularly one of the policy areas that have received a tremendous amount of attention in terms of CGE modelling (Devarajan and Robinson, 2002).

This study uses the standard CGE framework, which follows the usual single country, open economy trade model developed in the classical work of Dervis *et al*. (1982). Section 5.2 offers an overall discussion of the Lesotho CGE model in the context of the literature. Section 5.3 elaborates on the structure of the model and presents key equations. It also discusses the macroeconomic closures of the CGE model. A supplement to Section 5.3 appears in an appendix which details all the model's equations. The estimation and discussion of key behavioral parameters (Linear expenditure demand system (LES) and elasticities for Lesotho are done in Section 5.4. Section 5.5 summarizes and concludes the chapter.

5.2 The Lesotho CGE Model in the Context of Literature

The basic theoretical framework of the Lesotho and other CGE models is a competitive market equilibrium that satisfies Walras' Law (Decaluwé and Martens, 1988). Producers are assumed to maximize profit using a concave production technology; consumers maximize utility; and factors are remunerated at the margin, with factor payments equal to their marginal-value product. Only relative prices matter, and market clearing conditions allow instantaneous and simultaneous price-adjustment between supply and demand. Thus, the model is not dynamic.

This theoretical foundation can be applied using either a classical approach to trade with direct specification of production and consumption behaviours (e.g., Wobst, 2001; 2002), or a dual approach to trade (e.g., Beghin, Bureau and Park, 2003) as systematized in Dixit and Norman (1980) and widely used in many applied trade models such as Anderson and Neary (1996) and Anderson (1997). The dual approach represents technology by a production cost function, and consumption by an expenditure function. In practice, the classical approach allows for a more complete mapping of the economy, with a richer set of institutional details and interactions, than does a typical dual representation (Dervis *et al*., 1982 cited by Nouve, 2004).

The standard model includes a number of features designed to reflect the characteristics of developing countries. The specification follows the neoclassical-structuralist CGE modelling tradition presented in Dervis *et al*. (1982). It also incorporates imperfect Armington constant elasticity of substitution (CES) on the demand side and imperfect Powell and Gruen's constant elasticity of transformation (CET) on the supply side. This allows for substitution between domestically produced and externally traded goods (Lofgren *et al*., 2002).

5.3 Structure and Equations of the CGE Model

The neoclassical structuralist model is very standard. The classical book by Dervis *et al*. (1982) and also other references such as Lofgren *et al*. (2002) thoroughly discuss the structure of the model and document the complete set of equations. Appendix 5.1 provides a complete listing of equations, variables and parameters. Equations are divided into 4 blocks: prices, production and trade, institutions, and system constraints. Table 5.1 summarizes the notational principles.

Table 5.1: Notational principles

Item	Notation
Endogenous variables	Upper-case Latin letters without a bar
Exogenous variables	Upper-case Latin letters with a bar
Parameters	Lower-case Latin letters (with or without a bar) or lower-case Greek letters (with or without superscripts)
Set indices	Lower-case Latin letters as subscripts to variables and parameters

Notes: Exogenous variables are fixed in the basic model version but may be endogenous in versions with different treatments of macro- or factor-market closures.
Source: Lofgren *et al*., (2002).

5.3.1 Price Block

The price system of the model is rich, primarily because of the assumed quality differences among commodities of different origins and destinations (exports, imports, and domestic outputs used domestically). The price block consists of equations in which endogenous model prices are linked to other prices (endogenous or exogenous) and to non price model variables (Lofgren *et al*., 2002).

The price block is represented by a system of 10 equations for imports (Equation 5.1), exports (5.2), the demand price of domestic non-traded goods (5.3), the absorption (5.4), the value of marketed output (5.5), activity price (5.6), aggregate intermediate input price (5.7), and activity revenue and costs (5.8); there are also equations representing the consumer price index (5.9) and the producer price index for non-traded marketed output (5.10). While all these equations are documented in Appendix 5.1, an example is shown below:

Import Price $PM_c = pwm_c.(1+\ tm_c\ ).EXR + \sum_{c' \in CT} PQ_c\ icm_{c'c} \qquad c \varepsilon CM \qquad (5.1)$

$$\begin{bmatrix} import \\ price \\ (LCU) \end{bmatrix} = \begin{bmatrix} import \\ price \\ (FCU) \end{bmatrix} \cdot \begin{bmatrix} tariff \\ adjust \\ ment \end{bmatrix} \cdot \begin{bmatrix} exchange \\ rate \\ (LCU / FCU \end{bmatrix} + \begin{bmatrix} \cos toftrade \\ inputsper \\ importunit \end{bmatrix}$$

Export Price $PE_c = pwe_c.(1\text{-}te_c).EXR - \sum_{c' \in CT} PQ_{c'}.ice_{c'c}$ cεCE (5.2)

$$\begin{bmatrix} export \\ price \\ (LCU) \end{bmatrix} = \begin{bmatrix} export \\ price \\ (FCU) \end{bmatrix} \cdot \begin{bmatrix} tariff \\ adjust \\ ment \end{bmatrix} \cdot \begin{bmatrix} exchange \\ rate \\ (LCU / FCU \end{bmatrix} - \begin{bmatrix} cost of trade \\ inputs per \\ export unit \end{bmatrix}$$

Where: *c* ε *C* = a set of commodities (also referred to as *c'* and *C'*),

c ε *M* (c *C*) = a set of imported commodities,

c ε*CT* (c *C*) = a set of domestic trade inputs (distribution commodities),

PM_c = import price in LCU (local-currency units) including transaction costs,

pwm_c = c.i.f. import price in FCU (foreign-currency units),

tm_c = import tariff rate,

EXR = exchange rate (LCU per FCU),

PW_c = composite commodity price (including sales tax and transaction costs)

$icm_{c'c}$ = quantity of commodity c. as trade input per imported unit of c

c ε *CE* (c *C*) = a set of exported commodities (with domestic production),

PE_c = export price (LCU),

pwe_c = f.o.b. export price (FCU),

te_c = export tax rate,

$ice_{c'c}$ = quantity of commodity *c*. as trade input per exported unit of *c*

Equation (5.1) illustrates how the import price in local currency for commodity *c* (PM_c) is determined from the exogenous world prices of commodity *c* (pwm_c) using import tariffs (tm_c), the exchange rate (*EXR*), and the marketing margins incurred for moving the commodity from the border to the end user, represented by the last term in the right hand side of Equations (5.1). Marketing costs depend on the units $icm_{c'c}$ of other commodities (*c'*) used in moving the good *c* from the border to the demander, *c'* being valued at composite commodity prices $PQ_{c'}$.

The export price in LCU is the price received by domestic producers when they sell their output in export markets. This equation is similar in structure to the import price definition. The main difference is that the tax and the cost of trade inputs reduce the price received by the domestic producers of exports (instead of adding to the price paid by domestic demanders of imports). The domain of the equation is the set of exported commodities, all of which are produced domestically.

5.3.2 Production and Trade Block

The production and trade block covers four categories: domestic production and input use; the allocation of domestic output to home consumption, the domestic market, and exports; the aggregation of supply to the domestic market (from imports and domestic output sold domestically); and the definition of the demand for trade inputs that is generated by the distribution process.

Production is carried out by activities that are assumed to maximize profits subject to their technology, taking prices (for their outputs, intermediate inputs, and factors) as given. In other words, it acts in a perfectly competitive setting. The CGE model includes the first-order conditions for profit-maximization by producers. As noted in the preceding section, two alternative specifications are permitted at the top level of the technology nest: the activity level is either a CES or a Leontief function of the quantities of value-added and aggregate intermediate input use.

Commodities are produced using a two-level nested technology. At the base of the technology tree, production factors are combined into value-added using a CES technology, whereas intermediary inputs from each activity are combined into aggregate intermediary inputs following a Leontief aggregation function. At the top level, commodities are generated from a CES combination of value added and aggregate intermediate inputs. Some of these commodities are home-consumed and the rests are marketed. The marketed output is CES-aggregated into an aggregate marketed output, which is in turn CET-transformed into exports and domestic sales. Domestic sales are CES-combined with imports to generate the total domestic supply.

The production and trade block contains 17 equations, all of which are detailed in Appendix 5.1. These include the following:

- An activity production function represented by a CES combination of aggregate value-added and aggregate intermediate input quantities (Equation 5.11) and the corresponding first-order condition, which is represented by the ratio of quantities of aggregate value-added and aggregate intermediate inputs (Equation 5.12);

- A CES combination of production factors into aggregated value-added (Equation 5.13) and the resulting first-order condition representing factor demand (Equation 5.14);

- A Leontief demand for aggregate value added (Equation 5.15), and for aggregate factor demand (Equation 5.16) and disaggregated intermediate inputs (Equation 5.17);

- Commodity production (from fixed unit of activities) and allocation of the production to marketed output and home consumption (Equation 5.18);

- A CES aggregation of marketed output from activities to an aggregate marketed output for each commodity (Equation 5.19) and its corresponding first-order condition (Equation 5.20);

- A CET output transformation function of the aggregate marketed output into the aggregated exports and domestic sales (Equation 5.21), the related first-order conditions that show the optimal ratio aggregate exports to domestic supply functions (Equation 5.22), and the requirement that domestic sales and aggregate exports add up to the aggregate marketed output for commodities that are either exported or sold domestically, but not both (Equation 5.23);

- A CES composite supply combining aggregate imports and domestic supply (Equation 5.24), the corresponding first-order condition indicating the ratio of aggregate imports to domestic demand (Equation 5.25), and the condition that the sum of domestic supply and aggregate imports equal the composite supply for commodities that are either non-imported domestic sales or non-produced imports, but not both (Equation 5.26);

- Finally, there is a demand equation of marketing services defined as the sum of marketing margins on domestic sales, imports and exports (Equation 5.27).

All equations mentioned in the production and trade block are directly taken from Lofgren *et al*. (2002).

5.3.3 Institution Block

In the CGE model, institutions are represented by households, enterprises, the government, and the rest of the world. The CGE model allows for three domestic institutions (households, enterprises and government) and one foreign institution (ROW). All institutional blocks are fully documented in Lofgren *et al*. (2002). These equations refer to: total factor incomes (5.28), factor incomes to institutions (5.29), incomes to domestic non-government institutions (5.30), intra-institutional transfers (5.31), household consumption expenditures (5.32), household consumption spending on marketed commodities (5.33), households spending on home consumption (5.34), investment demand (5.35), government consumption demand (5.36), government revenue (5.37), and government expenditure (5.38).

The model assumes that households are the only non-government institutions with final consumption of commodities. The estimation of key behavioral parameters (Linear expenditure demand system (LES) and elasticities for Lesotho CGE is adopted from the work of Nganou (2004); it is elaborated in section 5.4.

5.3.4 System Constraints and Macroeconomic Closures

System constraints mainly refer to market clearing conditions and macroeconomic closures. Equations in this block refer to market clearing conditions in the factor (5.39) and the commodity markets (5.40).

Regarding commodities, markets clear when there is equality between quantity supplied and quantity demanded of the composite commodity. As discussed earlier in the production and trade block, the composite supply depends on domestic marketed output and aggregate imports. Composite demand is the sum of demands for intermediate use, household and government final consumptions, investment, stock change and trade input use. With the exception of stock change, all the components of the composite demand are defined earlier in the production and trade block.

The current account balance is given in Equation (5.41).

$$\sum_{c \in CMW} pwm_c.\mathrm{QM}_c + \sum_{f \in F} trnsfr_{\text{row, f}} = \sum_{c \in CEW} pwe_c.\mathrm{QE}_c + \sum_{i \in INSD} trnsfr_{\text{I, row}} + \overline{FSAV}$$

$$\begin{bmatrix} import \\ spending \end{bmatrix} + \begin{bmatrix} factor \\ transfer \\ toROW \end{bmatrix} = \begin{bmatrix} \exp ort \\ revenue \end{bmatrix} + \begin{bmatrix} institutional \\ transfers \\ fromROW \end{bmatrix} + \begin{bmatrix} foreign \\ savings \end{bmatrix}$$

Where: $\overline{FSAV}$ = foreign savings (FCU) (exogenous variable).

It is common to treat these foreign savings as fixed; a variable real exchange rate therefore adjusts to impose equilibrium in the current account balance equations. An alternative treatment would be to fix the real exchange rate and to flex the foreign savings to adjust in order to balance the current accounts.

The rest of the system constraints in the CGE model refer to government revenue and expenditure balance (5.42), determination of direct institutional tax (5.43) and saving rates (5.44), and the savings-investment balance (5.45). The saving-investment balance requires the sum of foreign, private and public savings to equate total investments adjusted with the changes in stocks; both investments and changes in stock are valued at the composite commodity prices. The government balance imposes equality between government revenue, on the on hand, and the sum of government expenditures and savings, on the other. This equation is cleared in the standard model by making government savings endogenous, while fixing the direct institutional tax components of the government revenue. Alternative specifications exist where government savings are fixed whereas institutional direct tax rates vary so that government revenues equate expenditures. Variations in direct institutional tax rates may either be uniform across non-government institutions, or proportional to the initial rates for each institution.

Finally, the specification of non-government institutions' savings (Equation 5.44) is closely related to government savings. In the standard specification, the saving investment balance is said to be investment-driven in that the value of savings adjusts to fixed levels of real investments. Institutional savings are uniformly adjusted so that total savings are in equilibrium with total investments. Lofgren *et al*. (2002) discuss four alternative saving-investment closures that are commonly used in the literature. These include: (i) another investment-driven closure similar to the standard specification, with the difference that adjustments in institutional savings are not uniform across relevant institutions, but proportional to initial savings of each non-government institution; (ii) a saving-driven balance in which all non-government saving rates are fixed whereas investments are proportionally adjusted to balance the fixed levels of institutional savings; and two so-called "balanced" investment-driven closures, which have the characteristics of the first two closures mentioned above (uniform and proportional adjustment in savings). In addition, the latter two closures are balanced, in the sense that they do not limit adjustment in absorption to the saving-investment account, but extend the adjustment to public and private consumptions as well.

The CGE system of equations is solved in GAMS as a mixed complementary programming (MCP) problem, and therefore does not require specification of an objective function. Details on all the 48 equations are available in Appendix 5.1.

5.4 Elasticities required for a CGE model of the Lesotho economy

The CGE model indicated the necessity to obtain the relevant elasticities with respect to Lesotho economy, which will then be used within a CGE framework.

CGE models are frequently criticized for resting on weak empirical foundations. The use of arbitrary values and a lack of model validation are two aspects that have received severe criticism (Liu, Channing and Thomas, 2001). According to Liu *et al*. (2001), several approaches have been used for parameter estimation in CGE models. These approaches include micro-econometric studies, the calibration method, the econometric method and the semi-econometric method. Elasticities for Lesotho were obtained (adopted) from the work of Nganou (2004). Nganou (2004) estimated linear expenditure system (LES) parameters (elasticities of expenditures, income and own-price elasticities, and Frisch parameters) and Armington elasticities, for use in the Lesotho CGE model.

For the estimation of LES he used Lesotho household expenditure survey (HES) of Lesotho Bureau of Statistics to derive expenditure levels. The commodities for which data were available in HES were re-categorized to match the commodities classification provided in the Lesotho SAM. Thus, Lesotho households direct most of their spending to the following nine commodities: Agriculture, Food, Beverages and Tobacco, textiles, Utilities, private services, Government services, Transport, Other Manufacturing, and Financial services. Table 5.2 presents the descriptive statistics for commodities expenditures and consumer price indices for each category of household. The data set contains a maximum of 1932 observations for urban households and 2628 observations for rural households.

Table 5.2: Descriptive Statistics (means) for Commodities Expenditures and CPI by Household type

Sector	Urban			Rural			All Households	
	Obs.	Expend.	CPI	Obs.	Expend.	CPI	Expend.	CPI
Agriculture	1900	6563.45	1.47	2326	4573.57	1.43	5468.22	1.45
Food	1932	7886.18	1.53	2525	3504.49	1.48	5403.84	1.50
Textile	1932	7780.45	1.33	1077	10159.18	0.57	8631.86	0.89
Utilities	1932	6287.66	1.29	2628	950.726	1.35	3211.9	1.32
Private Service	1932	6155.31	1.30	1503	6073.81	0.74	6119.65	0.98
Government Service	1932	7856.48	1.20	1374	2529.74	0.63	5642.64	0.87
Transport	1932	6457.14	1.50	799	3768.5	0.44	5671.53	0.89
Other Manufacturing	1932	6476.14	1.37	2449	4602.59	1.3	5428.82	1.33
Financial Service	1932	12007.06	1.30	866	6355.26	0.43	10257.79	0.79
Total Expenditures	1932	91721.86		2628	35185.76		59139.21	

Source: Nganou (2004).

Expenditure and price levels are higher for urban than rural households. The average expenditure amounts to 91,721.86 Maloti for urban households compared to only 35,185.76 Maloti for rural households. Financial services appear to be the most purchased service for urban households (12,000 Maloti on average) whereas rural households consumed more textile products (10,160 Maloti).

Estimation of LES parameters also requires data on prices. The 2000 Consumer Price index (CPI) series by commodities and location (rural and urban) provided by the Lesotho Bureau of Statistics are used as price variable.

A lack of data for the estimation of Armington elasticities is common in developing countries. Available data suggest consumer to choose between the following imported and domestically produced goods: Agriculture, Food, Beverages and Tobacco, Textiles, Mining and quarrying, other manufacturing, and Transport. Annual data were used in the disaggregated import series and appropriate average annual import price indices were used to deflate import data series obtained from the Lesotho Bureau of Statistics. The price of domestic output was obtained from the CPI data of the Bureau of Statistics. Real GDP data were used as the physical quantity of domestically produced goods and services.

Descriptive statistics for real imports, real domestic outputs, import prices and domestic output prices are presented in Table 5.3.

Table 5.3: Descriptive Statistics (means) for key variables in the Armington Regression

Commodities	Import value	Domestic production value (million Maloti)	Import price index	Domestic price index
Agriculture	252.63	152.23	0.91	0.89
Food	96.05	59.37	0.88	0.93
Textile	148.4	43.37	0.94	0.95
Mining	50.6	0.63	0.98	0.96
Other Manuf.	395.64	24.06	0.98	0.94
Transport	125.09	31.68	0.94	0.93

Source: Nganou (2004).

Two methods were used to estimate parameters: iterated seemingly unrelated regression (ITSUR) and generalized maximum entropy (GME) techniques for LES and Armington parameters respectively. Because efficiency gains can be achieved by combining each demand equation as a system, the Zellner's SUR method was used to estimate LES parameters. Given the dearth of data for the variables required for estimating Armington elasticities, the power of GME techniques was exploited for the purpose of estimation. The robustness of the GME method has been proven for ill-posed, limited and poor data problems (Golan, Judge and Miller, 1996).

5.4.1 Estimating LES parameter and Elasticities

The basic theoretical foundations of this linear expenditure system (LES) demand were presented in Nganou (2004). The following LES Marshallian demands were derived:

$$QH_{ch} = Y_{ch} + \frac{B_{ch}}{PQ_c}(EH_h - \sum_{c'} PQ_{c'}.Y_{c'h}) \tag{5.49}$$

Where QH_{ch} is the quantity demanded of commodities c by household h, EH_h is the total expenditure (or income) of household h, PQ_c id the price of commodity c, Y_{ch} and B_{ch} are LES parameters.

It is common practice to multiply both sides of equation (5.49) by PQ_c in estimation in order to obtain a linear expenditure system of equations, so designated because expenditure is a linear function of income and prices. In the parameters (Y_{ch},B_{ch}) the expenditure system is clearly not linear (see Judge, Hill, Griffiths, Lutkepohl, and Lee (1988)). The corresponding econometric model for the linear expenditure system is the following:

$$PQ_{c}.QH_{ch} = PQ_{c}.Y_{ch} + B_{ch} (EH_h - \sum_{c'} PQ_{c'}.Y_{c'h}) + e_{ch} \qquad (5.50)$$

Where e_{ch} is the error term, Y_{ch} and B_{ch} are the parameters to be estimated, c=c' represents the commodities for which sample data on prices, quantities, and income are available for the estimation pf parameters (c=Agriculture, Food, Beverages and Tobacco, Textiles, utilities, private services, Government Service, Transport, Other manufacturing, and financial Services). Appropriate data was available for only two household categories (i.e., h=urban, rural).The system represented by equation (5.50) can be viewed as a set of nonlinear seemingly unrelated regression equations since it can be shown that the covariance matrix of the system is not diagonal.

Judge *et al*. (1988) argued that, "the nature of the model provides some guide as to what might be good starting values for an iterative algorithm." They suggest the minimum value of the quantity demanded as being a reasonable starting value for the associated Y_c for each commodity .These starting values used are summarized in Table 5.4.

Table 5.4: Starting values for the iterative process of estimation of LES parameters

	Urban		Rural		All households	
	Y^o_c	B^o_c	Y^o_c	B^o_c	Y^o_c	B^o_c
Agriculture	33.380	0.072	0.000	0.130	7.440	0.092
Food	0.000	0.086	0.000	0.100	0.000	0.091
Textile	0.000	0.085	0.000	0.289	0.000	0.146
Utilities	0.000	0.069	0.000	0.027	0.000	0.054
Private Service	0.000	0.067	0.000	0.173	0.000	0.103
Government Service	0.000	0.086	0.000	0.072	0.000	0.095
Transport	0.000	0.070	0.000	0.107	0.000	0.096
Other Manufacturing	0.000	0.071	0.000	0.131	0.000	0.092
Financial Service	0.000	0.131	0.000	0.181	0.000	0.173
Total		1		1		1

Source: Nganou (2004).

The results of the estimation are presented in Table 5.5. Income elasticity of each commodity and Frisch parameters for each household category are crucial in the calibration process. In CGE models that adopt LES demand systems to represent the consumption behavior of households. The Frisch parameter is the substitution parameter measuring the sensitivity of the marginal utility of income to income/total expenditures. The Frisch parameter, also called money flexibility, establishes a relationship between own-price and income elasticities of demand.

Table 5.5: Estimation Results of parameters of the LES Demand System

	Urban		Rural		All households	
	Y_c	B_c	Y_c	B_c	Y_c	B_c
Agriculture	6115.67[a]	0.014[a]	3696.41[a]	0.089[a]	4745.30[a]	0.025[a]
Food	6993.31[a]	0.031[a]	2864.39[a]	0.072[a]	4446.53[a]	0.041[a]
Textile	6415.99[a]	0.042[a]	7919.98[a]	0.09[a]	6307.41[a]	0.048[a]
Utilities	4345.50[a]	0.06[a]	782.58[a]	0.02[a]	1903.72[a]	0.058[a]
Private Service	2126.28[b]	0.123[a]	2192.90[a]	0.216[a]	1436.41[a]	0.133[a]
Government Service	5046.26[a]	0.080[a]	2103.88[a]	0.020[a]	2610.10[a]	0.075[a]
Transport	128.68	0.230[a]	2739.90[a]	0.040[a]	0.00	0.201[a]
Other Manufacturing	4966.32[a]	0.050[a]	2020.6[a]	0.261[a]	3586.74[a]	0.074[a]
Financial Service	0	0.38	2916.91[a]	0.20	0.00	0.35

Note. a = significant at 1 percent, b = significant at 5 percent level; Y_c is the subsistence requirement parameter on commodity c; B_c is the supernumerary income parameter on commodity c.

Source: Nganou (2004).

It is important to provide good estimates of own-price elasticities in cases (such as cross sectional studies) where reliable price data are difficult to obtain. Consequently, the relationship for directly additive preferences proposed by Frisch (1959) and embodied in the Linear Expenditure System (LES) is often used to derive own-and cross-price elasticities. In fact, price elasticities of demand are determined simply by the income elasticity in conjunction with the Frisch parameters.

It is worth nothing that although own-price elasticities are estimated, in practice CGE modelers prefer the income and Frisch parameters. Using Frisch parameters prevents one from using own-price elasticities with positive signs in the CGE model. Also, given the huge number of cross-price elasticities (i.e., n (n-1)) to be estimated, there is an enormous saving in statistical investigation if the Frisch parameters are used to derived those elasticities instead of making a separate analysis for each of the cross-price elasticities (Frisch,1959).

The formula used to derive Frisch parameters is simply the negative ratio between household's total expenditures and the supernumerary income (i.e., the difference between household income and total expenditures on subsistence requirements) at the sample means (indicated by a bar over a variable). Frisch parameters are:

$$\text{Frisch}_h = -\frac{\overline{EH_h}}{(EH_h - \sum_{c'} \overline{PQ}_{c'} . Y_{c'h})} \tag{5.51}$$

Similarly, Marshallian own-price and expenditure elasticities are calculated at the sample means. The Marshallian own-price elasticities are:

$$\varepsilon_{ch} = \frac{\overline{Y}_{ch} . (1 - B_{ch})}{\overline{QH}_{ch}} - 1 \tag{5.52}$$

The expenditure/income elasticities are:

$$n_{ch} = \frac{B_{ch}.\overline{EH}_h}{\overline{PQ}_c.\overline{QH}_{ch}} \qquad (5.53)$$

Where: EH_h = total expenditure (income) household's h

PQ_c = price of commodity c

Y_{ch} = LES parameter (subsistance quantiles)

B_{ch} = LES parameter (relative contribution of commodity after subsistance)

ε_{ch}. = own price elasticities

n_{ch} = expenditure/income elasticities

QH_{ch} = quantity demand of commodities c by household h

The estimated own-price, income/expenditure elasticities and Frisch parameters for the two household subcategories and the entire sample are presented in Table 5.6 along with associated standard errors.

Table 5.6: Own-Price and income/Expenditures Elasticities of the LES Demand

	Urban		Rural		All households	
	e_c	n_c	e_c	n_c	e_c	n_c
Agriculture	0.376[a] (0.033)	0.198[a] (0.015)	-1.00[a] (0.000)	0.480[a] (0.016)	0.267[a] (0.026)	0.271[a] (0.012)
Food	0.313[a] (0.043)	0.364[a] (0.019)	-0.212[a] (0.030)	0.490[a] (0.016)	0.206[a] (0.031)	0.444[a] (0.013)
Textile	0.05 (0.066)	0.497[a] (0.03)	-1.00[a] (0.000)	0.539[a] (0.023)	-0.074[b] (0.034)	0.325[a] (0.013)
Utilities	-0.160[b] (0.065)	0.871[a] (0.032)	-0.198[a] (0.049)	0.500[a] (0.029)	-0.279[a] (0.054)	1.066[a] (0.025)
Private Service	-0.608[b] (0.197)	1.836[a] (0.091)	-0.508[a] (0.120)	1.688[a] (0.051)	-0.736[a] (0.101)	1.282[a] (0.040)
Government Service	-0.288[a] (0.106)	0.930[a] (0.048)	0.559[a] (0.079)	0.428[a] (0.035)	-0.485[a] (0.07)	00.787[a] (0.027)
Transport	-0..977[a] (0.254)	3.21[a] (0.118)	-1.00[a] (0.000)	0.852[a] (0.063)	-1.00[a] (0.00)	2.092[a] (0.052)
Other Manufacturing	-0.004 (0.074)	0.687[a] (0.034)	-0.654[a] (0.079)	1.534[a] (0.042)	-0.165[a] (0.062)	0.807[a] (0.028)
Financial Service	-1.00[a] (0.00)	2.867[a] (0.0069)	0.069 (0.235)	2.537[a] (0.085)	-1.00[a] (0.00)	2.513[a] (0.033)
Frisch Parameter	-2.188[a] (0.224)		-1.634[a] (0.092)		-2.415[a] (0.132)	

Note: a = significant at 1 percent level, b= significant at 5 percent level; standard errors are in the parenthesis; e represents own-price elasticity; n is the income elasticity.
Source: Nganou (2004).

The Armington elasticity, the degree of substitution between domestic and imported goods, is a key behavioral parameter that derives the results of interest to policymakers. For instance, trade policy can affect the price of traded goods relative to domestically produced goods. Such a price change will affect a country's trade opportunities, level of income, and employment.

The magnitude of these impacts will largely depend on the magnitude of the elasticities, including Armington parameters. Partial and general equilibrium models that rely on the Armington elasticities are usually sensitive to these parameters (McDaniel and Balistreri, 2002). Thus, it is important to use the true Armington parameters for the countries of study. Consequently, despite the dearth of data for Lesotho, the GEM technique is used to estimate Armington parameters. The theoretical foundations of the Armington demand function were presented in Nganou (2004).

The following equation is the first order condition of the Armington's consumer problem:

$$\frac{QMc}{QDc} = \left[\frac{PDD_c}{PM_c} . \frac{\delta^q{}_c}{1-\delta^q{}_c} \right] .^{\sigma^q{}_c} \quad \text{, c =1,…,6} \qquad (5.54)$$

Where the elasticity of substitution between commodities from these two sources is given by $\sigma^q{}_c = \frac{1}{1+p^q{}_c}$. Equation 5.54 defines the optimal mix between imports and domestic output.

From equation 5.54, it can be show that $\sigma^q{}_c$ is derived as follows:

$$\sigma^q{}_c = \frac{\partial Ln(\frac{QM_c(t)}{QD_c(t)}}{\partial Ln(\frac{PDD_c(t)}{PM_c(t)}} \text{ , c=1,…,6;} \quad \text{t =1,…,7} \qquad (5.55)$$

Where the numerator is the partial derivative of the logarithm of the ration of quantity of imports and domestic output, and the denominator is that for the ratio of prices of domestic output and imports. $\sigma^q{}_c$ is the proportionate change in the ratio of quantities divided by the proportionate change in the original rate of technical substitution as given by their prices ratio; t represents time.

The following parsimonious model specification, also common in the empirical literature on Armington elasticity of substitution, was used:

$$\text{Ln}\left(\frac{QM_c(t)}{QD_c(t)}\right) = \alpha^o{}_c + \sigma^q{}_c \,.\text{Ln}\left(\frac{PDD_c(t)}{PM_c(t)}\right) + u_c(t)\text{, c =1,…6 ; t=1,....24} \qquad (5.56)$$

Where: QMc = quantity of import
QDc = quantity of domestic output
PDDc = price of domestic output
PMc = price of import
σ^q_c = elasticity of substitution
α^o_c = constant term
u_c (t) = disturbances term associated to each equation.

Shannon (1948) used entropy to measure the state of knowledge (uncertainty). ME (Maximum entropy) is a special case of the GME where no weight is placed on the entropy of the error terms and where the data are represented in terms of exact moments. The GME proposed by Golan *et al*. (1996) uses a flexible, dual-loss objective function: a weighted average of the entropy of the deterministic part of the model and the entropy from the disturbance or stochastic part (Golan, Perloff and Shen, 2001).

The GME approach uses all the data points and does not require any restrictive moment or distributional error assumptions. Thus, the GME is robust for a general class error distribution. Additionally, the GME estimator may be used in several circumstances namely, when the sample is small, there are many covariates, and the covariates are highly correlated. Moreover, the GME method is very flexible as it can allow the user to easily impose nonlinear and inequality constraints (Golan, Perloff and Shen, 2001).

In order to estimate equation (5.56) with GME, it needs to express all the coefficients and error in terms of probabilities.

Incorporating re-parameterized terms into equation (5.56):

$$\text{Ln}\ \left(\frac{QMc(t)}{QDc(t)}\right) = \sum_{d=1}^{D} Z^o_{cd}.P^o_{cd} + \sum_{d=1}^{D} Z^{\sigma}_{cd}.P^{\sigma}_{cd}\ .\text{Ln}\ \left(\frac{PDDc(t)}{PMc(t)}\right) + \sum_{m=1}^{M} Vm.Wcm(t) \quad c = 1,\ldots 6\ ;\ t=1,\ldots.24\ . \tag{5.57}$$

The GME estimator maximizes the entropy of all the probabilities representing the signal (α^o_c , σ^q_c) and the noise (u_c(t)), subject to the data (equation(5.57)) and adding up constraints of the probabilities.

Letting $\underline{P} = (\underline{P}^{\alpha'}, \underline{P}^{\sigma'})'$, the GME estimator is given by the following optimization problem:

$$\max R(\underline{p}, \underline{w}) = - \underline{P}' .Ln(\underline{p}) - \underline{w}' .Ln(\underline{w}), \tag{5.58}$$

Subject to the data (i.e., Eq.(5.57)) and the GME adding-up conditions,

$$\sum_{d=1}^{D} P^{o}_{cd} = \sum_{d=1}^{D} P^{\sigma}_{cd} = \sum_{m=1}^{M} Wcd(t) = 1 \tag{5.59}$$

The solution to this maximization problem is unique. Forming the Lagrangian multipliers and solving for the first-order conditions yields the optimal solution, from which the following point estimates for the econometric model derived:

$$\hat{\alpha}^{o}_{c} = \sum_{d=1}^{D} Z^{\sigma}_{cd}. \hat{P}^{\sigma}_{cd} \tag{5.60}$$

$$\hat{\alpha}^{q}_{c} = \sum_{d=1}^{D} Z^{\sigma}_{cd}. \hat{P}^{\sigma}_{cd} \tag{5.61}$$

$$\hat{u}_{c}(t) = \sum_{m=1}^{M} Vm.Wcm(t) \tag{5.62}$$

Table 5.7: Summery of GME Armington Elasticity estimates for Lesotho CGE

Sector	**Armington Elasticity**	**Normalizaed Entropy**	**R^2**
Agriculture	0.898[a] (0.135)	0.999	0.899
Food	1.37[b] (0.596)	0.999	0.51
Mining	4.01 (16.62)	0.996	0.032
Textile	4.232 (5.01)	0.972	0.28
Transport	1.696 (5.093)	0.996	0.043
Other Manufacturing	0.486 (1.047)	0.003	-0.02

Note: a = significant at 1 percent level, b= significant at 5 percent level; the parameters asymptotic standard errors are provided in the parenthesis.
Source: Nganou (2004).

There is no consensus on the value of the parameters used in CGE models. Although many approaches to econometric estimation of these elasticities have been offered for the last 30 years, many trade economists view the estimates as fairly small (McDaniel and Balistreri, 2002).

A comparison of Armington estimates to those in selected literature is presented in Table 5.8.

Table 5.8: A comparison of selected Armington Elasticities

	Nganou (2004) (Lesotho's CGE)	**GTAP studies**	**De Janvry *et al.*2001**	**Lofgren (Egypt's CGE)**	**South Africa**
Agriculture	0.898	2.44	0.4	0.56	1.60
Food	1.37	2.40	0.50	1.65	1.53
Textile	4.232	3.32	0.50	0.30	4.13
Mining	4.01	2.41	0.50	2.00	0.76
Other Manufacturing	0.486	2.81	0.50	0.30	1.64
Transport	1.696	3.10	0.50	0.30	1.14

Source: Compiled by Nganou (2004).

The table reveals that the majority of Lesotho's estimates are higher than those provided by de Janvry and Sadoulet (2002). However, except for Mining and Textiles, the parameters are below those provided by GTAP. For Textiles, the Armington parameter (4.2) is apparently not far from the 3.3 used in the GTAP studies. In comparison, only Mining and Transport have an elasticity of substitution between imports and domestic output that is greater in magnitude than the South African parameters. The Lesotho estimates for Textiles and Food are very close in size to those for South Africa.

Comparison also reveals that, except for Food, Lesotho estimates for elasticities are higher than those of Egypt. Since there is a divergence of parameter values across studies, it might not be a good idea to use results of cross-country estimations in a country's CGE model. Using Country-specific elasticities should be preferred.

5.5 Summary and Conclusion

This chapter discusses the structure of a neoclassical structuralist computable general equilibrium, which is applied to analyzing the potential impacts of Trade on economy of Lesotho. The model is substantially based on a standard CGE framework developed at the International Food Policy Research Institute (IFPRI), referenced in Lofgren *et al.* (2002). The chapter emphasizes the description of IFPRI's standard model, with some reference to the specificities in the Lesotho economy. It also discusses the estimation of Lesotho elasticities in the context of the general CGE literature. The chapter finally discusses macroeconomic closures of the CGE model.

The CGE model described in this chapter may be viewed as a simulation laboratory for this study. The model is static, and thus, does not carry any dynamic, inter-temporal effect.

CHAPTER 6

DATA BASE AND A 2000 SOCIAL ACCOUNTING MATRIX FOR LESOTHO

6.1 Introduction

The main data source for the basis of the CGE model is a 2000 Social Accounting matrix (SAM) produced by Connigarth Economists and the World Bank (2002). This SAM distinguishes between 53 products (activities) and 57 commodities. Distinction is made between 10 different labour groups, 6 different capital groups, 6 different enterprises, 10 different household types, 17 different types of government (9 from the expenditure and 8 from the income side), 3 different types of capital and the rest of the world (ROW).

A Social Accounting Matrix is a square matrix that maps key transactions between different accounts in a given economy (Table 6.1 and Table 6.2). It is a consistent and comprehensive data framework with an economy-wide scope. The main purpose of SAMs is to obtain a core databases for a computable general equilibrium (CGE) model of the Lesotho economy. The SAM will be used to analise the potential impact of Trade on the economy of Lesotho.

The official data base of Lesotho is, as in many developing countries, limited in scope. Consequently, data from different sources are often inconsistent. It is therefore usually necessary to adjust data from different sources to gain a consistent macroeconomic database. To minimize any inconsistencies, it is important to use a single core data source to which all the other data can be reconciled and balanced. In the case of Lesotho it is difficult to use only one source. The National Accounts report 1980-2000, published by the Bureau of Statistics (BOS) was used as the core source. This source was supplemented by government budget data from the Ministry of Finance and National Accounts and balance of payments data from the Central Bank of Lesotho. These three sources were used to determine the macroeconomic SAM (Macrosam) control totals to which all other data will be reconciled and balanced. Because there are three main data sources, it was necessary to adjust some of the data to balance and arrive at a consistent macroeconomic SAM (Conningarth Economist and World Bank, 2002). The macrosam serves as an important reference point for the microeconomic or disaggregated SAM.

It is therefore necessary to readjust initial entries to a SAM, in order to make the row totals balance with the column totals. This readjustment is known as “SAM balancing”, and standard techniques exist for optimizing the process. This section presents one such technique, the cross-entropy method that was developed and widely used by International Food Policy Research Institute (IFPRI).

