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ECONOMIC IMPLICATIONS OF TRADE LIBERALISATION ON THE SOUTH AFRICAN RED MEAT INDUSTRY

by

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On a more personal note I wish to extend my gratitude to my parents, who have provided me with the best of everything at times they could not really afford to do so. Your continued encouragement and support will always serve as an example to me.

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André Jooste
Bloemfontein
May 2001

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Degree: PhD

Department: Agricultural Economics

Promoter: Professor H.D. van Schalkwyk

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ABSTRACT

Successful agricultural trade relations have to a large extent become a function of how well countries are able to measure the possible impact of increased trade liberalisation. Many studies worldwide have attempted to gauge the impact of agricultural trade liberalisation on world production, consumption, trade and prices by means of mathematical programming models. Given the importance of the red meat sector in South Africa's agricultural economy, it is of the utmost importance that the red meat industry understands the implications and consequences of trade liberalisation. Such knowledge would enable this industry to pro-actively provide input to Government on the possible `effects of trade liberalisation on the domestic red meat industry, that could be used in multi- or bilateral trade agreements. Furthermore, the industry would be in a position to identify threats and opportunities and make the necessary strategic decisions.

In South Africa many studies have investigated various different issues of economic importance pertaining to the red meat industry. None of them have attempted to investigate the impact of trade liberalisation within the mathematical programming framework. This study employs a spatial partial equilibrium model embedded in the

mathematical programming framework to analyse the possible effects of a reduction of tariffs, increases in world prices of red meat, changes in the exchange rate, the abolishment of the Lomé Convention and changes in population size. The model includes two-stage spatially separated markets for red meat products in South Africa that encompass behavioural parameters to gauge the impact of exogenous changes related to trade liberalisation.

In the case where all tariffs on red meat imports are abolished, changes in prices of red meat products will be substantial. Producer prices for cattle, sheep and pigs will decline by 21.11 per cent, 13.90 per cent and 11.99 per cent, respectively. Beef, sheep meat and pork prices will, on average, decline by 27.88 per cent, 28.56 per cent and 13.16 per cent, respectively. Demand will increase substantially for all three meat types. From a welfare point of view consumers will experience welfare increases. Producers, on the other hand, will experience a drop in welfare. In monetary terms the welfare gains by consumers are greater than the welfare losses by producers, which constitutes a net welfare gain to society. Furthermore, the red meat industry in South Africa should carefully consider preferential access granted to third countries under FTA's. Preferential access could easily lead to a reduction in the marginal tariff rate which, in turn, would result in lower domestic prices of red meat.

In the case where the world price increases more than 10 per cent for beef, 18 per cent for mutton and 6 per cent for pork, zero imports would result. The losses in welfare to consumers are greater than the gains in welfare by producers.

The impact of a 40 per cent depreciation in the exchange rate is very similar to the situation when world prices are assumed to increase, whilst the effect of a possible abolishment of Lomé on the South African beef market would be minimal. Finally, an increase in the population size combined with an increase in world prices will only partly offset the impact of a total reduction in tariffs. Also, increases in demand due to lower prices will largely be met by higher imports.

EKONOMIESE IMPLIKASIES VAN HANDELSLIBERALISERING OP DIE SUID-AFRIKAANSE ROOIVLEISBEDRYF

deur

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SAMEVATTING

Suksesvolle handelsverhoudinge het tot 'n groot mate 'n funksie geword van hoe goed lande die moontlike impak van verdere handelsliberalisering kan bepaal. Verskeie studies wêreldwyd het probeer om die impak van landbouhandelsliberalisering op produksie, verbruik, handel en pryse deur middel van wiskundige programmeringsmodelle te bepaal. Gegewe die belangrikheid van die rooivleissektor in Suid-Afrika is dit van uiterste belang dat hierdie bedryf die implikasies en gevolge van handelsliberalisering verstaan. Dit sal die bedryf in staat stel om proaktief insette aan die regering oor die moontlike impak van handelsliberalisering op die plaaslike rooivleisbedryf te lewer. Dit kan dan weer gebruik word in multi- of bilaterale onderhandelinge met betrekking tot handel. Die bedryf sal ook in 'n posisie wees om gevare en geleenthede te indentifiseer en daarvolgens die nodige strategiese besluite te kan neem.

Daar is reeds baie navorsing gedoen oor verskillende aspekte van ekonomiese relevansie vir die rooivleisbedryf in Suid-Afrika. Nie een van hierdie studies het gepoog om die impak van handelsliberalisering binne die raamwerk van wiskundige programmering te bepaal nie. Hierdie studie maak gebruik van 'n gedeeltelike

ruimtelike ewewigsmodel wat ondervang word deur die wiskundige programmerings raamwerk om die moontlike effek van 'n verlaging in tariewe, verhogings in die wêreldprys van rooivleis, veranderinge in die wisselkoers, die uitfasering van die Lomé Konvensie en veranderinge in die grootte van die bevolking, te bepaal. Die model bestaan uit twee ruimtelike onderskeibare markte vir rooivleisprodukte in Suid-Afrika wat ondervang word deur gedragsparameters om die impak van eksogene veranderinge wat verband hou met handelsliberalisering te bepaal.

Indien alle tariewe op die invoere van rooivleis verwyder word, sal die impak op pryse substansieël wees. Produentepryse vir beeste, skape en varke sal onderskeidelik met 21.11 persent, 13.90 persent en 11.99 persent daal. Die pryse van bees-, skaap- en varkvleis sal onderskeidelik met 27.88 persent, 28.56 persent en 13.16 persent daal. Die vraag na hierdie produkte sal egter substansieël toeneem. Uit 'n welvaart oogpunt sal verbruikers 'n verhoging in welvaart ervaar, terwyl die welvaart van produsente sal afneem. In monetêre terme is die verhoging in welvaart van verbruikers groter as die verlies aan welvaart deur produsente, wat 'n netto styging in welvaart vir die gemeenskap impliseer. Daar moet ook besin word oor toegewings aan derde lande wanneer dit kom by vryehandelsooreenkomste, omrede dit maklik kan lei tot 'n verlaging in die marginale tariefkoers, wat weer sal lei tot verlagings in pryse van rooivleis op die plaaslike mark.

In die geval van wêreldpryse vir bees-, skaap- en varkvleis wat met onderskeidelik 10 persent, 18 persent en 6 persent styg, sal geen rooivleis meer ingevoer word nie. Die verlies aan welvaart vir verbruikers is groter as die verhoging in welvaart vir produsente. Die impak van 'n 40 persent depresiasie van die wisselkoers sal 'n soortgelyke situasie tot gevolg hê, soos die geval wanneer aangeneem word dat wêreldpryse styg. Die uitfasering van Lomé sal 'n minimale impak op die beesvleisbedryf in Suid-Afrika hê. Laastens, indien die impak van 'n styging in die grootte van die bevolking gekombineer word met 'n styging in wêreldpryse, sal dit slegs gedeeltelik die effek van 'n totale uitfasering van tariewe teenwerk. Verder sal verhoogde vraag as gevolg van laer pryse grootliks deur invoere aangevul word.

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LIST OF ABBREVIATIONS

ACP	African, Caribbean and Pacific countries
CAP	Common Agricultural Policy
CGE	Computational General Equilibrium
CIF	Cost insurance and freight
CLS	Country-Link System
CMO	Common market organisation
CSE	Consumer Subsidy Equivalent
Cwe	Carcass weight equivalent
DME	Developing Market Economy
ERS	Economic Research Service of the USDA
EU	European Union
EAGGF	European Agricultural Guarantee and Guidance Fund
FAPRI	Food and Agricultural Policy Research Institute
FOB	Freight on board
FSU	Former Soviet Union
FTA	Free Trade Agreement
GAMS	General Algebraic Modelling System
GATT	General Agreement on Tariffs and Trade
IME	Industrial Market Economy
Kg	Kilogram
LFA	Less Favoured Areas
MERCOSUR	Southern Common Market

MFN	Most Favoured Nation
Mio	Million
Nes	Not elsewhere specified
OECD	Organisation for Economic Cooperation and Development
PSA	Private Storage Aid scheme
PSE	Producer Support Estimate (previously Producer Subsidy Equivalent)
SA	South Africa
SADC	Southern African Development Community
SAMIC	South African Meat Industry Company
SPE	Spatial partial equilibrium
SPS	Sanitary and phyto-sanitary measures
SSA	Sub-Saharan Africa
SWOPSIM	Static World Policy Simulation Model
TBT	Technical Barriers to Trade
TRIPS	Agreement on Trade Related Aspects of Intellectual Property Rights
TRQ	Tariff Rate Quota
US	United States
USDA	United States Department of Agriculture
WFM	World Food Model
WATSIM	World Agricultural Trade Simulation Model
WTO	World Trade Organisation

CHAPTER 1

INTRODUCTION

Indeed, models basically play the same role in economics as in fashion. They provide an articulated frame on which to show off your material to advantage, ... a useful role, but fraught with the dangers that the designer may get carried away by his personal inclination for the model, while the customer may forget that the model is more streamlined than reality.