This chapter deals with the structure and entries of a 2000 macrosam for Lesotho. The second section presents the Cross-entropy SAM balancing method to balance an unbalanced SAM. The third part discusses the entries of the 2000 microsam of Lesotho. The last section wraps up with the conclusions.

Table 6.1: SAM framework for Lesotho (Structure of a Social Accounting Matrix)

expenditures / receipts		**Activities**	**Commodities**	**Factor**		**Enterprises**	**Households**	**Government**	**Capital**	**ROW**	**Total**
				labour	**capital**						
		1	2	3	4	5	6	7	8		
Activities	1	-	P	-	-	-	-	-	-	E	g
Commodities	2	X	-	-	-	-	C	G	I	-	q
Factor payments (labour)	3	Wa	-	-	-	-	-	Wg	-	We	e_L
Factor payments (capital)	4	Fa	-	-	-	-	-	Fg	-	Fe	e_c
Enterprises	5	-	-	-	Q_e	-	-	-	-	-	Z_u
Households	6	-	-	L	-	Qv	Trh_H^1	Trg_H^1	-	Trr_H	Z_H
Government	7	Ti	Ta	-	Tf	Tu	Td	Trg_G	-	Trr_G	Z_G
Capital	8	-	-	-	Sf	Quv	Sh	Sg	-	-	Z_C
Rest of the world		-	M	W_l	Q_r	-	Trh_H^2	Trg_H^2	Sa	-	Z_A
Total		G	q	e_L	e_c	Z_u	Z_H	Z_G	Z_C	Z_A	

Source: Conningarth Economist and World Bank (2002).

Table 6.2: Explanation of variables

Column 1: Activities	**Column 2: Commodities**
X: Intermediate consumption	P: production of commodities
Wa: Remuneration of labour	Ta: Indirect taxes on products in Lesotho
Fa: Remuneration of capital	M: Imports from the rest of the world
Ti: Indirect taxes raised on activities	q: Total commodity flows
g: Total production	
Column 3: Factor payments-Labour	**Column 4: Factor payment-Capital**
L: Salaries and wages to households in Lesotho	Q_e: Dividends and interest to enterprises in Lesotho
W_l: Salaries and wages to households in the rest of the world	Tf: Tax on capital to the government of Lesotho
e_L: Total labour factor payments	Sf: Savings by the government and all other sectors
Column 5: Enterprise	Q_r: Transfers of dividends and interest to the rest of the world
Qv: Profits distributed to households in Lesotho	e_c: Total capital factor payments
Tu: Undistributed profits	**Column 6: Households**
Q_{uv} : undistributed profit	C: private consumption expenditure by households in Lesotho
Zu: Total payments by enterprises in Lesotho	Trh_H^1: Transfers between households in Lesotho
Column 7: Government	Td: Direct taxes and transfers paid to the Lesotho government
G: Government consumption expenditure	Sh: Household savings
Wg: Remuneration of government employees	Trh_H^2: Transfers from households in Lesotho to households in the rest of the world
Fg: Depreciation on government capital assets	Z_H: Total household expenditure
Trg_H^1: Transfers to households in Lesotho	**Column 8 : capital**
Trg_G: Transfers between different governmental bodies in terms of subsidies	I: Gross investment
Sg: Government savings	Sa: Capital flows from Lesotho to the rest of the world
Trg_H^2: Transfers to households in the rest of the world	Zc: Total Investment expenditure
Zg: Total Government expenditure	
Rest of the world	
E: Export From Lesotho To the rest of the world	
W_e: Wages paid to labourers in Lesotho by the rest of the world.	
F_e: Capital factor payments from the rest of the world	
Trr_H: Transfers to households in Lesotho from households in the rest of the world	
Trr_G: Transfers to the government of Lesotho from the rest of the world	
Z_A: Foreign income receipts	

6.2 A 2000 Macroeconomic SAM for Lesotho

A social accounting matrix provides a comprehensive and consistent description of the transactions taking place in an economy in a given year- between production sectors, factors, households, government institutions and the rest of the world. Each transactor or macro account in the SAM is represented by a column and a row, with columns tracking expenditures and rows tracking incomes. SAMs follow the principles of double-entry accounting. This has two implications: (1) any purchase, expenditure or financial outlay by one account is sale, income or financial inflow to one or more other accounts, and (2) for each account total income must be equal to total expenditure (Nielsen, 2002).

The structure of the Lesotho macro SAM can be briefly described by going through Table 6.1 and Table 6.2, which contains verbal explanation of the numerical entries.[1] The SAM structure shown in the table is fairly standard and represents the entries of the numerical macro-SAM for Lesotho. Following through the account in Table 6.1, one sees that the production activities purchase intermediate inputs from the commodities account and the services of factors from the factor account. Producers must furthermore pay activities and turn over taxes to the government. The output of these production activities is sold on either the domestic market for intermediate input use, final private or government consumption, and investment purposes or on foreign markets in the form of exports-both of which are tracked by the commodity account. This account also keeps track of the imports of goods and services entering the country. The primary factors of production earn income earned by supplying services to the production activities. This income is then distributed to households in the form of labour earnings, and to enterprises as capital income. Enterprises save part of their income for investment purposes; some earnings are retained and distributed to households, and profits, taxes and other transfers are paid to the government. Incomes received by households are spent on purchasing final goods and services, paying income taxes, saving and transferring resources abroad. The receipts of the government consist of income taxes paid by households, profits taxes, turnover taxes,

[1] For detailed discussion of the general structure of social accounting matrices, see e.g. Pyatt and Round (1985); and Reinert and Roland-Holst (1997)

import tariffs and export duties), and aid transfers from the rest of the world. The savings of households, enterprises and the government are placed in the Savings-investment account. These savings are used for investment purposes in the various production sectors. The rest of world account documents transaction between Lesotho and the rest of the world. This mainly concerns imports and exports of commodities, but also financial transfers between Lesotho institutions and foreign private and government entities.

Table 6.3 shows an analysis of National accounts of the Lesotho economy constitute showing the 35 nonzero entries in the 2000 macrosam. These accounts were compiled and published by Conningarth Economists and the World Bank (2002). The proposed structure of the macrosam has 9 accounts in rows and a similar number of accounts in columns. In addition to activities, commodities and factors accounts, there are 5 institutional accounts one which describe government recurrent (source of government receipts and destination of government expenditure). The other four institutional accounts are households, enterprises, saving-investment and the rest of the world. The explanation and source of entries are discussed in Appendix 6.1.

Table 6.3: A 2000 unbalanced Macroeconomic social accounting matrix (macrosam) for Lesotho (in million Maloti)

	Activities	Commodities	Labour	Capital	Enterprises	Households	Government	capital account	ROW	Total
Activities		7816.98							1776.00	9592.98
Commodities	5590.93					4736.80	1288.00	2479.00		14094.73
Labour	2179.97						867.03		1746.00	4793.00
Capital	1903.98						147.00		254.00	2304.98
Enterprises				1073.98						1073.98
Households			4601.00		527.99	53.09	58.00		17.00	5257.07
Government	-81.90	1531.90		366.99	184.00	303.60	82.00		226.00	2612.59
capital account				620.00	362.00	162.51	164.00		1170.00	2478.51
ROW		4745.00	192.00	244.00		1.00	6.97			5188.97
Total	9592.98	14093.88	4793.00	2304.98	1073.98	5257.00	2613.00	2479.00	5189.00	

6.3 A SAM Balancing Cross-Entropy Method

Balancing a SAM using the cross-entropy (CE) method has become a standard procedure in most SAM-based modelling. The method was formalized by IFPRI researchers (Robinson, Cattaneo and El-Said, 2000; Robinson and El-Said, 2000), but has roots in both information theory (Shannon, 1948; Theil, 1967) and maximum entropy econometrics (Golan, Judge and Robinson, 1994; Golan *et al*., 1996). As explained in Robinson, Cattaneo and El-Said (2000), the CE approach has been widely used to estimate social accounting matrices in Eastern and Southern African countries (Botswana, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe), as well as in other countries, including Brazil, Mexico, North Korea and the United States (cited by Nouve, 2004).

Traditionally, the RAS method is used to estimate or update balanced social accounting matrices. This method particularly suits situations where new information regarding the row and column sums of a SAM becomes available, with no knowledge on the new flows between various accounts of the SAM.

The RAS method can be represented as follows. Let **T** be an (n x n) SAM with each entry t_{ij} representing the payment from column account j to row account i. By definition, every row sum of a SAM must equal the corresponding column sum, and this can be represented as follows:

$$Y_i = \sum_j t_{ij} = \sum_j t_{ji} \tag{6.1}$$

Define A to be a SAM coefficient matrix with each entry a_{ij} representing the ratio t_{ij}/y_j. Let y be the (n x 1) vector of y_j. It follows from double-entry bookkeeping convention underlying SAMs that:

$$y = Ay \tag{6.2}$$

As y changes to y*, there is a need to obtain a new SAM coefficient matrix A*, which is close to the original matrix A, such that the equation (6.2) holds:

$$y^* = A^*y^* \tag{6.3}$$

Robinson, Cattaneo and El-Said (2000) following Bacharach (1970), discuss how the matrix A* can be obtained by means of biproportional row and column operations on the original matrix A. Let $\hat{R}$ and $\hat{S}$ be diagonal matrices of elements r_i and s_j, respectively. The biproportionality condition can be written as follows:

$$\overset{*}{A} = \hat{R}\,A\,\hat{S} \tag{6.4}$$

The form of this equation has lent its name to the procedure known as the "RAS" method. By imposing the biproportionality condition, one effectively reduces a problem of n^2 unknowns (the n x n cells of a SAM) to (2n-1) unknowns, which are fully and uniquely determined by the (2n-1) independent adding-up restrictions corresponding to the new row and column totals. It is therefore possible to find a unique set of positive elements of A*, and the elements of $\hat{R}$ and $\hat{S}$ can be recovered by iteration.

The cross-entropy method adds more flexibility to the traditional RAS approach. The method can incorporate information regarding not only new row and column totals, but also prior knowledge on any part of the SAM. It can also incorporate errors in variables and various forms of constraints to any part of the SAM. For example, a single value of households' factor income can be disaggregated into F*H figures corresponding to the incomes to H types of households from F different factors. Using the CE method, one can impose the restriction that the sum of the F*H factor incomes to households be equal to the aggregate value from the macrosam.

As indicated above, Robinson, Cattaneo and El-Said (2000) have explained that the CE method is built on information theory, as developed by Shannon (1948) and brought to economics by Theil (1967). The main idea is that the expected information value of additional data can be expressed as a Kullback-Leibler (1951) cross-entropy distance I (p:q) between the prior (q) and posterior (p) probability distributions of a set of n events.

$$-I(p:q) = -\sum_{i=1} p_i \ln \frac{p_i}{q_i} \tag{6.5}$$

The objective of the CE problem is to find the set of p_i that minimizes (6.5), using information on the prior and the data. With regards to SAM estimation or updating, the problem is to find a new SAM coefficient matrix **A*** that minimizes the CE distance between itself and the prior (or initial and probably unbalanced) coefficient matrix **A**. Let a_{ij}* and a_{ij} be the respective elements of **A*** and **A**, the minimization problem can be written as follows:

$$Min_{a^*_{ij}} \left[\sum_i \sum_j a_{ij} \ln \frac{a^*_{ij}}{a_{ij}} \right] = \quad \text{Subject to: } \sum_j a^*_{ij} y^*_j = y^*_i ; \sum_j a^*_{ji} = 1 \leq a^*_{ji} \leq 1 \tag{6.6}$$

Problem (6.6) does not have a closed form solution, and needs to be solved numerically, after setting up the Langragian multiplier. It is, however, possible to express the optimal solution a^*_{ij} as a function of both the Lagrange multipliers i associated with the row and column sums, and the initial coefficient a_{ij}:

$$a^*_{ij} = \frac{a_{ij} \exp(\lambda_i y^*_j)}{\sum_{i,j} a_{ij} \exp(\lambda_i y^*_j)} \tag{6.7}$$

Robinson, Cattaneo and El-Said (2000) discuss the comparability of (6.7) to Bayes' rule, in which "the posterior distribution is equal to the product of the prior distribution and the likelihood function, dividing by a normalization factor to convert relative probabilities to absolute ones". Thus, Equation (6.7) may be seen as an efficient information processing rule that satisfies the information conservation principle of Zellner (1962). That is, it does not ignore any of the input information and neither does it produce any false information. The authors also draw on Golan *et al*. (1996) to argue that the CE estimator is consistent and has maximum likelihood properties under some distributional assumptions.

The basic minimization problem in (6.6) can be made richer by incorporating aggregation constraints and measurement errors. For *k* restrictions, a typical aggregation constraint may be expressed as follows:

$$\sum_{i}\sum_{j} g_{ij}{}^{(k)} t_{ij} = y^{(k)} \tag{6.8}$$

Where *gij* are elements of a (n x n), zeros-ones (the ones (zeros) corresponds to the cells included (exclude) in the definition of a specific aggregate) aggregator matrix G and (is the value of the macrosam aggregate. Similarly, measurement errors are incorporated as follows:

$$y = x + e \tag{6.9}$$

Where *y* is a vector of row sums and *x*, measured with error *e*, is the vector of known column sums. The error is expressed as a weighted average of known constants v_{iw}:

$$\begin{gathered} e_i = \sum_{\omega} w_{tw} . v_{tw} \\ \sum_{\omega} w_{tw} = 1 \text{ and } 0 \le w_{iw} \le 1 \end{gathered} \tag{6.10}$$

The weights are treated as probabilities, which are estimated together with the elements of the matrix **A***. The estimation procedure used in this study is based on five weights that are symmetric about zero. The minimization problem (6.6) is solved, subject to Equations (6.8), (6.9) and (6.10). The CE procedure is applied to the initial SAM in Table

6.3 and the result is shown in Table 6.4, which is the balanced macrosam for Lesotho. The balancing procedure is done through GAMS software.

All the 35 nonzero entries in the balanced macrosam should, in principle, be used as the right-hand side figures in the aggregation constraints discussed in Equation (6.8). This would be necessary to ensure that entries in the disaggregated SAM.

The aggregated and disaggregated SAM of Lesotho was unbalanced. Therefore, the SAM was adjusted based on the IFPRI SAM format. Some of the adjustments which were done in order to restructure the SAM are as follows: Firstly, the ROW was included in the activities (i.e., activity row account, see Table 6.3 and 6.4), then all the ROW was included in the commodity account (i.e., moved to commodity ROW account); the factor government account was moved to activity commodity account; and the commodity activity account also included the value of export and government expenditure on factor and so on (see the adjusted and balanced macrosam on Table 6.5). These adjustments caused the Lesotho SAM to be highly unbalanced, and thus the aggregated and disaggregated SAM was balanced by the methods of cross entropy as is mentioned earlier.

Table 6.4: A balanced 2000 Macroeconomic Social accounting matrix for Lesotho

	Activities	Commodities	Labour	Capital	Enterprises	Households	Government	capital account	ROW	Total
Activities		7817.05							1775.97	9593.02
Commodities	5590.88					4736.76	1287.88	2478.71		14094.22
Labour	2180.00						866.96		1745.99	4792.95
Capital	1904.05						146.99		254.01	2305.04
Enterprises				1073.99						1073.99
Households			4600.95		527.97	53.09	58.00		17.00	5257.00
Government	-81.91	1532.05		367.01	184.00	303.63	-82.00		226.02	2448.80
capital account				620.05	362.02	162.53	164.00		1170.11	2478.71
ROW		4745.13	192.00	243.99		1.00	6.97			5189.09
Total	9593.02	14094.22	4792.95	2305.04	1073.99	5257.00	2448.80	2478.71	5189.09	

Source: Conningarth Economist and World Bank (2002).

Table 6.5: A balanced and adjusted 2000 Macroeconomic Social accounting matrix for Lesotho

	Activities	Commodities	Factor labour	Factor capital	Enterprise	Household	YTAX	STAX	MTAX	ITAX	FTAX	Government	Capital	ROW	Total
Activities	0.00	9972.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9972.00
Commodities	5102.93	0.00	0.00	0.00	0.00	4736.00	0.00	0.00	0.00	0.00	0.00	2155.03	2479.00	1775.95	16248.90
Factor labour	3047.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1746.00	4793.00
Factor capital	1903.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	254.00	2157.98
Enterprise	0.00	0.00	0.00	1546.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1546.98
Households	0.00	0.00	4601.00	0.00	527.99	53.01	0.00	0.00	0.00	0.00	0.00	58.00	0.00	17.01	5257.00
YTAX	0.00	0.00	0.00	0.00	147.20	304.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	451.20
STAX	0.00	391.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	391.70
MTAX	0.00	1140.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1140.20
ITAX	-81.90	0..00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-81.90
FTAX	0.00	0.00	0.00	366.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	366.99
Government	0.00	0.00	0.00	0.00	36.80	0.00	451.20	391.70	1140.20	-81.90	366.99	0.00	0.00	219.04	2524.03
Capital	0.00	0.00	0.00	0.00	835.00	163.00	0.00	0.00	0.00	0.00	0.00	311.00	0.00	1170.00	2479.00
ROW	0.00	4745.00	192.00	244.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5181.99
Total	9972.00	16248.90	4793.00	2157.98	1546.98	5257.00	451.20	391.70	1140.20	-81.90	366.99	2524.03	2479.00	5181.99	

6.4 Structure and Entries in the Lesotho Microsam

6.4.1 Structure of the Microsam

The structure of the microsam is based on the 2000 social accounting matrix constructed by Connigarth Economists and the World Bank (2002). It comprises of 53 products (activities) and 57 commodities. Distinction is made between 10 different labour groups, 6 different capital groups, 6 different enterprises, 10 different households and 17 different types of government (9 from the expenditure and 8 from the income side) and 3 different types capital. The detailed structure of the Lesotho Macrosam: account categories, account number, account name and account description is presented in Appendix 6.1 of section 6.1.2.

6.4.2 Entries to and Balancing of the Microsam

The entries to each account in the microsam are documented in Appendix 6.2**.** The entries involve two steps. In the first step, the aggregate figures from the unbalanced macrosam were disaggregated into the corresponding micro accounts, based on detailed activity and commodity information or on the disaggregation assumptions outlined in Appendix 6.2. The second step was to readjust the initial entries using the balanced macro aggregates, so that each entry in the new microsam is proportional to the initial entry. The proportionality coefficient is equal to the ratio of the aggregate entry in the balanced macrosam to the corresponding aggregate entry in the unbalanced macrosam. The resulting new microsam is balanced in the aggregate but remains substantially unbalanced in the details.

The readjustment of the disparities was left to the cross-entropy SAM balancing process. This process has the merit of effectively optimizing the use of all information contained in the unbalanced SAM. Applying the CE method to such an inconsistent base matrix may have a drawback in that the balancing process may sacrifice valuable information on the structure of the economy; this is however a necessary cost for obtaining a feasible solution. The Lesotho SAM was no exception. The rest of this chapter discusses the microsam's accounts further while presenting the structure of key transactions in the 2000 balanced SAM.

6.4.2.1 Production Factors

The microsam contains two factors (capital and labour) accounts. Factors receive income in the form of value-added from activities, and from the rest of the world. They pay this income to households and to the government factor tax account.

In dealing with factor payments, a definite distinction was made between capital remuneration and labour remuneration. Each was viewed in its own right. Although the factor payments (capital and labour) are treated separately, the method of distribution was similar. A key assumption was that the row totals of each factor payment equalled their column totals.

The labour Force Survey in Lesotho by BOS was used to calculate the distribution of activities to occupations. The most recent survey was conducted during 1999. In the SAM, the labourers in the various activities are depicted in 10 employment occupations according to skill levels.

Capital factor payments are also derived from activities as well as from government. Those derived from activities are in the form of interest and dividends. On the other hand, those that originate from government consist of interest on the public debt. The distribution from activities to factor payments capital components is mainly on a one to one basis. This was executed by means of inspecting the relevant relationship. It was decided that such interest as that on public debt should be allocated to the other private component of capital factor payments. All the banks and financial institutions fall under this component. In the SAM all these payments are to enterprises.

The distribution of factor payments capital to Enterprises is done on a one to one basis. The entity Enterprises has the same components as Capital. As far as the other components are concerned in the Capital column, they are distributed to the eight entities of Capital in proportion to the size of the factor payment capital of the eight entities.

6.4.2.2 Households

Lesotho is one of the least developed countries with more than 58% of the population living below the poverty line (1994/5 Household Budget Survey). Despite government poverty alleviation attempts, the poverty depth seem to increase, rising from 32.8% in 1986/7 to 35.4% in 1994/5 (May *et al*., 2002). Hence, it is critically important to pay utmost attention to the households in the construction of the Lesotho SAM. It has been shown that although poverty differs from region to region in Lesotho, it is highest in the rural areas. Consequently, it was important in this exercise to distinguish between urban and rural households and to further distinguish between different regions or agro-ecological zones of the country. Therefore, the households were first disaggregated into five groups: (i) the urban areas, (ii) the rural Lowlands, (iii) the rural Foothills, (iv) the rural Mountains and (v) the rural Senqu River Valley (SRV).

The disparities exist not only between urban and rural, and between regions, but also between different income groups. To account for this, the households' classifications were further disaggregated into low and high income groups. The threshold levels used were taken from the Consumer Price Index report (BOS, 2001) and were based on the 1994/95 Household Budget Survey. According to the report, low income households comprise all households with a monthly income of less than 500 Maloti, while high income households have a monthly income equal to 500 Maloti or above. The households were then disaggregated into the ten classifications shown in Table 6.6.

Table 6.6: Households classifications

Household type	Income level
Urban high income	>= 500
Urban low income	< 500
Rural Lowlands – high income	>= 500
Rural Lowlands – low income	< 500
Rural Foothills – high income	>= 500
Rural Foothills – low income	< 500
Rural Mountains – high income	>= 500
Rural Mountains – low income	< 500
Rural Senqu River Valley (SRV) – high income	>= 500
Rural SRV – low income	< 500

Source: Connigarth Economists and the World Bank (2002).

Households' accounts require reliable expenditure and income data. These types of data are usually found in countries' household budget surveys. In the case of Lesotho the most recent Household Budget Survey, 1994/5, was used in calibrating the accounts. The next two sections describe how the survey data were used to: (i) determine household consumption expenditures, and (ii) direct taxes to government and transfers to households.

6.4.2.3 Trade

The methodologies employed to calculate the structures for activities and commodities for exports and imports respectively in the foreign current account in the balance of payments for Lesotho are discussed in this section. According to the macrosam the exports and the imports of goods and services of Lesotho in 2000 were as follows:

- Exports of goods and services M1 772 million
- Imports of goods and services M4 745 million

These figures were used as control totals to ensure that figures presented in the SAM do not deviate significantly from published figures. However, for purposes of the SAM these figures had to be divided between the activities or commodities that had been identified in the compilation of the SAM. The following is a brief explanation of the methods used in this regard.

6.4.2.3.1 Exports of Goods and Services

A detailed exposition of the calculations done in order to determine a structure for Lesotho exports of goods is provided in Table 6.6. The totals are as far as possible balanced with the relevant information provided in published and unpublished sources of the Central Bank of Lesotho.

The first column of Table 6.6 reflects the results generated for exported goods. However, trade and transport margins had to be subtracted from these figures in order to arrive at a structure that reflects exports of goods at basic prices.

Table 6.7 shows the methodology for calculating a structure to divide the exports of services between the relevant activities. The exports of services entailed the following:

- Transport
  - passengers travelling by air
  - port services
- Tourism spending
  - hotel accommodation
  - hotel catering
  - handicrafts
  - car rentals
- Expenditures by kinship visitors
- Expenditure by foreign students
- Expenditure by expatriates

Table 6.7: Apportionment of Exports – Goods

Activities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				1 X 2	1 X 3			4 X 6	4 X 7			5 X 10	8 X 11	1 - 8 -9 -12 -13		14 + 15
	Export Goods	Trade Margins	Transpo margins	Trade margin values	Transpor margin values	Trad com Split	Trade infor Split	Trade commer values	Trade infor values	Transp road split	Transp rail split	Road margin values	Rail margin values	Exports at basic prices	Add margins	Exports at basic prices
Field crops	0.23		0.05	-	0.01					0.92	0.08	0.01	0	0.22	-	0.22
Field crops	-		0.05		-					0.92	0.08	-		-	-	-
Irrigated	1.18		0.05		0.06					0.92	0.08	0.05	0	1.12	-	1.12
Irrigated fruit	0		0.04		0					0.92	0.08	0	0	0	-	0
Cattle	5.36		0.03		0.13					0.92	0.08	0.12	0.01	5.22	-	5.22
Feedlot cattle	-		0.02		-					0.92	0.08	-	-	-	-	-
Dairy cattle	-		0.01		-					0.92	0.08	-	-	-	-	-
Sheep	0.06		0.03		0					0.92	0.08	0	0	0.06	-	0.06
Goats	-		0.02		-					0.92	0.08	-	-	-	-	-
Horses and	-		0.05		-					0.92	0.08	-	-	-	-	-
Poultry - layers	-		0.05		-					0.92	0.08	-	-	-	-	-
Poultry -	1.82		0.03		0.05				-	0.92	0.08	0.05	0	1.76	-	1.76
Chickens and	-		0.02							0.92	0.08	-	-	-	-	-
Other	-		0.05		-					0.92	0.08	-	-	-	-	-
Forestry	-		0.02		-					0.92	0.08	-	-	-	-	-
Fisheries	-				-					0.92	0.08	-	-	-	-	-
Mining and	1.86	0.05	0.04	0.09	0.07	1		0.09		0.92	0.08	0.06	0.01	1.7	-	1.7
Butchery	2.2	0.06	0.02	0.13	0.04	1		0.13		0.92	0.08	0.04	0	2.02	-	2.02
Fruit and	-				-					0.92	0.08	-	-	-	-	-
Dairy and other	14.33	0.06	0.02	0.86	0.29	1		0.86		0.92	0.08	0.26	0.02	13.19	-	13.19
Grain milling	34.6	0.06	0.02	2.08	0.69	1		2.08		0.92	0.08	0.64	0.06	31.84	-	31.84
Beverages -	70.27	0.05	0.02	3.16	1.26	1		3.16		0.92	0.08	1.16	0.1	65.84	-	65.84
Beverages -	-	0.01	0		-		1			0.92	0.08	-	-	-	-	-
Wool and	39.9	0.17	0.02	6.7	0.96	1		6.7		0.92	0.08	0.88	0.08	32.24	-	32.24
Wool and	0.99	0.14	0.02	0.14	0.02	1		0.14		0.92	0.08	0.01	0	0.84	-	0.84
Other textiles	1,053.82	0.14	0.02	147.53	21.08	1		147.53		0.92	0.08	19.39	1.69	885.2	-	885.2
Leather and	1.11	0.14	0.02	0.16	0.02	1		0.16		0.92	0.08	0.02	0	0.93	-	0.93
Wood,	11.44	0.18	0.05	2.06	0.57	1		2.06		0.92	0.08	0.53	0.05	8.81	-	8.81
Chemicals and pharmaceutical	7.39	0.2	0.1	1.48	0.74	1	-	1.48	-	0.92	0.08	0.68	0.06	5.18	-	5.18
Bricks	7.61	0.05	0.31	0.38	2.36		1		0.38	0.92	0.08	2.17	0.19	4.87	-	4.87
Other non-	0.02	0.05	0.31	0	0.01	1		0		0.92	0.08	0	0	0.01	-	0.01
Steel, metal	193.92	0.01	0.08	1.94	15.51	1		1.94		0.92	0.08	14.27	1.24	176.47	-	176.47
Micro-industry, crafts and	-	-	-	-	-	-	1	-	-	0.92	0.08	-	-	-	-	-
Other	-	0.35	0.01		-	1				0.92	0.08	-	-	-	-	-
Electricity	-				-					0.92	0.08	-	-	-	-	-
Water	7.45				-					0.92	0.08	-	-	7.45	-	7.45
Building	-				-					0.92	0.08	-	-	-	-	-
Civil	-				-					0.92	0.08	-	-	-	-	-
Informal	-				-					0.92	0.08	-	-	-	-	-
Sales and	-									0.92	0.08	-	-	-	-	-
Other commercial	-	-	-	-	-	-	-	-	-	0.92	0.08	-	-	-	166.33	166.33
Informal trade	-				-					0.92	0.08	-	-	-	0.38	0.38
Accommodatio	-		-		-					0.92	0.08	-	-	-	-	-
Road transport	-									0.92	0.08	-	-	-	40.37	40.37
Other road transport -	-	-	-		-	-	-	-	-	0.92	0.08	-	-	-	3.51	3.51
Air transport -	12.44				-					0.92	0.08	-	-	12.44	-	12.44
Telecommunica	-				-					0.92	0.08	-	-	-	-	-
Real estate &	-				-					0.92	0.08	-	-	-	-	-
Financial and	-				-					0.92	0.08	-	-	-	-	-
Informal financial and	-	-	-	-	-	-		-	-	0.92	0.08		-	-	-	-
Government	-				-					0.92	0.08	-	-	-	-	-
Domestic	-									0.92	0.08	-	-	-	-	-
Other	-									0.92	0.08	-	-	-	-	-
Total	1,468.00			166.71	43.88			166.33	0.38			40.37	3.51	1,257.41	210.59	1,468.00

Source: Connigarth Economists and the World Bank (2002).

6.4.2.3.2 Imports of Goods and Services

The methods employed to calculate imports of goods and services per commodity, are very much similar to those described in terms of the exports of goods and services. The data relating to the imports of goods were obtained form unpublished figures from BOS. The figures regarding the imports of services were obtained from the Central Bank of Lesotho.

The structure necessary to disaggregate the import of services was calculated in the same way as for exports. Appendix 6.2 provides the following: a detailed reflection of the apportionment of the imports of service; figures of an export structure for both goods and services and a summary of imports of goods and services per commodity.

The following items were distributed according to the framework for commodities.

- Transportation
  - air travel
  - shipment
- Foreign spending
  - Basotho students
  - Subsistence allowances by Lesotho government
  - Other foreign spending
- Insurance
- Property Income
- Professional and Technical Services
  - Advertising
  - Brokerage
- Lesotho embassies

6.4.2.4 Other entries to the microsam

All the remaining microsam entries not discussed above are fully explained in Appendix 6.2, and their final values are indicated in the balanced microsam.

6.5 Conclusion

This chapter was concerned with about the general description of the Lesotho SAM 2000 constructed by Conningarth Economists and the World Bank (2002). The final matrix is composed of 144 accounts including accounts for 53 activities, 53 commodities (the 57 commodities aggregated in to 53), 12 production factors, five household groups, one enterprise, eight taxes and tariffs, one public and one private saving-investment account, and the rest of the world accounts.

Various data sources were used for entries of transactions between these different accounts in the SAM. As result, the initial matrix was unbalanced. It was therefore necessary to balance the initial matrix. The balancing process was performed using the cross-entropy optimization procedure using GAMS software, which minimizes the entropy distance between the unbalanced and balanced SAMs.

CHAPTER 7

TRADE POLICY SCENARIOS, MODEL CLOSURE RULES AND CGE MODEL IMPLEMENTATION AND RESULTS

7.1 Introduction

In this chapter various scenarios of trade change and policy change are designed for Lesotho (and other SADC regions). The implementation of the CGE model and results follow thereafter. The scenarios are based on expected changes in the level of border protection and fiscal policies, and the changing world prices of Lesotho's export commodities.

The Lesotho CGE model was implemented using computer codes provided by the International Food Policy Research Institute (IFPRI), as documented in Lofgren *et al.* (2002). Model implementation consists of applying the theoretical model (Chapter 5) to behavioural parameters. The Lesotho CGE model was solved numerically with General Algebraic Modelling Systems (GAMS) software.

7.2 Scenarios

The reasoning behind the selection of the particular scenarios used for the analyses is supplied in the subsequent sections. Some of these scenarios may very well become reality in the not too distant future. A brief list follows below:

1. Border-protection scenarios:
    - Duty-free access for Lesotho textiles to export markets
    - Erosion of trade preference of Lesotho textiles
2. Fiscal polices (CET or tariff changes)
3. Changing world prices of Lesotho's export commodities

7.2.1 Border protection in Lesotho export markets

The Lesotho export markets can be differentiated into South Africa (Southern Africa) and the rest of the world (ROW). This section discusses how border protection of ROW is treated in differentiated markets.

7.2.1.1 Border protection in ROW

Commodity exports from Lesotho to the rest of the world (ROW) in the base year (2000) consisted of diamonds, textiles, leather and footwear, as well as pharmaceutical products. Of these export commodities, textiles were by far the most important, constituting 96% of the total export value in 2000 (Table 7.1). This analysis therefore deals only with the textile sector. Textile exports originating in Lesotho have benefited from preferential access to developed countries' markets. These benefits include the Generalized System of Preference (GSP), preferential access to markets under the Lome Convention (and the subsequent Cotonou Agreement), the US-Africa Growth and Opportunity Act (AGOA), and the EU's Everything-But-Arms (EBA) programme.

Table 7.1: Lesotho's main export commodities (millions of Maloti), 2000

Commodity	Export to South Africa/ Southern Africa	Export to ROW	Total
Diamonds	0.33	1.91	2.24
Textiles	63.2	815.62	878.82
Leather and footwear	14.02	14.04	14.06
Pharmaceutical products	1.93	14.01	15.94

Source: SAM Lesotho, 2000 constructed by Conningarth Economist and World Bank (2002).

Lesotho's textile industry has its roots in the early to mid 1980s, when East Asian entrepreneurs moved factories and production lines from South Africa to Lesotho in order to avoid international sanctions imposed on South Africa. Textiles have become the main source of economic growth and employment in Lesotho. Textile exports in U.S. dollar terms increased at an average annual rate of about 24% between 1992 and 2002, while textile value added grew at an annual rate of 15% in the same period. Textiles had emerged as a major source of income and employment by 1997, with its share of GDP having increased from about 3% in 1991 to 8% in 2002. Employment grew from 7,400 in 1991 to about 39,000 in 2002. In the late 1980s, the main impetus to growth was preferential market access to the European Union (EU) provided under the Lome Convention and to the United States under the Generalized System of Preference (GSP) (IMF, 2004).

The industry has also lately, particularly after 1999, attracted new investment and experienced exceptional growth in production and employment. This has been possible largely because of the duty-free and quota-free access to the U.S. market that the African Growth and Opportunity Act (AGOA) has provided since 2000. Least-developed African countries that qualify in terms of the AGOA have received so-called LDC (least-developed country) status, which relaxes the complex rules of origin in force until 2004. LDC status was set to expire in 2004, even though AGOA itself will remain valid until 2008 (IMF, 2004).

Lesotho's textile (garment) exports have benefited, in particular, from AGOA's "third-party fabric provision" status granted to least-developed countries (LDCs). As an LDC, Lesotho is entitled to import inputs from non-members of the AGOA without repercussions for its free access to the U.S. market. With relevant U.S. import tariffs on average more than 15%, and with foreign inputs accounting for at least 50% of total costs, value added in Lesotho is effectively protected at a rate of 30% or more (IMF, 2005). The value of exports to the United States has increased in exponential terms in response to the duty-free and quota-free access provided in terms of the AGOA. Lesotho's textile exports increased from US$100 million in 1999 to US$260 million in 2000 and US$262 million in 2002 (an average annual growth of about 54%). In 2000, 92.55% of Lesotho's textile exports were directed to the U.S. market, 6.98% to Southern African Development Community (SADC) countries, and 0.48% to the European markets (see Table 7.2) (IMF, 2004; ITC, 2001).

Table: 7.2. Value and destination of textile and clothing exports, 1996-2000 (Maloti)

Years	Destination			Total
	EU	USA	RSA	
1996	26,883,699	109,268,649	49,555,639	185,708,987
1997	3,602.298	153,764,951	233,209,681	390,576,930
1998	2,582,213	389,561,087	111,883,277	504,025,577
1999	67,397	550,877,475	86,161,342	637,106,196
2000	8,601,065	1,673,498,205	126,177,983	1,808,277,253
% of 2000 value	0.48	92.55	6.98	100

Source: Unpublished data supplied by the Lesotho BOS (cited by ITC, 2001)

Most of this growth was experienced during 2000 in anticipation of the announcement that Lesotho was going to qualify for tariff preferences under the Africa Growth and Opportunity Act (AGOA) (ITC, 2001).

Total exports to the European Union (EU) have declined and the EU now accounts for a negligible portion of total exports. This is due to the expiry of the derogation clause under the Lome Agreement whereby only 30% of the value of the final product had to be added in Lesotho for the product to qualify for duty-free access to the EU. On the expiry of this derogation in 1996, exports to the EU declined substantially as Lesotho's manufactures struggled to comply with the rules of origin (ITC, 2001). Chapter 2 supplies a detailed literature review on preferential market access.

The Agreement on Textiles and Clothing is a transitional arrangement, regulating the trade in textiles over the transition period. Quotas are to be eliminated through a step-by-step removal of existing quotas (integration) and the expansion of remaining non-integrated quotas (liberalisation). As a preferred beneficiary country, Lesotho is sensitive to the potential erosion of trade preferences following the implementation of trade policy reforms. Hoekman, Michalopoulos and Winters (2003), drawing on existing studies, estimate that these reforms would cut average tariffs on preference commodities from 4.3 to 2.5 percentage points, equivalent to an erosion of more than 41%. Comparable estimates suggest that the preference margins extended to the least-developed countries vary amongst countries and average at 50% of the most-favoured nation (MFN) margin. Thus, a removal of these preferences would amount to 50% erosion. In subsequent analyses, this magnitude of erosion is used as one scenario of erosion of existing preferences (EEP). Another scenario is duty-free access (DFA) of Lesotho textiles to export markets.