- J.H. Drèze (1984)

1.1 Background

The international trade environment has changed remarkably since the 18th century when the mercantilist philosophy was promoted widely amongst merchants, bankers and governments. The father of economics as science, Adam Smith, disagreed with this philosophy and stated that voluntary trade is only possible if there are mutual gains for trading partners. David Ricardo went further with his Law of Comparative Advantage (Chacholaides, 1990). The modern explanation of trade between countries is embedded in the thinking of people like Porter (1998), namely, competitive advantage. Moreover, the evolution of the trade environment could be explained more easily by Figure 1.1.

Figure 1.1: Evolution of the trade environment

•	***Political economy*** – dependence →	independence →	**interdependence**
•	***Markets*** – mercantilists →	'free market' →	**'free trade blocs'**
•	***Enterprises*** – production →	marketing →	**organisation**
•	***Strategies*** – stability →	competition →	**globalisation**

Source: Cordon, 2000.

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A large part of the 20th century was characterised by many countries breaking their dependence from colonialism. The so-called mainstay of these countries was that they could rely on their own resources and governance to ensure success in many respects. It was, however, realised, even by successful economies, that a country could not only rely on its own resources to face the challenges of international competition. Hence the movement towards interdependence on government and company level during the late 20th century into the 21st century (Cordon, 2000). With respect to the latter the cotton and fibre industry serves as good example. Cotton produced in Egypt finds its way to South America where it is processed (spun) and exported to Italy for the manufacture of designer clothes. Advertising campaigns for the same clothes, on the other hand, originate in the United States.

As was already mentioned the marketing environment has also undergone drastic changes. Mercantilism, which resulted in several wars, was followed by the ideology of free trade amongst countries. Even though the free market resembles the ultimate form of trade, its working still remains an enigma to many practitioners of this ideology. In essence the world was not ready to fully acknowledge and implement a fully free market regime (Cordon, 2000). Instead, countries opted for a subtle marketing regime, namely free trade blocs, of which there are various examples.

Enterprises also had to change their approach to world trade. Production was once considered the cornerstone of the marketing chain. However, consumers soon became much more sophisticated, and hence the emphasis moved towards marketing. However, it was soon realised that marketing was not enough, i.e. many enterprises lacked the ability to coordinate what consumers demanded and what was actually produced. Moreover, many companies lacked the ability to source the products they needed to market successfully (Porter, 1998). This resulted in much more emphasis being put on the organisation of the value chain. It is thus no' wonder that the international trade environment has seen multi-national companies excelling with regard to size, profits and market share.

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After World War II governments all over the world felt the need for stability (USDA, 1994). This resulted in the establishment of various international institutions, including the General Agreement on Tariffs and Trade (GATT), later transformed into the World Trade Organisation (WTO). A stable environment was seen to be the ideal opportunity to promote trade between countries. However, it was soon realised that in order to improve welfare through trade, products need to be competitive in markets outside domestic boundaries. Specialisation, technological innovation, structural change, etc. all accompanied the move towards becoming more competitive (Porter, 1998). These changes were, however, to a large extent localised in certain parts of the world. Third world countries, in particular, could not keep up with their more industrialised trading partners. Growth in the information technology sector, however, quickly changed this situation (Cordon, 2000). For example, it is today possible for anyone with access to a computer and Internet to source information on any aspect of technology, trade opportunities, trade partners, etc. from anywhere in the world. Communication advanced to such a degree that deals could be clinched without the contracting parties having to meet each other. This, together with factors already mentioned, resulted in the globalised trade environment as we know it today.

It should be clear that the trade environment has changed considerably, especially during the past few decades. South Africa's re-entry into the global village after the democratic elections was fast and uncompromising. Domestic enterprises had to adapt quickly from an environment that was inwardly orientated to one that is part and parcel of the international trade arena. This exercised pressure on institutions that survived the legacies of a regulated environment, and also on market structures designed to cater for a controlled trade regime.

1.2 Motivation

The red meat sub-sector is and will probably remain the dominant agricultural sub-sector in South Africa. It is, however, a fact that various factors will have an influence on the competitiveness and structure of the red meat industry in years to come. The

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rapidly changing economic and policy environment, as discussed above, and the possible influence of these variables, should be of major importance to role players in the red meat industry. The reason for this is the fact that the move towards deregulation coupled with liberalisation, as well as the economic welfare of South Africa, will not only influence the competitiveness of the red meat industry, but will also present challenges to industry role players regarding adjustment to the new marketing environment. Studies by, amongst others, Lubbe (1991, 1992a, 1992b) and Nieuwoudt (1985) provide ample proof to this effect. The deregulation process coupled with the liberalisation of international markets also forced this industry to reorganise its operational structures, of which the formation of the South African Meat Industry Company (SAMIC) is a good example, to address issues of mutual importance.

Of particular importance in the globalised world economy is the extent to which the red meat industry in South Africa will be affected when, for instance, tariffs are reduced or when red meat is included in regional free trade agreements. The importance lies in the fact that, on the one hand, there is a general move towards more liberalised markets whereby production and trade are supposed to be a function of the competitiveness of countries. On the other hand, policies in existence in countries like Japan, the US and the EU are still responsible for distorted production and trade patterns. Hence, from a South African red meat industry point of view, the question is what the possible impact will be if further liberalisation on the red meat industry takes place, e.g. what will happen if tariffs on red meat imports are reduced, or what will be the impact of a further liberalisation of the world market on the domestic red meat industry.

In order to measure the impact of such changes, appropriate economic modelling tools are needed. The fact of the matter is, however, that South African agriculture is lagging far behind in developments in this area compared to other countries such as the US, the EU and Australia. Therefore, in order to fill this gap, a modelling tool to measure the impact of further liberalisation on the red meat industry in South Africa is needed. Not only are producers, agri-business and consumers dependent on information about the possible results of further liberalisation in order to position themselves strategically, but

policy makers need this information to guide policy, to negotiate trade agreements and to create an environment for the improvement of the general welfare of a nation. Furthermore, the ability to measure the impact of external shocks in a scientifically correct manner becomes even more important if one considers that linear interpolations and extrapolations could easily lead to erroneous conclusions (Jooste, Aliber and Van Schalkwyk, 1998).

1.3 Problem statement

Many researchers have investigated issues of agricultural economic relevance in the red meat industry. These issues encompass studies related to the estimation of price inter-relationships in the South African meat industry (Van Heerden, Van Zyl and Viviers, 1989), estimation of demand elasticities and flexibilities, cross price elasticities and demand prospects (Du Toit, 1982; Nieuwoudt, 1985; Hancock, Nieuwoudt and Lyne, 1984, Bowmaker and Nieuwoudt, 1990; Nieuwoudt, 1998a and b), and the marketing and distribution of livestock and livestock products in developing areas and informal settlements (Nkosi and Kirsten, 1992; DBSA, 1992; Karaan and Myburgh, 1992; Van Rooyen and Jooste, 1997a and b). Other issues investigated ranged from studies on the importance of the red meat industry and analysis related to price cycles (Laubscher, 1982; Lubbe, 1989; Lubbe, 1990), evaluation of the red meat marketing scheme and regulations associated with it (Eales, 1979; Nieuwoudt, 1985; Lubbe, 1991; Lubbe, 1992a; Lubbe, 1992b; Venter, 1996) to issues specifically relating to international trade of red meat. These latter issues include research relating to the impact of the EU-SA FTA on the demand for meat in South Africa (Badurally-Adam and Darroch, 1997), the possible effect of a reduction of tariffs in the red meat industry (Jooste, 1996; Jooste and Van Schalkwyk, 1996a; Jooste, Aliber and Van Schalkwyk, 1998), trade preferences of specifically beef (Jooste and Van Schalkwyk, 1996b) and the impact of the EU export policy on the South African beef market (Nieuwoudt, 1997; Koester and Loy, 1998).

None of the research mentioned above, however, endeavoured to quantify the effects of trade-related issues, or demand and supply shift factors from a mathematical

programming point of view that falls within the spatial partial equilibrium (SPE) framework. By using this methodology the effects of trade-related shocks, such as a reduction in tariffs on red meat imports, could be quantified. In other words, answers could be provided on aspects related to (i) changes in the net price in each domestic region; (ii) changes in the quantity of exports or imports for each domestic region; (iii) which regions export, import or do neither; and (iv) the volume and direction of trade between each possible pair of regions.