The choice of both the 50% preferential access and the duty-free access to export markets scenarios is based on Figure 7.1. The figure presents the perspective of a small country that faces an infinitely elastic world demand at prevailing world prices. Three border protection regimes are depicted in the figure, and these correspond to the access of Lesotho exports to ROW under duty-free, preferential and EEP regimes. For the exporter, the infinitely elastic world demand at the prevailing world prices represents a schedule of net marginal benefits accruing from each additional unit of exports. This net benefit is greatest when the exporting country has duty-free access to importers' markets. According to Figure 7.1, Lesotho exporters would receive the net price ($DFAP_w$) for each unit of exports, and the corresponding marginal benefit is represented by the vertical distance ($O\text{-}DFAP_w$). When exports are subject to the EEP rate (t_{EEP}), the net marginal benefit drops to its lowest level (O-EEPPw), as the net price received by exporters falls to $EEPP_w$. Under a preferential border protection regime, the net price paid to exporters (PP_w) and the corresponding net marginal benefit ($O\text{-}PP_w$) will lie between the two extremes.

The level of border protection in export markets is usually not treated explicitly in applied general equilibrium models. The effect of export market protection is often regarded as part of the world price of commodities sold in a hypothetical global market, and the net price received by exporters is considered to have already taken into account the border protection level in importing countries. In implementing border protection scenarios, it is assumed that the prevailing conditions in the base year 2000 corresponded to some level of preferential access between the extreme DFA and EEP levels. In 2000, Lesotho was a legitimate beneficiary of trade preferences, causing the average protection facing Lesotho exports to be less than the EEP protection. However, eligibility for preferences does not necessarily translate into utilization of these preferences, and the effective access level would be different from duty-free access. Based on Figure 7.1, preferential export prices in the base year would correspond to PP_w. This price level will be obtained by calibrating the computable general model to the base-year (2000) data of Lesotho.

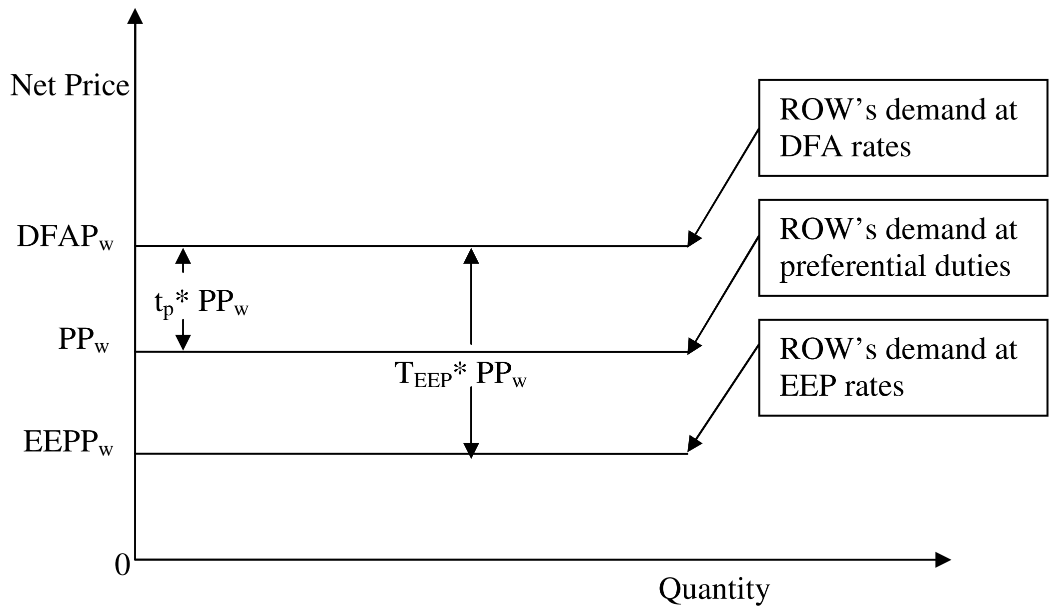

Figure 7.1: Export regime under different scenarios
Note: $DFAP_w$: World prices under a duty-free export regime; PP_w: World prices under the preferential export regime; $EEPP_w$: World prices under an export regime of erosion of existing preferences; $t_{EEP:}$ Level of protection when existing preferences are effectively eroded; t_p: Average preference rate (Figure adopted from Nouve, 2004).

The implementation of the two remaining scenarios of border protection in Lesotho export markets requires the estimation of average EEP tariffs applied to commodities of export relevant to Lesotho (t_{EEP} in Figure 7.1). The EEP tariffs are applied to all countries having most-favoured nations (MFN) status in the importing country. An average preferential tariff (t_p) will be set to half the EEP or MFN tariff level ($tp = 0.5t_{EEP}$). It follows from Figure 7.1 that $DFAP_w = (1 + t_p)*PP_w = (1 + 0.5t_{EEP})*PP_w$. Similarly, $DFAP_w = (1 + t_{EEP})*EEPP_w$, which implies that $EEPP_w = DFAP_w/(1 + t_{EEP}) = [(1 + 0.5t_{EEP})/(1 + t_{EEP})]* PP_w$. The price level $DFAP_w$ defines the duty-free access scenario, whereas $EEPP_w$ defines the EEP access scenario. Both scenarios depend on the calibrated level of preferential access price (PP_w) and on the MFN tariff rate (t_{EEP}).

Although textiles were in theory eligible for duty-free entry to markets in many developed countries (in terms of GSP and ACP-EU preferences), effective access to these markets may in fact not have been duty free, due to technical restrictions and other regulations. This analysis relies on simple averages of MFN tariffs applied to imports of these commodities in major markets. The database of the Global Trade Analysis Project (GTAP) at Purdue University (McDougall and Elbehri, 1998) documents these rates for several regions in the world. Average MFN tariff rates on textiles were as follows in 1996: USA (7.3%), EU (1.6%) and ROW (80.9%). The average tariff was calculated as being 29.93%, and this mean tariff (MFN) rate will be used for simulations to determine how the MFN and duty-free scenarios would deviate from the (calibrated) preferential scenario.

The MFN rate will be used in the simulations to determine how the MFN and duty-free scenarios would deviate from the (calibrated) preferential scenario (DFAPw = (1 + 0.5tEEP)*PPw and EEpPw = [(1 + 0.5tEEP) / (1 + tEEP)]*PPw, where tEEP is the EEP or MFN average tariffs assumed above. DFAPw, EEPPw and PPw represent the export prices under DFA, EEP, and preferential market access regimes, respectively). Consider, for example, an average import tariff of 29.93% for textiles in general. The deviations from the calibrated preferential regime would be 1.14965 *PPw for the duty-free access and 0.884823*PPw for access when existing preferences are eroded (EEP). In other words, the marginal revenue from each additional unit of duty-free textile exports would be 1.14965 times the marginal revenue under the status quo (corresponding to the prevailing regime in the base year). This marginal revenue drops to 0.884823 times the base year's value when the trade regime switches to EEP tariffs.

7.2.1.2 Border protection in South and Southern Africa

In addition to changes in border protection facing Lesotho exports to ROW, the protection levels facing Lesotho exports to Southern Africa or South Africa have also changed. These changes are made possible by ongoing intergovernmental efforts to liberalize regional markets within South Africa. Such efforts are supported by SACU's aim to create a free trade area among Southern African countries. SACU has developed a common external tariff (CET) regime that affects non-member imports, whereas within-SACU imports are essentially free of customs duties.

Based on the Social Accounting Matrix of Lesotho, Lesotho exports to South Africa or Southern Africa consist of vegetables; cattle, sheep and goats; poultry; diamonds; beef; processed grain; beverages and tobacco; raw wool; raw mohair; textiles, leather and wood; bricks; steel and metallic products; other manufacturing, electricity and water; commercial and informal trade; and other services. The CET scenario will be based on discussions in section 7.2.2: Government polices (tariff changes).

7.2.2 Government policies

Lesotho's macroeconomic policy is circumscribed due to its membership of the Common Monetary Area (CMA). Other members of the CMA are Namibia, South Africa and Swaziland**.** Under the CMA, currencies are pegged at parity with the South African Rand. This eliminates monetary policy autonomy and implies that Lesotho's external competitiveness will be reflected in movements in the real effective exchange rate (REER) of the Rand (Anon, 2003).

7.2.2.1 Tariff policy

Lesotho has had a relatively liberal foreign trade regime through its membership of the Southern Africa Customs Union (SACU), the world's oldest customs union formed in 1910. The other members are Botswana, Namibia, South Africa and Swaziland. The SACU agreement calls for all members to apply the same customs and excise duties (as well as related trade laws) to goods imported from outside into the common customs area (Anon, 2003). Goods imported from outside the common customs area are subject to a common external tariff (CET). Lesotho has used SACU import tariffs (CET of SACU). The analysis will focus on changing import tariffs, which is a direct result of ongoing trade reforms in Southern Africa and the rest of the world.

Tariff liberalization and simplification conducted in the 1990s has caused SACU to have a relatively open trade regime. The simple average applied MFN tariff rate was 10.4 percent in 2001, down from 15.1 percent in 1997. There are significant tariff peaks on garments in the CET, however, and these create an anti-export bias for Lesotho. The CET is moreover plagued by a number of specific, compound, mixed and formula duties, which are less transparent than simple *ad valorem* tariffs and therefore facilitate protectionist lobbying (Anon, 2003).

The CET is implemented within a customs union (SACU). The CET regime harmonizes the rate of tariffs applied to extra-SACU imports, while eliminating intra-SACU tariffs. Tariffs affect domestic resource allocation by raising the domestic price of tradable goods above world prices. Quantity restrictions, by reducing the supply of imports, also serve to increase the domestic price of the restricted goods (Jakobeit, Hartzenberg and Charalambides, 2005).

Jakobeit *et al*. (2005) cited the average CET rates applicable to non-SACU imports in Lesotho. A summary of these tariffs is shown in Table 7.3.

Table 7.3: Average nominal tariff protection (CET) on imports from ROW (%)

Commodity	SACU CET
Agriculture and forestry	5%
Fishing	8%
Mining	1%
Food processing	13%
Beverages	21%
Tobacco	32%
Textiles	24%
Clothing	51%
Leather and footwear	21%
Wood and wood products	9%
Furniture	19%
Paper	7%
Publishing	5%
Petroleum and coal products	3%
Basic chemicals	2%
Industrial chemicals	4%
Other chemicals	4%
Rubber	13%
Plastic	14%
Glass and ceramics	7%
Ceramic products	8%
Other non-metallic products	3%
Iron and steel products	3%
Fabricated metal products	8%
Machinery	3%
Electrical machinery and appliances	4%
Professional and scientific equipment	0%
Vehicles	17%
Other vehicles	1%
Other manufacturing	8%
All other products	2%

Source: Jakobeit *et al.* (2005).

The CET reform scenario is implemented in this study by applying the rates of relevant non-SACU imports. These rates are set to zero on SACU imports. With one external sector, the Lesotho CGE model uses an aggregate CET tariff, which is computed as a weighted average of the SACU and non-SACU tariffs under the CET regime (the weight being the respective shares of SACU and non-SACU imports in total imports.) The CET simulation is run by substituting the aggregated import tariffs for the base tariffs calibrated from the Lesotho data. Thus, in this study, the average import tariff is taken as

8.21% and it incorporates the mean of the overall tariff by the corresponding import commodities (all commodities imported by Lesotho).

7.2.3 World export price and world import price

The simulation of the scenario of changes in the world export price (Pwe) and world import price (Pwm) uses data obtained from the Central Bank of Lesotho, cited in Table 21 of Lesotho: Balance of payments (IMF, 2004).

Table 7.4 presents the design of the policy scenario using 10% and 16% as the mean of world export price (Pwe) and world import price (Pme) respectively. Since the study deals only with exports, a 10% increase is used for the simulation of the world price of all commodities.

Table 7.4: Value of Lesotho exports and imports (% and millions of U.S. dollars)

	1999/00	**2000/01**	**2001/02**
Value of export growth	8.1	13.3	7.5
Value of import growth	-4	18.5	35.5
Mean of world export price growth		10	
Mean of world import price growth		16	

7.3 Model closure rules

Closure rules mathematically ensure that the number of variables and equations in the model is consistent – a necessary condition for model solution. In economic terms, closure rules define fundamental differences in perceptions of how economic systems operate.

7.3.1 Foreign exchange market

The foreign exchange market is assumed to clear via a flexible exchange rate and therefore the external balance (or current account balance) remains fixed. Lesotho, being a small country, is a price taker on international markets, with all prices of imported and exported goods being fixed in foreign currency units.

7.3.2 Saving-Investment

All savings- and investment-related transactions are conducted by assuming that the share of investment expenditure in total final domestic demand remains constant. This allows for some variation in the volume of investment due to changes in the price of investment goods and any change in the total value of domestic absorption. The equilibrating variables are the savings rates of all households and incorporated business enterprises. These rates are allowed to vary equiproportionately, which ensures that savings equal investments.

The government account is closed by variations in the level of government borrowing or savings – that is, the size of the budget deficit or surplus. All tax rates are assumed to remain constant and the government is assumed to consume a fixed share of total final domestic demand.

7.3.3 Factor market

Factor market closure assumes that production factors are fully employed and mobile across various sectors (activities) in the economy, with the wage rate as the equilibrating variable in the case of labour. The equilibrating variable is the quantity of employed citizens. The quantity of capital used by each activity is fixed.

7.3.4 Numéraire

All prices in a CGE model are expressed relative to the numéraire – a fixed price (or price index) in the model. In this analysis the model numéraire is the consumer price index (CPI).

7.4 CGE model implementation, model calibration and results

As already indicated, this study analyses the potential impact of trade and changing trade conditions on the economy of Lesotho. Such an inquiry requires the quantification of the direction and magnitude of price and policy shocks associated with trade policy (based on the policy scenario mentioned).

7.4.1 Model calibration

The Lesotho CGE model was calibrated using IFPRI's computer codes written in General Algebraic Modelling Systems (GAMS) language. Inputs to the model included the Lesotho Social Accounting Matrix (SAM) and other behavioural parameters on production technology, commodity trade, and consumer preferences. These parameters were taken directly from the literature.

The model has two types of production elasticities, characterizing the two levels of the nested production technology. At the bottom of the technology nest, production factors are CES aggregated into value added. Production elasticities at this first level are characteristic of the rate of substitution between production factors. These elasticities were obtained from Nganou (2004). The remaining elasticities are adopted from literature. The production elasticities were set at 0.6. The model also contains an output aggregation elasticity, which was set to 8.

As with production elasticities, there are two types of trade elasticities. The first represents the demand side of the economy and corresponds to the substitution between imports and local sales of domestic output. The second characterizes the supply side of the economy and shows the rate of transformation of total output into domestic sales and exports. These two sets of elasticities were taken from Nganou (2004), as mentioned in Chapter 5.

Finally, parameters for the Linear Expenditure System (LES) of demand are calibrated from the aggregated SAM entries, along with assumed values for expenditure elasticities and the Frisch parameter. The Frisch parameter (Frisch, 1959) measures the negative of the marginal utility of income, also known as the flexibility of the marginal utility of income. Following Nganou (2004), the Frisch parameter was set to negative 2.415 (-2.415) for all households.

Armington elasticity – the degree of substitution between domestic and imported goods – is a behavioural parameter that materially affects the effects of trade on macro economic parameters. For instance, trade policy can affect the price of traded goods relative to domestically produced goods. Such a price change will affect a country's trade opportunities, level of income, and employment. The magnitude of these impacts will largely depend on the magnitude of the elasticities, including Armington parameters. Thus, it is important to use the true Armington parameters for the countries of study. The details of elasticity are explained in Chapter 5. Table 7.5 summarizes elasticities of expenditure, Armington and LES.

Table 7.5: Own-price , income, LES demand and GME Armington elasticity

Commodities	Urban		Rural		All households		Armington elasticity
	e_c	n_c	e_c	n_c	e_c	n_c	
Agriculture	0.376	0.198	-1.00	0.480	0.267	0.271	0.898
Food	0.313	0.364	-0.212	0.490	0.206	0.444	1.37
Mining							4.01
Textiles	0.05	0.497	-1.00	0.539	-0.074	0.325	4.232
Utilities	-0.160	0.871	-0.198	0.500	-0.279	1.066	
Private Service	-0.608	1.836	-0.508	1.688	-0.736	1.282	
Government Service	-0.288	0.930	0.559	0.428	-0.485	00.787	
Transport	-0.977	3.21	-1.00	0.852	-1.00	2.092	1.696
Other Manufacturing	-0.004	0.687	-0.654	1.534	-0.165	0.807	0.486
Financial Service	-1.00	2.867	0.069	2.537	-1.00	2.513	
Frisch Parameter	-2.188		-1.634		-2.415		

Note: e represents own-price elasticity; n is the income elasticity.
Source: Nganou (2004).

When these are incorporated in the calibrated model, one can perform simulation analyses. Base and simulation results are presented.

7.4.2 Model results

Four shocks were simulated to quantify their impact on the economy of Lesotho: Duty-free export access of textiles; erosion of preferential access of textiles; CET for all commodities; and increase in world price for commodities seen as a whole.

Lesotho is a net exporter of textiles; hence a duty-free market access regime and an increase in the world price of the commodity (PWEINCR) can be expected to benefit Lesotho. However, the erosion of existing preferences (EEP) in the market access regimes of textiles can be disadvantageous for the Lesotho economy.

The analysis of the results incorporates the effects of the following parameters: impact on commodity price and trade; impact on activities output and intermediate input cost; impact on household welfare; and impact on factor, government and macroeconomic variables.

7.4.2.1 Results for border protection

This study consists of analyses of the potential impact of trade and changes in trade parameters on the economy of Lesotho. In order to elucidate the channels through which reforms are likely to affect the economy of Lesotho, this section also presents additional results of changes in other economic variables. The results are organized into four parts, defined by the various impacts and scenarios examined in this study.

7.4.2.1.1 Results of duty-free (DFA) access scenarios

7.4.2.1.1.1 Impact on commodity prices and trade

The simulation results indicate that the duty-free access (DFA) market regimes of textiles will lead to an average increase of 0.2% in the domestic export price (PEXP) of other commodities. Textile exports (QEXP) will increase by 19.1% (c20). Figure 7.2 indicates increases and decreases in the quantities of other commodities exported: the most significant increase (0.56%) is experienced by pharmaceutical products (c25), and at the other end of the spectrum, exports by the air transport sector (c44) decrease by 2.67% as a result of DFA market regimes. The quantity exported (QEXP) from the following sectors can be expected to increase by margins is too small to be regarded as significant, as these margins are well below 1.00%: gas and petroleum products (c24), soap cleaning compounds (c26), other chemical products (c27), micro industry products (c31), other manufacturing (0.05%) and other community services (c53) .

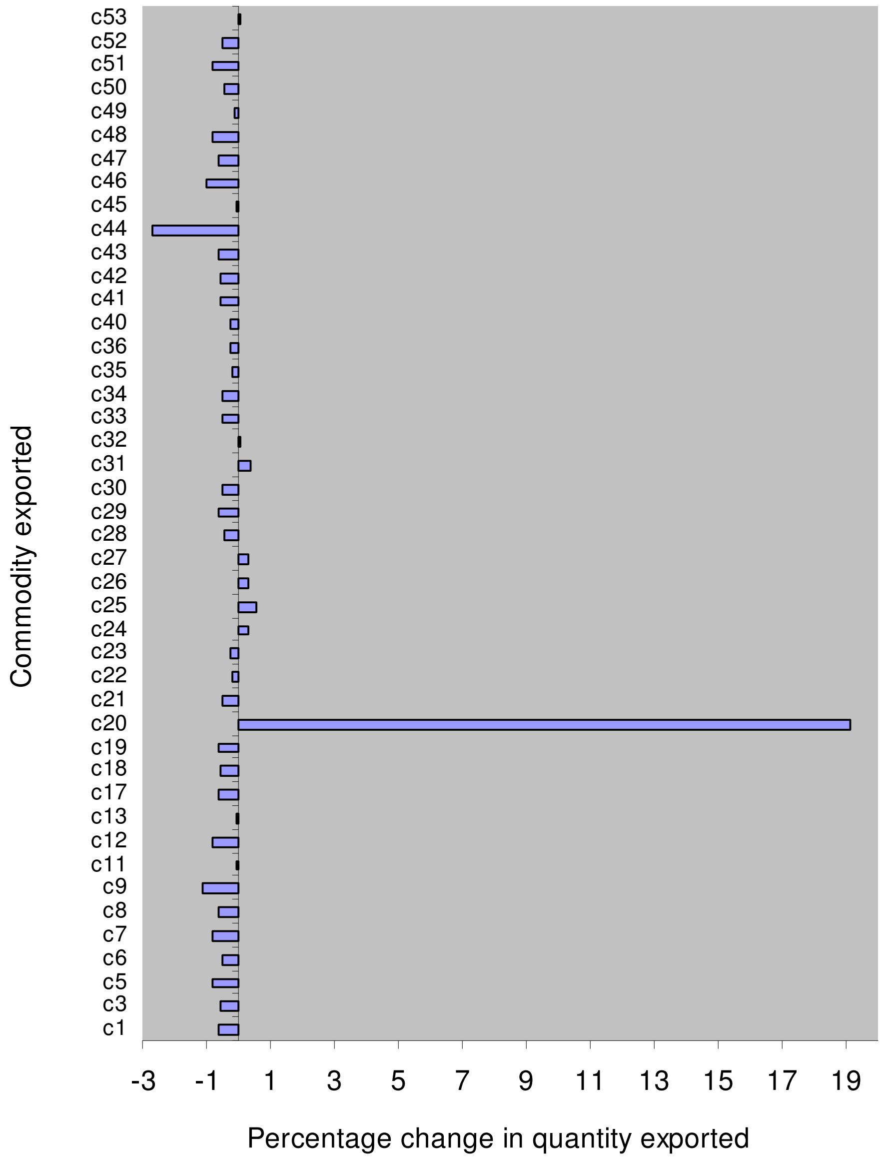

Figure 7.2: Export quantities (QEXP) at DFA market regimes
Source: Model estimation results (for the code, see Appendix 6.1 section 6.1.2)

DFA market regimes will cause the price of imported (PMXP) textiles to decrease by 6.66%. The quantity of products imported (QMXP) will on average increase by merely 0.4%. The most significant increase in imports (6.90%) occurs in the textile sector (c20), while at the other end of the scale, the DFA market regimes cause micro industry product (c31) imports to decrease by 0.25%. Quantity imported (QMXP) of the following sectors can also be expected to decrease but by less than 0.10%: skins and hides (c6), broilers and other poultry products(c10), other mining and quarrying products(c13), processed grain and grain products (c15), wood and wood products (c22), gas and petroleum products (c24) and soap cleaning compounds (c26). A detailed picture (QMXP) of the entire commodity spectrum is shown in Figure 7.3.

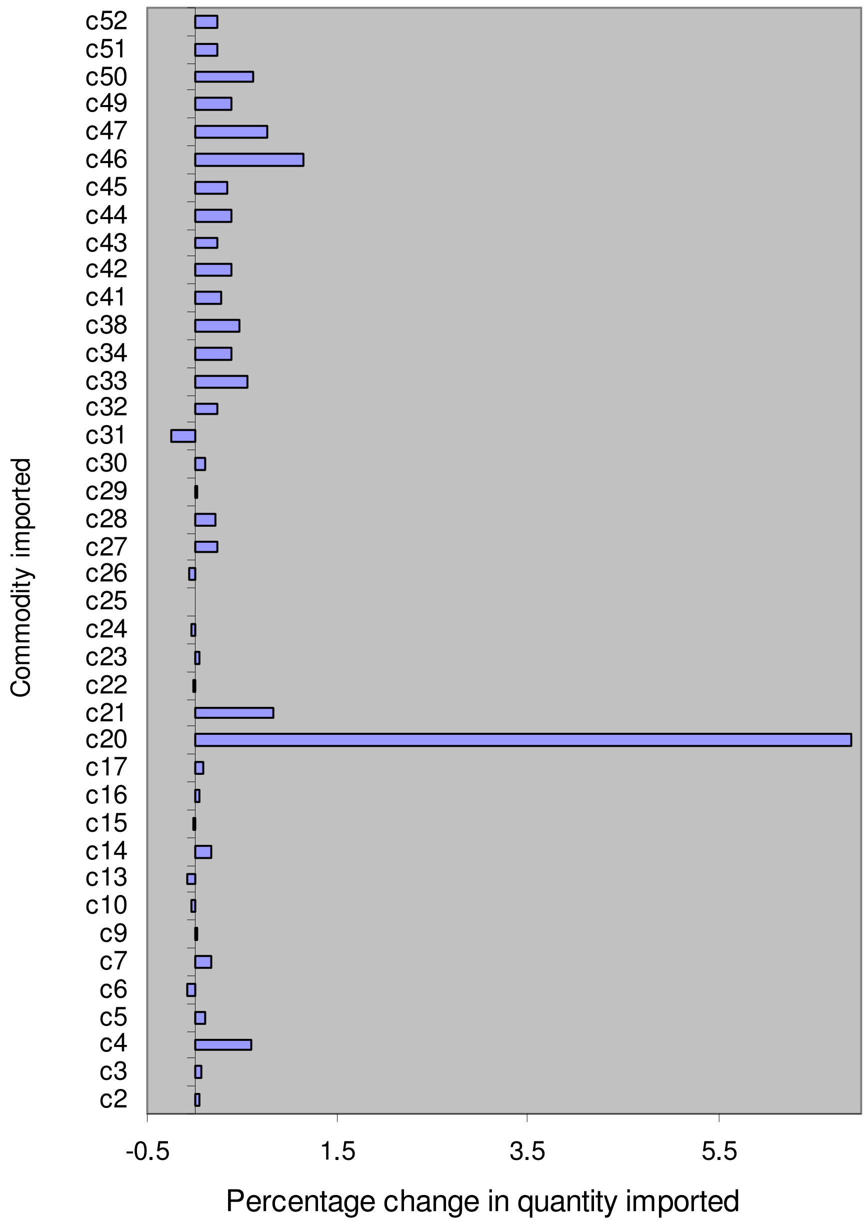

Figure 7.3: Import quantities (QMXP) at DFA market regimes
Source: Model estimation results (for the code, see Appendix 6.1 section 6.1.2)

Both the demand price (PDDXP) and the supply price (PDSXP) of commodities produced and sold domestically increase on average by 0.25%. Changes range between -5.87% for the textile sector (c20) and +0.98% for the air transport sector (c44).

The impact on the price of composite goods (PQXP), average output price (PXXP) and quantity of aggregated marketed commodity (QXXP) is as follows: price of composite goods (PQXP) will on average increase by +0.20%, ranging between -6.50% for textiles (c20) and +0.73% for the coarse and fine sand sector (c12). The model predicts all commodities except the textiles sector to experience increase of price of composite goods (PQXP), but the margin is too small to be meaningful, ranging from +0.04% to +0.71% for micro industry products (c31) and postal services (c46) respectively. The average impact on average output price (PXXP) is an increase of +0.30%, ranging from -2.11% to +0.72% for textile products (c20) and postal services (c46) respectively. Once again, all commodities except textiles sector are expected to experience very slight increases in average output price (PXXP) but the margin is too small to be considered material. Quantity aggregated marketed commodity (QXXP) increases on average by 0.09%, ranging from -2.25% for air transport sector (c44) to +13.68% for the textile sector (c20). Aggregated marketed commodity quantity (QXXP) for all the commodities will change by less than 0.29%.

7.4.2.1.1.2 Impact on activities output and intermediate input cost

Figure 7.4 shows the effect of DFA on the output prices of activities. The only sector to show an appreciable change in output price (PAXP) is fruit and vegetable processing (a19) (-2.11%). Prices for other commodities are set to increase on average by 0.40%, with 0.56 % (road transport services (a44) the highest. A detailed presentation of the effects appears in Figure 7.4.

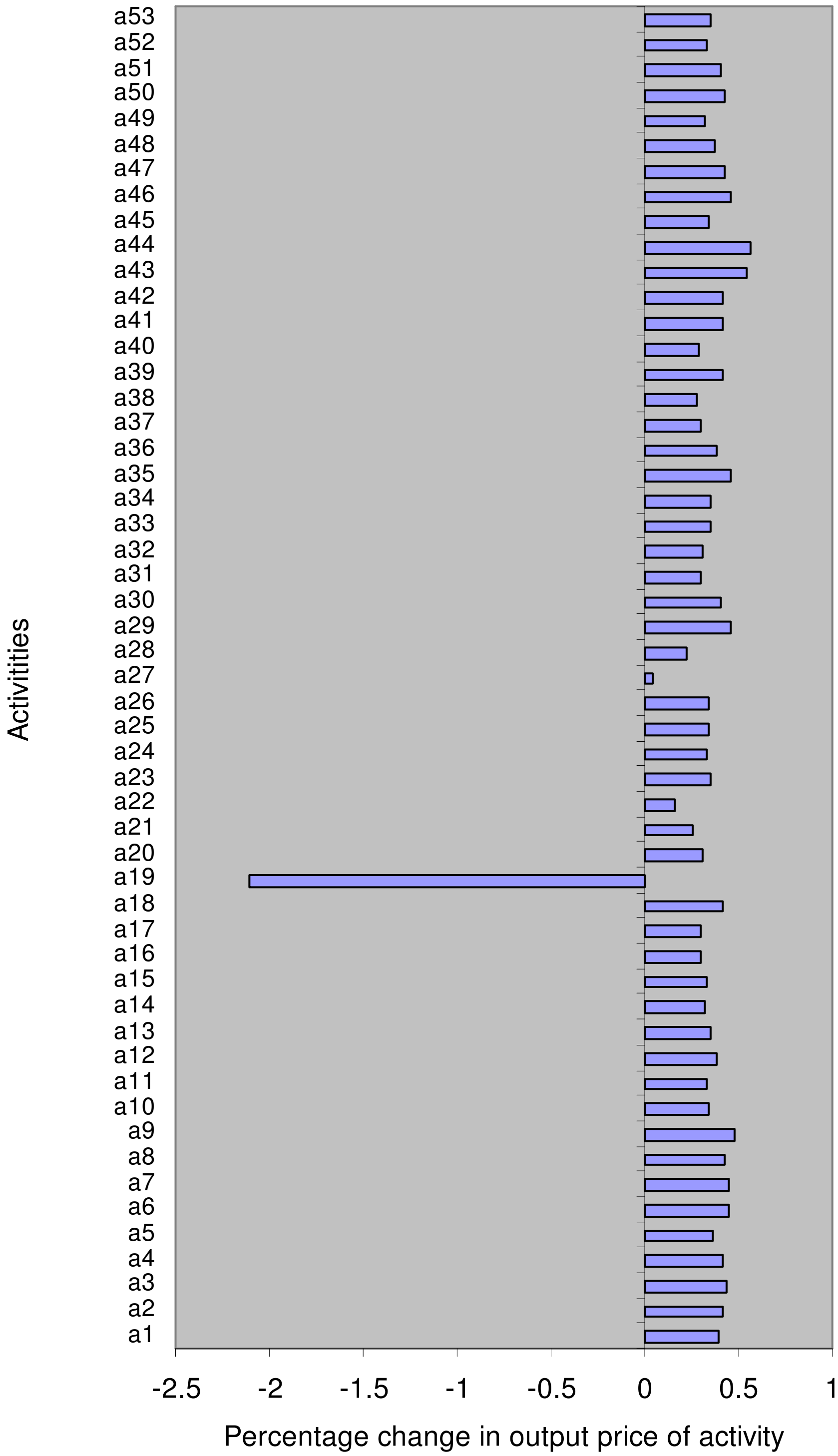

Figure 7.4: Output price of activities (PAXP) at DFA market regimes
Source: Model estimation results

Price changes in intermediate aggregate inputs (PINTAXP) are presented in Figure 7.5. The results indicate that water services (a36) make important intermediate inputs into production, which explains the 0.41% increase in the price of intermediate inputs into production. Changes in intermediate inputs used in the production of other activities vary from -3.26% to +0.39% for textile products (a26) and real estate and business services (a48) respectively.

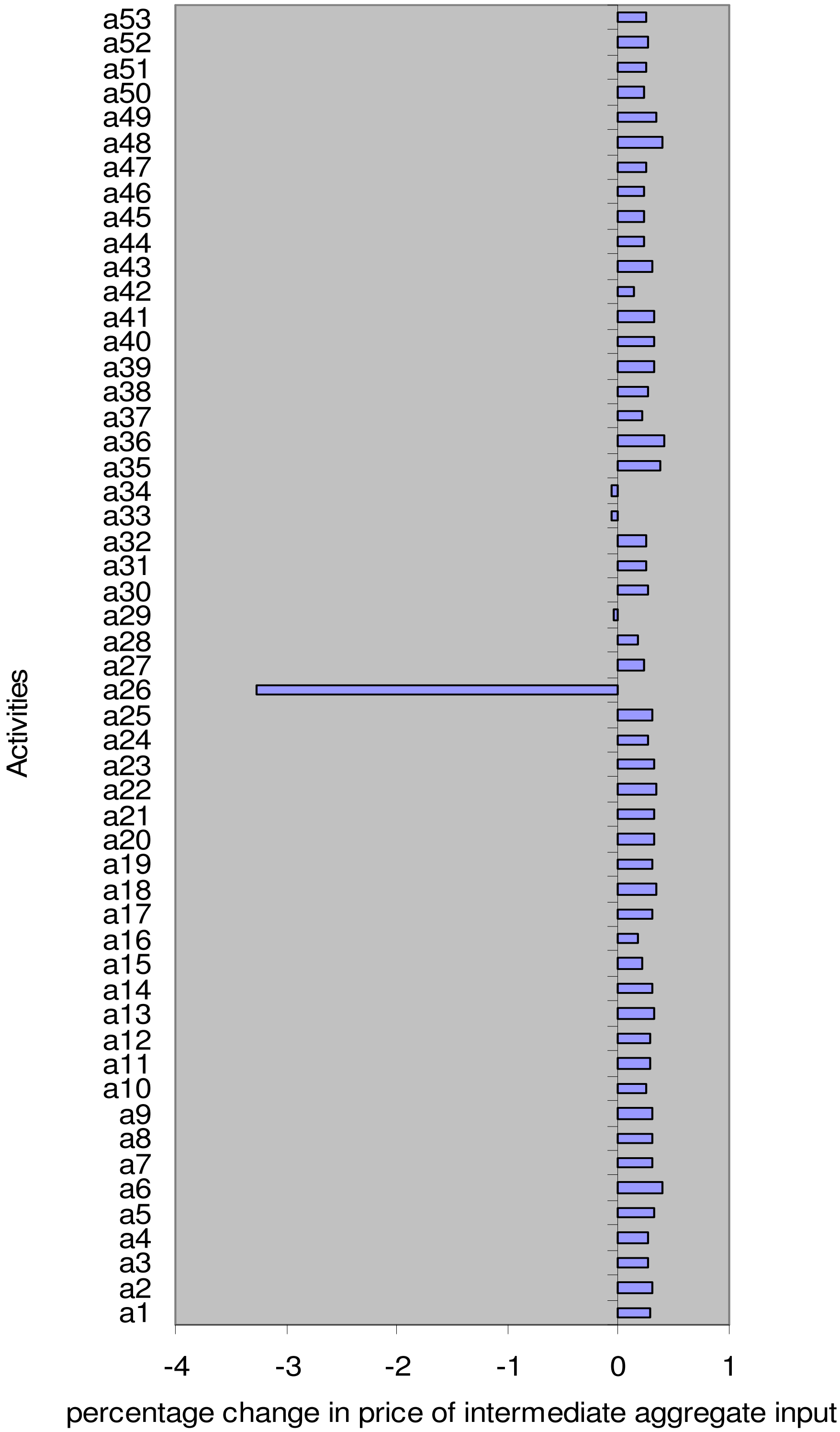

Figure 7.5: Price of intermediate aggregate input (PINTAXP) at DFA market regimes
Source: Model estimation results

Expansion or contraction of industries is primarily affected via changes in return to factors and in subsequent reallocations. The change in the price of value added (PVAXP) reported in Figure 7.6 indicates changes in the overall return to factors in different activities. The figure shows increased return to factors in all activities, implying an expansion of economic activity in all industries.

The percentage increase on PVAXP as a result of DFA market regimes varies from 0.23% to 2.12% for the accommodation-catering (a43) and textile (a26) sectors respectively. In terms of aggregated industries, the manufacturing industry experiences the most significant average absolute increase of 0.53%, followed by the mining sector (0.49%), then services (0.48%) and lastly agriculture, which increases by 0.41%.