Given the above problem statement and provided that one is able to construct a SPE model, it would be possible to simulate the outcome of various different scenarios relating to trade aspects, as well as demand and supply shift factors on prices, production, consumption and trade flows between different regions. Such a model could be used by policy makers, agri-business and producers to address a wide range of issues.

1.4 Objectives

The **primary objective** of this study is to quantify the possible impact of liberalisation and market parameters on beef, mutton and pork in order to provide future policy and management guidelines to enhance the red meat industry's competitive position. A better understanding of the effects of liberalisation and other market variables will prove to be useful in the formulation and implementation of policies that affect the red meat industry in South Africa. In order to achieve the primary objective several **secondary objectives** will have to be met:

- Investigate the international and domestic red meat markets in order to provide information on production, consumption and trade trends. Furthermore, this also involves identifying possible market opportunities for trade in red meat products by South Africa, and whether these opportunities are being utilised.

- Determine the impact of tariff liberalisation on the red meat industry in South Africa. This also involves determining a different tariff regime that will uphold the *status quo*. Other issues pertaining to improved market access will also be investigated, e.g. the abolishment of the Lomé Convention. In addition, the effect of a more liberalised red meat market on the South African red meat industry will be investigated.

- Determine the impact of socio-economic factors, such as population growth and income shifts on issues related to supply, demand and prices of livestock and red meat products in South Africa.

1.5 Methodology and data used

This study is concerned with the development of a SPE model, which may be used to solve for spatial equilibrium prices, consumption, production and geographical flows from a multi-commodity point of view, provided that linear functions are acceptable approximations of regional demand and supply functions. In other words, a trade simulation model that encompasses the interaction between supply and demand activities on various levels will be used to quantify the effects of different policy regimes and/or marketing scenarios on red meat trade.

The model is based on the Takayama and Judge (1971) approach to modelling trade between spatially separated markets. In fact, this approach or variations thereof is probably the most widely used amongst agricultural economists worldwide to quantify the effects of different policies on different industries (Halbrendt, Jundong, Aull-Hyde and Webb, 1995; Yavuz, Zulauf, Schnitkey and Miranda, 1996). The underlying assumptions of this modelling approach are that (i) there are two or more regions trading a homogeneous good, (ii) each region constitutes a single and distinct market, (iii) the regions of each possible pair of regions are separated but not isolated by a transport cost per physical unit which is independent of volume, (iv) there are no legal restrictions limiting the actions of the profit-seeking traders in each region and (v) for

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each region the functions which relate local production and local use to local price are known, and consequently, the magnitude of difference which will be exported or imported at each local price is also known. It is of particular importance to note that this modelling approach assumes homogeneous goods, which entails that consumers regard goods as perfect substitutes for each other. In reality, however, the situation is much more complex, and hence would require a much more complex modelling framework that requires data currently unavailable in South Africa. For example, dropping the homogeneity assumption would require the implementation of the Armington approach. The Armington approach requires information on the substitutability of products from a consumer's point of view. Hence, in order to use the Armington approach, substitution elasticities need to be calculated. This entails a complex study on its own, especially if one considers the changes in factors that affect consumers' purchasing decisions (Bansback, 1995) coupled with the paucity of data. For this reason it was decided that the Armington approach falls beyond the scope of this study.

Nevertheless, by adopting the above methodological framework for the red meat industry different policy scenarios under different climatic and socio-economic conditions on a macro-level can be simulated. This will provide the necessary management information for improving strategic management and influencing policy makers.

The data needs for such a model is extensive. Data needs include, amongst others, regional supply and demand data, transport costs between regions, behavioural parameters (elasticities), as well as domestic and international prices. Due consideration should also be given to the consistency of the data used. Furthermore, it is important to provide a holistic view of the international and domestic red meat industries. Hence, trend information will also be used to describe patterns in terms of production, consumption, prices and trade.

1.6   Outline of the study

Chapter 2 presents a discussion of issues that relate to the international red meat industry. More specifically, an overview of production, consumption and trade is given. **Chapter 3** contains a profile of the domestic red meat industry. Specific emphasis is placed on red meat trade and opportunities that exist internationally. In **Chapter 4** a spatial partial equilibrium model is developed to model red meat trade in South Africa. In addition, justification for using this type of model is provided.

Models are merely abstractions of reality, and hence it is impossible to capture all the specifics prevalent in the red meat industry. However, the aim is to develop a modelling tool that represents reality as closely as possible. In **Chapter 5** the model developed in Chapter 4 is validated in terms of how well it represents reality. In **Chapter 6** different scenarios relating to trade liberalisation are simulated. Finally, **Chapter 7** will provide overall conclusions and recommendations.

CHAPTER 2

THE INTERNATIONAL RED MEAT TRADE ARENA

2.1   Introduction

As mentioned in Chapter 1 the subject matter of this study relates to the impact of trade liberalisation on the South African red meat industry. However, in order to understand this issue properly a holistic overview of the international trade environment and the factors influencing it is necessary. This chapter provides an overview of the international red meat market in terms of production, consumption and trade. This includes information on the major role players, as well as the intensity and growth in trade of red meat products internationally.

Trends in production, consumption and trade of red meat products will undoubtedly be influenced by the worldwide trend towards globalisation. In this respect the move towards greater liberalisation under the auspices of the World Trade Organisation (WTO) and reforms of the EU's Common Agricultural Policy (CAP) will probably have the most significant effect. It is for this reason that this chapter will also focus on issues related to the WTO and the CAP. This does not mean that other issues, such as trade integration between various economies in the world, are considered of lesser importance. To the contrary, such issues are considered to be as important, but cognisance should be taken of the fact that a wealth of information, that could not possibly be included in a study such as this, exists. For example, it would not be viable to discuss all the issues relating to the liberalisation process under the auspices of the WTO. For this reason it was attempted to cite as much literature relating to trade issues that could be used for further reference as possible, without going into unnecessary detail.

2.2 Production, consumption and trade in red meat

2.2.1 The beef sector

• **Production**

According to Figure 2.1 world beef and veal production reached a maximum in 1990 with production at 51 365 thousand tons, after which it averaged 48 159 thousand tons per annum. Annual growth from 1961 to 1990 was 2.4 per cent. Annual growth between 1991 and 2000 was, however, negative at -0.43 per cent.

Canada	Mexico	US
Argentina	Brazil	Uruguay
EU15	Eastern Europe	USSR
SA	Middle East and Northern Africa	China
India	Australia	New Zealand
Other		
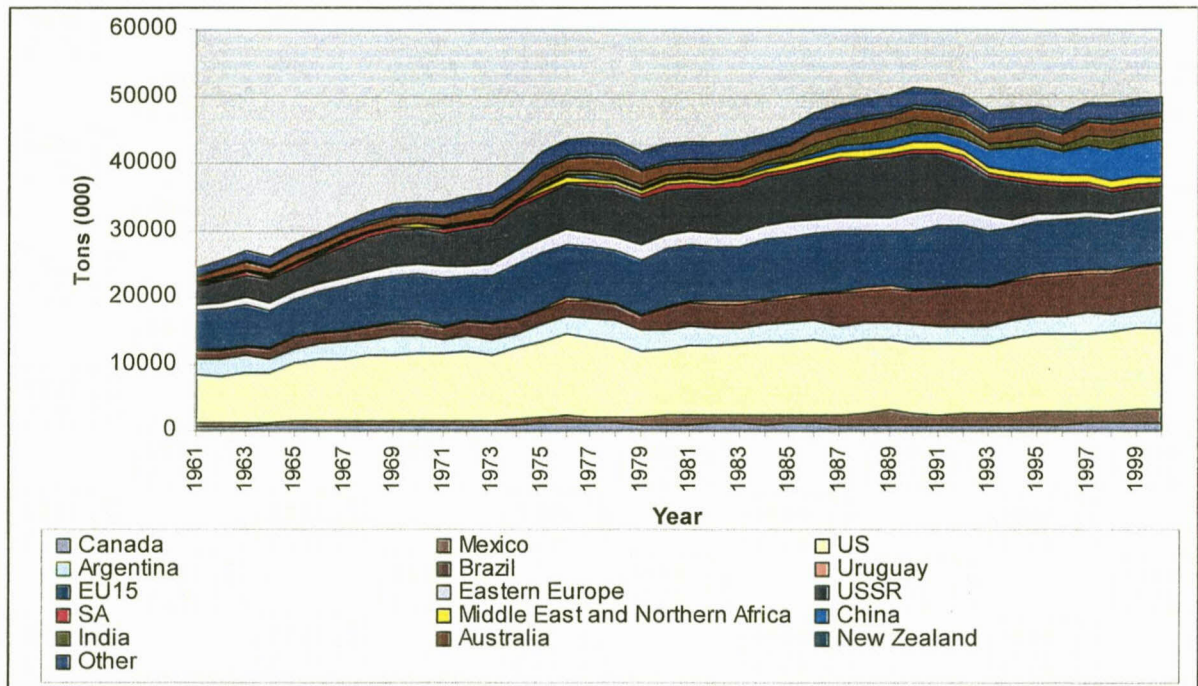
Figure 2.1: World beef and veal production (1961 – 2000)
Mean: 41 180 thousand tons
Standard deviation: 8 115 thousand tons
Source: ERS, 2000.

Figure 2.1 also shows the contribution to production for selected countries and regions in the world. The US is by far the largest beef producing country in the world, contributing on average 25.72 per cent to total world production since 1961. The US is followed by the EU (18.81%) and Brazil (8.11%). Interestingly enough major export

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countries, such as Australia, Argentina and Uruguay, have a relatively small share of the world production of beef.

- **Consumption**

Global beef consumption is expected to rise (Fapri, 1998; European Commission 1998; IPC 1998; USDA, 1998). The reason for this is the expectation that there will be a general growth in per capita income throughout the world during the next few years. However, in many developed countries per capita consumption of beef is expected to fall or to stagnate, since consumers continue to substitute beef with pork and poultry meat.

- **Price**

Figure 2.2 shows the US carcass equivalent price, which could be regarded as a proxy for international prices. This price is derived from the prices of topside, rump, strip loin, chuck and brisket prices in the US.
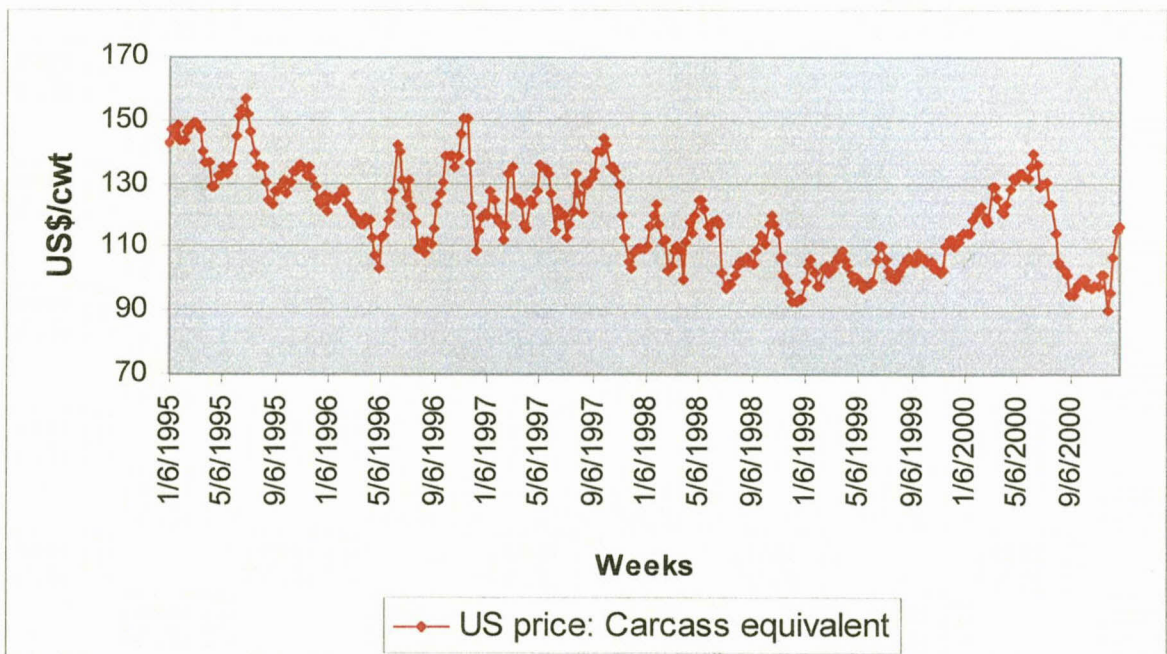
Figure: 2.2: US price for beef in carcass equivalents (US$)
Source: Agrimark Trends, 2000.

It is clear from Figure 2.2 that the price of beef has experienced a downward trend from 1995 to 1999, whereafter it rebounded to levels seen in late 1997. During the latter part of 2000, however, prices started to drop again.

o   **Trade**

Table 2.1 shows the major net exporters and importers of cattle and beef in the world. Note that although the US is the largest producer of beef in the world it remains a net importer of beef.

Table 2.1:   Major net exporters and importers of cattle and beef

Net exporters	Net importers
Australia Canada Brazil EU New Zealand Argentina India Uruguay CEEC's	Japan USA Middle East/North Africa FSU Other Far East South Korea South Africa Mexico

Source: IMS-GIRA, 2000.

Table 2.2 shows the exports of selected bovine meat products in the world (see Appendix A for a detailed list of exporting countries of the different bovine meat products).

World exports of bovine carcasses and half carcasses (fresh or chilled) was valued at just over a million dollars in 1999 with 314 027 tons being exported (see Table 2.2). From 1995 to 1999 the value of exports decreased by 4 per cent, whilst the quantity exported remained the same. The major performer among the top 15 exporters in this market is Spain, showing considerable growth in terms of the value and quantity exported (see Appendix A). Ireland, Canada and Austria also performed well over the period 1995 to 1999.

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Table 2.2: World exports of bovine meat products (1999)

Exports	Value exported in 1999, in US$ thousand	Quantity exported in 1999 (tons)	Annual growth in value between 1995 - 1999, %	Annual growth in quantity between 1995 - 1999, %
Product 020110 (Bovine carcasses and half carcasses, fresh or chilled)				
World estimation	1 047 813	314 027	-4	0
Product 020120 (Bovine cuts bone in, fresh or chilled)				
World estimation	2 604 564	836 976	-6	-4
Product 020130 (Bovine cuts boneless, fresh or chilled)				
World estimation	5 117 632	1 265 272	2	8
Product 020210 (Bovine carcasses and half carcasses, frozen)				
World estimation	209 637	173 003	-15	-10
Product 020230 (Bovine cuts boneless, frozen)				
World estimation	4 564 609	2 162 012	-2	0

Source: ITC calculations based on COMTRADE statistics, 2000.

Table 2.2 shows that for bovine cuts (bone in, fresh or chilled) annual growth in the value and quantity exported was negative. Exports from Eastern European countries, such as Poland and the Czech Republic have, however, exceeded that of all other countries in terms of value and quantity exported. The US has also shown positive annual growth, but trails distantly behind Poland and the Czech Republic. Bovine carcasses and half carcasses (frozen) experienced negative growth in terms of value and quantity exported, even though some of the major exporters, such as the US, Spain, Belgium and Lithuania have improved their position.

Bovine cuts (boneless frozen) are the most prominent in terms of quantity exported, but experienced negative growth in the value of exports between 1995 and 1999 (see Table 2.2). Australia, the largest exporter of this product, however, experienced positive growth in both value and quantity exported. Similarly, Brazil and Uruguay performed well over the stated period, but for Argentina the opposite applies (see Appendix A).

According to Table 2.2 only bovine cuts (boneless, fresh or chilled) experienced growth in both the value and the quantity exported. The US, the largest exporter of this product, saw growth in quantity exported, but experienced stagnant growth in value exported. The second largest exporting country, namely Australia, experienced negative growth in the value exported, even though the quantity exported increased. Countries performing well in terms of both value and quantity exported include, amongst others,

Canada, Germany, Brazil, Uruguay, Italy, Spain, Mexico, Panama and Paraguay (see Appendix A).

Table 2.3 shows the imports of selected bovine meat products in the world (see Appendix B for a detailed list of importing countries for the different bovine meat products). The trends in imports (value and quantity) for the different products shown in Table 2.3 are similar to that shown for exports in Table 2.2.

Table 2.3: World imports of bovine meat products (1999)

Imports	Value exported in 1999, in US$ thousand	Quantity exported in 1999 (tons)	Annual growth in value between 1995 - 1999, %	Annual growth in quantity between 1995 - 1999, %
Product 020110 (Bovine carcasses and half carcasses, fresh or chilled)				
World estimation	1 002 113	369 480	-6	0
Product 020120 (Bovine cuts bone in, fresh or chilled)				
World estimation	2 366 702	776 640	-7	-3
Product 020130 (Bovine cuts boneless, fresh or chilled)				
World estimation	5 346 718	1 365 689	2	10
Product 020210 (Bovine carcasses and half carcasses, frozen)				
World estimation	199 633	163 094	-14	-10
Product 020230 (Bovine cuts boneless, frozen)				
World estimation	4 494 507	2 182 725	-2	2

Source: ITC calculations based on COMTRADE statistics, 2000.