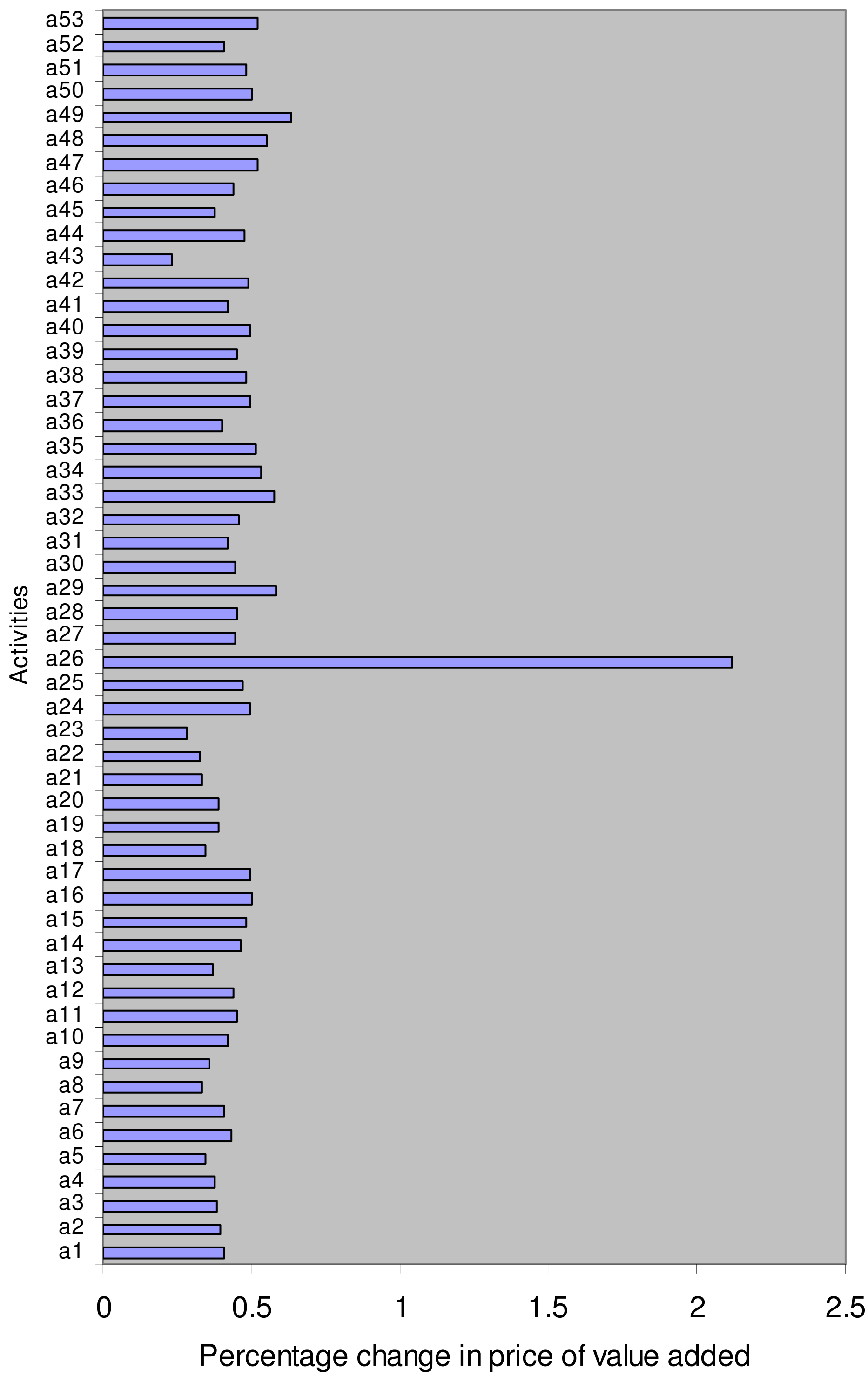

Figure 7.6: Price of value added (PVAXP) at DFA market regimes
Source: Model estimation results

Figure 7.7 shows the change in the GDP at factor cost in real terms. Nominal terms are mentioned only for reasons of comparison. Gross domestic product (GDP) for the overall activity increases by +0.47%, varying between -1.82% and +16.1% for air transport (a46) and the textile sector (a26) respectively. Only 12 activities including air transport sectors have a negative percentage change or decrease with a small margin namely : wool and mohair processing (a25) (-0.63%), feedlot cattle (a6) (-0.58%), dairy cattle (a7) (-0.36%), poultry - layers (a11) (-0.24%), accommodation and catering (a43) (-0.16%), freight and passengers (a45) (-0.08%), grain milling (a21) (-0.07%), dairy and other food processing (a20), beverages (a22) (-0.06% each), poultry - broilers (a12) (-0.04%) and goats (a9) (-0.01%), the rest of activities posses a positive percentage changes it varies from +0.10% fruit production (a4) to +0.88% chemical and pharmaceutical production (a29). At aggregate sector level, agriculture increases by 0.05%, mining by 0.43%, manufacturing by 1.12%, and services by 0.28%.

On the other hand, when seen from the perspective of real terms, the overall activity decreases by -0.001%, while it varies again between -2.25% and +13.68% for air transport (a46) and the textile sector (a26) respectively. Only 11 activities including textile sectors have a positive percentage change or increase with a small margin namely : mining and quarrying (a17) (+0.01%), electricity (a35) (+0.04%), telecommunications (a47) , informal financial and business services (a50) (+0.06% each), micro-industry (a33) (+0.07%), real estate and business services (a48) (+0.08%), other manufacturing (a34) (+0.10%), financial and insurance services (a49) (+0.13%), other community service (a53) (+0.27%) and (a29) (+0.29%), the other activities posses with a negative percentage changes it varies from -1.10% wool and mohair processing (a25) to -0.02% civil engineering (a38). In terms of aggregated industries, agriculture decreases by 0.36%, mining decreases by 0.06%, manufacturing increases by 0.57%, and the service sector decreases by 0.19%. The details of activities appear in Figure 7.7.

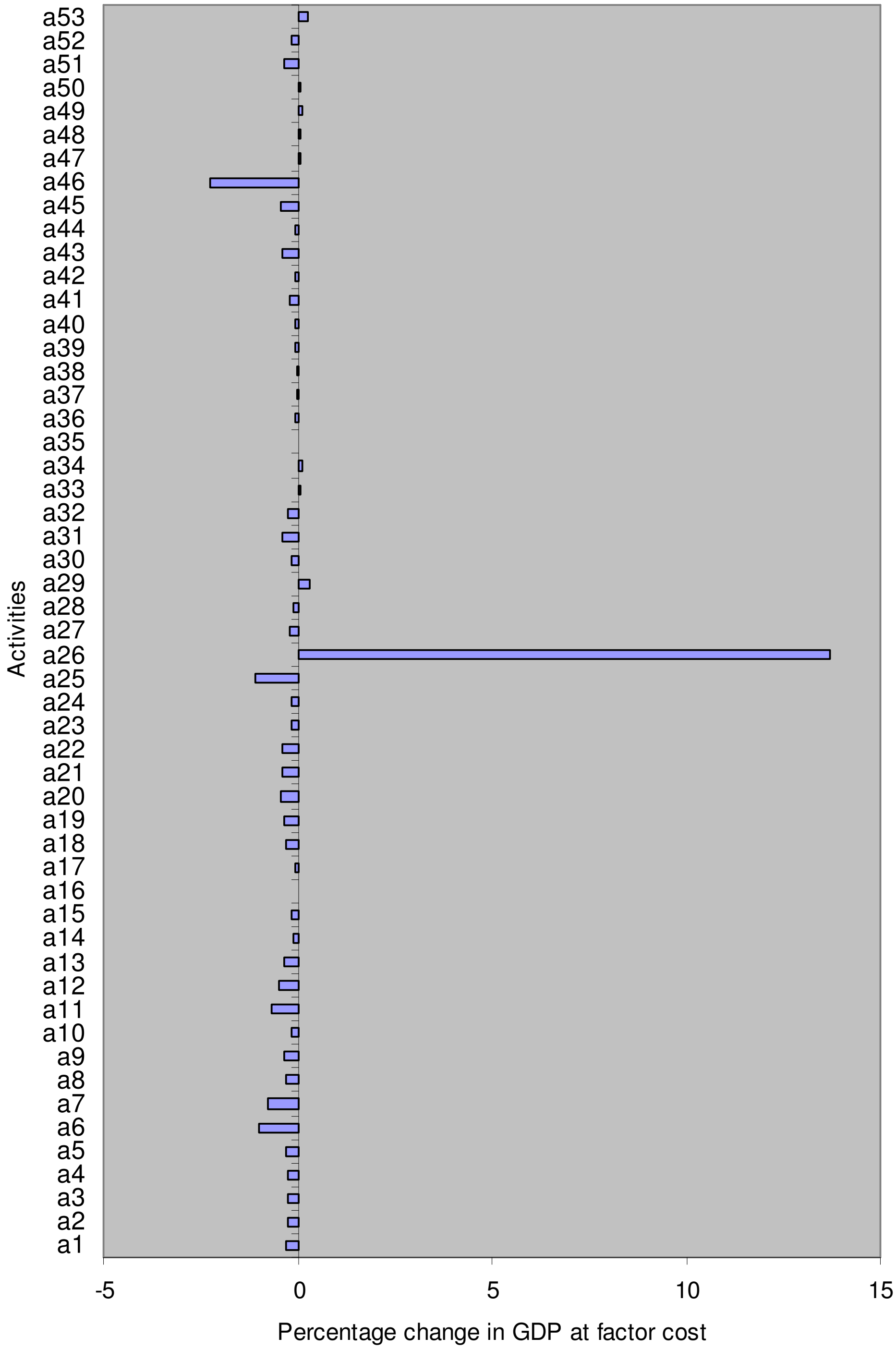

Figure 7.7: GDPTAB2P: GDP at factor cost by activity (real) at DFA market regimes

Source: Model estimation results

7.4.2.1.1.3 Household impact

The households were disaggregated into five groups: (i) urban areas, (ii) rural lowlands, (iii) rural foothills, (iv) rural mountains, and (v) rural Senqu River Valley (SRV). Disparities exist not only between urban and rural groups and between regions, but also between different income groups. To account for this, the household classification was further disaggregated into low- and high-income groups. The threshold levels were taken from the Consumer Price Index Report (BOS, 2001). Low-income households comprise all households with a monthly income of less than 500 Maloti, while high-income households have a monthly income equal to 500 Moloti or above.

Movement towards DFA market regimes may, through its individual effects, affect household consumption expenditure (EHXP), household income (YIXP), and welfare of households (EV). Equivalent variation (EV) is one of the most common indicators used to measure changes in welfare.

As shown in Table 7.6, the EHXP hardly increases on aggregate (0.18%). The urban low-income households show the biggest EHXP increase (0.47%), followed by the rural Sengu River Valley low-income households (0.27%).

The rather modest gain in household income (YIXP) is also highest for the urban low-income households (0.68%), followed by the rural Sengu River Valley low-income households (0.48%).

Lesotho could experience a 6.28% gain in welfare (EV). This gain would be concentrated in the urban areas. As indicated in Table 7.6, urban high-income households have the highest EV gain (3.89%) followed by rural lowlands low-income and rural mountain low-income households (0.57% and 0.36% respectively).

Table 7.6: Changes in household expenditure and income, and equivalent variation associated with movement to DFA

Households	**Base**	**EHXP**	**EV**	**Base**	**YIXP**
Urban high income	3231.72	0.113	3.893	3606.32	0.325
Urban low income	22.15	0.466	0.073	24.5	0.679
Rural lowlands high income	512.88	0.045	0.219	542.5	0.25
Rural lowlands low income	254.56	0.184	0.571	266.95	0.39
Rural foothills high income	283.29	0.055	0.107	301.86	0.263
Rural foothills low income	139.21	0.21	0.321	146.97	0.419
Rural mountain high income	216.26	0.068	0.43	225.61	0.273
Rural mountain low income	97.91	0.237	0.359	99.24	0.443
Rural SRV high income	119.05	0.096	0.13	126.78	0.3
Rural SRV low income	64.47	0.274	0.183	67.16	0.479
Total	4941.5	1.748 (0.175*)	6.278	5407.89	3.821 (0.38*)

Note: High-income group where income is >=500 Maloti, low-income group where income is <500 Maloti, SRV= Senqu River Valley and *average. Where: EHXP = Household consumption expenditure, EV = Equivalent variation, and YIXP = Household income

Source: Model estimation results

7.4.2.1.1.4 Impact on labour employment and factor income

The attention now shifts toward the simulated impact of DFA on labour and capital. The effect of a shock on the various labour categories largely depends on the effect on the activities that provide employment. DFA market regimes will have a negligible average effect (-0.02% per activity) in quantity labour demanded (FLAB). Effects on different activities range from -2.32% for commercial air transport (a46) to +15.88% for the textile sector (a26). These are the only two activities predicted to change by more than 1%. Detailed results are shown in Figure 7.8.

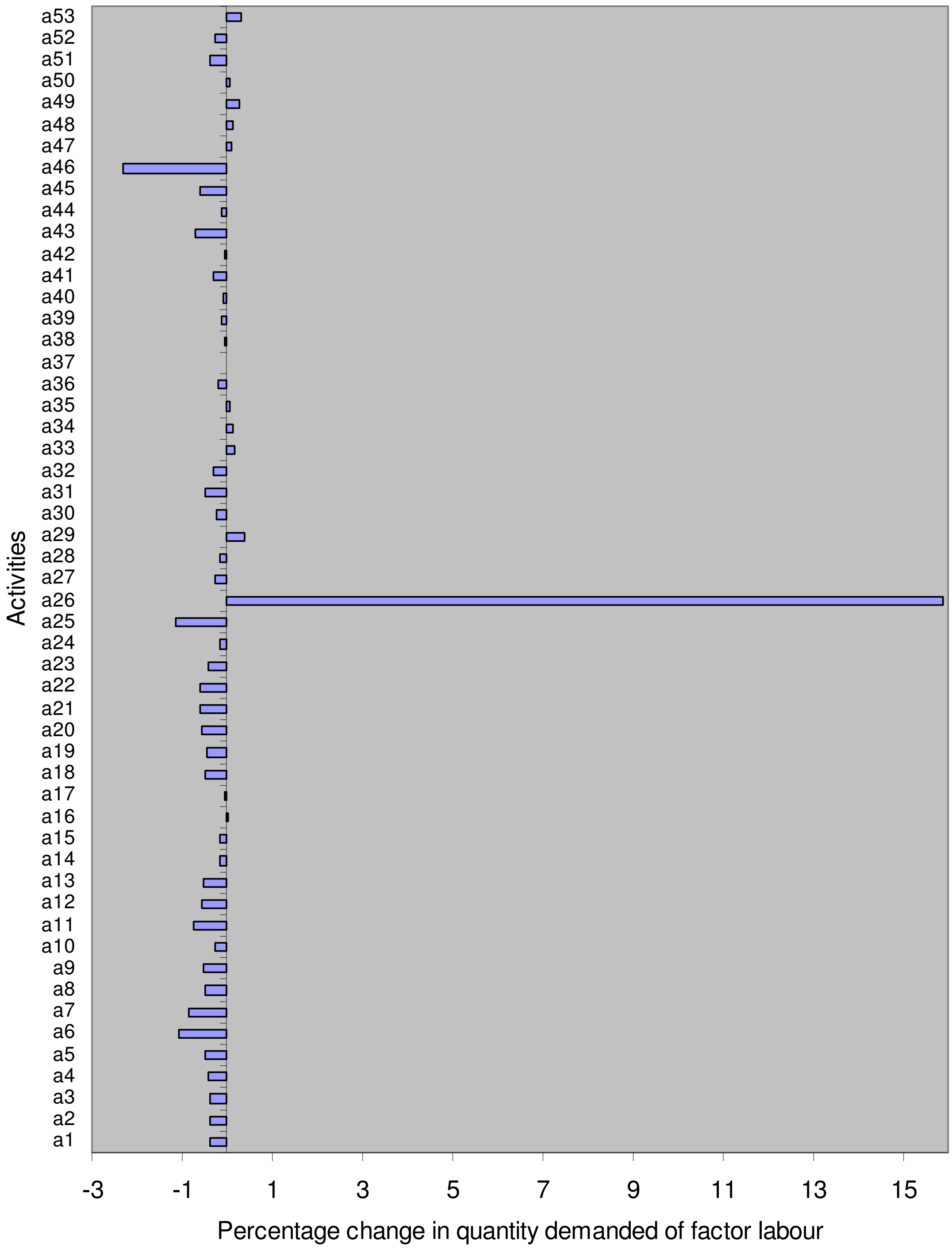

Figure 7.8: QFXP (quantity demanded of factor (labour) from activity) at DFA market regimes
Source: Model estimation results

Table 7.7 shows the effect that changes in wage rates and employment will have on factor incomes. The labour factor income is predicted to increase by 0.5% and that of the capital factor by 0.4%.

Table 7.7: Factor income (YFXP) (% change)

	Base	YFXP(%)
FLAB (Labour)	3006.46	0.497
FCAP (Capital)	1472.98	0.404

Source: Model estimation results

7.4.2.1.1.5 Impact on government and macroeconomic variables

The effect of DFA market regimes on a number of government and macroeconomic variables is shown in Table 7.8. DFA market regimes will cause the gross domestic product (GDP) to increase very slightly by 0.13% and 0.11% in nominal and real terms respectively. Total investment and government consumption expenditure increases by 0.3% and 0.1% respectively in nominal terms.

The improvement in terms of trade will also result in a marginal increase in trade relative to the GDP. Export and import values increase by 2.23% and 0.51% respectively in real terms. Net indirect tax increases by 0.46%.

Table 7.8: GDPTAB1 and GDPTAB1P: GDP and national account (real and nominal) at DFA market regimes (Million Maloti)

		Value of gross domestic product (GDPBTAB1)		Percentage change of gross domestic product (GDPTAB1P)	
	Base	Nominal	Real	Nominal	Real
ABSORP	9171.34	9185.593	9178.102	0.155	0.074
PRVCON	4941.5	4947.081	4948.262	0.113	0.137
FIXINV	2376.56	2383.578	2376.56	0.295	0*
GOVCON	1853.28	1854.934	1853.28	0.089	0*
EXPORTS	1280.79	1311.881	1309.228	2.427	2.225
IMPORTS	-4423.71	-4454.917	-4446.11	0.705	0.506
GDPMP	6009.06	6017.052	6015.822	0.133	0.113
GDPMP2	6009.06	6017.052	6009.06	0.133	0*
NETITAX	1529.62	1516.713	1536.664	-0.844	0.461
GDPFC2	4479.44	4500.339	4479.385	0.467	-0.001

Note: * there is no percentage change
Source: Model estimation results

7.4.2.1.2 Results of preference erosion (EEP) policy scenarios

7.4.2.1.2.1 Impact on commodity price and trade

The erosion of existing preferences (EEP) in the market access regimes of textiles will cause the domestic export price (PEXP) to decrease by 0.23% and the quantity exported (QEXP) by 14.10%. The quantity of total commodities exported (QEXP) can be expected to decrease by 0.072%. Some exports are expected to increase, with the most significant increase (1.88%) being in the air transport sector (c44). Quantity exported (QEXP) decreases of less than 1% are to be experienced with pharmaceutical products (c25), gas and petroleum products (c24), other chemical products (c27), soap cleaning compounds (c26), micro industry products (c31), other manufacturing (c32) (-0.23%) and other community services (c53). Except for air transport (c44) which is forecast to increase by 1.88%, the other commodities expected to increase will do so by less than +1.00%. Detailed results are shown in Figure 7.9.

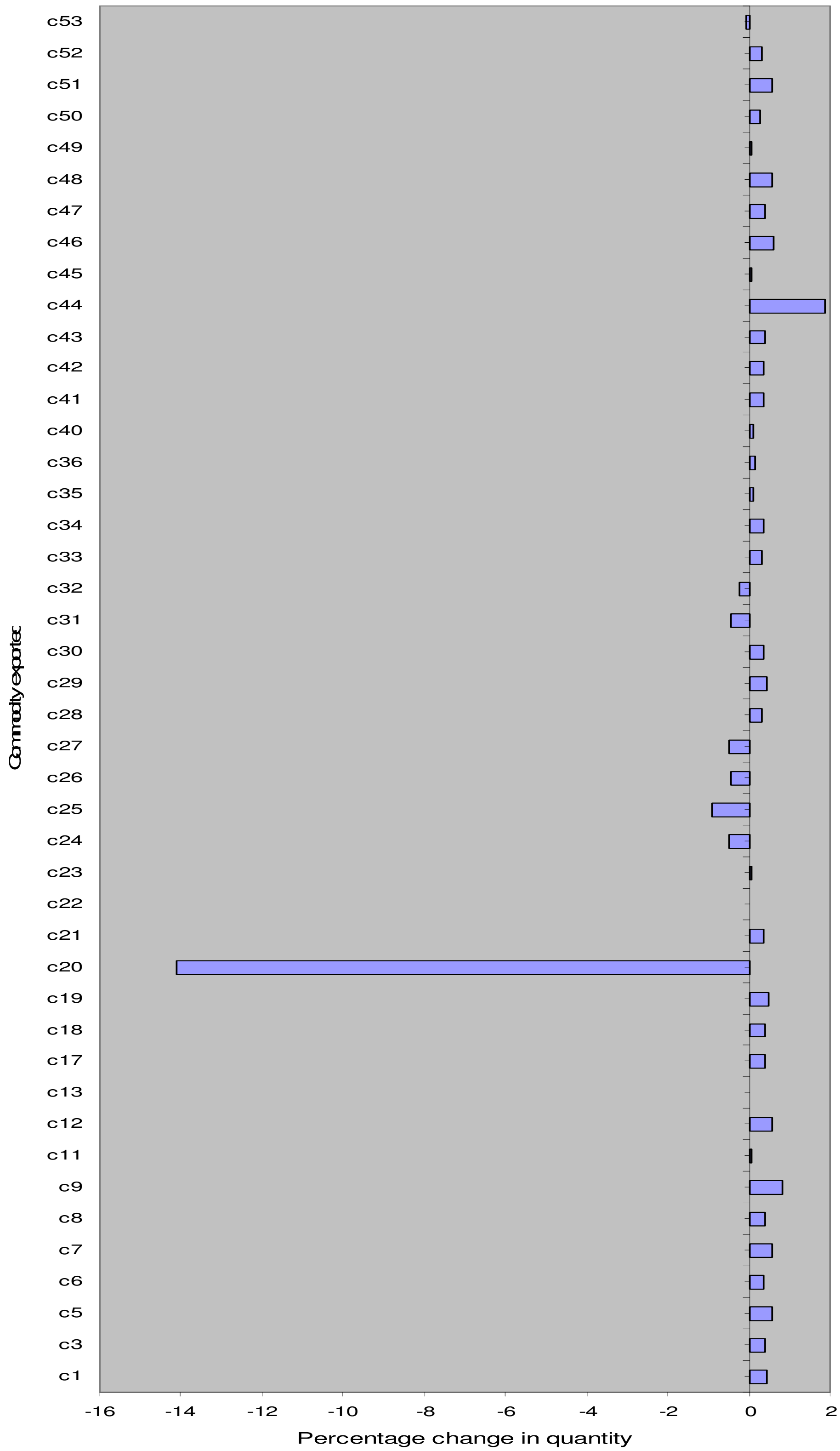

Figure 7.9: Quantity of exports (QEXP) at EEP market regimes
Source: Model estimation results (for the code, see Appendix 6.1 section 6.1.2)

EEP will cause the import price (PMXP) of textiles to increase by 6.6%, while on average the import prices of commodities will decrease by 0.23%. The quantity of textiles imported (QMXP) will decrease by 5.62%, while the effect on imports of other commodities will vary, but will be less than a 1.00% change in every instance. Detailed results are shown in Figure 7.10.

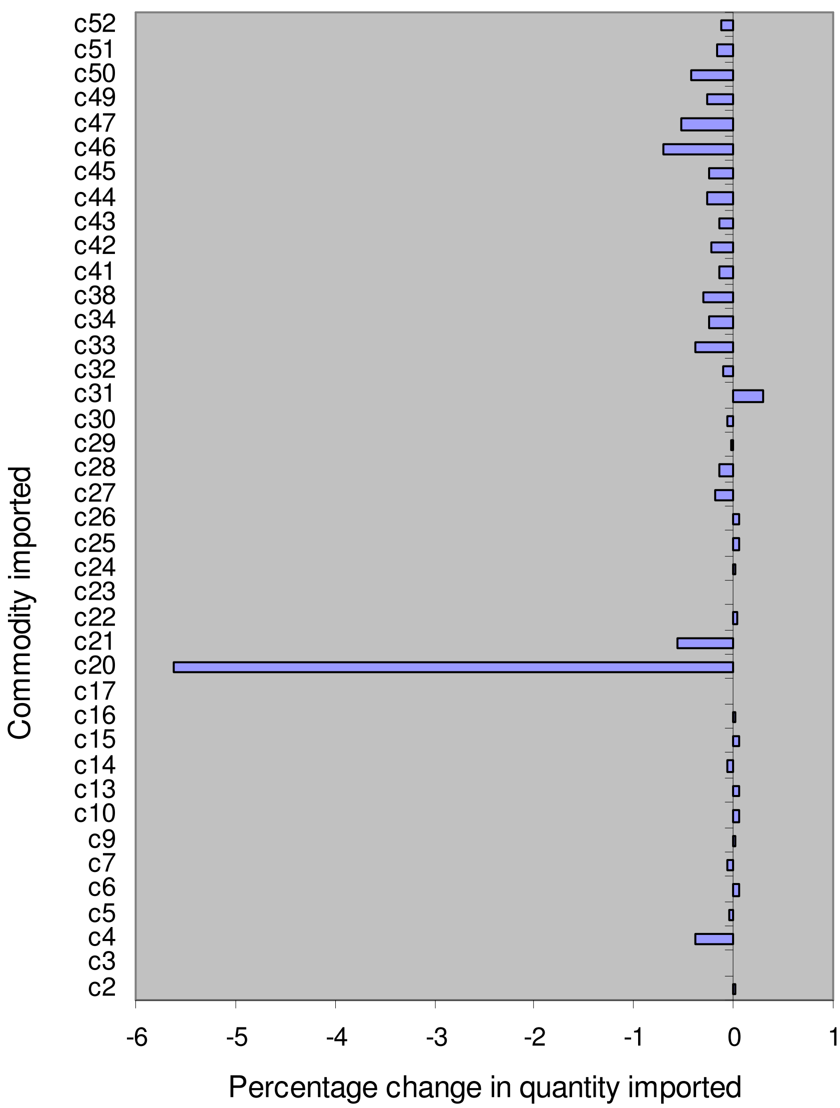

Figure 7.10: Quantity of imports (QMXP) at EEP market regimes
Source: Model estimation results (for the code, see Appendix 6.1 section 6.1.2)

The impact of EEP on both the demand price (PDDXP) and the supply price of commodities (PDSXP) produced and sold domestically ranges between -0.76% for the air transport sector (c44) and a 5.58% increase for the textile sector. On aggregate, the mean for all commodities will decrease by 0.22%.

The EEP impact on the price of composite goods (PQXP), average output price (PXXP) and the quantity of aggregated marketed commodities (QXXP) is as follows: On aggregate, the price of composite goods (PQXP) for commodities is to decrease by 0.18%, ranging between -0.60% for the coarse and fine sand sector (c12) and a +6.38% increase for the textile sector. Price of composite goods (PQXP) for all commodities are to be immaterially affected negatively by less than -0.60% (except the textile sector). The average output price (PXXP) for the overall commodity complex is predicted to decrease by -0.28%, ranging between -0.57% and +2.14%, again for the coarse and fine sand and textile sectors respectively. Average output price (PXXP) for all commodities except textiles are expected to decline by less than -0.57%. The aggregated quantity of marketed commodities (QXXP) will hardly change, with an average decrease of 0.09% for the overall commodity complex. This effect ranges from -10.00% for the textiles sector to +1.58% for air transport (c44). Quantity of aggregated marketed commodities (QXXP) is predicted to change by less than 0.50%, except for the textile sector which is expected to experience a decline of 10.00%. Detailed results for the impact of these five variables or parameters are available in Appendix 7.2.

7.4.2.1.2.2 Impact on activities' output price and intermediate input cost

The impact of EEP on activities output price (PAXP) was found to range between -0.48% and +2.14% for financial-insurance services (a49) and the textile sector respectively, with an average or mean of -0.30% for all activities. Agricultural activities will on average face a decrease of 0.36%, mining activities a decrease of 0.43%, the manufacturing sector a decrease of 0.14%, and other services on average decrease of 0.38%. None of these changes can be expected to be meaningful.

Changes in the price of intermediate inputs (PINTAXP) appear in Table 7.9. In the textile sector an increase of 3.20% can be expected. Changes in other sectors will be much smaller and negative in most cases, varying between +0.04% in the micro industry sector (a33) and other manufacturing sectors (a34) and –0.38% in the water services sector (a36).

Expansion or contraction of industries is primarily affected via changes in return to factors and subsequent reallocations. The change in the price of value added (PVAXP) in

Table 7.9 indicates changes in the overall return to factors in different activities. Returns to factors are predicted to decrease somewhat in all activities, implying a mild contraction of economic activity in all industries.

According to the model estimation results, the textile sector (a26) will experience the largest decrease in PVAXP (1.76%), while the accommodation and catering sector (a43) experiences the least significant decrease (0.26%). At industry level, the manufacturing industry is to experiences a mean absolute decrease of 0.48% in the price of value added, while the mining sector (0.43%), services (0.41%) and agriculture (0.37%) are set to be less affected.

Changes in the GDP at factor cost are shown in real terms. Nominal terms are mentioned only for reasons of comparison. Gross domestic product (GDP) for the overall activity will increase by 0.42%, varying between -11.54% and +1.18% for the textile sector (a26) and air transport (a46) respectively at nominal terms. Chemical and pharmaceutical products stand to decrease by 1.01%. Changes in the other activities will be minimal, in all cases less than 1.00%.

When seen from the real terms perspective, the overall activity will decrease by 0.007%. Some change in structure is to occur with some activities gaining (e.g. textile (a26) +1.58%) and some losing (e.g. air transport -9.96%). Changes in other sectors are to be less than 1.00%. None of the aggregated industry groups – agriculture, mining, manufacturing and services are to change by over 1.00%.

Table 7.9: Model estimation results of PAXP, PINTAXP, PVAXP and GDP at EEP

Activities	PAXP	PINTAXP	PVAXP	BASE	GDP(Nom.)	GDP(real)
a1	-0.36	-0.29	-0.37	132.53	-0.16	0.21
a2	-0.35	-0.3	-0.36	123	-0.18	0.18
a3	-0.33	-0.27	-0.34	225.58	-0.14	0.2
a4	-0.32	-0.28	-0.34	122.5	-0.13	0.22
a5	-0.32	-0.32	-0.32	106.74	-0.09	0.24
a6	-0.39	-0.36	-0.39	2.24	0.35	0.75
a7	-0.36	-0.31	-0.37	10.34	0.19	0.56
a8	-0.32	-0.29	-0.32	89.24	-0.11	0.21
a9	-0.33	-0.29	-0.33	78.35	-0.06	0.27
a10	-0.37	-0.26	-0.38	37.95	-0.24	0.14
a11	-0.39	-0.28	-0.4	6.52	0.08	0.49
a12	-0.38	-0.27	-0.39	21.5	-0.05	0.35
a13	-0.34	-0.31	-0.34	28.19	-0.07	0.27
a14	-0.4	-0.29	-0.41	54.26	-0.31	0.1
a15	-0.4	-0.21	-0.43	32.95	-0.32	0.11
a16	-0.38	-0.19	-0.44	6.85	-0.45	-0.01
a17	-0.43	-0.3	-0.43	21.14	-0.39	0.04
a18	-0.32	-0.32	-0.32	113.94	-0.1	0.22
a19	-0.32	-0.3	-0.36	40.98	-0.1	0.26
a20	-0.33	-0.31	-0.36	26.79	-0.02	0.34
a21	-0.31	-0.3	-0.32	50.22	-0.04	0.28
a22	-0.31	-0.32	-0.3	32.92	-0.01	0.3
a23	-0.29	-0.29	-0.3	56.32	-0.19	0.11
a24	-0.29	-0.26	-0.43	7.94	-0.32	0.12
a25	-0.38	-0.31	-0.42	8.63	0.43	0.86
a26	2.14	3.2	-1.76	44.79	-11.54	-9.96
a27	-0.31	-0.26	-0.4	67	-0.26	0.14
a28	-0.24	-0.18	-0.42	57.76	-0.39	0.04
a29	-0.17	0.02	-0.56	36.22	-1.01	-0.44
a30	-0.32	-0.28	-0.4	57.14	-0.28	0.12
a31	-0.32	-0.26	-0.39	36.21	-0.13	0.25
a32	-0.33	-0.26	-0.41	33.32	-0.25	0.16
a33	-0.04	0.04	-0.52	9.19	-0.6	-0.08
a34	-0.22	0.04	-0.51	42.08	-0.7	-0.2
a35	-0.41	-0.35	-0.45	132.77	-0.47	-0.02
a36	-0.37	-0.38	-0.36	129.3	-0.3	0.07
a37	-0.29	-0.22	-0.44	375.88	-0.44	0
a38	-0.31	-0.27	-0.43	352.61	-0.42	0.01
a39	-0.32	-0.29	-0.41	31.12	-0.35	0.06
a40	-0.41	-0.31	-0.43	27.84	-0.38	0.05
a41	-0.35	-0.31	-0.37	416.54	-0.21	0.16
a42	-0.27	-0.13	-0.43	9.64	-0.4	0.03
a43	-0.28	-0.29	-0.26	85.61	0.01	0.27
a44	-0.38	-0.25	-0.42	76.45	-0.34	0.08
a45	-0.29	-0.25	-0.36	56.98	-0.06	0.3
a46	-0.38	-0.25	-0.4	32.43	1.18	1.58
a47	-0.36	-0.24	-0.46	126.2	-0.51	-0.05
a48	-0.47	-0.36	-0.48	309.77	-0.54	-0.06
a49	-0.48	-0.33	-0.54	197.56	-0.63	-0.1
a50	-0.41	-0.22	-0.44	51.66	-0.5	-0.06
a51	-0.39	-0.26	-0.43	61.88	-0.18	0.24
a52	-0.34	-0.25	-0.37	38.41	-0.24	0.12
a53	-0.3	-0.25	-0.45	145.46	-0.65	-0.19
TOTAL				4479.44	-0.42	0.00E+00

Where: PAXP= percentage change of activities output price, PINTAP= percentage change of price of intermediate inputs, PVAXP = percentage change of price of value added and GDP = percentage change of gross domestic product.

Note: Agriculture included from a1 to a16, Mining a17, Manufacturing a18 - a34 and Services a35 - a53.

Source: Model estimation results

7.4.2.1.2.3 Household impact

The effects of an erosion of existing preferences (EEP) in market access regimes of textiles on household consumption expenditure (EHXP), household income (YIXP) and the welfare of households, measured in terms of equivalent variation (EV), now receive attention.

As shown in Table 7.10, on aggregate EHXP hardly changes and decreases by 0.18%. Urban low-income households will experience an EHXP decrease of 0.46%, and changes in the other population groups will be smaller. Similar small responses are to occur in terms of household income losses, which will vary from 0.64% downwards.

Lesotho can experience a 5.96% loss in welfare (EV), largely concentrated in urban areas. Table 7.10 shows that this welfare loss will largely be concentrated among the urban high-income band who will experience a welfare loss of 3.67%, whilst losses in other population groups will be 0.53% or smaller.

Table 7.10: Household expenditure, income, and equivalent variation

Households	Base	EHXP	EV	Base	YIXP
Urban high income	3231.72	-0.124	-3.663	3606.32	-0.307
Urban low income	22.15	-0.457	-0.071	24.5	-0.64
Rural lowlands high income	512.88	-0.064	-0.215	542.5	-0.241
Rural lowlands low income	254.56	-0.188	-0.532	266.95	-0.366
Rural foothills high income	283.29	-0.073	-0.113	301.86	-0.254
Rural foothills low income	139.21	-0.213	-0.297	146.97	-0.393
Rural mountain high income	216.26	-0.086	-0.416	225.61	-0.263
Rural mountain low income	97.91	-0.239	-0.344	99.24	-0.417
Rural SRV high income	119.05	-0.113	-0.13	126.78	-0.29
Rural SRV low income	64.47	-0.274	-0.175	67.16	-0.451
Total	4941.5	-1.83(0.18*)	-5.958	5407.89	-3.62(-0.36*)

Note: EHXP = Household consumption expenditure, EV = Equivalent variation, and YIXP = Household income
Source: Model estimation results

7.4.2.1.2.4 Impact on labour employment and factor income

The effect that a shock will have on the various labour categories largely depends on the effect on the activities that provide employment. The effect of erosion of existing preferences (EEP) on the quantity of labour demanded (FLAB), including skilled and unskilled labour from activities or the quantity of labour per activity, hardly changes on average (-0.006%). There will however occur a serious loss of 11.39% in the textile sector (a26) and a small 1.63% gain in the air transport sector (a46). In the other activities, very small changes, less than 1% will happen. Detailed results are shown in Table 7.11.

Table 7.11: QFXP at EEP

Activities	Base	QFXP	Activities	Base	QFXP	Activities	Base	QFXP
a1	95.84	0.3	a19	29.56	0.35	a37	310.82	0
a2	80.58	0.28	a20	20.84	0.43	a38	180.47	0.02
a3	145.72	0.32	a21	33.61	0.42	a39	18.86	0.09
a4	79.69	0.33	a22	21.5	0.46	a40	26.37	0.05
a5	67.66	0.37	a23	22.37	0.28	a41	281.49	0.24
a6	2.08	0.8	a24	7.73	0.12	a42	8.22	0.04
a7	9.08	0.64	a25	8.41	0.88	a43	47.8	0.49
a8	53.63	0.36	a26	38.9	-11.39	a44	60.45	0.1
a9	53.75	0.39	a27	49.99	0.19	a45	43.21	0.39
a10	25.46	0.2	a28	40.05	0.05	a46	31.42	1.63
a11	6	0.53	a29	26.91	-0.6	a47	87.02	-0.08
a12	18.65	0.4	a30	41.54	0.17	a48	165.99	-0.12
a13	19.61	0.38	a31	29.32	0.31	a49	89.11	-0.22
a14	41.1	0.13	a32	27.61	0.2	a50	47.27	-0.06
a15	29.57	0.12	a33	4	-0.18	a51	59.15	0.25
a16	3.24	-0.02	a34	29.58	-0.28	a52	22.92	0.21
a17	19.53	0.05	a35	83.52	-0.04	a53	132.22	-0.21
a18	70.43	0.36	a36	56.61	0.15			

Where: QFXP = percentage change of quantity demanded of factor (labour) from activity
Source: Model estimation results

Table 7.12 shows the effect on factor income resulting from the changes in wage rates and employment. The labour factor income decreases by 0.44%, while the capital factor income decreases by 0.37%.

Table 7.12: Factor income (YFXP) (% change)

	Base	YFXP(%)
FLAB (Labour)	3006.46	-0.437
FCAP(Capital)	1472.98	-0.37

Source: Model estimation results

7.4.2.1.2.5 Government and macroeconomic variables

Table 7.13 shows the effect of the erosion of existing preferences (EEP) in the market access of textiles on a number of government and macroeconomic variables. Gross domestic product (GDP) decreases insignificantly by 0.12% and 0.09% in nominal and real terms respectively. Government consumption decreases by 0.08% in nominal terms. Private consumption decreases by 0.12% and 0.11% in nominal and real terms respectively. None of these changes can be regarded as significant.

The changed terms of trade also lead to a decrease in trade relative to the GDP: export and import values decrease by 1.7% and 0.4 % respectively in real terms. Net indirect tax also decreases by 0.35% in real terms.

Table 7.13: GDPTAB1 and GDPTAB1P: GDP and national account (real and nominal) at EEP (Million Maloti)

		Value of gross domestic product (GDPBTAB1)		Percentage change of gross domestic product (GDPTAB1P)	
	Base	Nominal	Real	Nominal	Real
ABSORP	9171.34	9156.772	9165.777	-0.159	-0.061
PRVCON	4941.5	4935.357	4935.937	-0.124	-0.113
FIXINV	2376.56	2369.624	2376.56	-0.292	0*
GOVCON	1853.28	1851.791	1853.28	-0.08	0*
EXPORTS	1280.79	1311.881	1309.228	-1.927	-1.698
IMPORTS	-4423.71	-4454.917	-4446.11	-0.618	-0.387
GDPMP	6009.06	6001.847	6003.497	-0.12	-0.093
GDPMP2	6009.06	6001.847	6009.06	-0.12	0*
NETITAX	1529.62	1540.988	1524.244	0.743	-0.351
GDPFC2	4479.44	4460.859	4479.408	-0.415	-7.03E-04

Note: * there is no measurable change
Source: Model estimation results

7.4.2.2 Result of government policy: CET scenarios

The common external tariff (CET) regime represents a harmonized tariff regime between SACU countries. It eliminates tariffs on internal trade between these countries, while imposing a common tariff on non-member imports. The simulation results are interpreted as the potential impact of the CET regime, if the regime were in place in the base simulation year (i.e. 2000).

7.4.2.2.1 Impact on commodity price and trade

CET for non-SACU members will result in a 1.29% decrease in the domestic export price (PEXP). This will lead to an average decrease of 2.19% in the quantity of exports (QEXP). The biggest decreases will be in the textile sector (c20) (9.83%) and for pharmaceutical products (c25) (9.09%). Decreases varying between 3.74% and 2.33% can be expected, in descending order, for leather and footwear products (c21), postal services (c46), other chemical products (c27), insurance services (c49), gas and petroleum products (c24), other manufacturing (c32), soap cleaning compounds (c26), micro industry products (c31), air transport (c44), civil engineering (c36), other community services (c53), wood and wood products (c22), bricks (c28) and building construction (c35).

CET will cause import prices (PMXP) of commodities on average to increase by 0.56%, varying from a 0.73% increase for water services and a 0.44% increase for the sale and repair of autos. On average, quantities imported (QMXP) will decrease by 1.39% varying between a decrease of 3.74% for the skins and hides sector (c6) and a 0.39% increase for pharmaceutical products (c25), the only sector predicted to experience an increase. Decreases of 2.00 % or more can be expected (in descending order) in imports of skins and hides (c6), crops (c4), water(c34), electricity(c33), sheep, goats and pigs (c7), telecommunications (c45), beverages and tobacco (c17), sales and repair of auto services (c38), beef and processed meat (c14), cattle (c5), taxis and minibus road transport (c42), informal financial and business services (c50), real estate and business services (c47) and domestic services (c52).

Details of model estimation results of QEXP and QMXP at CET are appears in Table 7.14.

Table 7.14: Model estimation results of QEXP and QMXP at CET

Commodities	Base	QEXP	Commodities	Base	QMXP
c1	0.26	-0.87	C2	41.31	-1.67
c3	11.06	-1.23	C3	6.5	-1.81
c5	5.47	-1.46	C4	6.22	-3.52
c6	3.77	-0.71	C5	13.51	-2.19
c7	0.9	-1.61	C6	58.13	-3.74
c8	2.27	-0.9	C7	16.85	-2.46
c9	1.29	0.25	C9	28.76	-0.76
c11	7.88	-0.02	C10	87.83	-0.87
c12	0.76	-1	C13	53.83	-0.12
c13	0.56	-1.97	C14	110.72	-2.25
c17	3.47	-1.9	C15	444.66	-1.04
c18	5.69	-1.78	C16	362.54	-1.28
c19	4.93	-0.3	C17	125.31	-2.37
c20	402.43	-9.83	C20	305.85	-1.7
c21	88.17	-3.74	C21	135.33	-1.42
c22	27.33	-2.49	c22	146.55	-1
c23	3.34	-2.62	c23	253.33	-0.48
c24	33.03	-3.19	c24	437.31	-0.64
c25	1.09	-9.09	c25	94.32	0.39
c26	30	-3.04	c26	118.05	-0.72
c27	14.65	-3.45	c27	320.72	-0.37
c28	30.84	-2.46	c28	53.82	-0.85
c29	15.01	-1.71	c29	266.26	-0.39
c30	7.18	-1.51	c30	1321.41	-0.28
c31	0.02	-2.95	c31	1.96	-1.13
c32	45.96	-3.11	c32	30.21	-0.57
c33	2.02	-1.43	c33	0.22	-2.64
c34	10.34	-0.74	c34	0.08	-3.34
c35	0.44	-2.33	c38	0.42	-2.32
c36	93.92	-2.66	c41	0.7	-0.96
c40	0.94	-1.69	c42	4.2	-2.13
c41	169.46	-3	c43	55.81	-0.23
c42	1.5	-1.18	c44	29.98	-0.14
c43	81.39	-4	c45	17.64	-2.43
c44	26.13	-2.93	c46	2.02	-0.38
c45	50.92	-0.83	c47	128.21	-2.07
c46	0.4	-3.51	c49	109.29	-0.56
c47	0.2	-1	c50	24.4	-2.11
c48	0.33	-0.25	c51	91.09	-0.93
c49	0.15	-3.26	c52	2.1	-2.03
c50	1.16	-0.57			
c51	10.67	-0.37			
c52	4.57	-1.27			
c53	5.8	-2.57			

Where: QEXP = percentage change of quantities exported, QMXP = percentage change of quantities imported
Source: Model estimation results

The demand price for commodities produced and sold domestically (PDDXP) and the supply price for commodities produced and sold domestically (PDSXP) will on average decrease by 0.22% for the overall commodity mix in both cases, ranging between -1.21% for financial services (c48) and a 2.13% increase for pharmaceutical products (c25). The textile sector (c20) can expect demand price for its products to increase by 1.80%.

The impact on the price of composite goods (PQXP), average output price (PXXP) and quantity of aggregated marketed commodities (QXXP) is as follows: price of composite goods (PQXP) will on average decrease by 0.06%, ranging between a decrease of 1.21% for financial services (c48) and a 0.91% increase for pharmaceutical products (c25). As is the case with other sectors, the textile sector (c20) is hardly affected with an increase of 0.82%.

Average output price (PXXP) will on average decrease by 0.49%, ranging from -1.29% to +2.00% for diamonds (c11) and pharmaceutical products (c25) respectively. The textile sector (c20) will hardly experience change (-0.05%). The only other sectors to experience change of more than 1.00% are soap cleaning compounds (c26), and petroleum products (c24) and other chemical products (c27), all of which will experience a decline.

Quantity of aggregated marketed commodities (QXXP) will on average decrease by 0.28% for the overall commodity range, ranging from -7.55% for textiles (c20) to +1.58% for processing of grain and grain products (c15). Quantities of some aggregated marketed commodities (QXXP) can also be expected to increase, but the margins by which they increase are less than +1.60%; activities with margins of increase larger than 1.00% include broilers and other poultry products (c10), egg products (c9), dairy and other food products (c16) and government services (c51). With the exception of textiles, decreases in marketed quantities of the other product sectors will be less than 3.00% Those among these where a decline of over 1.00% can be expected, are gas and petroleum products (c24), pharmaceutical products (c25), soap cleaning compounds (c26), other chemical products (c27), commercial road transport (c43), air transport (c44), accommodation and catering (c41), footwear products (c21) and other manufacturing (c32). Detailed results of these five variables or parameters appear in Appendix 7.3.

7.4.2.2.2 Impact on activities output and intermediate input cost

The impact of CET on activity output price (PAXP) was found to range between -0.97% and +0.09% for water services (a36) and micro industries (a33) respectively. Agricultural output decreases by 0.63%, mining output by 0.85%, manufacturing output by 0.33%, and the services sector output by 0.57%. None of these changes can be considered to be of material importance.

The price of intermediate aggregate inputs (PINTAXP) increases in some sectors. This increase amounts to 0.45% in the textile sector. Some other activities will experience a decrease in the price of their intermediate inputs. This decline amounts to 0.83% for water services (a36). Other activities will experience changes between these two.

Expansion or contraction of industries is primarily affected via changes in return to factors and subsequent reallocations. The change in prices of value added (PVAXP) reported in Table 7.15 indicates changes in the overall return to factors in different activities. The results show that CET will result in a decrease in return to factors in all activities, implying a contraction of economic activity in all industries.

The decrease ranges from -2.14% to -0.27% for the accommodation-catering sector (a43) and the grain milling sector (a21) respectively. In terms of aggregated industries, the services industry experiences an absolute average decrease (-1.00%), followed by the mining sector (-0.94%), manufacturing (-0.91%) and agriculture (-0.73%).

The model estimates the change in the gross domestic product (GDP) at factor cost in both nominal and real terms. At nominal prices the overall activity will experience a rather slight decrease of 0.89%, which amounts to merely 0.001% in real terms. In nominal terms the value changes range from respectively -9.29% to +1.68% for textiles (a26) and cattle production (a6). Other activities with a positive change or increase (of more than 1.05% and less than 1.68%) are dairy and other food processing (a20), grain milling (a21) and wool and mohair processing (a25). Other activities to undergo declines of over 1.0% are the following: chemical and pharmaceutical production (a29), accommodation and catering (a43), road transport (a45), footwear production (a27) and other manufacturing (a34). At aggregate level, in nominal terms, the agricultural sector increases by 0.06%, the mining sector decreases by 0.93%, the manufacturing sector decreases by 1.23%, and the services sector decreases by 1.26%.

However, in real terms, value changes range from -7.55% to +2.50% for textiles and the wool and mohair processing sectors (a25) respectively. Other activities expected to show increases of over 1.00% but less than +3.00% include feedlot cattle (a6), dairy cattle (a7) grain milling (a21), poultry - broilers (a12), poultry - layers (a11), wool and mohair shearing sheds (a24) and government services (a51). Besides textiles, the following activities can expect to undergo declines of more than 1.00%: Chemical and pharmaceutical production (a29), freight and passengers (a45), air transport-commercial (a46), other manufacturing (a34) and footwear production (a27). At aggregate level, the agricultural sector is set to increase by 0.80%, while in real terms the mining sector will decrease by 0.02%, the manufacturing sector by 0.24%, and the service sector by 0.26%. These aggregate level changes are too slight to be regarded meaningful. A detailed exposition of the estimation results of PAXP, PINTAXP, PVAXP and gross domestic product (GDP) at factor cost, at CET of each activity in respect of percentage increase and decrease, is presented in Table 7.15.

Table 7.15: Model estimation results of PAXP, PINTAXP, PVAXP and GDP at CET

Activities	PAXP	PINTAXP	PVAXP	GDP(Nom.)	GDP(real)
a1	-0.58	0.08	-0.7	-0.06	0.64
a2	-0.56	-0.07	-0.64	-0.04	0.6
a3	-0.49	0.2	-0.72	-0.31	0.41
a4	-0.58	0.13	-0.81	-0.6	0.21
a5	-0.52	-0.15	-0.56	0.15	0.72
a6	-0.73	-0.49	-0.75	1.68	2.45
a7	-0.64	-0.05	-0.71	0.96	1.68
a8	-0.5	-0.19	-0.54	0.11	0.66
a9	-0.6	-0.16	-0.65	0.02	0.68
a10	-0.73	0.3	-0.81	-0.58	0.23
a11	-0.75	0.07	-0.81	0.54	1.36
a12	-0.64	-0.02	-0.71	0.81	1.54
a13	-0.55	-0.29	-0.57	0.36	0.93
a14	-0.76	-0.33	-0.81	-0.44	0.37
a15	-0.75	0.13	-0.88	-0.59	0.29
a16	-0.7	0.11	-0.95	-1.01	-0.05
a17	-0.85	0.26	-0.91	-0.93	-0.02
a18	-0.45	-0.34	-0.68	-0.23	0.45
a19	-0.24	-0.05	-0.61	0.33	0.94
a20	-0.33	-0.21	-0.51	1.15	1.68
a21	-0.32	-0.34	-0.27	1.3	1.58
a22	-0.44	-0.24	-0.73	-0.34	0.39
a23	-0.44	-0.48	-0.37	0.05	0.42
a24	-0.52	-0.43	-0.88	0.14	1.03
a25	-0.7	-0.37	-0.85	1.63	2.5
a26	-0.05	0.45	-1.89	-9.29	-7.55
a27	-0.63	-0.15	-1.41	-3.16	-1.77
a28	-0.12	0.1	-0.83	-0.62	0.21
a29	-0.34	0.31	-1.75	-4.61	-2.91
a30	-0.21	0.21	-1	-1.3	-0.3
a31	-0.29	0.24	-0.85	-0.55	0.3
a32	-0.18	0.32	-0.78	-0.07	0.72
a33	0.09	0.31	-1.12	-1.32	-0.2
a34	-0.53	0.31	-1.47	-3.04	-1.6
a35	-0.69	-0.28	-1.01	-1.23	-0.22
a36	-0.97	-0.83	-1	-1.08	-0.09
a37	-0.13	0.22	-0.91	-0.93	-0.02
a38	-0.05	0.27	-1.05	-1.24	-0.19
a39	-0.48	-0.38	-0.79	-0.57	0.22
a40	-0.74	-0.03	-0.9	-0.88	0.02
a41	-0.54	-0.03	-0.83	-0.63	0.2
a42	-0.46	-0.09	-0.91	-0.93	-0.02
a43	-0.72	-0.1	-2.14	-3.98	-1.88
a44	-0.62	0.24	-0.87	-0.7	0.17
a45	-0.48	0.24	-1.55	-3.92	-2.41
a46	-0.84	0.24	-0.96	-2.96	-2.02
a47	-0.53	0.08	-0.96	-1.1	-0.15
a48	-0.64	-0.26	-0.69	-0.38	0.3
a49	-0.73	0.04	-0.99	-1.08	-0.09
a50	-0.77	-0.23	-0.87	-0.39	0.48
a51	-0.62	0.16	-0.87	0.13	1.01
a52	-0.63	0.04	-0.87	-0.8	0.07
a53	-0.19	0.04	-0.94	-1.31	-0.37
TOTAL				-0.89	0

Where: PAXP= percentage change of activities output price, PINTAP= percentage change of price of intermediate inputs, PVAXP = percentage change of price of value added and GDP = percentage change of gross domestic product.

Note: Agriculture included from a1 to a16, Mining a17, Manufacturing a18 - a34 and Services a35 - a53.
Source: Model estimation results

7.4.2.2.3 Household impact

CET will have an impact on household consumption expenditure (EHXP), household income (YIXP) and household welfare (EV). Equivalent variation (EV) is one of the most common indicators used to measure changes in welfare.

As shown in Table 7.16, common external tariffs (CETs) will cause household consumption expenditure (EHXP) to decrease by 0.42% on aggregate. The urban low-income households experience the most significant decrease in EHXP (-1.26%), followed by rural Sengu River Valley low-income households (-0.73%).

Household income (YIXP) decreases on aggregate by 1.00%. The loss of household income (YIXP) is concentrated in the urban areas particularly, with the urban low-income households experiencing a decrease in YIXP of 1.86%, followed by the rural SRV low-income households with a decrease of 1.31%.

Lesotho can experience a small (0.20%) loss in welfare (EV). This loss will be concentrated in urban areas. Table 7.16 indicates that urban low-income households will lose 1.2%, followed by rural SRV low-income households at 0.7%.

Table 7.16: Household expenditure, income, and equivalent variation

Households	Base	EHXP	EV	Base	YIXP
Urban high income	3231.72	-0.259	-0.3	3606.32	-0.864
Urban low income	22.15	-1.258	-1.2	24.5	-1.857
Rural lowlands high income	512.88	-0.021	-0.1	542.5	-0.608
Rural lowlands low income	254.56	-0.485	-0.5	266.95	-1.07
Rural foothills high income	283.29	-0.043	-0.1	301.86	-0.64
Rural foothills low income	139.21	-0.554	-0.5	146.97	-1.148
Rural mountain high income	216.26	-0.076	-0.1	225.61	-0.663
Rural mountain low income	97.91	-0.627	-0.5	99.24	-1.21
Rural SRV high income	119.05	-0.145	-0.2	126.78	-0.731
Rural SRV low income	64.47	-0.726	-0.7	67.16	-1.308
Total	4941.5	-0.42	-0.2	5407.89	-1.00

Note: EHXP = Household consumption expenditure, EV = Equivalent variation, and YIXP = Household income
Source: Model estimation results

7.4.2.2.4 Impact on labour employment and factor income

The effect of common external tariffs (CETs) on the various labour categories largely depends on the way in which those activities that provide employment are affected. On average, activities will employ 0.081% more labour (FLAB). The textile sectors will lay off many workers (-8.65%). The sector experiencing the most significant increase will be cattle production (+2.64%). Fourteen activities or sectors can be expected to show increases larger than 1.00%: Wool and mohair shearing sheds (a24), government services (a51) feedlot cattle (a6), cattle production (a5), dairy cattle (a7), sheep (A8), poultry - layers (a11), poultry - broilers (a12), chickens and pigs (a13), fruit and vegetable processing (a19), dairy and other food processing (a20), beverages (a23) and wool and mohair processing (a25). Detailed results are shown in Table 7.17.

Table 7.17: QFXP at CET

Activities	Base	QFXP	Activities	Base	QFXP	Activities	Base	QFXP
a1	95.84	0.89	a19	29.56	1.31	a37	310.82	-0.02
a2	80.58	0.92	a20	20.84	2.16	a38	180.47	-0.36
a3	145.72	0.64	a21	33.61	2.36	a39	18.86	0.36
a4	79.69	0.32	a22	21.5	0.6	a40	26.37	0.02
a5	67.66	1.13	a23	22.37	1.07	a41	281.49	0.29
a6	2.08	2.64	a24	7.73	1.06	a42	8.22	-0.02
a7	9.08	1.92	a25	8.41	2.57	a43	47.8	-3.34
a8	53.63	1.1	a26	38.9	-8.65	a44	60.45	0.21
a9	53.75	0.99	a27	49.99	-2.37	a45	43.21	-3.17
a10	25.46	0.35	a28	40.05	0.31	a46	31.42	-2.09
a11	6	1.48	a29	26.91	-3.9	a47	87.02	-0.21
a12	18.65	1.77	a30	41.54	-0.41	a48	165.99	0.57
a13	19.61	1.34	a31	29.32	0.37	a49	89.11	-0.19
a14	41.1	0.49	a32	27.61	0.87	a50	47.27	0.53
a15	29.57	0.32	a33	4	-0.46	a51	59.15	1.06
a16	3.24	-0.11	a34	29.58	-2.26	a52	22.92	0.11
a17	19.53	-0.03	a35	83.52	-0.35	a53	132.22	-0.41
a18	70.43	0.73	a36	56.61	-0.2			

Where: QFXP = Percentage change of quantity demanded of factor (labour) from activity
Source: Model estimation results

Table 7.18 shows the effect on factor incomes resulting from the changes in wage rates and employment. Labour factor income decreases by 0.91%, while the capital factor decreases by 0.85%.

Table 7.18: Factor income (YFXP) (% change)

	Base	YFXP (%)
FLAB (Labour)	3006.46	-0.905
FCAP (Capital)	1472.98	-0.849

Source: Model estimation results

7.4.2.2.5 Impact on government and macroeconomic variables

The effect of CET on a number of government and macroeconomic variables is shown in Table 7.19. CET increases the gross domestic product (GDP) at market price by 0.51% in nominal terms, but decreases it by 0.20% in real terms. Such a change cannot be regard to be significant. Investment and government consumption expenditure will in nominal terms increase by 0.051% and 0.045% respectively.

The terms of trade also cause trade to marginally decrease relative to GDP, with the value of both exports and imports decreasing by 4.95% and 2.13% respectively in nominal terms. Net indirect tax will decrease by 0.78% in real terms.

Table 7.19: GDPTAB1 and GDPTAB1P: GDP and national account (nominal and real)(Million Maloti)

		Value of gross domestic product (GDPTAB1)		Percentage change of gross domestic product (GDPTAB1P)	
	Base	**Nominal**	**Real**	**Nominal**	**Real**
ABSORP	9171.34	9161.068	9159.06	-0.112	-0.134
PRVCON	4941.5	4929.184	4929.22	-0.249	-0.248
FIXINV	2376.56	2377.774	2376.56	0.051	0*
GOVCON	1853.28	1854.11	1853.28	0.045	0*
EXPORTS	1280.79	1311.881	1609.228	-4.953	-3.708
IMPORTS	-4423.71	-4454.917	-4446.11	-2.127	-0.844
GDPMP	6009.06	6039.695	5996.78	0.51	-0.204
GDPMP2	6009.06	6039.695	6009.06	0.51	0*
NETITAX	1529.62	1599.985	1517.645	4.6	-0.783
GDPFC2	4479.44	4439.71	4479.384	-0.887	-0.001

Note: * there is no percentage change
Source: Model estimation results

7.4.2.3 Results with increased world export price

7.4.2.3.1 Impact on commodity price and trade

If world export prices (PWEX) increase by 10%, it will also cause Lesotho's domestic export prices (PEXP) to increase by 5.50%. The quantity exported (QEXP) will on average increase by 7.60%, varying among commodities. The most significant increase (72%) will occur in the textile sector (c20), while at the other end of the scale, egg exports (c9) is set to decrease by 9.00%. The quantity exported (QEXP) of the following sectors can also be expected to increase by more than 10.00%: footwear products (c21) (+17.91%), gas and petroleum products (c24) (+13.76%), pharmaceutical products (c25) (+48.91%), soap cleaning compounds (c26) (12.99%), other chemical products (c27) (+14.99%), micro industry products (c31) (+15.04%), other manufacturing (c32)

(+11.62%), civil engineering (c36) (+12.18%), accommodation and catering (c41) (+11.20%), commercial road transport (c43) (+16.65%), insurance services (c49) (+18.68%) and other community services (c53) (+12.62%).

The increased world export prices (PWEINCR) will be associated with a decrease of 4.08% in import prices (PMXP) of commodities. The quantity imported (QMXP) will on average increase by 11.70%, varying among products and sectors. The most significant increase is set to occur in the crop sector (c5) (30.14%) and the least significant increase in the pharmaceutical products sector (c25) (0.03%). The quantity imported (QMXP) of the following sectors can also be expected to increase by more than +10.00%: vegetables (c2) (+15.25%), fruit crops (c3) (16.93%), crops (c4) (30.14%), cattle (c5) (+18.45%), skins and hides (c6) (+20.25%), sheep, goats and pigs (c7) (+20.38%), beef and processed meat (c14) (+19.76%),dairy and other food products (c16) (12.07%),beverage and tobacco (c17) (+19.62%), textile (c20) (+14.50%), footwear products (c21) (+13.18%),electricity (c33) (+20.35%), water (c34) (+23.92%), sales and repair of auto services (c38) (+19.50%0, catering and accommodation (c41) (+13.09%), road transport (c42) (+17.90%), telecommunication (c45) (+14.93%), postal services (c46) (+13.84%), business services (c47) (+15.54%), informal financial services (c50) (+15.74%) and domestic services (c52) (+17.1%).

For details of the model estimation results of QEXP and QMXP, with a +10% increased world export prices (PWEINCR), see Table 7.20.

Table 7.20: Model estimation results of QEXP and QMXP at +10% PWE

Commodities	Base	QEXP	Commodities	Base	QMXP
c1	0.26	0.00E+00	c2	41.31	16.25
c3	11.06	2.2	c3	6.5	16.93
c5	5.47	0.47	c4	6.22	30.14
c6	3.77	3.44	c5	13.51	18.45
c7	0.9	0.72	c6	58.13	20.25
c8	2.27	-0.12	c7	16.85	20.38
c9	1.29	-9.06	c9	28.76	6.5
c11	7.88	-0.32	c10	87.83	7.37
c12	0.76	-1.55	c13	53.83	0.09
c13	0.56	9.62	c14	110.72	19.76
c17	3.47	3.56	c15	444.66	9.62
c18	5.69	3.59	c16	362.54	12.07
c19	4.93	-2.34	c17	125.31	19.62
c20	402.43	72.76	c20	305.85	14.5
c21	88.17	17.91	c21	135.33	13.18
c22	27.33	9.41	c22	146.55	7.7
c23	3.34	9.53	c23	253.33	4.78
c24	33.03	13.76	c24	437.31	4.34
c25	1.09	48.91	c25	94.32	0.03
c26	30	12.99	c26	118.05	6.25
c27	14.65	14.99	c27	320.72	2.6
c28	30.84	9.51	c28	53.82	6.98
c29	15.01	3.06	c29	266.26	2.54
c30	7.18	2.9	c30	1321.41	2.07
c31	0.02	15.04	c31	1.96	9.11
c32	45.96	11.62	c32	30.21	5.75
c33	2.02	3.19	c33	0.22	20.35
c34	10.34	-1.22	c34	0.08	23.92
c35	0.44	9.87	c38	0.42	19.5
c36	93.92	12.18	c41	0.7	13.09
c40	0.94	5.08	c42	4.2	17.9
c41	169.46	11.2	c43	55.81	4.67
c42	1.5	2.27	c44	29.98	4.01
c43	81.39	16.65	c45	17.64	14.93
c44	26.13	-7.49	c46	2.02	13.84
c45	50.92	3.42	c47	128.21	15.54
c46	0.4	7.48	c49	109.29	3.57
c47	0.2	0.47	c50	24.4	15.74
c48	0.33	-4.89	c51	91.09	6.94
c49	0.15	18.68	c52	2.1	17.1
c50	1.16	-2.67			
c51	10.67	-5.46			
c52	4.57	2.19			
c53	5.8	12.62			

Where: QEXP = percentage change of quantities exported, QMXP = percentage change of quantities imported
Source: Model estimation results

Demand price (PDDXP) and supply price (PDSXP) of commodities produced and sold domestically will increase on average by a modest 1.93%, ranging in both cases between a decline of 9.23% for the textile sector and an increase of 8.64% for the financial services sector (c48).

The price of composite goods (PQXP), average output price (PXXP) and quantity of aggregated marketed commodity (QXXP) will change as follows: On aggregate, price of composite goods (PQXP) will experience an average increase of 0.50%, ranging between a decline of 5.24% for pharmaceutical products (c25) and an increase of 8.64% for the financial sector (c48). Some of commodities or sectors are to experience increased prices of composite goods (PQXP): Prices of water (c34) as well as coarse and fine sand (c12) are to increase by over 6.00%, and those of horses and donkeys (c8), auto sales and repair services (c38), crops (c4), electricity (c33), raw mohair (c19) and field crops (c1) by between 4.00% and 5.00%. Average output price (PXXP) increases by 3.02%, ranging from a decline of 8.30% for pharmaceutical products (c25) and an increase of 8.63% for financial services (c48). In addition to pharmaceutical products, meaningful declines are to be expected in the output prices of insurance services (c49) (-2.76%). Commodities or sectors expected to gain from increased output prices (increases of over 4.5%) include: water (c34), coarse and fine sand (c12), diamonds (c11), soap cleaning compounds (c26), crops (c4), informal financial and business services (c50) and textiles (c20). Marketed quantities (QXXP) will on average increase by +0.76%, ranging from -10.26% for the egg and poultry activity to a +56% increase for the textile sector. Commodity or activity groups which can expect to increase marketed quantities (QXXP) by more than +9.00% are: gas and petroleum products (c24), pharmaceutical products (c25), soap cleaning compounds (c26), other chemical products (c27) (+12.48% each), commercial road transport (c43) and footwear products (c21). Increases for other commodities vary from +7.63% to +0.100%. Market quantity reductions predicted for other commodities or sectors are less than 0.10%. Detailed results for these five variables or parameters appear in Appendix 7.4.

7.4.2.3.2 Impact on activity output and intermediate input costs

Model estimation results indicate that the impact of a 10% increase in the world export price (PWEINCR) on the activity output price (PAXP) ranges between -0.72% and +6.4% for the micro industry sector and water services respectively. On average, the price of agricultural activities increases by 4.3%, while that of mining activities by

5.65%, the price of manufacturing activities by 1.96%, and that of other services by 3.64%.

Changes in price of intermediate aggregate inputs (PINTAXP) are presented in Table 7.21. Water services (a36) provide important intermediate inputs in production, which explains the 5.68% increase in the price of intermediate inputs in production. Changes in intermediate inputs used in the production of other activities vary from -2.98% to +3.39% for textile products (a26) and the traditional beverage sector (a23) respectively.

Expansion or contraction of industries is primarily affected via changes in returns to factors and subsequent reallocations. The change in the price of value added (PVAXP) reported in Table 7.21 indicates changes in the overall return to factors in different activities. Returns to factors increase in all activities, implying an expansion of economic activity in all industries.

Value changes will be considerable in all sectors and will range from 1.75% to 11.87% for grain milling (a21) and the textile sector (a26) respectively. The second highest increase will occur in informal trade (a42) (11.23%). At aggregate level the service industries experience the most significant average increase of 6.44%, followed by the mining sector (6.00%), manufacturing (5.91%) and lastly agriculture (4.99%).

The model estimates the change in the gross domestic product (GDP) at factor cost in both nominal and real terms. At nominal price the overall activity increases by 5.92%, but this amounts to a 0.04% decrease in real terms. In nominal terms the value changes from -10.18% to 74.00% for cattle production (a6) and the textile sector (a26) respectively. Activities with a positive percentage change or increase (greater than +8.00%, other than textile sector) are: electricity (a35) (+8.21%), micro-industry (a33), other community service (a53) (+10.15% each), other manufacturing (a34) (+13.94), footwear product (a27) (+18.55%), freight and passengers (a45) (+19.44%), accommodation and catering (a43) (+19.71%) and chemical and pharmaceutical production (a29) (+23.31%), other positive percentage changes are varies from +7.78%

to +0.26% for financial and insurance services (a49) and other non-metallic minerals (a31) respectively. On the other hand the negative percentage changes vary from -9.10% wool and mohair processing (a25) to -0.51% beverages (a23). At aggregate level, in nominal terms, the agricultural sector increases by 0.30%, the mining sector increases by +5.67%, the manufacturing sector increases by +7.6%, and the service sector increases by +6.57%.

From the perspective of real terms, however, value changes range from -14.42% to +55.84% for cattle production and the textile sector respectively. Activities other than the textile sector which can be expected to increase by more than 3.00% are: other community service (a53), other manufacturing (a34), accommodation and catering (a43), footwear product (a27), freight and passengers (a45) and chemical and pharmaceutical production (a29). Those commodities expected to experience declines of more than 3.00% are the following: Feedlot cattle (a6), wool and mohair processing (a25), poultry – layers (a11), dairy cattle (a7), grain milling (a21), poultry - broilers (a12), dairy and other food processing (a20), air transport-commercial (a46), government services (a51), steel, metal production and machinery (a32), chickens and pigs (a13), fruit and vegetable processing (a19), wool and mohair shearing sheds (a24), electricity (a35), goats (a9), cattle production (a5), sheep (a8) and informal financial and business services (a50). At aggregate level, the agricultural sector decreases by 4.49%, the mining sector decreases by 0.32%, the manufacturing sector increases by 1.31%, and the service sector increases by 0.085%. Detailed model estimation results of PAXP, PINTAXP, PVAXP and gross domestic product (GDP) at factor cost, at +10% PWE of each activity with respect to percentage increase and decrease are presented in Table 7.21.

Table 7.21: Model estimation results of PAXP, PINTAXP, PVAXP and GDP at +10% PWE

Activities	PAXP	PINTAXP	PVAXP	GDP(Nom.)	GDP(real)
a1	4.15	-0.61	5.07	2.14	-2.79
a2	4.1	0.44	4.7	1.74	-2.82
a3	3.85	-1.51	5.62	4.73	-0.84
a4	4.15	-0.98	5.83	5.39	-0.42
a5	3.39	0.98	3.7	-0.93	-4.47
a6	4.83	3.36	4.96	-10.18	-14.42
a7	4.19	0.29	4.7	-5.94	-10.17
a8	3.32	1.26	3.58	-0.66	-4.1
a9	3.85	1.07	4.14	-0.61	-4.56
a10	4.97	-2.17	5.53	4.34	-1.13
a11	4.81	-0.54	5.19	-5.6	-10.26
a12	4.25	0.1	4.73	-4.81	-9.11
a13	3.76	1.84	3.91	-1.64	-5.34
a14	5.22	2.24	5.58	3.92	-1.57
a15	5.09	-0.73	5.96	5.33	-0.6
a16	4.92	-1.01	6.73	7.49	0.71
a17	5.65	-1.56	6	5.66	-0.32
a18	2.94	2.27	4.42	1.39	-2.9
a19	1.69	0.29	4.26	-1	-5.05
a20	2.24	1.28	3.63	-5.75	-9.05
a21	2.21	2.46	1.75	-7.82	-9.41
a22	2.92	1.51	4.97	2.62	-2.24
a23	2.98	3.39	2.31	-0.51	-2.76
a24	3.27	2.68	5.9	0.7	-4.91
a25	4.58	2.28	5.67	-9.1	-13.98
a26	0.21	-2.98	11.87	74.34	55.84
a27	2.81	-0.74	8.65	18.55	9.11
a28	0.61	-0.82	5.13	2.75	-2.27
a29	1.54	-2.22	9.63	23.31	12.48
a30	1.07	-1.59	6.19	6.72	0.5
a31	1.53	-1.83	5.05	0.26	-4.57
a32	0.92	-2.41	4.92	-1.23	-5.86
a33	-0.72	-2.3	8.15	10.15	1.86
a34	2.56	-2.3	8.02	13.94	5.48
a35	4.55	1.86	6.71	8.12	1.32
a36	6.4	5.68	6.55	7.04	0.46
a37	0.71	-1.7	6.04	6.16	0.1
a38	0.06	-2.04	6.77	7.71	0.88
a39	3.04	2.31	5.24	3.81	-1.36
a40	4.91	0.16	6.02	5.9	-0.11
a41	3.95	0.16	6.11	6.31	0.19
a42	3.02	0.51	6.05	6.24	0.18
a43	3.8	0.5	11.23	19.71	7.63
a44	4.26	-1.82	5.99	5.85	-0.14
a45	2.41	-1.81	8.69	19.44	9.89
a46	4.98	-1.85	5.77	-3.12	-8.41
a47	3.45	-0.58	6.26	6.9	0.6
a48	4.17	1.72	4.44	2.3	-2.05
a49	5.02	-0.5	6.91	7.78	0.82
a50	5.06	1.38	5.73	2.04	-3.5
a51	3.98	-1.23	5.68	-2.97	-8.18
a52	4.21	-0.37	5.84	5.51	-0.31
a53	1.19	-0.39	6.34	10.15	3.59
TOTAL				5.92	-0.04

Where: PAXP= percentage change of activities output price, PINTAP= percentage change of price of intermediate inputs, PVAXP = percentage change of price of value added and GDP = percentage change of gross domestic product.

Note: Agriculture included from a1 to a16, Mining a17, Manufacturing a18 - a34 and Services a35 - a53.

Source: Model estimation results

7.4.2.3.3 Household impact

The increase in world price will have an effect on household consumption expenditure (EHXP), household income (YIXP) and household welfare (EV). Equivalent variation (EV) is used as indicator of changes in welfare.

As shown in Table 7.22, a +10% increase in world export price (PWEINCR) will cause household consumption expenditure (EHXP) to increase by 4.40% on aggregate. The urban low-income households experience the most significant increase in EHXP (+5.58%), followed by the rural Sengu River Valley high-income households (+5.35%).

Household income (YIXP) increases on aggregate by 3.40%. The gain in household income (YIXP) is concentrated in the urban areas. The urban low-income households show a 4.56% increase in YIXP, followed by rural Sengu River Valley high-income households with an increase of 4.37%.

Lesotho can experience a 4.00% gain in welfare (EV). This gain will be concentrated in urban areas. Table 7.22 indicates that rural Sengu River Valley high-income households will gain 5.60%, followed by urban low-income households with 5.00%.

Table 7.22: Household expenditure, income, and equivalent variation

Households	Base	EHXP	EV	Base	YIXP
Urban high income	3231.72	3.685	3.7	3606.32	2.687
Urban low income	22.15	5.58	5	24.5	4.563
Rural lowlands high income	512.88	4.607	4.9	542.5	3.631
Rural lowlands low income	254.56	3.303	3.5	266.95	2.34
Rural foothills high income	283.29	4.818	5	301.86	3.823
Rural foothills low income	139.21	3.571	3.4	146.97	2.589
Rural mountain high income	216.26	4.958	5	225.61	3.98
Rural mountain low income	97.91	3.882	3.3	99.24	2.914
Rural SRV high income	119.05	5.353	5.6	126.78	4.372
Rural SRV low income	64.47	4.168	4.2	67.16	3.198
Total	4941.5	4.4	4	5407.89	3.4

Note: EHXP = Household consumption expenditure, EV = Equivalent variation, and YIXP = Household income
Source: Model estimation results

7.4.2.3.4 Impact on labour employment and factor income

The effect of a +10% increase in world export price (PWEINCR) on the various labour categories largely depends on the way in which those activities that provide employment are affected.

On average, the entire activity decreases by 0.98%, varying from -15.46% to 66.21% for the cattle production and textile sectors respectively. Twelve activities or sectors are expected to increase labour employment by more than 1.00%: water (a36), textiles (a26), fisheries (a16), footwear products (a27), chemical and pharmaceutical production (a29), micro-industry (a33), other manufacturing (a34), electricity (a35), civil engineering (a38), freight and passengers (a45), financial and insurance services (a49) and other community service (a53). Detailed results are presented in Table 7.23.