The largest importer of bovine carcasses and half carcasses (fresh or chilled) in the world, namely Italy with a share of 45.52 per cent, has shown growth in value and quantity imported (see Appendix B). Other countries increasing their imports of this product include, amongst others, Portugal, the US, Belgium and the United Kingdom.

Italy is also the largest importer of bovine cuts (bone in, fresh or chilled). However, the value of imports to Italy dropped by 2 per cent since 1995, even though the quantity imported increased by one per cent. Mexico, Macedonia and Argentina, although small role players, have seen considerable growth in both the value and quantity imported (see Appendix B).

In the case of bovine cuts (boneless, fresh or chilled) Japan, the world's largest importer of this product, experienced negative growth in value and quantity imported. On the

other hand, the US and Mexico, respectively the second and third largest importers of this product, experienced increases in value and quantity exceeding 40 per cent from 1995 to 1999. Almost all the countries in the EU experienced growth in value and quantity imported of this product over the same period (see Appendix B).

The import market for bovine carcasses and half carcasses (frozen) is dominated by the Russian Federation. Hence, the drop in the value and quantity imported of this product from a global point of view is probably a consequence of the drop in the value and quantity imported by the Russian Federation. Value of imports and quantity imported declined by 21 per cent and 14 per cent respectively in the Russian Federation. Nevertheless, the Netherlands, Portugal and especially Egypt experienced strong growth in terms of both value and quantity of imports. However, their respective market shares are very small compared to that of the Russian Federation (see Appendix B).

In terms of bovine cuts (boneless, frozen) the US is the most prominent importing country with a share of nearly 23 per cent of world imports. The US is followed closely by Japan with a market share of just over 18 per cent. Both countries experienced growth in the quantity imported from 1995 to 1999, but only the US experienced growth in the value of imports. Most EU countries experienced a drop in value and quantity imported (see Appendix B).

2.2.2   The pork sector

•   **Production**

Figure 2.3 shows the production of pork for the world from 1961 to 2000. It is clear that pork production increased substantially from 1961 to 1995. However, in 1996 production dropped by 81 651 thousand tons, but recovered again, with production at 1 052 990 thousand tons during 2000. Annual growth from 1961 to 1995 was 6.79 per cent, whereas growth after 1996 was more modest at 2.1 per cent.
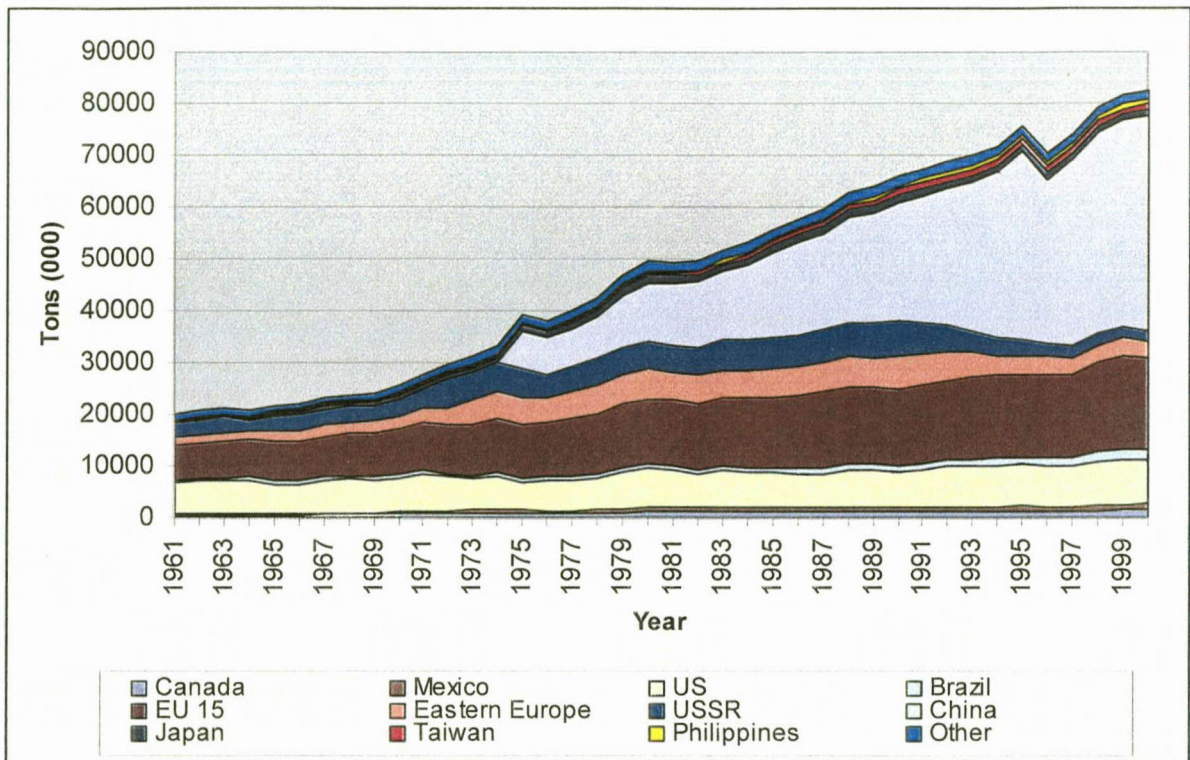
Figure 2.3: World pork production (1961 – 2000)
Mean: 623 716 thousand tons
Standard deviation: 330 900 thousand tons
Source: ERS, 2000.

Figure 2.3 also shows the net production breakdown for selected countries in the world. China produces nearly half of the world's pig meat, followed distantly by the EU and the US.

- **Consumption**

Demand for pork in general is expected to increase. The rate of growth will, however, differ between countries. In developed countries pork growth is expected to slow down due to increased competition from poultry and moderate economic growth (European Commission, 2000b).

●   **Price**

Figure 2.4 shows the barrow and gilt price in the US. Prices were under severe pressure during late 1998 and early 1999. The main reason for this was an oversupply on the market. Certain market observers in the US blamed this state of affairs on a lack of processing space. This was due to over-expansion by pork producers following discussions and decisions on moratoriums and additional rules and regulations (N.C. Pork Council, 1998). In addition to this the industry in the US and Canada was also plagued by strikes and closure of processing plants. Increases in productivity and efficiency also played its part to aggravate the oversupply. Hurt (1998) supports the notion that a lack of packer capacity contributed to the problems in the US pork industry, but he also states that high retail prices delayed increases in the volume of pork consumption.

According to O'Doherty (1998) the situation in the EU was as bad. Producers in the EU, as in the US and Canada, faced severe financial problems. The main reason was an oversupply of pig meat on the EU market. Overproduction in Europe was exacerbated by the virtual closure of export markets to Russia, Japan and the rest of Asia due to the financial crisis experienced by these countries at the time.
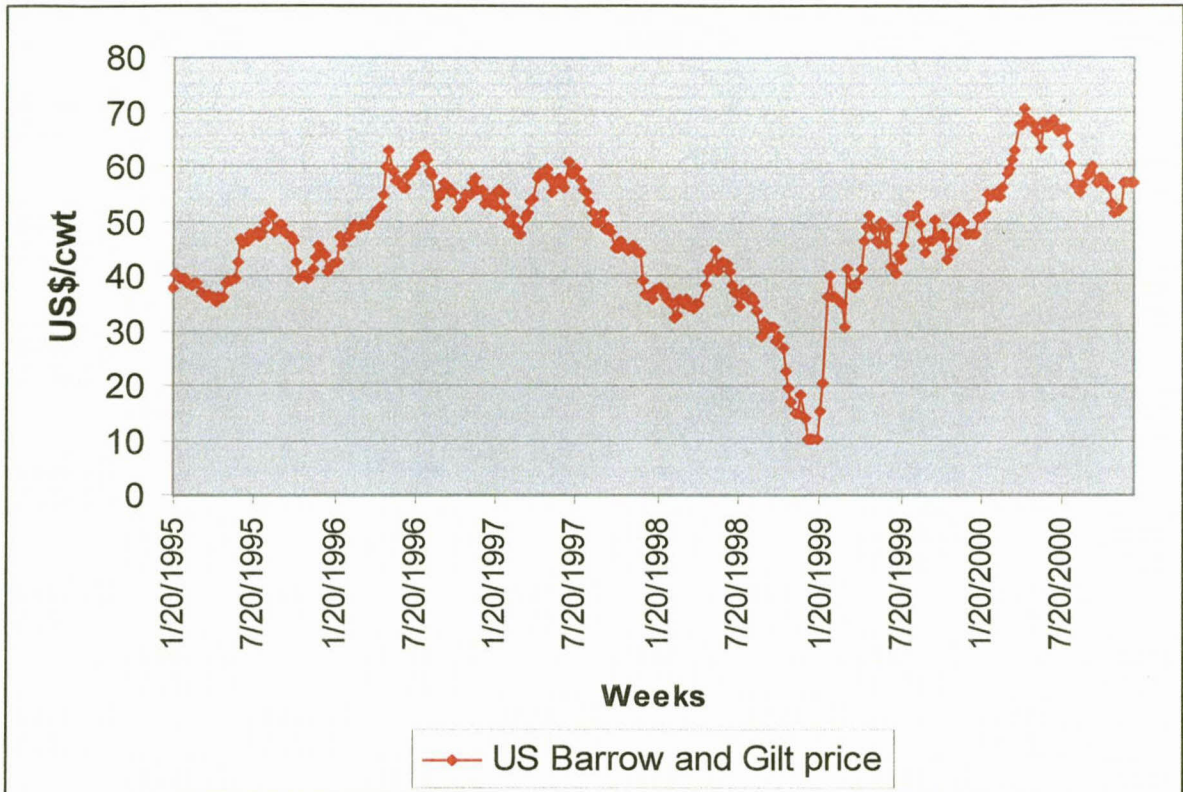
Figure 2.4: Barrow and gilt price in the US (US$)
Source: Agrimark Trends, 2000.