Table 7:23: QFXP at +10% PWE

Activities	Base	QFXP	Activities	Base	QFXP	Activities	Base	QFXP
a1	95.84	-3.84	a19	29.56	-6.94	a37	310.82	0.13
a2	80.58	-4.28	a20	20.84	-11.51	a38	180.47	1.73
a3	145.72	-1.29	a21	33.61	-13.78	a39	18.86	-2.24
a4	79.69	-0.64	a22	21.5	-3.4	a40	26.37	-0.12
a5	67.66	-6.97	a23	22.37	-6.83	a41	281.49	0.29
a6	2.08	-15.46	a24	7.73	-5.04	a42	8.22	0.21
a7	9.08	-11.51	a25	8.41	-14.33	a43	47.8	14
a8	53.63	-6.74	a26	38.9	66.21	a44	60.45	-0.17
a9	53.75	-6.59	a27	49.99	12.36	a45	43.21	13.21
a10	25.46	-1.68	a28	40.05	-3.26	a46	31.42	-8.67
a11	6	-11.1	a29	26.91	17.09	a47	87.02	0.87
a12	18.65	-10.44	a30	41.54	0.68	a48	165.99	-3.8
a13	19.61	-7.6	a31	29.32	-5.61	a49	89.11	1.83
a14	41.1	-2.06	a32	27.61	-7.04	a50	47.27	-3.82
a15	29.57	-0.67	a33	4	4.3	a51	59.15	-8.54
a16	3.24	1.51	a34	29.58	7.87	a52	22.92	-0.52
a17	19.53	-0.34	a35	83.52	2.11	a53	132.22	3.96
a18	70.43	-4.66	a36	56.61	1.06			

Where: QFXP = Percentage change of quantity demanded of factor (labour) from activity
Source: Model estimation results

Table 7.24 shows the effect on factor income resulting from changes in wage rates and employment. Labour factor income increases by 6.03% and income to the factor capital increases by 5.70%.

Table 7.24: Factor income (YFXP) (% change)

	Base	YFXP(%)
FLAB (Labour)	3006.46	6.025
FCAP (Capital)	1472.98	5.695

Source: Model estimation results

7.4.2.3.5 Impact on government and macroeconomic variables

The effect of change in the world price of commodities on a number of government and macroeconomic variables is shown in Table 7.25. With a 10% increase in the world price of commodities, the gross domestic product (GDP) will increase by 1.50% in real terms it is significant, while total investment and government consumption expenditure increases by 2% and 4% respectively.

The improvement in the terms of trade also leads to a marginal increase in trade relative to the GDP, while export and import values increase by 18% and 7% respectively in real terms. Net indirect tax increases by 6.5%.

Table 7.25: GDPTAB1 and GDPTAB1P: GDP and national account (Million Maloti)

		Value of gross domestic product (GDPTAB1)		Percentage change of gross domestic product (GDPTAB1P)	
	Base	**Nominal**	**Real**	**Nominal**	**Real**
ABSORP	9171.34	9171.34	9171.34	1.956	2.176
PRVCON	4941.5	4941.5	4941.5	3.937	4.039
FIXINV	2376.56	2376.56	2376.56	-0.502	0*
GOVCON	1853.28	1853.28	1853.28	-0.176	0*
EXPORTS	1280.79	1311.881	1309.228	25.37	18.826
IMPORTS	-4423.71	-4454.917	-4446.11	2.619	6.989
GDPMP	6009.06	6009.06	6009.06	5.134	1.479
GDPMP2	6009.06	6009.06	6009.06	5.134	0*
NETITAX	1529.62	1529.62	1529.62	2.844	6.51
GDPFC2	4479.44	4479.44	4479.44	5.917	-0.037

Note: * there is no percentage change
Source: Model estimation results

7.5 Conclusion

This chapter discusses the implementation and the results of the Lesotho CGE model. The analysis evaluates the potential impact of trade on the economy of Lesotho. Four policies – namely those relating to duty-free access for textiles, the erosion of the preference market for textiles, the rate of import protection (CET) for the overall commodity, and an increase in world export price – are evaluated.

The simulations are performed using IFPRI's standard CGE model. The analysis is based on the Lesotho Social Accounting Matrix (SAM). The results under the assumption of duty-free access (DFA) policy scenarios are shown to have a significant effect on the economy of Lesotho. It seems logical that gross domestic product (GDP) for the activity increases significantly for textile sector. There are serious implications for an expansion of economic activity. Further strong effects enter through a decrease in price changes of intermediate aggregate inputs (particularly the textile sector) and resource reallocation, which positively impacts on natural resource sectors.

As opposed to the case of DFA, the erosion of existing preferences (EEP) policy scenarios negatively affect the economy of Lesotho, as indicated gross domestic product (GDP) for the activity significantly decrease for the textile sector. For example, the Lesotho economy or activities experiencing a relative increase in the price of their intermediate inputs spend 3.20% for the textile sector, which implies a negative impact on resources. It is also interpreted in the same way with an increase of +10% in the world price of commodities and a CET policy scenario. All these results vary with changes in model parameters and in macroeconomic closures.

The value of the modelling approach is therefore overly simplistic for a change of trade policy that would predict clear benefits positively and negatively. The fact that the entire economy is modelled also serves to place the expected effects into perspective.

CHAPTER 8

SUMMARY AND CONCLUSION

8.1 Introduction

This study has attempted to evaluate the potential impact of trade on the economy of Lesotho. The approach has been to evaluate probable changes in the economy of Lesotho under plausible trade policy scenarios. The approach in this study is based on a Computable General Equilibrium (CGE) analysis, and has the following objectives: a literature survey on the economy of Lesotho, as well as the trade policy, a Social Accounting Matrix (SAM) and Computable General Equilibrium (CGE) of developing countries; the construction of a Computable General Equilibrium (CGE) model for Lesotho based on the Social Accounting Matrix (SAM) of Lesotho, 2000; the design of trade policy scenarios based on price changes, border protection applied to Lesotho exports with special emphasis on the textile sector, fiscal policy choices and changes in the world price of commodities; a simulation of the impact of trade policy scenarios in a CGE; and the identification of the likely impact of trade policy decisions on the economy of Lesotho (i.e. GDP, employment, income distribution, welfare. etc). Each of these aspects is evaluated intensively in chapter seven. Section 8.4 discusses the achievements and limitations of this study.

8.2 Trade policy scenarios

Trade policy scenarios are based on changes in the level of border protection applied to Lesotho exports, giving special treatment to the textile sector, as well as fiscal policies and changes in world prices. There are infinite possible trade policy scenarios; this prompts the need to select a limited number of scenarios for tractable policy analysis. Each of the above-mentioned scenarios covers a specific aspect of the policy scenario.

One group of possible trade policy scenarios in Lesotho can consist of changes in the level of border protection (tariffs) facing key Lesotho exports, particularly those of the textile sector. Lesotho could face erosion in the preferential tariff rates that the country enjoys on its exports to the rest of the world (ROW), and this possibility is captured in the effective erosion of preferences (EEP) scenario. Alternatively, Lesotho could obtain additional preferences in the form of duty-free access (DFA) to exports of textile products to Europe and the USA. The DFA scenario is also considered in the analysis.

A second group of scenarios emphasises the common external tariff (CET) regime for non-SACU members. A third and final group of scenarios refers to a +10% increase in the world price of commodities. The rationale underlying each of these scenarios or design of trade reform scenarios is discussed in detail in chapter seven.

The CGE simulation results in each of these scenarios are interpreted as the effects that the policies and market conditions underlying these scenarios would have on the Lesotho economy.

8.3 CGE analysis of the impact of trade policy on the Lesotho economy

The central focus in this thesis is the use of a Computable General Equilibrium (CGE) model to simulate changes in the Lesotho economy under various trade policy scenarios.

The Lesotho Computable General Equilibrium model belongs to the class of so-called neoclassical structuralist models. These models are based on the neoclassical general equilibrium of markets. The Lesotho CGE model is essentially adapted from a standard neoclassical structuralist model developed by researchers at the International Food Policy Research Institute (IFPRI), applying the standard CGE model using the Social Accounting Matrix (SAM) of Lesotho 2000.

The results of this study are based on the CGE model for Lesotho using the SAM of Lesotho as a database. The simulation results presented are based on the following policy scenarios:

1. Border protection scenarios:
    - Duty-free access for Lesotho textiles to export markets
    - Erosion of trade preference of Lesotho textiles
2. Fiscal polices (CET or tariff changes)
3. Changing world prices of Lesotho's export commodities

The results can be viewed from the perspective of the impact of policy scenarios on: commodity price and trade, activities output and intermediate input cost, households, employment, and government and macroeconomic variables for each policy scenario.

8.3.1 Duty free access to export markets

The results indicate that in terms of the scenarios encompassing duty-free access (DFA) market regimes of textiles, Lesotho will benefit. The DFA impact on commodity price and trade is as follows: the DFA will cause textile exports to increase by 19.10%, and the price of imported textiles to decrease by 6.60%. The results also show increases and decreases in the quantities of other commodities exported; commodities exported increase by less than 1.00% and decrease by less than 3.00%. The quantity of products imported will also increase and decrease, the most significant increase in imports (6.90%) will occur in the textile sector, while at the other end of the scale, the DFA market regimes are set to cause a decrease of less than 0.50% in quantities imported. Both the demand price and the supply price of commodities produced and sold domestically will decrease significantly by 5.87% for the textile sector, while those for the other commodities will increase by less than 1.00%. The price of composite goods will decrease by 6.50% for the textile sector, and increase by less than 1.00% for the other sectors. The average output price will decrease by 2.11% for textile sector, while increasing by less than 1.00% for other commodities, and the quantity of aggregated marketed commodities will increase by 13.68% for the textile sector and decrease by less than 0.02% for other commodities.

The attention now shifts to activities' output and intermediate input costs. The output price of fruit and vegetable processing will decrease by 2.11%, while those of the other commodities are to increase by less than 1.00%. Intermediate aggregate input costs are predicted to decrease by 3.26% for the textile sector and to increase by less than 1.00% for the other commodities. The price of added value is forecast to increase by 2.12% for the textile sector and less than 1.00% for the other sectors. Gross domestic product (GDP) will increase by 16.10% for textile sector, and decrease by less than 3.00% in most of the other sectors nominal terms. In real terms the textile sector GDP is predicted to increase by 13.68%.

Changes in household consumption expenditure are predicted to be minimal with an aggregate projected increase of 0.18%, and the change predicted to be less than 0.50% for every population group. Projected gains in household income are also almost immaterial, the highest being that of urban low-income households (0.68%). Lesotho could experience a 6.28% gain in welfare or equivalent variation (EV), with this gain concentrated in the urban areas. Urban high-income households are to gain 3.89%.

DFA market regimes will cause employment in the textile sector to increase by 15.88 % measured in terms of quantity of labour demanded. In most other for activities demand for labour will decrease by less than 3.00%. The labour factor income will increase by 0.50% (from the base 3006.46 to 3021.49) and that of the capital factor by 0.40% (from the base 1472.98 to 1478.87).

DFA market regimes will cause gross domestic product (GDP) to increase by 0.13% and 0.11% insignificantly in nominal and real terms respectively. Total investment and government consumption expenditure increase by 0.30% and 0.10% respectively in nominal terms. The improvement in the terms of trade will also marginally increase trade relative to the GDP, while both export and import values increase by 2.23% and 0.51 % respectively in real terms. Net indirect tax also increases by 0.46%.

8.3.2 Erosion of existing preferential access

The result of erosion of the existing preferences market access (EEP) regimes of textiles will be a decrease of 14.10% in quantity of products exported by the textile sector. Prices of imported textiles are set to increase by 6.60% and the quantity textile products imported to decrease by 5.62%. Such effects on other commodities are too small to be significant. Both the demand prices and supply prices of commodities produced and sold domestically will increase by 5.58% for the textile sector, with negligibly small effects in other sectors. Price of composite goods will increase by 6.38% in the textile sector and by less than 0.04% in other sectors. Average output price will increase by 2.14% for the textile sector, while decreasing by less than 0.03%, for the other commodities. The quantity aggregated marketed commodities will decrease by 10.00% for the textile sector and increase by less than 2.00% for the other commodities.

The output price of the textile sector will increase by 2.14%, while that of other commodities will decrease by less than 0.03%. Intermediate aggregate inputs are projected to increase by 3.20% for the textile sector and to decrease by less than 0.12% for the other commodities. The textile sector will be the only sector to experience a material change in the price of value added (a decrease of 1.76%). Gross domestic product (GDP) per activity is predicted to decrease by 11.54% in nominal, and 9.96% in real terms for the textile sector.

Household consumption expenditure is predicted hardly to change on aggregate a predicted decrease of 0.18% with no population group having to expect a change exceeding 0.50%. Expected changes in household expenditure and household incomes are of a similar magnitude. Lesotho can experience a 5.96% loss in welfare or equivalent variation (EV), largely concentrated in urban areas. Urban high-income households will experience the largest welfare loss (3.67%).

EEP market regimes will have an effect on employment. In different activities, the effect will vary between an 11.39% decrease in the textile sector and a 1.63% increase in the air transport sector. The labour factor income decreases by 0.50% (from the base 3006.46 to 2991.43) and that of the capital factor by 0.37% (from the base 1472.98 to 1467.53). Neither of these changes is meaningful, but results for individual activities suggest possible structural change.

EEP market regimes will hardly affect government and macroeconomic variables: gross domestic product (GDP) and government consumption will change by less than 0.13% in both nominal and real terms. Neither will the changing terms of trade lead to appreciable change in trade relative to GDP or to net indirect tax.

8.3.3 Common external tariffs

CET scenarios were the next to receive attention: CET for non-SACU members will cause a 1.29% decrease in domestic export price, while the quantity of products exported will decrease by 9.38% for the textile sector and 3.74% for skins and hides. Changes in other sectors will be smaller. Both the demand price and the supply price of commodities produced and sold domestically will increase by 2.13% for pharmaceutical products, 1.80% for the textile sector and less than 1.00% for other sectors. Prices of composite goods are projected to decrease by 1.21% for financial services – the only activity predicted to show a change of more than 1.00%. The average output price will increase by 2.00% for pharmaceutical products and change by less than 0.04% for other commodities, including the textile sector. The quantity of aggregated marketed commodities will decrease by 7.55% for the textile sector and much less for the other commodities.

Output prices and intermediate aggregate inputs are not to be materially affected, in all cases by less than 1.00%. The model estimation results show that accommodation-catering services will experience the most significant decrease in the price of value added (2.14%). Gross domestic product (GDP) per activity decreases by 9.29% for the textile sector, and some of activities increases by less than 2.00% in nominal terms, in real terms also the textile sector decreases by 7.55%, for other activities also increase by less than

3.00%, it varies from 0.02% for sales and repairs of auto and trucks and 2.50% for wool and mohair processing.

Urban low-income households will experience a household consumption expenditure decrease of 1.26%, while the expected decrease in other population groups is projected to be considerably lower. Household income is on aggregate projected to decrease by 1.00%. The loss of household income is concentrated in the urban areas, particularly the urban low-income households with a decrease of 1.86%, followed by the Sengu River Valley low-income households with a decrease of 1.31%. Lesotho can experience a small (0.20%) loss in welfare or equivalent variation (EV), largely concentrated in urban areas. Urban low-income households will lose 1.20%, followed by rural Sengu River Valley low-income households with 0.70%.

The effect of common external tariffs (CETs) on the various labour categories largely depends on the way in which those activities that provide employment are affected. The textile sectors will lay off many workers (8.65%). The sector with the most significant increase will be cattle production (2.64%). The labour factor income will decrease by 0.91% (from the base 3006.46 to 2979.10), while the capital factor income will decrease by 0.85% (from the base 1472.98 to 1460.46).

The CET policy scenario will hardly cause government and macroeconomic variables such as gross domestic product (GDP), investment, net indirect tax and government consumption expenditure to change; such changes are projected to be less than 0.80% in both nominal and real terms. Trade can be expected to decrease marginally relative to GDP, while the value of both exports and imports will respectively decrease by 4.96% and 2.13% in nominal terms.

8.3.4 An increase in world export prices

A +10% increase in world export prices will cause domestic export prices to increase by 5.50%. The quantity products exported will increase by 72.00% for the textile sector while at the other end of the scale, egg exports is set to decrease by 9.00% . The price of imported commodities will decrease by 4.08%; the quantity of products imported will increase by 30.14% for the crop sector. Both the demand price and supply price of commodities produced and sold domestically will decrease by 9.36% for the textile sector and increase by 8.64% for the financial services sector. The price of composite goods will experience an increase by 8.64% for the financial sector, a decrease by 5.24% for the pharmaceutical products and of 5.23% for the textile sector. The average output price will increase by 8.63% for financial services and decrease by 8.30% for pharmaceutical products. Price for the textile sector (an increase of 0.21%) will hardly change at all. The quantity aggregated marketed commodities will increase by 56.00% for the textile sector and decrease by 10.26% in the egg and poultry activity.

The price of water services is forecast to increase by 6.40%, while those of other activities (including the textile sector, with a change of 0.21%) will hardly change intermediate aggregate inputs are predicted to increase by 5.68% for water services and to decrease by 2.98% in the textile sector. The model estimation results show that the textile sector should experience the most significant increase in the price of value added (11.87%), while the grain milling sector experiences the least significant increase (1.75%). Gross domestic product (GDP) per activity is expected to increase by 74.00% in nominal, and 55.84% in real terms for the textile sector. Those of some other activities will hardly change at all.

On aggregate, household consumption expenditure is forecast to increase by 4.40%. The urban low-income households are to experience the most significant household consumption expenditure increase (5.58%), followed by the rural Sengu River Valley high-income households (5.35%). Household income will on aggregate increase by 3.40%. The gain in household income is concentrated in the urban areas, followed by the urban low-income households with an increase of 4.56% and then the rural Sengu River Valley high-income households with an increase of 4.37%. Lesotho can experience a 4.00% gain in welfare or equivalent variation (EV), largely concentrated in urban areas.

Rural Sengu River Valley high-income households will gain 5.60%, followed by urban low-income households with 5.00%.

The effect of a +10% increase in the world export price on the various labour categories largely depends on the way in which those activities that provide employment are affected. Cattle production employment is predicted to decrease by 15.46%, while employment in the textile sector is set to increase by 66.21%. The labour factor income will increase by 6.03% (from the base 3006.46 to 3187.75) and the factor capital income by 5.70 %(from the base 1472.98 to 1556.94).

A +10% increase in the world price of commodities will cause government and macroeconomic variables: gross domestic product (GDP) increases of 1.50% in real terms, while total investment and government consumption expenditure are to increase by 2.00% and 4.00% respectively. The improvement in the terms of trade also leads to marginally increased trade relative to GDP, with both export and import values increasing by 18.00% and 7.00% respectively in real terms. Net indirect tax also increases by 6.50%.

8.4 Achievements and limitations of the thesis

This study analyzes the potential impact of trade on the economy of Lesotho through the application of a CGE model based on a 2000 SAM. The results indicate that the different policy scenarios have some decisive effects on the performance and the sectoral structure of Lesotho's economy, and that macroeconomic policies matter. The analysis reveals that the applied CGE model is an appropriate analytical tool for addressing the study's objectives and adequately reflects the reality of Lesotho's economy, capturing the particular characteristics of the country and its regional context. This is particularly true when compared with partial equilibrium approaches, which lack the analytical depth of CGE modelling because they do not capture finite resource endowments, economy-wide inter-household welfare effects, or endogenous income effects. Neither do those approaches provide the kind of consistency checks inherent in a general equilibrium framework in which the accounts of all economic actors must add up and thus satisfy Walras' Law.

Thus, the contribution of this study stems from its focus on the impact of trade policies and complementary policies on the economy of Lesotho, using a model that captures salient characteristics of the Lesotho economy, including rural-urban households, labour, and differences in sectoral structures. The analysis is exploratory in that it does not try to mimic any specific liberalization scheme. Rather, it tries to further our understanding of the relative importance of some of the factors that condition the impact of trade on the Lesotho economy.

In addition to the development of the Lesotho CGE model, the preparation of the underlying database to fit for the IFPRI style of CGE model should prove to be a valuable contribution to trade policy analysis in Lesotho. The SAM that has been constructed for Lesotho is unbalanced and cross-entropy estimation techniques apply. The simulation results obtained in this study are robust with respect to reasonable variations of the model's parameters.

One limitation of this study is the fact that a SAM does not allow for the incorporation of effects of new technologies, new products and market pressures, which are all extremely important. This suggests that the results need to be interpreted and used cautiously. However, the most serious problem in the application of CGE modelling to actual economies is the shortage of data from which the Social Accounting Matrix may be constructed. The core of the SAM is an input-output table, which may generate information on outputs, intermediate inputs, factor use, and so on. This is augmented by the use of data from national income accounts, for instance, to construct the SAM. However, although the latter information is usually available on an annual basis, with a tolerable time lag before publication. Input-output tables are in most cases, and certainly in less developed countries, at best published every 5 to 10 years. Such gaps are to be expected given the nature of the work involved in their construction, but for many countries the most recent table may be some 10 or 15 years out of date, and no such table exists for some others. Given the pace of technological change in many sectors in developed countries, and the increasing rate of adoption of such technologies by the developing economies, the shortage of such information imposes a serious constraint on the construction of CGE models and on the interpretation of their results.

The second limitation lies in the nature of general equilibrium models. These models are abstractions complex enough to capture the essential features of the economy, yet simple enough to be tractable. Moreover, they are more popular than their partial equilibrium counterparts because they stress the interactions among different sectors. However, particularly static models such as the Lesotho CGE model are not perfect. They fail to take into account the dynamic effects that accompany changes in a given economy as a result of policy change. A dynamic model would therefore be useful for a richer understanding of the adjustment path the economy will follow in response to policy shocks.

Despite the limitations outlined above, the key objectives of the study have essentially been met. The country-specific specification of the Lesotho CGE model accommodates a wide range of problem-oriented research, simulations and forecasting. This is especially true for trade-related analysis, and could be used to provide analytical support for trade negotiations and to analyze intraregional trade issues.

Finally, a general message from this study is that in a world where productivity and competition is growing faster than in Lesotho, households benefit from freer trade regimes that allow them to access that increased productivity. Households with immobile resources, producing import substitutes, generally lose. The losses will be mitigated, or even reversed, if the Lesotho industry can become equally productive as the rest of the world, because then domestic production will be able to compete more effectively against imports.

8.5 Further model developments, research and recommendation

The study leads to some suggestions for further research and advancements. At this point in time, the latest and only SAM available for Lesotho is dated 2000, so there is a need for the SAM to be constructed or updated for the future in order to incorporate substantially improvements in the technology and other information underlying the SAM database. This will consequently provide a basis for improved analysis with updated time framework.

CGE modelling, which requires extensive data in order to capture broad economic interdependency, still has a somewhat limited scope. Future research should include more advanced estimation techniques for the response parameters of the CGE model, which can be estimated using a maximum entropy approach relying on historical data series and incorporating all CGE constraints at the outset and further research using a dynamic CGE model.

The country-specific specification of the Lesotho CGE model accommodates a wide range of problem-oriented research and simulations. These simulations illustrate the importance of trade policy and links between Lesotho and the rest of word. This is especially true for trade-related analysis, and could be used to provide analytical support for trade negotiations, guidance for the priority of development strategy policies and enhance national economic welfare.

The following recommendations forwarded:

In order to incorporate the limitation of data and to update a SAM with the effects of new technologies, new products and market pressures a well organized and computerized information bank is a prerequisite. This goal will not readily be achieved without the assistance of external bodies' technical assistance, such as tracking information about conducting business in Lesotho and conditions of market access (abroad and in Lesotho) for both exporters and importers. Purchases of information technology, equipment and software will have to be coupled with the training of staff in data collection and statistical analysis, and the integration or sharing of data with SACU, SADC, USA, EU and other concerned bodies. The tasks mentioned will have to be achieved through team work with neighbouring countries, trade partners and various other agencies such as the IMF, World Bank and agencies of the United Nations. Lesotho needs a modern statistical system for both government and private business generally. Without it, the quality of policy making will remain poor, misperception of Lesotho's performance among foreign analysts will persist, and high cost of due diligence will keep many high quality investors out of Lesotho.

The performance in U.S. markets indicates that Lesotho's exporters of textiles have been competitive also under MFA/ AGOA arrangements. These truly remarkable performance auspices well for the country's competitiveness once these special preferences expire, and it appears that Lesotho's textile industry should be able to compete with other big exporters currently bounded by those quotas, such as China.

However, Lesotho's competitiveness in the textile industry could be jeopardized by the lower costs of many Asian countries. One should also consider it that Lesotho's industrial base is still very narrow, turning out only a few products that are competitive in international markets. Concerns therefore abound as to the prospects of survival in a post-AGOA and MFA environment. Hence, the concerned body or government should avoid the risk of greater losses in the temporary tariff preferences offered under MFA/AGOA and develop to a permanent comparative advantage.

It is imperative to not only maintain to a permanent advantage in textile processing but also to develop and sustain the textile sector through the entire supply chain. The textile sector is almost unique in its low ratio of capital equipment to labour inputs. Efficiency in managing the entire supply chain is required or the pre-assembly stage involving designing, grading and marking of patterns and cutting of textiles into individual components, which has been revolutionised by computer-assisted methods. By contrast, the assembly stage remains highly labour-intensive and involves delicate handling and sewing operations that do not lend themselves to automated progress.

Lesotho's export trade is highly concentrated, both in terms of products (textiles) and markets (South Africa and the US). There is no question about it that the textile sector sets the benchmark for development in Lesotho, as few (if any) African countries have been able to match the outstanding success achieved by this sector. However, the erosion of preferential treatment/access renders the diversification of products to be pre-requisite for avoiding the risk of failure and for a sustainable development of the country. A considerable potential exists for diversification into sectors such as furniture manufacturing (wood and wood products), bricks, sandstone and ceramics, wool and mohair products, pharmaceutical products and the recently revived diamond industry. These are likely to offer opportunities for export diversification. The pharmaceutical products and furniture manufacturing are mainly targeted at South Africa and the Southern African region. It is moreover necessary to encourage export trade developing to the potential for increased market penetration to non-US destinations. Export diversification is a complex issue. It is not simply a matter of looking for the next miracle product to give a magic answer. It is about providing a solid infrastructure within an economy and building upon that foundation, and this includes strong regional and global linkages. It is about where to put your priorities in order to maximise the marginal gain to the economy.

Last but not least, the government should strengthen the capacity of the private sector to deal effectively with rapid change and growing competition in order to capture the trade opportunities that are being created through improved market access. Actions needed include steps such as dissemination and technological transfers, and negotiations for improved market access for textiles and other potential products.

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APPENDICES

Appendix 5.1: MATHEMATICAL SUMMARY STATEMENT FOR THE STANDARD CGE MODEL[*]

SETS

$\alpha \in A$	activities
$\alpha \in ACES(\subset A)$	activities with CES function at the top of the technology nest
$\alpha \in ALEO(\subset A)$	activities with a Leontief function at the top of the technology nest
$\alpha \in C$	commodities
$c \in CD\ (\subset C)$	commodities with domestic sales of domestic output
$c \in CDN\ (\subset C)$	commodities not in CD
$c \in CE(\subset C)$	exported commodities
$c \in CEN(\subset C)$	commodities not in CE
$c \in CM(\subset C)$	imported commodities
$c \in CMN(\subset C)$	commodities not in CM
$c \in CT\ (\subset C)$	transactions service commodities
$c \in CX\ (\subset C)$	commodities with domestic production
$f \in F$	factors
$i \in INS$	institution (domestic and rest of the world)
$i \in INSD(\subset INS)$	domestic institutions
$i \in INSDNG(\subset INSD)$	domestic non-government institutions
$h \in H(\subset INSDNG)$	households

PARAMETERS

Latin letters

$cwts_c$	weight of commodity *c* in the *CPI*
$dwts_c$	weight of commodity *c* in the production price index
$ica_{c\,a}$	quantity of *c* as intermediary input per unit of activity *a*
icd_{cc}	quantity of commodity *c* as trade input per unit of *c*' produced and sold domestically
$ice_{cc'}$	*q*uantity of commodity *c* as trade input per exported unit of *c*'
$icm_{cc'}$	quantity of commodity *c* as trade input per imported unit of *c*'
$inta_a$	quantity of aggregate intermediate input per activity unit
iva_a	*q*uantity of value-added per activity unit
$\overline{mps}_i$	base saving rate for domestic institution *i*
$mps01_c$	0-1 parameter with 1 for institutions with potentially flexed

[*] Longren, Harris and Robinson (2002).

	direct tax
pwe_c	export price (foreign currency)
pwm_c	import price (foreign currency)
$qdst_c$	quantity of stock change
$\overline{qg}_c$	base-year quantity of government demand
$\overline{qinv}_c$	base-year quantity of private investment demand
$shif_{i,f}$	share of the domestic institution *i* in income of factor *f*
$shif_{ii'}$	share of net income of *i*' to *i* ($i' \varepsilon$ *INSDNG*'; $i\ \varepsilon$ *INSDNG*)
$t\alpha_a$	tax rate for activity *a*
te_c	export tax rate
tf_f	direct tax rate for factor *f*
$\overline{tins}_i$	exogenous direct tax rate for domestic institution *i*
$tins01_i$	0-1 parameter with 1 for institutions with potentially flexed direct tax rates
tm_c	import tariff rate
tq_c	rate of sales tax
$trnsfr_{if}$	transfer from factor *f* to institution *i*
tva_a	rate of value-added tax for activity *a*

Greek letters

α^a_a	efficiency parameter in the CES activity function
a^{va}_a	efficiency parameter in the CES value-added function
a^{ac}_a	shift parameter for the domestic commodity aggregation function
a^q_c	CES function shift parameter (imports and domestic sales)(Armington function shift parameter)
α^t_c	CET shift function parameter (exports and domestic sales)
β^h_{ach}	marginal share of consumption spending on home commodity *c* from activity *a* for household *h*
β^m_{ch}	marginal share of consumption spending on marketed commodity *c* for household *h*
δ^a_a	CES activity share parameter
δ^{ac}_{ac}	share parameter of domestic commodity aggregation function
δ^q_c	CES function share parameter (imports and domestic sales)
δ^t_c	CET function share parameter (exports and domestic sales)
δ^{va}_{fa}	CES value-added function share parameter for factor *f* in activity *a*
γ^m_{ch}	subsistence consumption of marketed commodity *c* for household *h*
γ^h_{ach}	subsistence consumption of home commodity *c* from activity *a* for household *h*
θ_{ac}	yield of output *c* per unit of activity *a*
ρ^a_a	CES production function exponent

ρ^{va}_{a}	CES value-added function exponent
ρ^{ac}_{c}	domestic commodity aggregation function exponent
ρ^{q}_{c}	CES function exponent (imports and domestic sales)
ρ^{t}_{c}	CET function exponent (exports and domestic sales)

EXOGENOUS VARIABLES

$\overline{CPI}$	consumer price index
$\overline{DTINS}$	change in domestic institution tax share (= 0 for base; exogenous variable)
$\overline{FSAV}$	foreign saving (foreign currency)
$\overline{GADJ}$	*g*overnment consumption adjustment factor
$\overline{IADJ}$	*i*nvestment adjustment factor
$\overline{MPSADJ}$	saving rate scaling factor (= 0 for base)
$\overline{QFS}_{f}$	quantity supplied of factor
$\overline{TINSADJ}$	direct tax scaling factor (= 0 for base; exogenous variable)
$\overline{WFDIAT}_{fa\ a}$	wage distortion factor for factor *f* in activity *a*

ENDOGENOUS VARIABLES

$DMPS$	change in domestic institution saving rates (= 0 for base; exogenous variable)
DPI	producer price index for domestically marketed output
EG	government expenditures
EH_h	consumption spending for household
EXR	exchange rate (local currency per unit of foreign currency)
$GOVSHR$	government consumption share in nominal absorption
$GSAV$	government savings
$INVSHR$	*i*nvestment share in nominal absorption
MPS_i	*m*arginal propensity to save for domestic non-government institution (exogenous variable)
PA_a	*a*ctivity price (unit gross revenue)
PDD_c	*d*emand price for commodity produced and sold domestically
PDS_c	*s*upply price for commodity produced and sold domestically
PE_c	*e*xport price (domestic currency)
$PINTA_a$	*a*ggregate intermediary input price for activity
PM_c	*i*mport price (domestic currency)
PQ_c	*c*omposite commodity price
PVA_a	*v*alue-added price (factor income per unit of activity)
PX_c	*a*ggregate producer price for a commodity
$PXAC_{ac}$	producer price for commodity *c* for activity *a*
QA_a	quantity (level) of activity

QD_c	quantity sold domestically of out put
QE_c	quantity of exports
$QF_{f,a}$	quantity demanded of factor *f* from activity *a*
QG_c	*g*overnment consumption demand for commodity
$QHA_{a,c,h}$	quantity of household home consumption of commodity *c* from activity *a* for household *h*
$QINTA_a$	quantity of aggregate intermediary input
$QINT_{c\,a}$	quantity of commodity *c* as intermediary input to activity *a*
$QINV_c$	quantity of investment demand for commodity
QM_c	quantity of imports
QQ_c	quantity of goods supplied to domestic market (composite supply)
QT_c	quantity of commodity demanded as trade input
QVA_a	quantity of (aggregate) value-added
QX_c	aggregate marketed quantity of domestic output of commodity
$QXAC_{a\,c}$	quantity of market output of commodity *c* from activity *a*
TABS	total nominal absorption
$TINS_i$	direct tax rate for institution *i* (*i* ε *INSDNG*)
$TRII_{i,i'}$	transfer from institution *i*' to *i* (both in the set *INSDG*)
WF_f	average factor price *f*
YF_f	income of factor *f*
YG	government revenue
YI_i	income of domestic non-government institution
$YIF_{i\,f}$	income to domestic institution *i* from factor *f*

EQUATIONS

1. Price Block

Import price $PM_c = pwm_c.(1 + tmc).EXP + \sum_{c' \in CT} PQ_{c'}.icm_{c'c}$ c ε CM (5.1)

Export price $PEc = pwe_c.(1 - te_c).EXR - \sum_{c' \in CT} PQ_{c'}.ice_{c'}c$ c ε CE (5.2)

Demand price of domestic non traded goods $PDD_c = PDSc + \sum_{c' \in CT} PQ_{c}.icd_{c'c}$ c ε CD (5.3)

Absorption $PQ_c.(1-tq_c).QQ_c = PDD_c.QD_c + PM_c.QM_c$ c ε (CD U CM) (5.4)

Market output value $PX_c.QX_c = PDS_c.QD_c + PE_c.QE_c$ c ε CX (5.5)

Activity price $PA_a = \sum_{c \in C} PXAC_{ac}.\Theta_{ac}$ a ε A (5.6)

Aggregate intermediate input price $PINTA_a = \sum_{c \in C} PQ.ica_{ac}$ a ε A (5.7)

Activity revenue and costs $PA_a.(1-ta_a).QA_a = PVA_a.QVA_a + PINTA_a.QINTA_a$ a ε A (5.8)

Consumer price index $CPI = \sum_{c \in C} PQ_c.cwts_c$ (5.9)

Producer price index for nontraded market output $DPI = \sum_{c \in C} PDS_c.dwts_c$ (5.10)

2. Production and Trade Block

CES technology: Activity production function $QA_a = \alpha^a_a . (\delta^a_a . QVA_a^{-pa}{}_a + (1- \delta^a_a).QINT_a^{-pa}a)^{\frac{-1}{p^a{}_a}}$ a ε ACES (5.11)

CES technology: Value-added

intermediate-input quality ratio $\frac{QVAa}{QINTAa} = \left[\frac{PINTAa}{PVAa}.\frac{\delta^a{}_a}{1-\delta^a{}_a}\right]^{\frac{1}{1+p^a{}_a}}$ a εACES (5.12)

Leontif technology:
Demand for aggregate value-added $QVA_a = iva_a.QA_a$ a εALEO (5.13)

Leontif technology: Demand for aggregate intermediate input $QINTA_a = ivaa.QA_a$ a εALEO (5.14)

Value-added and factor demands $QVA_a = \alpha^{va}{}_a . \left(\sum_{f \in F} \delta^{va}{}_{fa} . QF_{fa} - p^{va}{}_a\right)^{-1/p^{va}{}_a}$ a εA (5.15)

Factor demand $WF_f = WFDIST_{fa} = PVA_a . (1- tva_a).QVA_a . \left(\sum_{f \in F'} \delta^{va}{}_{fa} . QF_{fa}^{-p^{va}{}_a}\right)^{-1} . \delta^{va}{}_{fa} . QF_{f_a}^{-p^{va}{}_a - 1}$ a εA and f ε F (5.16)

Disaggregated intermediate: input demand $QINT_{ca} = ica_{ca}.QINTA_a$ a εA and cε C (5.17)

Commodity production and allocation $QXAC_{ac} + \sum_{h \in H} QHA_{ach} . \theta_{ac}.QA_a$ a εA and a εCA (5.18)

Output aggregation function $QX_c = \alpha^{ac}{}_c . \left(\sum_{a \in A} \delta^{ac}{}_{ac} . QXAC_{ac}{}^{-p^{ac}{}_c} \right)^{1/p^{ac}{}_c - 1}$ c ε CX (5.19)

First order condition for

Output aggregation function $PXAC_{ac} = PX_c . QX_c \left(\sum_{a \in A'} \delta^{ac}{}_{ac} . QXAC_{ac}{}^{-p^{ac}{}_c} \right)^{-1} . \delta_{ac}{}^{ac} . QXAC_{ac}{}^{-p^{ac}{}_c - 1}$ a εA c ε CX (5.20)

Output transformation (CET)function $QXc = \alpha^t{}_c . \left(\delta^t{}_c . QE_c{}^{p^t{}_c} + (1 - \delta^t{}_c . QD_c{}^{p^t{}_c} \right)^{1/p^t{}_c}$ c ε (CE∩CD) (5.21)

Export-domestic supply ratio $\frac{QE_c}{QD_c} \left(\frac{PE_c}{PDS_c} . \frac{1 - \delta^t{}_c}{\delta^t{}_c} \right)^{1/p^t{}_c - 1}$ c ε (CE∩CD) (5.22)

Output transformation for non-export commodities $QX_c = QD_c + QE_c$ c ε (CE∩CEN) ∪ (CE∪CDN) (5.23)

Composite supply

(Armington) function $QQc = \alpha^q{}_c . \left(\delta^q{}_c . QM_c{}^{-p^q{}_c} + (1 - \delta^q{}_c) . QD_c - p_c{}^q \right)^{1/p^q{}_c}$ c ε (CM∩CD) (5.24)