- **Trade**

Table 2.4 shows the major net exporters and importers of pork in the world. Even though China is the largest producer of pig meat it still remains a net importer of this product. The same is true for the US as a major pig meat producing country.

Table 2.4: Major net exporters and importers of pork

Net exporters	Net importers
EU	FSU
Canada	Japan
Brazil	South Korea
CEEC's	US
	Mexico
	China
	Taiwan

Source: IMS-GIRA, 2000.

Table 2.5 shows exports of selected pork products of the world (see Appendix A for a detailed list of exporting countries for the different pork products). All the pork products have shown growth in quantities exported from 1995 to 1999. The largest growth was reported for swine carcasses and half carcasses (frozen). The major contributors to this growth are situated mainly on the European continent, namely Germany, France, Spain, the Netherlands, Hungary, Finland and Norway. Germany accounts for about 34 per cent of world exports, followed by Poland with 19.39 per cent; the respective share of exports of other countries is less than 10 per cent. Poland experienced only moderate growth in quantity exported compared to the mentioned countries. The Ukraine and China recorded negative growth in terms of value and quantity exported.

Table 2.5: World exports of pork products (1999)

Exports	Value exported in 1999, in US$ thousand	Quantity exported in 1999 (tons)	Annual growth in value between 1995 -1999, %	Annual growth in quantity between 1995-1999, %
Product 020311 (Swine carcasses and half carcasses, fresh or chilled)				
World estimation	987 595	729 130	-9	4
Product 020312 (Hams, shoulders and cuts thereof, of swine bone in, fresh or chilled)				
World estimation	1 695 543	1 084 145	-3	7
Product 020321 (Swine carcasses and half carcasses, frozen)				
World estimation	278 966	305 256	3	15
Product 020322 (Hams, shoulders and cuts thereof, of swine, bone in, frozen)				
World estimation	328 072	236 572	0	12
Product 020329 (Swine cuts, frozen nes*)				
World estimation	3 377 848	1 760 419	-1	12

* nes = not elsewhere specified
Source: ITC calculations based on COMTRADE statistics, 2000.

Note that for carcasses and half carcasses (fresh or chilled), hams, shoulders and cuts thereof (bone in, fresh or chilled) and swine cuts (frozen) growth in value from 1995 to 1999 was negative, even though the quantity exported had been positive (see Table 2.5). This translates into a lower per unit value of these products over the mentioned period and is probably a result of increased competition between exporters.

Table 2.6 shows the imports of pork products for the world (see Appendix B for a detailed list of importing countries for the different pork products). The quantity imported of pork products increased from 1995 to 1999. However, in terms of the value

of imports only hams, shoulders and cuts thereof (bone in, frozen) experienced positive growth. Swine carcasses and half carcasses (fresh or chilled) experienced the largest drop in value of imports, probably fuelled by the drop in the value of imports by Germany, Italy and Greece; these three countries account for nearly 92 per cent of world imports of this product. Only Germany experienced a decline in the quantity imported from 1995 to 1999 (1%). Other countries that experienced considerable growth in the value and quantity of imports, although their shares of world imports are relatively small, were Mexico, Belgium, Switzerland, Romania, Slovakia, the Czech Republic and Lithuania.

Table 2.6: World imports of pork products (1999)

Imports	Value exported in 1999, in US$ thousand	Quantity exported in 1999 (tons)	Annual growth in value between 1995 -1999, %	Annual growth in quantity between 1995-1999, %
Product 020311 (Swine carcasses and half carcasses, fresh or chilled)				
World estimation	893 821	733 686	-11	4
Product 020312 (Hams, shoulders and cuts thereof, of swine bone in, fresh or chilled)				
World estimation	1 650 859	1 097 217	-3	9
Product 020321 (Swine carcasses and half carcasses, frozen)				
World estimation	243 920	251 064	-5	8
Product 020322 (Hams, shoulders and cuts thereof, of swine, bone in, frozen)				
World estimation	286 553	254 687	4	20
Product 020329 (Swine cuts, frozen nes)				
World estimation	3 876 824	1 627 452	-7	6

Source: ITC calculations based on COMTRADE statistics, 2000.

The Russian Federation, Spain, China and Taiwan were the main importing countries that stimulated growth in the value and quantity imported of hams, shoulders and cuts thereof (bone in, frozen). The decline in the value of imports of swine cuts (frozen), the most important imported pork product, is largely attributed to negative growth in the value of imports in Japan and Germany. Together these two countries accounted for 57.45 per cent of world imports of this product.

2.2.3   The sheep meat sector

- **Production**

Figure 2.5 shows the production of sheep meat for the world. Production averaged 500 mio tons from 1988 to 1996. However, since 1997 production increased again on an annual basis. Given past trends this growth could be expected to level out within the next few years.
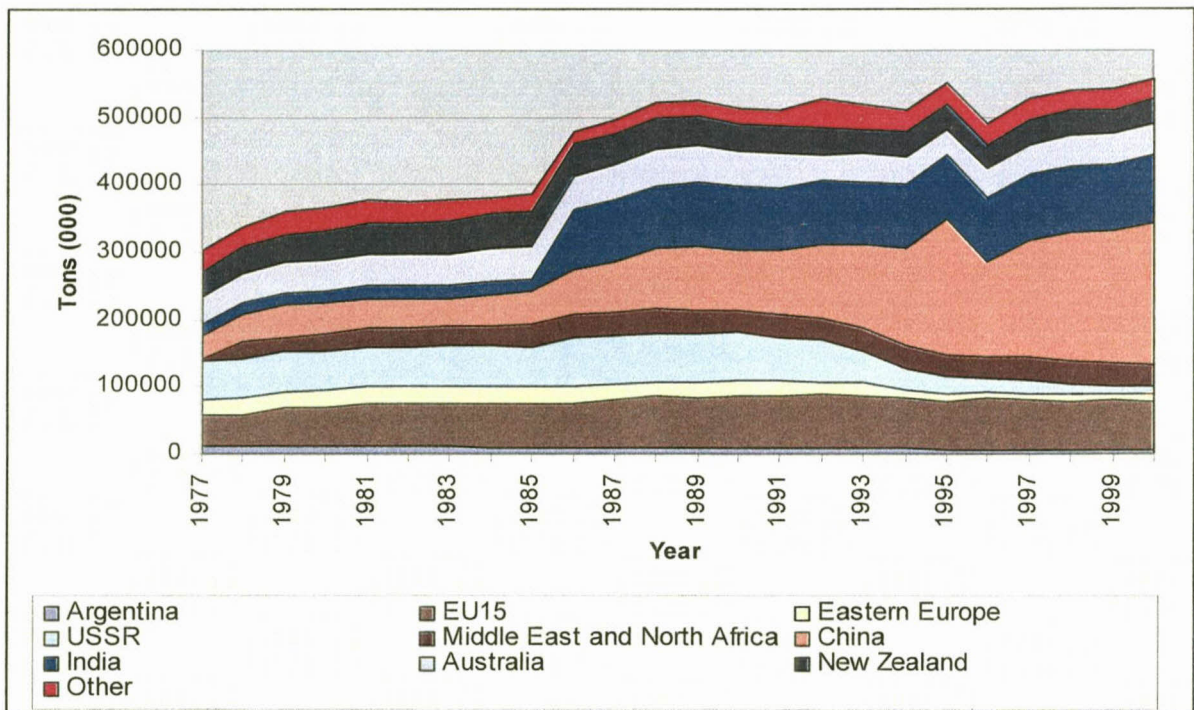
Figure 2.5: World sheep meat production (1977 – 2000)
Mean: 325 568 thousand tons
Standard deviation: 185 860 thousand tons
Source: ERS, 2000.