Import –domestic demand ratio $\frac{QM_c}{QD_c} = \left(\frac{PDD_c}{OM_c} \cdot \frac{\delta^q{}_c}{1 - \delta^q{}_c} \right)^{\frac{1}{1 + p^q{}_c}}$ c ε (CM∩CD (5.25)

Composite supply for non-imported outputs and nonproduced imports $QQ_c = QD_c + QM_c$ $c \ \varepsilon \ (CD \cap CMN) \cup (CE \cup CDN)$ (5.26)

Demand for transactions services $QT_c = \sum_{c' \in C'} (icm_{cc'}.QM_{c'} + ice_{cc'}.QE_{c'} + icd_{cc'}.QD_{c'})$ $c \ \varepsilon$ CT (5.27)

2. Institution Block

Factor income $YF_f = \sum_{a \in A} WF_f.\overline{WFDIST}_{fa}.QF_{fa}$ $f \ \varepsilon F$ (5.28)

Institutional factor income $YIF_{if} = shif_{if}.\left((1-tf_f).YF_f - trnsfr_{rowf}.EXR\right)$ $i \ \varepsilon INSD$ and $f \ \varepsilon F$ (5.29)

Income of domestic, non government institution $YI_i = \sum_{f \in F} YIF_{if} + \sum_{i' \in INSDNG'} TRII_{ii'} + trnsfr_{igov}.\overline{CPI} + trnsfr_{irow}.EXR$ $i.\varepsilon INSDING$ (5.30)

Intra-institutional transfers $TRII_{ii'} = shii_{ii'}.(1-MPS_{i'}).(1-TINS_{i'}).YI_{i'}$ $i \ \varepsilon INSDING$ and $i' \ \varepsilon$ INSDING' (5.31)

Household consumption expenditure $EH_h = \left(1 - \sum_{i \in INSDNG} shii_{ih}\right).(1-MPS_h).(1-TINS_h).YI_h$ $h \ \varepsilon H$ (5.32)

Household consumption demand for marketed commodities $PQc.QHch = PQc.Ymch + Bmch.\left(EH_h - \sum_{c' \in C} PQ_{c'}.Y^{m}{}_{c'h} - \sum_{a \in A} \sum_{c' \in C} PXAC_{ac'}.Y^{h}{}_{ac'h}\right)$ $c \varepsilon C$ and $h \varepsilon H$ (5.33)

Household consumption demand for home commodities $PXAC_{ac}.QHA_{ach} = PXAC_{ac}.Y^{h}_{ach} + B^{h}_{ach}.\left(EH_h - \sum_{c'\in C} PQ_{c'}.Y^{m}{}_{c'h} - \sum_{a\in A}\sum_{c'\in C} PXAC_{ac'}.Y^{h}{}_{ac'h}\right)$ a.εA,cεC and hεH (5.34)

Investment demand $QINVc = \overline{IADJ}.\overline{qinv}_c$ c εCINV (5.35)

Government consumption demand $QG_c = \overline{GADJ}.\overline{qg}_c$ cεC (5.36)

Government revenue

$$YG = \sum_{i\in INSDNG} TINS_i.YI_i + \sum_{f\in F} tf_f.YF_f + \sum_{a\in A} tva_a.PVA_a.QVA_a + \sum_{a\in A} ta_a.PA_a.QA_a + \sum tm_c.pwm_c.QM_c.EXR + \sum_{c\in C} tq_c.PQ_c.QQ_c + \sum_{f\in F} YIF_{govf} + trnsfr_{govrow}.EXR \quad (5.37)$$

Government expenditure $EG = \sum_{c\in C} PQ_c.QG_c + \sum_{i\in INSDNG} trnsfr_{igov}.\overline{CPI}$ (5.38)

4. System constraint Block

Factor market $\sum_{a\in A} QF_{fa} = \overline{QFS}_f$ fεF (5.39)

Composite commodity markets $QQc = \sum_{a\in A} QINT_{ca} + \sum_{h\in H} QH_{ch} + QG_c + QINV_c + qdst_c + QT_c$ c ∈ C (5.40)

Current account balance with rest of the world (in foreign currency) $\sum_{a\in CM} pwm_c.QM_c + \sum_{f\in F} trnsfr_{rowf} = \sum_{a\in CE} pwe_c.QE_c + \sum_{i\in INSD} trnsfr_{irow} + \overline{FSAV}$ (5.41)

Government balance YG =EG+GSAV (5.42)

Direct institutional tax rates TINSi $= \overline{tins} \cdot \left(1 + \overline{TINSADJ} \cdot tins01_i\right) + \overline{DTINS}.tins01_i$ i ∈ INSDNG (5.43)

Institutional savings rates $MPS_i = \overline{mps}_i.\left(1 + \overline{MPSADJ}.mps01_i\right) + DMPS.mps01_i$ i ∈ INSDNG (5.44)

Savings-Investment Balance $\sum_{i\in INSDNG} MPS_{i.} \cdot (1 - TINS_i).YI_i + GSAV + EXR.\overline{FSAV} = \sum_{c\in C} PQ_{c.}QINV_c + \sum_{c\in C} PQ_c.qdst_c$ (5.45)

Total absorption

TABS = $\sum_{h\in H}\sum_{c\in C} PQ_c.QH_{ch} + \sum_{a\in A}\sum_{c\in C}\sum_{h\in H} PXAC_{ac}.QHA_{ach} + \sum_{c\in C} PQ_c.QG_c + \sum_{c\in C} PQ_c.QINV_c + \sum_{c\in C} PQ_c.qdst_c$ (5.46)

Ratio of investment to absorption INVSHR.TABS= $\sum_{c\in C} PQ_c \cdot QINV_c + \sum_{c\in C} PQ_c.qdst_c$ (5.47)

Ratio of government consumption to absorption GOVSHR.TABS= $\sum_{c\in C} PQ_c.QG_c$ (5.48)

Appendix 6.1

6.1.1 Justification of Entries in the Lesotho Macrosam*

The Lesotho macrosam, as presented in Table 6.3 contains 35 nonzero entries This Appendix documents the sources and the rationale of each of these entries. Throughout this section the row and column totals are control totals of the SAM. An attempt was made to obtain all the control totals from the existing data from the three main sources listed above (BOS, Finance department and the Central Bank of Lesotho (CBL)). Where this was not possible, the totals were derived or calibrated from matrix cell entries. The macrosam serves as an important reference point for the microeconomic or disaggregated SAM. Sub-matrices which appear as cells are coded as follows: M: R. C, where M denotes a matrix identified by row (R) and column (C) co-ordinates. For example, cell M: 2.1 refers to row 2 column 1. The codes identify sub-matrix locations for easy reference. All figures are expressed in million Maloti (Conningarth Economist and the World Bank (2002).

SAM CELL: column, row	**VALUE Millions Maloti**	**DESCRIPTION AND DATA SOURCES (Data sources as per list below)**
M:2.1	5591	Intermediate consumption. Calculated residually as total activities column less other elements of activities column.
M:3.1	2180	Compensation of domestic employees. The remuneration of labour is calculated by using the 1999 Labour Force Survey (LFS)[2]. It is important to keep in mind that this remuneration comprises of three components: - Compensation of domestic employers M2180 - Compensation of government employers M 867 - Compensation of Basotho nationals working abroad M1746 Total M4793
M:4.1	1904	Gross operating surplus. Calculated residually. Value added in total is known as well as the other two components namely, labour remuneration and net indirect tax.

* Conningarth Economists and the World Bank (2002).

[2] Labour Force Survey 1999, BOS, Maseru

M:7.1	-82	Subsidies to activities
M:1.2	7817	Activities output for domestic sale. Calculated as a residual of total activity row and total exports: 9593 Gross output activities - 1776 Total exports, M: 1.9 7817
M:7.2	1532	Taxes on products Calculated: 1140.2 Customs 268.0 Sales tax 57.7 Oil levy 66.0 Water royalties 1532.0 * note: BOP figure = 64, but has been adjusted to figure in government statistics for consistency.
M:9.2	4745	Total imports. Calculation: 5512 Total imports - 1140 Customs tax 4372 + 373* 4745 * adjustment for services bought in RSA by Lesotho citizens and not recorded in the BOP, e.g. business and legal services.
M:6.3	4601	Compensation of employees distributed to households. Calculated residually as the difference between total labour income and foreign labour payments: 4793 Total labour income - 192 Foreign labour payments 4601
M:9.3	192	Compensation of foreign employees.
M:5.4	1074	Dividends and interests. Calculated residually as total of capital (GOS) column less other elements of the column.
M:8.5	361	Property income * 378, Budget figure for the year 2001/2002 adjusted for 2000.
M:8.4	155 + 465	Depreciation of government capital. Depreciation was assumed to be

= 620 30% of average investment over 10 years (1991 – 2000). The assumption is based on the fact that Lesotho is still investing highly and that most of its investment is on construction, which normally takes about 100 years before it gets written off.

Total depreciation calculation: 30% of fixed capital formation (1991 – 2000).

2068.30 Average gross fixed capital formation (1991 – 2000)
x .30
620 .00 Total depreciation

To isolate government from other sectors' depreciation, the share of government investment in total investment was calculated as 25 %. Depreciation of government assets was then calculated as 25% of total depreciation:

620 x .25 =155

465 Depreciation, other sectors

Calculation:

620 Total depreciation
- 155 Depreciation of government capital
465

M:9.4 244 Payable property income/investment income abroad.

M:6.5 528 Distributed profits. Calculated residually as total enterprise column, less other column elements.

M:7.5 184 Company tax, calculated:
488 Income tax
- 304 Personal tax, (see M:7.6 for explanation)
184

M:8.5 362 Enterprise savings. Calculated residually as net private savings, less private capital depreciation and households savings:

Calculated:
1309 Gross national savings
- 164 Net government savings, M:8.7
- 155 Depreciation of government assets, M:8.4
990
- 465 Depreciation of private assets, M:9.4
525
- 163 Household savings M:9.6
362

M:2.6 4736 Households' consumption. Calculated residually as total households'

		column, less other elements of households' column:
		5257 Total, households column - (53+304+163+1) Sum, other households' column elements 4736
M:6.6	53	Households' transfers. According to the 1994/95 household budget survey, transfers comprise about 1 % of total household expenditure: 5257 x 0.01 = 53
M:7.6	304	Personal tax. Calculated as 62% of income tax: 488 x .62 = 304 Note: There is no breakdown between for company and personal tax for the year 2000. The breakdown for 2001/2002 was used to calculate the proportions of the two taxes: income (personal tax as a proportion of total tax on income and profits: 330.4/529.9 = 0.6235 This factor was used to calculate income tax from total tax on income for the year 2000 : 0.6235 * 488 = 304
M:9.6	163	Household savings. Assumed to be 2.5% of total household spending, based on the Namibian SAM (1998) and the 1994/5 Lesotho Household Budget Survey.
M:9.6	1	Transfers from local to foreign households. Calculated: 0.07 Gifts 0.01 Charitable transfer 0.31 Maintenance 0.33 Rounded up to 1 for computation purpose.
M:2.7	1288	Government expenditure on goods and services. Calculated: 1435 Other goods and services - 82 Subsidies, M:7.1 - 58 Pensions, M:6.7 1295 - 7 Foreign transfers, M:9.7 1288
M:3.7	867	Compensation to government employees
M:4.7	147	Interest on public debt
M:6.7	58	Transfers to households. Calculated as the average of 1999/2000 and 2000/2001 transfers: Average: 53 99/00 transfers

		61 00/01 transfers 58
M:7.7	82	Subsidies, M:7.1
M:8.7	164	Government savings. Calculated as the difference between government revenue and recurrent expenditure: 2768 Revenue and grants - 2448 Recurrent expenditure 319 - 155 Depreciation of government assets, (part of M:8.4) 164
M:9.7	7	Foreign factor payments
M:2.8	489+1990 = 2479	Government capital expenditure
	-170	Current deficit. Calculated residually as the difference between government net savings and capital expenditures: 319 Total, capital government row - 489 government capital expenditures, M:2.8 - 170
	1990	Private capital consumption. Calculated residually as total capital consumption less government capital consumption: 2657 Gross fixed capital formation + (-)178 Changes in inventories - 489 Government capital consumption, M:2.8 1990
	-1000	Current deficit. Calculated residually as all other sectors net savings less total capital consumption: 990 Row total, capital, all other sectors - 1990 All other sectors' capital consumption - 1000
M:3.9	1746	Labour payments from abroad Calculated: 1391 Miners remittances +355 Other remittances from RSA 1746
M:4.9	254	Return on foreign investment
M:1.9	1776	Total exports Calculation: 1468.00 Exports f.o.b

		+ 0.21	Passenger services, credit
		+ 3.56	Port services, credit
		+ 166.39	Travel, credit
		+ 0.10	Net pensions with non CMA
		+ 86.82	Water sales
		+ 0.23	Management fees, credit
		+ 22.71	Expenditure by foreign embassies
		+ 23.83	Expenditure by expatriates
		1772.00	
		+ 4.00	adjustment to export figure in national accounts,
		1776.00	
M:6.9	17	Foreign transfers to households. Calculated residually as the difference between total foreign transfers and transfers to government :	
		919.86	Government, net transfers
		+ 6.56	Subscription to international organisations
		+ 16.27	Transfers to other sectors
		942.69	Total foreign transfers
		- 926.00	Total government transfers
		17.00	
M:7.9	226	Foreign transfers Calculated:	
		Grants	139
		+ water royalties	87
			226
M: 8.9	1170	Current deficit	

All the 35 nonzero entries in the macrosam will be disaggregated in order to fill in the relevant cells of the microsam, which is discussed in **Appendix 6.2.**

6.1.2: Structure of the Lesotho Microsam

Account category	**Account Number**	**Account Name**	**Account Description**
Activities	1	*a1*	Field crops (improved)
	2	*a2*	Field crops (traditional)
	3	*a3*	Irrigated vegetable production
	4	*a4*	Irrigated fruit production
	5	*a5*	Cattle production
	6	*a6*	Feedlot cattle
	7	*a7*	Dairy cattle
	8	*a8*	Sheep
	9	*a9*	Goats
	10	*a10*	Horses and donkeys
	11	*a11*	Poultry – layers
	12	*a12*	Poultry – broilers
	13	*a13*	Chickens and pigs (traditional)
	14	*a14*	Other agricultural crops
	15	*a15*	Forestry
	16	*a16*	Fisheries
	17	*a17*	Mining & quarrying
	18	*a18*	Butchery activities
	19	*a19*	Fruit and vegetable processing
	20	*a20*	Dairy & other food processing
	21	*a21*	Grain milling
	22	*a22*	Beverages commercial
	23	*a23*	Beverages traditional
	24	*a24*	Wool and mohair shearing sheds
	25	*a25*	Wool and mohair processing
	26	*a26*	Other textiles and clothing
	27	*a27*	Leather and footwear
	28	*a28*	Wood, furniture, paper, printing and publishing
	29	*a29*	Chemical and pharmaceutical production
	30	*a30*	Bricks production
	31	*a31*	Other non-metallic minerals
	32	*a32*	Steel, metal production and machinery
	33	*a33*	Micro-industry, crafts and artifacts & jewelry
	34	*a34*	Other manufacturing
	35	*a35*	Electricity
	36	*a36*	Water
	37	*a37*	Building construction
	38	*a38*	Civil engineering
	39	*a39*	Informal construction
	40	*a40*	Sales and repairs of auto and trucks
	41	*a41*	Other commercial trade - wholesale and retail
	42	*a42*	Informal trade
	43	*a43*	Accommodation & catering
	44	*a44*	Road transport - taxis & minibuses
	45	*a45*	Other road transport - freight & passengers

	46	*a46*	Air transport-commercial
	47	*a47*	Telecommunications & postal services
	48	*a48*	Real estate & business services
	49	*a49*	Financial and insurance services
	50	*a50*	Informal financial and business services
	51	*a51*	Government services
	52	*a52*	Domestic services
	53	*a53*	Other community services
Commodities	54	*c1*	Field crops
	55	*c2*	Other vegetables
	56	*c3*	Fruit crops
	57	*c4*	Other crops
	58	*c5*	Cattle
	59	*c6*	Skins and hides
	60	*c7*	Sheep, goats and pigs
	61	*c8*	Horses & donkeys
	62	*c9*	Eggs
	63	*c10*	Broilers and other poultry products
	64	*c11*	Diamonds
	65	*c12*	Course & fine sand
	66	*c13*	Other mining & quarrying products.
	67	*c14*	Beef and processed meat
	68	*c15*	Processed grain & grain products
	69	*c16*	Dairy & other food products
	70	*c17*	Beverages & tobacco
	71	*c18*	Raw wool
	72	*c19*	Raw mohair
	73	*c20*	Textiles & clothing
	74	*c21*	Leather & footwear products
	75	*c22*	Wood & wood products
	76	*c23*	Paper, printing & publishing
	77	*c24*	Gas, petroleum products & other fuel
	78	*c25*	Pharmaceutical products
	79	*c26*	Soap cleaning compounds and toilet preparations
	80	*c27*	Other chemical products
	81	*c28*	Bricks
	82	*c29*	Other non metallic mineral products
	83	*c30*	Steel, metal products and machinery
	84	*c31*	Micro industry products, handicrafts and artifacts
	85	*c32*	Other manufacturing
	86	*c33*	Electricity
	87	*c34*	Water
	88	*c35*	Building construction
	89	*c36*	Civil engineering
	90	*c37*	Informal construction
	91	*c38*	Sales and repair of auto services
	92	*c39*	Other commercial trade
	93	*c40*	Informal trade

	94	*c41*	Accommodation & catering
	95	*c42*	Taxis & minibus road transport
	96	*c43*	Commercial road transport
	97	*c44*	Air transport
	98	*c45*	Telecommunications
	99	*c46*	Postal services
	100	*c47*	Real estate & business services
	101	*c48*	Financial services
	102	*c49*	Insurance services
	103	*c50*	Informal financial and business services
	104	*c51*	Government services
	105	*c52*	Domestic services
	106	*c53*	Other community services
Trade and Transport margin	107	TTM	Trade margin
	108	TRM	Transport margin
Production factors(labour	109	L1	Legislators, senior officials and managers
	110	L2	Professionals
	111	L3	Technical & associate professionals
	112	L4	Clerks
	113	L5	Service workers, shop & market sales workers
	114	L6	Skilled agric. and fishery workers
	115	L7	Craft and related traders workers
	116	L8	Plant and machine operators & assemblers
	117	L9	Elementary occupations
	118	L10	Subsistence farmers
Production factors(capital	119	K1	General government
	120	K2	Parastatals (LHWP)
	121	K3	Private enterprise (Market orientated farming, - Subsistence farming & Informal sector and Industry).
Enterprises	122	ENT1	General government
	123	ENT2	Parastatals (LHWP)
	124	ENT3	Private enterprise
Households	125	HH1	Urban households (High income/ Low income)
	126	HH2	Rural low lands (High income/ Low income)
	127	HH3	Rural foothills (High income/ Low income)
	128	HH4	Rural mountains (High income/ Low income)
	129	HH5	Rural Senqu River Valley (S.R.V) (High income/ Low income)
Taxes	130	DTAX	Direct taxes
	131	ITAX	Indirect taxes
	132	SACU	Customs (SACU)
	133	WL	Water royalties
	134	SUB	Subsidies
	135	TRA	Transfers

	136	OGI	Other national government income
	137	MCC	Maseru City Council
Government	138	G1	General government (General public services, Public order & safety, Education services, Health services, Social, community and local government services, Rural development services (from water royalties) Other economic services, Public debt)
	139	G2	Maseru City Council
Saving-investment	140	S_I1	General government
	141	S_I2	Lesotho Highlands Water Project
	142	S_I3	Private Sector & parastatals (excl. LHWP)
Rest of the world	143	ROW1	Republic of South Africa (Factor payments & transfers, Goods and services and Capital)
	144	ROW2	Rest of the world (Factor payments & transfers, Goods and services and Capital)

Source: SAM of Lesotho , constructed by Connigarth Economists and the World Bank (2002).

In this study the SAM is aggregated to 53 activities and commodities; household disaggregated to 10 groups based on their income; taxes disaggregated in to direct tax; indirect tax, income tax, sale tax and factor tax; one government; one saving – investment and one ROW.

Appendix 6.2: Justification of Entries to the Lesotho Microsam [δ]

The microsam has 144 accounts, as mentioned earlier. Entries to the microsam were obtained by disaggragating the 35 nonzero entries of the macrosam. This section discusses the disaggreation procedure and the main sources of the data needed to carry out this procedure.

6.2.1 Detailed Distribution Structures

In this section an exposition is given of the data and methodologies used to calculate the distribution structures to redistribute the row and column totals as shown although serious efforts were made to use the unique Lesotho data for calculating the structures, the researchers had to rely on regional data due to the unavailability of some data. Furthermore, no Input/Output Table exists for Lesotho which made the construction of the SAM an even more daunting task than it already is. However, much care was taken in ensuring that structures conform to the economic situation of Lesotho. Probably the most serious problem with the National Accounts Statistics for purposes of compiling a SAM for Lesotho, is that industry surveys currently don't exist. Industry surveys form the basis of detailed intermediate input structures for various activities and, their absence, made the compilation of the SAM extremely difficult. Luckily, data on the output and value added of the economic sectors of Lesotho was available from the BOS. Per definition,

Output =Production= Intermediate demand + Value added Thus,
Intermediate demand=Production – Value added

These 3 aspects were the only ones that data was available on for each of the sectors. In addition, separate income and expenditure accounts of incorporated business enterprises as well as those of households do not exist. Normally the SAM apportions economic participation on three broad categories, namely corporate sector, household sector and the government sector. In National Accounts, separate accounts are constructed to depict each of these participants' detailed income and expenditure. In essence these three entities should not be viewed as being mutually exclusive, but as a

[δ] Conningarth economist and World bank (2002).

coherent system. This three dimensional system is very helpful, and is actually a must for the compilation of a SAM. It does not exist in the case of Lesotho.

Relevant South African structures were used in order to disaggregate intermediate demand between the 57 commodities provided in the SAM. Detailed notes on each of the activities are provided in the following section.

6.2.2 Activities for SAM Lesotho 2000

Production, GDP and Gross output figures were mainly obtained from the Central Bank of Lesotho and the Bureau of Statistics (BOS) in Maseru. The activities consist of 53 sectors.

6.2.2.1 Agriculture

A production figure of M1184.4 million was available for agriculture. The GDP figure was used to disaggregate this figure. The internal report from the BOS helped to disaggregate the sectors by total input and output figures.

Note that in this study, subsistent farmers and traditional farmers. Traditional farmers are seen as being synonymous. Traditional farmers participate in agriculture through the following:

Activities: Field crops (traditional)
Cattle production
Sheep
Goats
Chickens and pigs (traditional)
Horses and donkeys

There are not really any commercial farmers in Lesotho. All farming activities are subsistence or traditional to some extent.

Table 6.2.A: Value added percentage of Agriculture

%	Value added	Maloti Mln
1.00	Agriculture	959.80
0.66	crops	636.1
0.29	Livestock	274
0.05	Service	49.70

Production (output) in Maloti million dividing agriculture into crop and livestock farming.

Table 6.2.B: Production percentage of Agriculture

%	Production(output)	Maloti Mln
1.00	Agriculture	1184.1
0.66	crops	781.5
0.34	livestock	402.6
0.00	services	0

Turnover figures for agricultural crops were used to determine the different crop activities, like field crops (improved), field crops (traditional), etc.

6.2.2.2 Mining and quarrying.

Total production of M8.1 million represents diamond mining and quarrying. Diamond mining represents a small portion of M0.8 million, in comparison with stone quarrying of M7.3 million

Table 6.2.C: Production of Mining and quarrying

	Production M Mln
Diamond	0.8
Stone quarrying	7.3
Total	8.1

6.2.2.3 Manufacturing

Manufacturing is by far the most important economic sector in Lesotho, with a Production figure of M2382 million for the year 2000.

Table 6.2.D: Gross output of manufacturing

Gross output	Total M Mln
Food products and beverages	960.8
Textiles, clothing, footwear, leather	814.3
Other manufacturing	606.9
Total	2382

6.2.2.4 Electricity and water

The bulk of these two activities come from the Lesotho Highland Water Project (LHWP) in the form of revenue for water, at M170.2 million.

Table 6.2.E: Gross output of Electricity and water

Gross output	Total M Mln
Electricity supply	217.6
Water supply	207

6.2.2.5 Building and construction

The LHWP provided a considerable labour and financial injection to Lesotho. Of the M2509.8 million, the LHWP contributes M1211.4 million. Informal building and construction add up to M91.6 million.

Table 6.2.F: Gross output of Building and construction

Gross output	Total M Mln
Building and construction	1076.8
Civil engineering	1341.4
Informal construction	91.6

6.2.2.6 Accommodation and catering.

Table 6.2.G: Gross output of Accommodation and catering

Gross output	Total M Mln
Hotel	128.1
Restaurants and cafes	116.8

6.2.2.7 Wholesale and retail

Twenty percent of M805.8 million was allocated to other commercial trade, to give a final figure of M644.64 million to fuel distribution - Wholesale and retail and M161.16 million to other commercial trade.

Table 6.2.H: Gross output of Wholesale and retail

Gross output	Total M Mln
Wholesale and retail trade	805.8
Fuel distribution	15.7
Informal trade	9.9

6.2.2.8 Transport

The Lesotho rail and road transport sectors were added together to form the activity - Other road transport- freight and passengers. A portion of road transport was allocated to buses and taxis.

Table 6.2.I: Gross output of Transport

Gross output	Total M Mln
Road transport-busses and taxis	88.00
Other road transport –freight and passenger	112.40
Air transport -commercial	14.30
Total	214.7

6.2.2.8 Telecommunication and postal services

Telecommunication and postal services are combined under one activity no. 48 and total M159.2 million.

Table 6.2.J: Gross output of Telecommunication and postal services

Gross output	Total M Mln
Postal activities	15.5
Telecommunications	92.7
DHL	3.5
VCL communication	37.9
other	9.6
Total	159.20

6.2.2.9 Real estate and business services

Lesotho being a very rural country, the bigger, towns including Maseru are surrounded by owner occupied dwellings and businesses.

Table 6.2.K: Gross output of Real estate and business services

Gross output	Total M Mln
Real estate, renting and business	127.1
Business services, non-residential rentals	97.4
Rentals of residential dwellings	29.7
Own occupied dwellings	66.7
Total	320.9

6.2.2.10 Financial services

A number of activities are lumped together to form two major activities. The informal financial and business services sub-sector is by far the smallest with M47.6 million.

Table 6.2.L: Gross output of financial services

Gross output	Total M Mln
Financial and insurance services	245.80
Informal financial and business services	47.60
Total	293.40

6.2.2.11 Government services

All government services classified as non-government market producers amounted to M21.9 million according to the BOS.

6.2.2.12 Domestic services

Due to the fact that Lesotho has only a small higher income group, there are not many work opportunities for domestic workers.

6.2.2.13 Other community services

Many of other community services are made use of in the Republic of South Africa, that is the Lesotho people use services in RSA, as does RSA use there service in Lesotho.

Table 6.2.M: Gross output of other community services

Gross output	Total M Mln
Market producers	
-funeral and others	28
Non-market producers	
-churches, clubs, welfare)	63.3
Education	504.20
Health and social work	50.80
Total	646.3

6.2.3 Commodities

The values of Commodities are derived from the production and demand structures of the other components of the SAM.

6.2.3.1 Outputs of Commodities

Outputs are derived from intermediate demand, household consumption, current government spending, investment and exports. These have been estimated in prior processes when constructing the SAM.

As described in the document, certain columns of the SAM were direct distributions, while others were derived distributions.The entities that could be directly sub-divided (direct distributions) were:

- Activities
- Households
- Government
- Capital account
- Rest of the world

Consequently, these columns could be constructed using data from the Reserve Bank of Lesotho and BOS. Once these columns had been developed, the row totals of other entities, such as commodities, could be determined. This implies that, per definition, if the row totals are known, the column totals are known. Accordingly, so-called "prior processes" of direct distributions produced the necessary row totals for those entities that could not be directly distributed.

For instance, the row total of commodities, consists of the following components:

$$q = X + C + G + I$$

Where

q	=	Row totals of commodities
X	=	Intermediate consumption
C	=	Private consumption expenditure by households in Lesotho
G	=	Government consumption expenditure
I	=	Gross investment

All the components of q (X, C, G and I) were known due to their nature of being direct distributions. Adding them together provides q. Thus, q is calculated via "prior processes" when constructing the SAM. Since the row totals are known, per definition, the column totals are known as well.

6.2.4 Inputs

The origin of the commodities, which in this case is similar to the inputs of commodities, stems from activities as well as imports from the rest of the world. Imports also constitute the residual of total domestic demand. This is also the position in the matrix where the balancing of demand and supply done. Accordingly the calculated imports tally with the actual imports the demand and supply of commodities are in balance.

6.2.5 Factor Payments

6.2.5.1 **Labour** (Distribution activities to occupations)

In order to calculate the distribution of activities to occupations use was made of the Labour Force Survey in Lesotho by BOS. The most recent Survey was conducted during 1999. In Table 6.2.N the Activity Status of the Survey is shown.

Table 6.2.N: Population aged 10 years and above by current activity status 1999

Activity	Males	Females	Total
Eco. Active Pop	437 537	411 771	849 308
Employed in Lesotho	268 340	245 727	514 067
Employed in RSA	78 233	25 266	103 499
Total Employed	346 573	270 993	617 566
Total Unemployed	90 964	140 778	231 742
Empl. Rate	79.2	65.8	68.9
Unempl. Rate[a]	20.8	34.2	27.3
Unempl. Rate[b]	25.3	36.4	31.1
Eco Inactive	156 428	263 561	419 989
Total Pop 10+	593 965	675 332	1 269 297
LFPR	66.9	73.7	61.0

Note: [a] means that migrant workers are included as part of the labour force
[b] means that migrant workers are not included as part of the labour force
Source**:** Labour Force Survey 1999, BOS.

There were a total employed of 617 566 working in a major economic entities. The total of 617 556 employed had to be disaggregated for the compilation of the Lesotho SAM. In the SAM a distinction is made between the private sector and the public sector.

Table 6.2.O: Employed population by major economic entities, aged 10 years and above by current activity status 1999

Sector	Total	Urban	rural
Government	50,014	19,404	30,610
Parastatalr	11,129	5,734	5,395
Private	133,033	60,734	72,299
Subsistencefarming	423,390	26,507	396,884
Total	617,566	112,379	50,5188

Source**:** BOS (1999).

Table 6.2.P: Employed population 10 years and above by industry, in Lesotho 1999

Industry	Total
Agric, Hunting and Forestry	23 289
Fishing	125
Mining and Quarrying	3 003
Manufacturing	21 796
Electricity, Gas and Water	3 263
Construction	29 495
Wholesale Retail and H/H Goods	29 014
Hotel and Restaurant	4 447
Transport Storage and Communication	10 670
Financial Intermedia	1 851
Real Estate, Renting and Business Act	5 437
Defense, Social and Security	7 576
Education	13 224
Health and Social Work	4 965
Social and Personal Service Activities	9 451
Private HH with Employees	26 444
Territorial Organizations and Bodies	126
Subsistence Farming	423 390
Total	**617 566**

Source: Labour Force Survey (1999).

The data given in Tables 6.2.O and 6.2.P were used to determine the final number of employees per activity in the Lesotho SAM. The relevant figures are shown in Table 6.2 Q.

Table 6.2.Q: Employed population 10 years and above by industry in Lesotho

	Total employed		Total employed workers)		Total employed subsistence farmers)		Total employed government		Total private sector employee	
	Total [numbers	Structure [percenta	Total [numbers	Structure [percenta	Total [numbers	Structure [percenta	Total [numbers	Structure [percenta	[numbers	Structure [percenta
Agriculture, hunting &	23,289	3.80%	19,477	3.80%	19,477	12.20%	16,212	14.70%	16,212	3.50%
Fishing	125	0.00%	105	0.00%	105	0.10%	87	0.10%	87	0.00%
Mining & quarrying	3,003	0.50%	97	0.00%	97	0.10%	81	0.10%	81	0.00%
Manufacturing	21,796	3.50%	18,228	3.50%	18,228	11.40%	15,173	13.80%	15,173	3.30%
Electricity, gas and water	3,263	0.50%	2,729	0.50%	2,729	1.70%	2,271	2.10%	2,271	0.50%
Construction	29,495	4.80%	24,667	4.80%	24,667	15.40%	20,533	18.70%	20,533	4.40%
Wholesale, retail and	29,014	4.70%	24,265	4.70%	24,265	15.20%	20,198	18.40%	20,198	4.40%
Hotel and restaurant	4,447	0.70%	3,719	0.70%	3,719	2.30%	3,096	2.80%	3,096	0.70%
Transport, storage and	10,670	1.70%	8,924	1.70%	8,924	5.60%	7,428	6.80%	7,428	1.60%
Financial intermedia	1,851	0.30%	1,548	0.30%	1,548	1.00%	1,289	1.20%	1,289	0.30%
Real estate, renting &	5,437	0.90%	4,547	0.90%	4,547	2.80%	3,785	3.40%	3,785	0.80%
Defense, social & security	7,576	1.20%	6,336	1.20%	6,336	4.00%		0.00%	-	0.00%
Education	13,224	2.10%	11,059	2.20%	11,059	6.90%		0.00%	-	0.00%
Health & social work	4,965	0.80%	4,152	0.80%	4,152	2.60%		0.00%	-	0.00%
Social & personal service	9,451	1.50%	7,904	1.50%	7,904	4.90%	1,316	1.20%	1,316	0.30%
Private households with	26,444	4.30%	22,116	4.30%	22,116	13.80%	18,409	16.70%	18,409	4.00%
Territorial organizations	126	0.00%	105	0.00%	105	0.10%	88	0.10%	88	0.00%
Subsistence farming	423,390	68.60%	354,089	68.90%		0.00%		0.00%	354,089	76.30%
Total	617,566	100%	514,067	100%	159,978	100%	109,964	100%	464,053	100%

Source*:* Conningarth Economists and World Bank (2002).

6.2.5.2 Capital

Capital factor payments are also derived both from activities and from government. Those derived from activities are in the form of interest and dividends. On the other hand, those that originate from government consist of interest on the public debt. The distribution from activities to factor payments capital components is mainly on a one to one basis. This was executed by means of inspecting the relevant relationship. It was decided that such interest as that on public debt should be allocated to the other private component of capital factor payments. All the banks and financial institutions fall under this component. In the SAM all these payments are to enterprises.

The distribution of capital factor payments to enterprises is done on a one to one basis. The entity Enterprises has the same components as Capital. As far as the other components are concerned in the Capital column, they are distributed to the eight entities of Capital in proportion to the size of the factor payment capital of the eight entities.

6.2.6 Enterprises

As is the case with labour factor payments no structure exists for Lesotho regarding the redistribution of interest and dividends from Enterprises to Households. It was therefore necessary to use a derived structure from the 1988 RSA SAM[ε].

It is important to note that the framework of the SAM makes provision for the two entities; factor payments (capital) and enterprises.

These entities are very closely related and were in SAMs from earlier times, viewed as a single entity. However, currently the following process is reflected in the SAM:

- Factor payments (capital) pay interest and dividends to Enterprises
- Then, subsequently, Enterprises pay these interests and dividends to Basotho households.

[ε] Ibid: CSS 1988.Final Social Accounting matrix for South Africa. CSS Report no. 04-03-02(1988) RSA.

Thus, Basotho households do receive interest and dividends (implying that they do own shares in firms in Lesotho), but these payments are made via the Enterprises identified for purposes for the Lesotho SAM.

Corporate taxes and savings of various enterprises were done in proportion to the size of the enterprises.

6.2.7 Households

Raw data from the 1994/5 Lesotho Household Budget Survey[κ] were used to derive household expenditure figures. Consumption figures derived from the survey were unrealistically high. The data were therefore used to derive expenditure structures, or proportions, which were then applied to the final households consumption figure published in the National Accounts Report 1980–2000 (BOS, 2001) in order to derive household consumption expenditure figures for 2000. The underlying assumption is that the structures remained the same over the years. This was done in consultation with the Economics Statistics Department of the BOS.

Derivation of household consumption figures involved three steps. Firstly, it was necessary to determine total household expenditures for the ten household classifications. Using the data, the following structures were derived.

Table 6.2.R: Total household consumption expenditure structure

Agro-Ecological Zone	**Income Group**	
	High	**Low**
Urban households	0.99	0.01
Rural lowlands	0.66	0.34
Rural foothills	0.66	0.34
Rural mountain	0.67	0.33
Rural SRV	0.64	0.36

Total household consumption expenditure structure was derived from the Lesotho national Household Budget Survey (HBS) for 1994/95. The following steps were followed:

[κ] The Survey data was made available by the BOS, January, 2002.

(i) Total national household expenditures were calculated.

(ii) The figure in (i) was divided among five agro-ecological zones – urban areas, rural lowlands, rural foothills, rural mountains and rural Senqu River Valley (SRV)

(iii) Total expenditures in each agro-ecological zone were divided between low income groups and high-income groups

(iv) Values in (iii) were expressed as a percentage of total household expenditure in each zone, e.g.

Urban Areas

Total household expenditure:	M180,675,941
High-income household expenditure:	M178,918,053
Low-income household expenditure:	M 1,757,888

Proportions

High-income households:	178,918,053/180,675,941 = 0.99
Low-income households:	1,757,888/180,675,941 = 0.01

According to the above Table, 99% of total urban households expenditures comprised of high income households' expenditures. In each zone, high income households were responsible for over 60% of total rural household expenditures.

The second step involved dividing total household expenditures between different expenditure groups: (i) commodities, (ii) transfers, (iii) direct taxes and (iv) savings. The derived structure is shown in the table below.

Table 6.2.S: Household expenditure between different expenditure groups

Agro-Ecological Zone	**Urban households**		**Rural lowlands**		**Rural foothills**		**Rural mountains**		**Rural SRV**	
Income Group	H	L	H	L	H	L	H	L	H	L
Commodities	0.92	0.01	0.64	0.34	0.62	0.34	0.64	0.33	0.61	0.36
Transfers	0.01	0.00	0.01	0.00	0.01	0.00	0.03	0.00	0.02	0.00
Taxes	0.02	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.00
Savings	0.04	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Total	**0.99**	**0.01**	**0.66**	**0.34**	**0.66**	**0.34**	**0.67**	**0.33**	**0.64**	**0.36**

Note: H and L stand for high and low income groups, respectively.

According to the Table 2.6.S, more than 80% of total households' expenditures are comprised of commodity expenditure, with the high income households' share dominating. Finally, it was necessary to determine structures of each of the above expenditure groups. Structures for household transfers and direct taxes will be discussed in the next section.

To derive the commodity expenditure structure, the composite group was disaggregated into different consumption commodities, 57 in the disaggregated SAM. At this stage it is important to mention that the data used for the calibration of households' accounts were received from BOS in one large electronic file with different spread sheets. Expenditure data comprised of the total expenditure summary sheet, showing different expenditure groups and main consumption commodity groups, and disaggregated consumption expenditures sheets. The structures of consumption expenditure and expenditure between different expenditure groups were derived from the expenditures summary sheet. Other data sheets had to be used to derive expenditure structures for specific consumption commodities. However, because the data did not have household identities/codes, it was difficult to match households in each data set/spread sheet. It was therefore difficult to use the survey data to isolate high and low income households' consumption expenditures in the commodity structure. To circumvent this problem, consumption weights for different commodity groups for different income groups published by BOS in the Consumer Price Index Report (BOS, 2001), were used. BOS used the same survey (1994/95) to derive these weights. Hence, it made perfect sense to use them.

Derivation of commodity expenditure structure involved two steps. The first step comprised derivation of average consumption expenditure structure for each zone. The second step involved using the weights to derive consumption structure for each income group in all the zones.

6.2.8 Household Transfers and Taxes

The derivation of household's transfers and tax structures is discussed in this section. Beginning with household transfers, it was necessary to first allocate transfers from different regions and income groups to: (i) Lesotho households, (ii) South African households and the rest of the world households. Secondly, it was necessary to allocate domestic transfers between different regions and income groups. These were difficult tasks since such information is not supplied in the survey data. Although there are household transfers, it is not clear where the transfers go. However, the transfers are very small, averaging 1% of total household expenditures across income groups and regions. Proportions from the South African 2000 SAM were used to derive the structure. These will have to be improved once better data become available.

The tax structure was not very difficult to arrive at since it was assumed that all households' tax comprised direct taxes. So, 100% of tax expenditures went to direct taxes.

6.2.9 Government

The current expenditure of the Lesotho government is depicted in the SAM in terms of two separate spheres, namely central and local authorities.

6.2.9.1 Central Government

The information pertaining to central government expenditure was mainly based on the report Estimates of Revenue and Expenditure for the financial year 1 April 2001 – 31 March 2002 for Lesotho[ρ]. Although the SAM was developed for 2000, this report portrayed information on the Lesotho fiscus in a very user-friendly way and facilitates the construction of a SAM .This information was then used to calculate distribution structures for calculating the 2000 absolute values of current expenditure.

The central government of Lesotho was divided into the following functions:

- General public services
- Public order and security
- Education services
- Health services
- Social, community and local government services
- Rural development services
- Other economic services

[ρ] The Kingdom of Lesotho, Estimates of Kingdom of Lesotho for the year from 1st April 2001 to 31st March

- Public debt.

In Table 2.6.S the expenditure of the central government is summarized per function (Maloti millions, 2000 Prices)

Table 2.6.T: Expenditure of Government per function in % (Maloti millions, 2000 Prices)

sector	**Total government expenditure**	**%**
General public service	720	25.57
Public order & safety	306	11.71
Education services	583	22.30
Health services	214	8.18
Social, community & local government services	177	6.79
Rural development services	-	0.00
Other economic services	286	10.95
Public debt	311	11.90
Total	2597	100

Four functions are the recipients of the bulk of the total estimated current expenditure for 2000/2001, namely general public services (27.6%), education (22.3%), the public debt (11.9%) and Public Order & Safety (11.7 %).

The next step was to allocate the above-mentioned expenditure to the Commodities, Factor payments (Labour and Capital), Households, Government and the Capital account.

Table 2.6.U: Structure to divide government expenditure between the relevant entities

	General public service	Public order & safety	Education services	Health services	Social community	Rural development	Other service	Public debt
Activities								
Commodities	0.60	0.60	0.39	0.66	0.33		0.69	
Labour	0.30	0.40	0.56	0.32	0.31		0.29	
Capital	0.00		0.00	0.00			0.00	0.47
Enterprises								
Households					0.33			
Government	0.05	0.00	0.06	0.02	0.04		0.02	
Capital account								0.53
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

6.2.9.1.1 Maseru City Council

It was ascertained that local governments in Lesotho mainly consist of district and rural councils which are funded by the central government. This expenditure is included under the function Social, community and local government function. The Maseru City Council is the only fully fledged municipality.

The Expenditure account of the Maseru City Council for the year ended 30 September 2000 was used to allocate the relevant data to the SAM. The department figure explained in Table 2.6. V.

Table 2.6.V: Departmental figures (%)

Department	Total M	%
Administration	2 690 359	30.7
Finance	1 475 660	16.8
Health & Environment	1 764 089	20.2
Parks and Recreation	595 643	6.8
Works	1 913 038	21.8
Planning	326 016	3.7
Total	8 764 805	100.0

The next step was to allocate the above expenditure to the relevant entities in the Lesotho SAM.

6.2.10 Capital account

The main purpose of the capital account is to reflect gross fixed capital formation per commodity for the government as well as the other sectors in the economy of Lesotho. The components identified for purposes of developing the capital account portion of the SAM, were as follows:

Table 2.6.W: Capital account portion

	Gross fixed capital formation M Mln
General government	336
Lesotho highland water project	650
Private sector and parastartals	323

It was necessary for each of the above-mentioned components to divide the gross fixed capital formation between the different commodities identified for purposes of the SAM. Thus, a coefficient matrix was developed that reflected the magnitude of capital stocks per commodity for each of the sector listed above. The figures for gross fixed capital formation for each sector were multiplied by this coefficient matrix rendering a matrix that reflected capital formation per sector on a commodity basis.

Unique coefficient structures were developed for each of the three capital account items listed above. For the general government, information on investment by the general government from the budget of Lesotho was used. In terms of the LHWP, detailed information on the capital investment relating to this project was used. As far as the private sector is concerned, the structure was based on South African coefficients.

6.2.12 Rest of the world

Table 2.6.X: Apportionment of exports- Services

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Transporta				Travel					Insurance	Water	Manageme	Governme		TOTAL
				Tourism Spending			Kinship	Expenditur	Expenditur		royal-	fees	Expenditur	Expenditur	Exports
Activities		Port	Hotel	Hotel	Handi-	Hire	visitors	foreign	expatriots		ties		forein	expatriots	
	Passenger	service	rooms	food	crafts	cars		students					embasies		
Field crops (improved)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Field crops (traditional)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Irrigated vegetable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Irrigated fruit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cattle production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Feedlot cattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dairy cattle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sheep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goats	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Horses and donkeys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poultry - layers	0	0	0	0	0	0	0.448	0.021	0.322	0	0	0	0.182	0.191	1.163
Poultry - broilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chickens and pigs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other agricultural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Forestry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fisheries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mining and quarrying	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Butchery activities	0	0	0	0	0	0	2.016	0.095	1.447	0	0	0	0.818	0.858	5.234
Fruit and vegetables	0	0	0	0	0	0	2.408	0.114	1.728	0	0	0	0.977	1.025	6.251
Dairy and other food	0	0	0	0	0	0	3.697	0.174	2.653	0	0	0	1.499	1.573	9.595
Grain milling	0	0	0	0	0	0	11.202	0.528	8.038	0	0	0	4.542	4.766	29.076
Beverages - commercial	0	0	0	0	0	0	4.537	0.214	3.255	0	0	0	1.84	1.93	11.776
Beverages - traditional	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wool and mohair	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wool and mohair	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other textiles and	0	0	0	0	0	0	9.074	0.428	6.511	0	0	0	3.679	3.86	23.552
Leather and footwear	0	0	0	0	0	0	3.921	0.185	2.813	0	0	0	1.59	1.668	10.177
Wood, furniture, paper,	0	0	0	0	0	0	5.545	0.261	3.979	0	0	0	2.248	2.359	14.393
Chemicals and	0	0	0	0	0	0	2.857	0.135	2.05	0	0	0	1.158	1.215	7.414
Bricks production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other non-metallic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Steel, metal production	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micro-industry, crafts	0	0	0	0	0	0	0.314	0.015	0.225	0	0	0	0.127	0.133	0.814
Other manufacturing	0	0	0	0	0	0	0.314	0.015	0.225	0	0	0	0.127	0.133	0.814
Electricity	0	0	0	0	0.45	0	0.157	0.007	0.113	0	0	0	0.064	0.067	0.857
Water	0	0	0	0	0	0	0.067	0.003	0.048	0	0	0	0.027	0.029	0.174
Building construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Civil engineering	0	0	0	0	0	0	0	0	0	0	86.82	0	0	0	86.82
Informal construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sales and repairs of	0	0	0	0	0	0	0.314	0.015	0.225	0	0	0	0.127	0.133	0.814
Other commercial trade	0	0	0	0	0.45	0	0	0	0	0	0	0	0	0	0.45
Informal trade	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Accommodation &	0	0	0	0	0	0	0.314	0.015	0.225	0	0	0	0.127	0.133	0.814
Road transport - taxis	0	0	51.15	18.82	0	0	3.417	0.161	2.452	0	0	0	1.385	1.454	78.838
Other road transport -	0	3.56	0	0	0	0.83	1.176	0.055	0.844	0	0	0	0.477	0.5	7.443
Air transport -	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Telecommunications &	0.21	0	0	0	0	0	0.056	0.003	0.04	0	0	0	0.023	0.024	0.355
Real estate & business	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Financial and insurance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Informal financial and	0	0	0	0	0	0	0.314	0.015	0.225	0	0	0	0.127	0.133	0.814
Government services	0	0	0	0	0	0	2.576	0.121	1.849	0.1	0	0	1.045	1.096	6.787
Domestic services	0	0	0	0	0	0	1.288	0.061	0.924	0	0	0.23	0.522	0.548	3.574
Other community	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.21	3.56	51.15	18.82	0.9	0.83	56.01	2.64	40.19	0.1	86.82	0.23	22.71	23.83	308

Table 2.6.Y: Apportionment of total exports and Services (M mln)

Receipts: Values 2000 **Activities**	Total exports of goods	Total exports of services	Exports of goods & services	Total Export Coefficients
Field crops (improved)	0.222	0	0.222	0.000125
Field crops (traditional)	0	0	0	0
Irrigated vegetable production	1.122	0	1.122	0.000632
Irrigated fruit production	0.003	0	0.003	0.000002
Cattle production	5.224	0	5.224	0.002941
Feedlot cattle	0	0	0	0
Dairy cattle	0	0	0	0
Sheep	0.059	0	0.059	0.000033
Goats	0	0	0	0
Horses and donkeys	0	0	0	0
Poultry - layers	0	1.163	1.163	0.000655
Poultry - broilers	1.763	0	1.763	0.000993
Chickens and pigs (traditional)	0	0	0	0
Other agricultural crops	0	0	0	0
Forestry	0	0	0	0
Fisheries	0	0	0	0
Mining and quarrying	1.698	0	1.698	0.000956
Butchery activities	2.021	5.234	7.254	0.004085
Fruit and vegetables processing	0	6.251	6.251	0.00352
Dairy and other food processing	13.186	9.595	22.781	0.012827
Grain milling	31.836	29.076	60.912	0.034297
Beverages - commercial	65.843	11.776	77.619	0.043704
Beverages - traditional	0	0	0	0
Wool and mohair shearing sheds	32.238	0	32.238	0.018152
Wool and mohair processing	0.836	0	0.836	0.000471
Other textiles and clothing	885.205	23.552	908.756	0.511687
Leather and footwear	0.933	10.177	11.11	0.006255
Wood, furniture, paper, printing and	8.811	14.393	23.204	0.013065
Chemicals and pharmaceutical production	5.176	7.414	12.59	0.007089
Bricks production	4.868	0	4.868	0.002741
Other non-metallic minerals	0.011	0	0.011	0.000006
Steel, metal production and machinery	176.466	0	176.466	0.099361
Micro-industry, crafts and artifacts and	0	0.814	0.814	0.000458
Other manufacturing	0	0.814	0.814	0.000458
Electricity	0	0.857	0.857	0.000483
Water	7.453	0.174	7.627	0.004295
Building construction	0	0	0	0
Civil engineering	0	86.82	86.82	0.048885
Informal construction	0	0	0	0
Sales and repairs of auto and trucks	0	0.814	0.814	0.000458
Other commercial trade - wholesale and	166.333	0.45	166.783	0.093909
Informal trade	0.38	0	0.38	0.000214
Accommodation & catering	0	0.814	0.814	0.000458
Road transport - taxis & minibuses	40.367	78.838	119.205	0.06712
Other road transport - freight &	3.51	7.443	10.953	0.006167
Air transport - commercial	12.437	0	12.437	0.007003
Telecommunications & postal services	0	0.355	0.355	0.0002
Real estate & business services	0	0	0	0
Financial and insurance services	0	0	0	0
Informal financial and business services	0	0.814	0.814	0.000458
Government services	0	6.787	6.787	0.003822
Domestic services	0	3.574	3.574	0.002012
Other community services	0	0	0	0
	1468	**308**	**1776**	**1**

6.2.Z: Apportionment of imports Services (M mln)

Receipts: Values 2000	1	2	3	4	5	6	7	8	9	10	11
	Transportation		Travel			In-sur-ance	Property income	Professional technical		Gov. services Lesotho embass.	Total Import - services
Commodities	Air travel	Shipment	Basotho students	Government subsistence allowance	Other			Advert-ising	Broke-rage		
Maize	0	0	0	0	0	0	0	0	0	0	0
Sorghum	0	0	0	0	0	0	0	0	0	0	0
Wheat	0	0	0	0	0	0	0	0	0	0	0
Beans	0	0	0	0	0	0	0	0	0	0	0
Peas	0	0	0	0	0	0	0	0	0	0	0
Vegetables	0	0	1.527	0.15	0.839	0	0	0	0	0.445	2.962
Fruit crops	0	0	0	0	0	0	0	0	0	0	0
Other crops	0	0	0	0	0	0	0	0	0	0	0
Cattle	0	0	0.564	0.055	0.31	0	0	0	0	0.164	1.094
Skins and hides	0	0	0	0	0	0	0	0	0	0	0
Sheep, goats and pigs	0	0	0.705	0.069	0.387	0	0	0	0	0.206	1.367
Horses & donkeys	0	0	0	0	0	0	0	0	0	0	0
Eggs	0	0	0.313	0.031	0.172	0	0	0	0	0.091	0.608
Broilers and other poultry	0	0	0	0	0	0	0	0	0	0	0
Diamonds	0	0	0	0	0	0	0	0	0	0	0
Course & fine sand	0	0	0	0	0	0	0	0	0	0	0
Other mining & quarrying	0	0	0	0	0	0	0	0	0	0	0
Beef and processed meat	0	0	0.298	0.029	0.164	0	0	0	0	0.087	0.577
Dairy & other food	0	0	3.171	0.312	1.743	0	0	0	0	0.925	6.151
Processed grain & grain	0	0	7.83	0.77	4.304	0	0	0	0	2.284	15.188
Beverages & tobacco	0	0	2.584	0.254	1.42	0	0	0	0	0.754	5.012
Raw wool	0	0	0	0	0	0	0	0	0	0	0
Raw mohair	0	0	0	0	0	0	0	0	0	0	0
Other textiles & clothing	0	0	6.342	0.624	3.486	0	0	0	0	1.85	12.302
Leather & footwear	0	0	2.741	0.27	1.506	0	0	0	0	0.799	5.316
Wood & wood products	0	0	3.876	0.381	2.13	0	0	0	0	1.131	7.518
Paper, printing &	0	0	0	0	0	0	0	0	0	0	0
Gas, petroleum products &	0	0	1.331	0.131	0.732	0	0	0	0	0.388	2.582
Pharmaceutical products	0	0	0	0	0	0	0	0	0	0	0
Soap cleaning compounds	0	0	0.666	0.065	0.366	0	0	0	0	0.194	1.291
Other chemical products	0	0	0	0	0	0	0	0	0	0	0
Bricks	0	0	0	0	0	0	0	0	0	0	0
Other non-metallic	0	0	0	0	0	0	0	0	0	0	0
Steel, metal products and	0	0	0	0	0	0	0	0	0	0	0
Micro industry products,	0	0	0.219	0.022	0.121	0	0	0	0	0.064	0.425
Other manufacturing	0	0	0.219	0.022	0.121	0	0	0	0	0.064	0.425
Electricity	0	0	0.11	0.011	0.06	0	0	0	0	0.032	0.213
Water	0	0	0.047	0.005	0.026	0	0	0	0	0.014	0.091
Building construction	0	0	0	0	0	0	0	0	0	0	0
Civil engineering	0	0	0	0	0	0	0	0	0	0	0
Informal construction	0	0	0	0	0	0	0	0	0	0	0
Informal trade	0	0	0	0	0	0	0	0	0	0	0
Sales and repairs of auto	0	0	0.219	0.022	0.121	0	0	0	0	0.064	0.425
Other commercial trade	0	0	0	0	0	0	0	0	0	0	0
Accommodation &	0	0	0.219	0.022	0.121	0	0	0	0	0.064	0.425
Commercial road	0	196.35	0.822	0.081	0.452	3.53	0	0	0	0.24	201.475
Taxis & minibus road	0	0	2.388	0.235	1.313	0	0	0	0	0.697	4.632
Air transport	22.41	0	0	0	0	0	0	0	0	0	22.41
Postal services	0	0	0.02	0.002	0.011	0	0	0	0	0.006	0.038
Telecommunications	0	0	0.02	0.002	0.011	0	0	0	0	0.006	0.038
Financial services	0	0	0	0	0	0	0	0	0	0	0
Insurance services	0	0	0	0	0	3.53	5.8	0	0	0	9.33
Real estate & business	0	0	0	0	0	0	0	0.01	0.08	0	0.09
Informal financial and	0	0	0.219	0.022	0.121	0	0	0	0	0.064	0.425
Government services	0	0	1.801	0.177	0.99	0	0	0	0	0.525	3.493
Domestic services	0	0	0.9	0.089	0.495	0	0	0	0	0.263	1.747
Other community services	0	0	0	0	0	0	0	0	0	0	0
Total	22.41	196.35	39.15	3.85	21.52	7.06	5.8	0.01	0.08	11.42	307.65

6.2.Z1. Apportionment of total imports Services (M mln)

Receipts: Values 2000 **Activities**	Total exports of goods	Total exports of services	Exports of goods & services	Total Export Coefficients
Field crops (improved)	0.222	0	0.222	0.000125
Field crops (traditional)	0	0	0	0
Irrigated vegetable production	1.122	0	1.122	0.000632
Irrigated fruit production	0.003	0	0.003	0.000002
Cattle production	5.224	0	5.224	0.002941
Feedlot cattle	0	0	0	0
Dairy cattle	0	0	0	0
Sheep	0.059	0	0.059	0.000033
Goats	0	0	0	0
Horses and donkeys	0	0	0	0
Poultry - layers	0	1.163	1.163	0.000655
Poultry - broilers	1.763	0	1.763	0.000993
Chickens and pigs (traditional)	0	0	0	0
Other agricultural crops	0	0	0	0
Forestry	0	0	0	0
Fisheries	0	0	0	0
Mining and quarrying	1.698	0	1.698	0.000956
Butchery activities	2.021	5.234	7.254	0.004085
Fruit and vegetables processing	0	6.251	6.251	0.00352
Dairy and other food processing	13.186	9.595	22.781	0.012827
Grain milling	31.836	29.076	60.912	0.034297
Beverages - commercial	65.843	11.776	77.619	0.043704
Beverages - traditional	0	0	0	0
Wool and mohair shearing sheds	32.238	0	32.238	0.018152
Wool and mohair processing	0.836	0	0.836	0.000471
Other textiles and clothing	885.205	23.552	908.756	0.511687
Leather and footwear	0.933	10.177	11.11	0.006255
Wood, furniture, paper, printing and	8.811	14.393	23.204	0.013065
Chemicals and pharmaceutical production	5.176	7.414	12.59	0.007089
Bricks production	4.868	0	4.868	0.002741
Other non-metallic minerals	0.011	0	0.011	0.000006
Steel, metal production and machinery	176.466	0	176.466	0.099361
Micro-industry, crafts and artifacts and	0	0.814	0.814	0.000458
Other manufacturing	0	0.814	0.814	0.000458
Electricity	0	0.857	0.857	0.000483
Water	7.453	0.174	7.627	0.004295
Building construction	0	0	0	0
Civil engineering	0	86.82	86.82	0.048885
Informal construction	0	0	0	0
Sales and repairs of auto and trucks	0	0.814	0.814	0.000458
Other commercial trade - wholesale and	166.333	0.45	166.783	0.093909
Informal trade	0.38	0	0.38	0.000214
Accommodation & catering	0	0.814	0.814	0.000458
Road transport - taxis & minibuses	40.367	78.838	119.205	0.06712
Other road transport - freight &	3.51	7.443	10.953	0.006167
Air transport - commercial	12.437	0	12.437	0.007003
Telecommunications & postal services	0	0.355	0.355	0.0002
Real estate & business services	0	0	0	0
Financial and insurance services	0	0	0	0
Informal financial and business services	0	0.814	0.814	0.000458
Government services	0	6.787	6.787	0.003822
Domestic services	0	3.574	3.574	0.002012
Other community services	0	0	0	0
	1468	**308**	**1776**	**1**

Appendix: Model Estimation Result

Appendix 7.1: Model estimation results of PDDXP, PDXP, PQXP, PXXP and QXXP, at DFA

Commodities	PDDXP	PDSXP	PQXP	Commodities	PXXP	QXXP
c1	0.38	0.38	0.38	c1	0.38	-0.26
c2	0.35	0.35	0.33	c2	0.35	-0.25
c3	0.36	0.36	0.35	c3	0.35	-0.27
c4	0.45	0.45	0.44	c4	0.45	-0.15
c5	0.36	0.36	0.34	c5	0.35	-0.37
c6	0.26	0.26	0.23	c6	0.26	-0.3
c7	0.36	0.36	0.35	c7	0.36	-0.34
c8	0.42	0.42	0.42	c8	0.41	-0.18
c9	0.49	0.49	0.24	c9	0.44	-0.68
c10	0.42	0.42	0.24	c10	0.42	-0.48
c12	0.73	0.73	0.73	c11	0.2	-0.06
c13	0.19	0.19	0.2	c12	0.7	-0.06
c14	0.35	0.35	0.31	c13	0.19	-0.06
c15	0.32	0.32	0.23	c14	0.35	-0.3
c16	0.34	0.34	0.24	c15	0.32	-0.4
c17	0.32	0.32	0.28	c16	0.34	-0.38
c18	0.3	0.3	0.3	c17	0.32	-0.27
c19	0.33	0.33	0.33	c18	0.28	-0.29
c20	-5.87	-5.87	-6.5	c19	0.29	-0.37
c21	0.42	0.42	0.29	c20	-2.11	13.68
c22	0.23	0.23	0.21	c21	0.31	-0.19
c23	0.28	0.28	0.22	c22	0.22	-0.12
c24	0.11	0.11	0.2	c23	0.27	-0.12
c25	0.06	0.06	0.17	c24	0.19	0.29
c26	0.11	0.11	0.2	c25	0.07	0.29
c27	0.18	0.18	0.2	c26	0.2	0.29
c28	0.36	0.36	0.32	c27	0.2	0.29
c29	0.37	0.37	0.23	c28	0.33	-0.17
c30	0.36	0.36	0.21	c29	0.34	-0.38
c31	0.04	0.04	0.04	c30	0.34	-0.24
c32	0.24	0.24	0.22	c31	0.04	0.07
c33	0.46	0.46	0.46	c32	0.22	0.1
c34	0.42	0.42	0.42	c33	0.46	0.04
c35	0.3	0.3	0.3	c34	0.4	-0.09
c36	0.32	0.32	0.32	c35	0.3	0
c37	0.35	0.35	0.35	c36	0.31	-0.02
c38	0.46	0.46	0.46	c37	0.35	-0.08
c39	0.38	0.38	0.38	c38	0.46	-0.07
c40	0.3	0.3	0.3	c39	0.38	-0.2
c41	0.41	0.41	0.4	c40	0.3	-0.05
c42	0.43	0.43	0.42	c41	0.28	-0.4
c43	0.42	0.42	0.31	c42	0.42	-0.09
c44	0.98	0.98	0.39	c43	0.29	-0.46
c45	0.3	0.3	0.29	c44	0.42	-2.25
c46	0.73	0.73	0.71	c45	0.27	0.06
c47	0.54	0.54	0.44	c46	0.72	0.06
c48	0.67	0.67	0.67	c47	0.54	0.08
c49	0.32	0.32	0.25	c48	0.66	0.13
c50	0.47	0.47	0.39	c49	0.32	0.13
c51	0.46	0.46	0.31	c50	0.46	0.06
c52	0.38	0.38	0.38	c51	0.43	-0.36
c53	0.32	0.32	0.32	c52	0.37	-0.16
				c53	0.32	0.27

Where: PDDXP = percentage change of demand price for commodities produced and sold domestically, PDSXP = percentage change of supply price for commodities produced and sold domestically, PQXP= percentage change of price of composite goods, PXXP = percentage change of average output price and QXXP = percentage change of quantity of aggregated marketed commodities.
Source: Source: Model estimation results

Appendix 7.2: Model estimation results of PDDXP, PDXP, PQXP, PXXP and QXXP, at EEP

Commodities	PDDXP	PDSXP	PQXP	Commodities	PXXP	QXXP
c1	-0.35	-0.35	-0.35	c1	-0.35	0.2
c2	-0.33	-0.33	-0.31	c2	-0.33	0.2
c3	-0.33	-0.33	-0.33	c3	-0.32	0.22
c4	-0.4	-0.4	-0.39	c4	-0.4	0.11
c5	-0.33	-0.33	-0.32	c5	-0.33	0.28
c6	-0.28	-0.28	-0.26	c6	-0.28	0.22
c7	-0.34	-0.34	-0.32	c7	-0.34	0.25
c8	-0.38	-0.38	-0.38	c8	-0.37	0.14
c9	-0.43	-0.43	-0.26	c9	-0.39	0.49
c10	-0.38	-0.38	-0.26	c10	-0.38	0.35
c12	-0.6	-0.6	-0.6	c11	-0.23	0.04
c13	-0.23	-0.23	-0.23	c12	-0.57	0.04
c14	-0.33	-0.33	-0.3	c13	-0.23	0.04
c15	-0.31	-0.31	-0.25	c14	-0.33	0.22
c16	-0.32	-0.32	-0.26	c15	-0.31	0.28
c17	-0.3	-0.3	-0.28	c16	-0.32	0.28
c18	-0.3	-0.3	-0.3	c17	-0.3	0.2
c19	-0.33	-0.33	-0.33	c18	-0.29	0.21
c20	5.58	5.58	6.38	c19	-0.3	0.27
c21	-0.39	-0.39	-0.29	c20	2.14	-9.96
c22	-0.23	-0.23	-0.23	c21	-0.31	0.14
c23	-0.25	-0.25	-0.24	c22	-0.23	0.04
c24	-0.11	-0.11	-0.23	c23	-0.25	0.04
c25	0.01	0.01	-0.18	c24	-0.22	-0.44
c26	-0.1	-0.1	-0.23	c25	0.00E+00	-0.44
c27	-0.16	-0.16	-0.23	c26	-0.23	-0.44
c28	-0.34	-0.34	-0.31	c27	-0.22	-0.44
c29	-0.34	-0.34	-0.25	c28	-0.32	0.12
c30	-0.34	-0.34	-0.24	c29	-0.32	0.25
c31	-0.04	-0.04	-0.05	c30	-0.33	0.16
c32	-0.2	-0.2	-0.21	c31	-0.04	-0.08
c33	-0.41	-0.41	-0.41	c32	-0.22	-0.2
c34	-0.38	-0.38	-0.38	c33	-0.41	-0.02
c35	-0.29	-0.29	-0.29	c34	-0.37	0.07
c36	-0.31	-0.31	-0.31	c35	-0.29	0
c37	-0.32	-0.32	-0.32	c36	-0.31	0.01
c38	-0.41	-0.41	-0.41	c37	-0.32	0.06
c39	-0.35	-0.35	-0.35	c38	-0.41	0.05
c40	-0.27	-0.27	-0.27	c39	-0.35	0.16
c41	-0.36	-0.36	-0.36	c40	-0.27	0.03
c42	-0.38	-0.38	-0.38	c41	-0.28	0.27
c43	-0.37	-0.37	-0.31	c42	-0.38	0.08
c44	-0.76	-0.76	-0.37	c43	-0.29	0.3
c45	-0.3	-0.3	-0.29	c44	-0.38	1.58
c46	-0.56	-0.56	-0.55	c45	-0.28	-0.05
c47	-0.47	-0.47	-0.4	c46	-0.56	-0.05
c48	-0.56	-0.56	-0.56	c47	-0.47	-0.06
c49	-0.32	-0.32	-0.27	c48	-0.56	-0.1
c50	-0.41	-0.41	-0.36	c49	-0.32	-0.1
c51	-0.41	-0.41	-0.31	c50	-0.41	-0.06
c52	-0.35	-0.35	-0.34	c51	-0.39	0.24
c53	-0.3	-0.3	-0.3	c52	-0.34	0.12
				c53	-0.3	-0.19

Where: PDDXP = percentage change of demand price for commodities produced and sold domestically, PDSXP = percentage change of supply price for commodities produced and sold domestically, PQXP= percentage change of price of composite goods, PXXP = percentage change of average output price and QXXP = percentage change of quantity of aggregated marketed commodities.
Source: Source: Model estimation results

Appendix 7.3: Model estimation results of PDDXP, PDXP, PQXP, PXXP and QXXP, at CET

Commodities	PDDXP	PDSXP	PQXP	commodities	PXXP	QXXP
c1	-0.55	-0.55	-0.55	c1	-0.55	0.62
c2	-0.491	-0.49	-0.36	c2	-0.49	0.41
c3	-0.523	-0.52	-0.48	c3	-0.58	0.21
c4	-0.756	-0.76	-0.7	c4	-0.76	0.36
c5	-0.498	-0.5	-0.39	c5	-0.53	0.84
c6	-0.886	-0.89	-0.16	c6	-0.91	0.45
c7	-0.517	-0.52	-0.41	c7	-0.52	0.72
c8	-0.694	-0.69	-0.69	c8	-0.73	0.23
c9	-0.626	-0.63	0.36	c9	-0.75	1.36
c10	-0.641	-0.64	0.3	c10	-0.64	1.54
c12	-0.606	-0.61	-0.61	c11	-1.29	-0.02
c13	0.187	0.19	0.55	c12	-0.65	-0.02
c14	-0.355	-0.36	-0.12	c13	-0.32	-0.02
c15	-0.316	-0.32	0.34	c14	-0.36	0.45
c16	-0.276	-0.28	0.28	c15	-0.32	1.58
c17	-0.453	-0.45	-0.15	c16	-0.28	1.21
c18	-0.32	-0.32	-0.32	c17	-0.46	0.6
c19	-0.819	-0.82	-0.82	c18	-0.48	0.66
c20	1.801	1.8	0.82	c19	-0.97	0.68
c21	0.022	0.02	0.34	c20	-0.05	-7.55
c22	-0.121	-0.12	0.3	c21	-0.63	-1.77
c23	0.168	0.17	0.43	c22	-0.39	0.21
c24	0.277	0.28	0.55	c23	0.13	0.21
c25	2.127	2.13	0.91	c24	-1.15	-2.91
c26	0.284	0.28	0.69	c25	2	-2.91
c27	0.412	0.41	0.56	c26	-1.23	-2.91
c28	0.037	0.04	0.18	c27	-1.02	-2.91
c29	-0.04	-0.04	0.45	c28	-0.21	-0.3
c30	-0.063	-0.06	0.53	c29	-0.29	0.3
c31	0.095	0.1	0.11	c30	-0.18	0.72
c32	0.274	0.27	0.39	c31	0.09	-0.2
c33	-0.682	-0.68	-0.68	c32	-0.53	-1.6
c34	-0.946	-0.95	-0.94	c33	-0.69	-0.22
c35	-0.131	-0.13	-0.13	c34	-0.97	-0.09
c36	0.037	0.04	0.04	c35	-0.13	-0.02
c37	-0.479	-0.48	-0.48	c36	-0.05	-0.19
c38	-0.739	-0.74	-0.72	c37	-0.48	0.22
c39	-0.539	-0.54	-0.54	c38	-0.74	0.02
c40	-0.422	-0.42	-0.42	c39	-0.54	0.2
c41	0.146	0.15	0.15	c40	-0.46	-0.02
c42	-0.613	-0.61	-0.56	c41	-0.72	-1.88
c43	0.592	0.59	0.57	c42	-0.62	0.17
c44	0.336	0.34	0.5	c43	-0.48	-2.41
c45	-0.775	-0.78	-0.57	c44	-0.84	-2.02
c46	0.423	0.42	0.43	c45	-0.95	-0.15
c47	-0.644	-0.64	-0.32	c46	0.41	-0.15
c48	-1.212	-1.21	-1.21	c47	-0.64	0.3
c49	0.317	0.32	0.45	c48	-1.21	-0.09
c50	-0.76	-0.76	-0.38	c49	0.31	-0.09
c51	-0.515	-0.52	0.08	c50	-0.77	0.48
c52	-0.566	-0.57	-0.52	c51	-0.62	1.01
c53	-0.178	-0.18	-0.18	c52	-0.63	0.07
				c53	-0.19	-0.37

Where: PDDXP = percentage change of demand price for commodities produced and sold domestically, PDSXP = percentage change of supply price for commodities produced and sold domestically, PQXP= percentage change of price of composite goods, PXXP = percentage change of average output price and QXXP = percentage change of quantity of aggregated marketed commodities.
Source: Source: Model estimation results

Appendix 7.4: Model estimation results of PDDXP, PDXP, PQXP, PXXP and QXXP, at +10% PWE

Commodities	PDDXP	PDSXP	PQXP	Commodities	PXXP	QXXP
c1	4.017	4.017	4.017	c1	4.018	-2.803
c2	3.852	3.852	2.754	c2	3.852	-0.837
c3	4.041	4.041	3.652	c3	4.15	-0.416
c4	5.187	5.187	4.69	c4	5.187	-1.325
c5	3.395	3.395	2.555	c5	3.49	-5.179
c6	3.155	3.155	-0.714	c6	3.307	-2.902
c7	3.632	3.632	2.78	c7	3.643	-4.525
c8	4.935	4.935	4.935	c8	4.969	-1.132
c9	4.651	4.651	-2.771	c9	4.814	-10.256
c10	4.25	4.25	-2.453	c10	4.25	-9.11
c12	6.437	6.437	6.437	c11	5.507	-0.319
c13	-2.153	-2.153	-4.048	c12	6.382	-0.319
c14	2.862	2.862	0.877	c13	0.611	-0.319
c15	2.208	2.208	-2.667	c14	2.862	-2.902
c16	1.886	1.886	-2.207	c15	2.208	-9.406
c17	3.044	3.044	0.693	c16	1.886	-6.5
c18	2.254	2.254	2.254	c17	3.075	-3.44
c19	4.306	4.306	4.306	c18	2.83	-4.099
c20	-9.233	-9.233	-5.225	c19	4.702	-4.562
c21	-0.087	-0.087	-2.558	c20	0.208	55.84
c22	0.334	0.334	-2.475	c21	2.813	9.109
c23	-0.511	-0.511	-2.965	c22	1.613	-2.267
c24	-1.554	-1.554	-4.066	c23	-0.338	-2.267
c25	-8.926	-8.926	-5.241	c24	4.911	12.479
c26	-0.937	-0.937	-4.053	c25	-8.302	12.479
c27	-2.228	-2.228	-4.069	c26	5.27	12.479
c28	0.012	0.012	-1.184	c27	4.349	12.479
c29	0.471	0.471	-3.287	c28	1.073	0.495
c30	0.394	0.394	-3.879	c29	1.53	-4.566
c31	-0.725	-0.725	-0.833	c30	0.916	-5.861
c32	-0.751	-0.751	-2.148	c31	-0.723	1.855
c33	4.541	4.541	4.532	c32	2.565	5.481
c34	6.463	6.463	6.457	c33	4.549	1.323
c35	0.708	0.708	0.708	c34	6.4	0.462
c36	-0.334	-0.334	-0.334	c35	0.71	0.104
c37	3.036	3.036	3.036	c36	0.056	0.883
c38	4.91	4.91	4.792	c37	3.036	-1.361
c39	3.951	3.951	3.951	c38	4.91	-0.113
c40	2.898	2.898	2.898	c39	3.951	0.194
c41	1.023	1.023	0.988	c40	3.016	0.177
c42	4.24	4.24	3.865	c41	3.799	7.626
c43	-2.09	-2.09	-3.058	c42	4.259	-0.137
c44	3.588	3.588	-2.264	c43	2.407	9.891
c45	3.287	3.287	2.086	c44	4.98	-8.409
c46	2.055	2.055	1.86	c45	4.059	0.601
c47	4.174	4.174	1.793	c46	2.077	0.601
c48	8.637	8.637	8.637	c47	4.174	-2.052
c49	-2.771	-2.771	-3.518	c48	8.631	0.821
c50	5.051	5.051	2.234	c49	-2.755	0.821
c51	3.745	3.745	-0.795	c50	5.06	-3.496
c52	4.08	4.08	3.707	c51	3.978	-8.178
c53	1.149	1.149	1.149	c52	4.207	-0.309
				c53	1.192	3.59

Where: PDDXP = percentage change of demand price for commodities produced and sold domestically, PDSXP = percentage change of supply price for commodities produced and sold domestically, PQXP= percentage change of price of composite goods, PXXP = percentage change of average output price and QXXP = percentage change of quantity of aggregated marketed commodities.
Source: Source: Model estimation results