Figure 2.5 also shows the net production breakdown of sheep meat for selected countries. On a single country basis the largest sheep producer in the world is China, followed by India. On a regional basis the Middle East/North Africa and the EU, produces 17 per cent and 6 per cent of the world's total sheep meat respectively.

* **Consumption**

According to Cordon (2000) the consumption of sheep meat is basically determined by the degree of presence and the tradition of sheep rearing. Barnard (2000) states that over the past 40 years, the global sheep meat industry has been singularly unsuccessful in competing for space on consumers' plate, with a decline in per capita consumption of 0.6 per cent per annum. For example, in 1999 the amount of sheep meat consumed worldwide was only one-fifth the amount of beef consumed, only one-sixth the amount of poultry consumed, and only one-eighth of the amount of pork consumed. Consumption of, for example, lamb has fallen by 37 per cent in Australia, 22 per cent in the US and the United Kingdom between 1980 and the late 1990's, whilst per capita consumption in New Zealand experienced a drop of 57 per cent since the mid 1980's (Barnard, 2000). He attributes the decline in consumption primarily to the fact that sheep meat is the most expensive meat world-wide and that sheep meat prices have increased at a faster rate than that of other meats.

* **Price**

The decline in sheep meat consumption has also placed pressure on sheep meat prices. Figure 2.6 shows that after prices of lamb and ewes rebounded in late 1996 it remained relatively high throughout 1997, whereafter it declined again to stabilise around US$1.50 per kg lambs weighing 15 kg. The price of lamb weighing 21 kg stabilised just below US$1.50 per kg since 1998. For ewes the price stabilised at nearly half the level of what it was in 1997.

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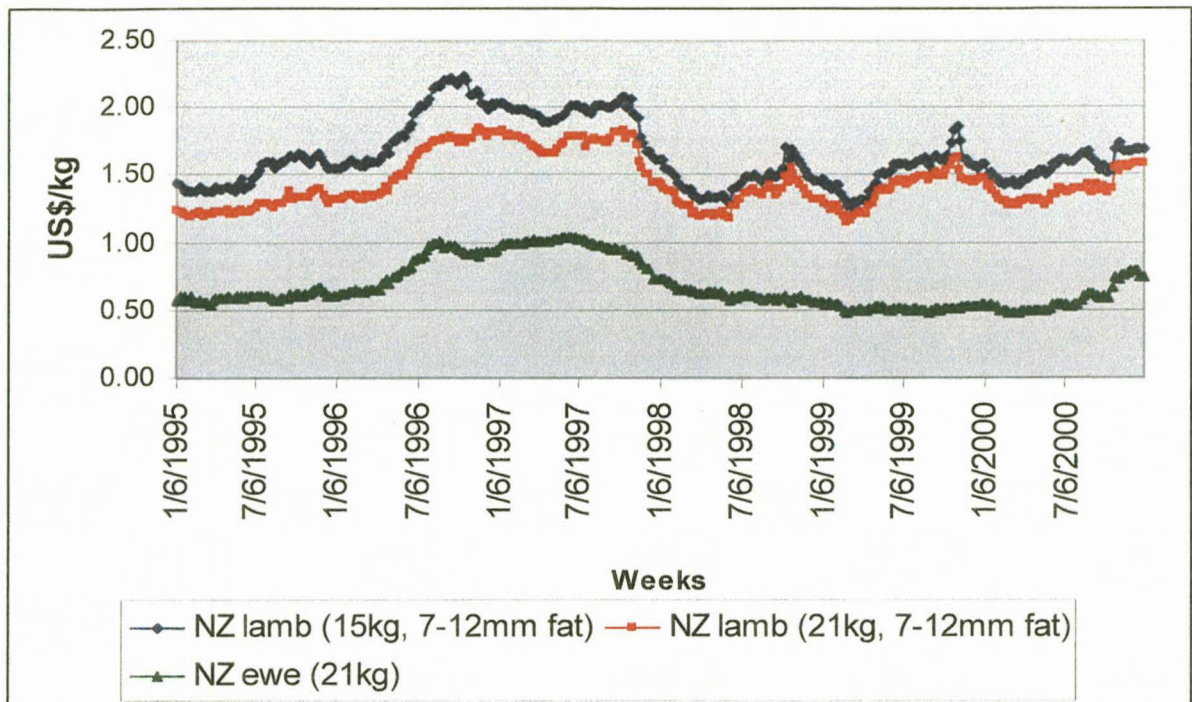
Figure 2.6: New Zealand lamb and ewe prices (US$)
Source: Agrimark Trends, 2000.

• **Trade**

Table 2.7 shows the major exporters and importers of sheep meat in the world. Considering Figure 2.5, note that the major sheep meat producers are also major net importers of this product (China, EU, Middle East/North Africa). Although China is the largest sheep meat producer, New Zealand, Australia and Britain are the major players in terms of world trade, exporting approximately 87 per cent of the world's sheep meat.

The EU is the third largest exporter of lamb with Britain, Ireland, Spain and France being the major exporters. The EU is, however, a net importer of lamb and mutton. Out of the eight major mutton importing countries (importing ± 80% of the world mutton), five are in Europe (± 65%). The economic welfare of the European consumer therefore plays a major role in world mutton trade trends (IMS-GIRA, 2000). Australia and New Zealand contributes the largest share to world exports. In 2000 these two countries accounted for nearly 75 per cent of world exports, i.e. 33.7 per cent and 40.6 per cent respectively (IMS-GIRA, 2000).

Table 2.7:   Major net exporters and importers of sheep and sheep meat

Net exporters	Net importers
New Zealand Australia East Africa CEEC's South America	EU Middle East/North Africa Other Far East US South Africa Japan/South Korea FSU

Source: IMS-GIRA, 2000.

Table 2.8 shows the exports of selected lamb and sheep products for the world (see Appendix A for a detailed list of exporting countries for the different lamb and sheep products).

Table 2.8: World exports of lamb and sheep products (1999)

Exports	Value exported in 1999, in US$ thousand	Quantity exported in 1999 (tons)	Annual growth in value between 1995 -1999, %	Annual growth in quantity between 1995-1999, %
Product 020410 (Lamb carcasses and half carcasses, fresh or chilled)				
World estimation	505 353	115 595	-6	-10
Product 020422 (Sheep cuts, bone in, fresh or chilled)				
World estimation	285 381	79 457	13	17
Product 020441 (Sheep carcasses and half carcasses, frozen)				
World estimation	38 369	40 852	-9	-8
Product 020442 (Sheep cuts, bone in, frozen)				
World estimation	619 357	337 399	2	7

Source: ITC calculations based on COMTRADE statistics, 2000.

Table 2.8 show that exports of lamb carcasses and half carcasses (fresh or chilled) and sheep carcasses and half carcasses (frozen) experienced negative growth in terms of value and quantity exported. The United Kingdom, which is responsible for about 50 per cent of world exports of lamb carcasses and half carcasses (fresh or chilled), experienced a 10 per cent drop in the quantity exported and a 12 per cent decline in the value of its exports. Ireland, the second largest exporter of this product, with a share of just over 30 per cent, experienced a 27 per cent drop in terms of the quantity exported, but a one per cent increase in the value of exports of this product. As far as the exports of sheep carcasses and half carcasses (frozen) are concerned, New Zealand and India can be considered to be the driving forces behind the drop in quantity and value in

world exports of this product. Their export performance overshadowed the positive growth in exports (value and quantity) from Australia, which has a world market share of nearly 60 per cent. Sheep cuts (bone in, fresh or chilled) and sheep cuts (bone in, frozen) both experienced growth in value and quantity exported between 1995 and 1999 (see Table 2.8). The growth in respect of the former product can be attributed mainly to the export performance of New Zealand and Australia with a combined market share of 78.11 per cent. Although Belgium and France also experienced exceptional growth in terms of value and quantity exported their market share is relatively small (Belgium - 6.10%; France – 4.76%). Similarly, growth in the value and quantity of sheep cuts exported (bone in, frozen) was driven mainly by New Zealand (66.63% market share) and Australia (2.76% market share), although the former experienced stagnant growth in the value of exports of this product. Belgium, Uruguay, Germany, Chile, Korea, Ireland and the Netherlands all experienced considerable growth in value and quantity exported, however, their respective shares of world exports are relatively low (see Appendix A).

Table 2.9 shows the imports of different lamb and mutton products for the world (see Appendix B for a detailed list of importing countries for the different lamb and sheep products).

Table 2.9: World imports of lamb and sheep products (1999)

Imports	Value exported in 1999, in US$ thousand	Quantity exported in 1999 (tons)	Annual growth in value between 1995 -1999, %	Annual growth in quantity between 1995-1999, %
Product 020410 (Lamb carcasses and half carcasses, fresh or chilled)				
World estimation	552 984	191 523	-5	0
Product 020422 (Sheep cuts, bone in, fresh or chilled)				
World estimation	291 077	58 203	10	13
Product 020441 (Sheep carcasses and half carcasses, frozen)				
World estimation	41 216	41 163	-9	-4
Product 020442 (Sheep cuts, bone in, frozen)				
World estimation	652 000	328 226	2	7

Source: ITC calculations based on COMTRADE statistics, 2000.

Similar to exports of lamb and sheep products, lamb carcasses and half carcasses (fresh or chilled) and sheep carcasses and half carcasses (frozen) did not perform well over the period 1995 to 1999. In terms of the former, France, with a share of 66.13 per cent of world imports reduced its imports by 1 per cent, whilst the value of imports declined by 5 per cent. Other EU countries that experienced a negative growth in either the value of imports, the quantity imported or both include Italy, Belgium, Germany, Portugal, the United Kingdom, the Netherlands and Spain. These countries contributed 22.74 per cent to world imports of this product.

As far as sheep carcasses and half carcasses (frozen) are concerned negative growth in value and quantity imported was fuelled by Korea, Malaysia, Oman, Taiwan, the Russian Federation, Jamaica and the US. Growth in the value and quantity of imports of the world's largest importer of this product could not negate the negative overall growth (see Appendix B).

Growth in respect of the value and quantity of sheep cuts imported (bone in, fresh or chilled) can be attributed to the fact that the top 17 importers of this products experienced positive growth in both value and quantity imported, with the exception of Germany, which experienced marginal negative growth in the value of imports. Four countries dominate the imports of this product, namely the US, France, United Kingdom and Belgium with respective market shares of 26.52 per cent, 15.02 per cent, 12.66 per cent and 11.63 per cent (see Appendix B).

Sheep cuts (bone in, frozen) also experienced positive growth with regard to value and quantity imported (see Table 2.9). The overall situation is, however, not as positive as is the case with sheep cuts (bone in, fresh or chilled). The major importer of this product, namely the United Kingdom, only experienced a 4 per cent growth in the quantity imported, but zero growth in the value imported. Growth in the value and quantity imported by the US, the second largest importer with less than half the market share of the United Kingdom, exceeded that of the United Kingdom.

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2.3   The WTO and agriculture

The General Agreement on Tariffs and Trade (GATT), the forerunner of what is today known as the WTO, was established in Geneva in 1947. Its basic aim was to liberalise world trade and to place it on a secure basis, thereby contributing to economic growth and development (USDA, 1994), or stated otherwise, it has aimed to create a framework that would regulate international trade and stimulate international commerce (FAO, 1998b). Without too much deliberation about the GATT, it is nevertheless necessary to take into account the most important elements of the GATT as set out in the 1947 Act (see Table 2.10).

Table 2.10:   The principles of the 1947 Act

Most Favoured Nation (MFN)	This entails that each contracting party to the GATT is required to provide all other contracting parties with the same conditions of trade at the most favourable terms it extends, i.e. each contracting party is required to treat all contracting parties in the same way that it treats its "most favoured nation".
Reciprocity	The benefits of any bilateral agreements between contracting parties, regarding tariff reductions and market access, are extended simultaneously to all contracting parties. The principle of reciprocity relates to the requirement to reciprocate the treatment provided by other contracting parties.
Transparency	Fundamental to a transparent system of trade is the need to harmonise the system of import protection, so that barriers to trade can then be reduced through the process of negotiation. The GATT therefore limited the use of quotas, except in specific conditions widely used by agriculture.
Tariff reduction	When GATT was established tariffs were the main form of trade protection, and negotiations in the early years focused primarily upon tariff reduction. The text of the 1947 GATT sets out the obligations of the contracting parties in this regard.

Source: FAO, 1998b.

Since 1947 various so-called GATT negotiating Rounds were held to further expand and develop the "rules" that were laid down initially. In total eight Rounds were held, but agriculture was largely excluded from seven of them mainly due to opinions that agriculture was a unique sector of the economy, that, for reasons of national food security, could not be treated like other sectors. Agriculture was also exempted from some important GATT rules (FAO, 1998b):

- Agriculture was allowed to make use of quantitative import restrictions, whilst it was banned for all other commodities, providing that domestic production

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of the commodity in question was also subject to certain restrictions, or to domestic price stabilisation or price support policies.

•   The use of agricultural export subsidies was explicitly permitted, conditional upon the observance of "equitable" market shares; but "equitable" was difficult to define and agricultural subsidies proliferated.

•   Other mechanisms for protecting agriculture, variable import levies and domestic subsidies, were not covered explicitly by the GATT, and provided additional loopholes for agricultural policy makers wishing to protect the agricultural sector.

It was only during the last Round, the Uruguay Round, that agriculture was put firmly on the negotiating table. The reasons for doing so were due mainly to issues related to comparative advantages, world market instabilities and the effects of protectionism. This Round also paved the way for establishing the WTO. Although the establishment of the WTO was not foreseen when talks began in the Uruguay Round in 1986 it was increasingly realised that an institutional framework enabling greater clarification and enforcement of all the procedures and commitments under the GATT was needed. Hence, the importance of the WTO lies in its consolidation of all the Agreements and arrangements of the GATT both for 1947 and 1994, under a single umbrella. In other words, the WTO provides the common institutional framework for the conduct of trade relations among its members in matters relating to the agreements contained in the Final Act of the Uruguay Round (FAO, 1998b). The main differences between the GATT and the WTO are summarised in Table 2.11

Table 2.11: Main differences between GATT and the WTO

GATT	WTO
GATT is a set of rules, a multilateral agreement, with no institutional foundation and with only a small associated secretariat, which has its origins in the attempt to establish and International Organisation in the 1940's.	The WTO is a permanent institution with its own secretariat.
GATT was applied on a "provisional basis".	The WTO commitments are full and permanent.
GATT rules applied to trade in merchandise goods.	The WTO also covers trade in services and the trade-related aspects of intellectual property.
While GATT was a multilateral instrument by the 1980's, many new arrangements of plurilateral and therefore selective nature had been added.	The agreements which constitute the WTO are almost all multilateral and thus involve commitments for the entire membership.
The old GATT dispute settlement system was susceptible to blockages.	The WTO dispute settlement system is faster, more automatic and thus less susceptible to blockages. The implementation of WTO dispute findings will also be more easily assured.

Source: NDA, 1997.

Given the above background the terms GATT and WTO will be used interchangeably since multilateral trade negotiations underpinning the rules governed by the WTO took place under the auspices of the GATT.

2.3.1   The Uruguay Round of GATT negotiations

According to the FAO (1998b), the Uruguay Round was launched in 1986 by the Punta del Este Declaration, in which the negotiating objectives of the Round were laid down. The objectives are summarised by Van Zyl and Kirsten (1992):

• Improvement of market access through the reduction of import barriers;

• increased discipline regarding the use of all subsidies and other measures affecting trade;

• compensation of trading partners for any damage incurred as a result of changes in trade barriers; and

• settlement of trade disputes through negotiations by using GATT codes of conduct as guidelines.

The process of negotiating the Agreement on Agriculture (AoA) has not been plain sailing all the way. It was characterised by fierce negotiations by the main actors, namely the US, the EU, the Cairns group and developing countries outside the Cairns group. Although the latter two groups played an important role during negotiations, the discussions were dominated by the differences between the US and the EU. The inability to resolve differences between them also resulted in the final agreement being reached much later than planned. The main features of the negotiating process are shown in Table 2.12.

Pearce (1996) states that the principle components of the AoA focussed on domestic support, market access restrictions and export subsidies. Table 2.12 does not show the specific commitments as they relate to these components, but they are reported widely by amongst others, GATT (1994); USDA (1994); Pearce (1996); FAO (1998b). Nevertheless, mention is made of specific commitments in the text to follow as they relate to the impact of liberalisation.

It should be clear from the above discussion that negotiations regarding the AoA were mostly dominated by the US and the EU. This is no wonder if one takes into account that, although developing countries had very clear intentions to bargain for lower subsidies and improved access to developed country markets, developing countries still felt the desperate need to protect their own interests. It would appear that in the end the latter weighed heavier than the former. Ingco and Townsend (1998) state that the negotiating efforts of developing countries were concentrated on obtaining preferential treatment regarding market access to industrial country markets and exemptions from many GATT rules. Special and differential treatment was the yardstick for judging their links to the multilateral trade rules. Furthermore, the motivation for several developing countries to take part in the negotiations was mainly to safeguard old preferences or obtain compensation for potential adverse effects from higher food prices on their import bills. In other words, one could argue that developing countries were not really at the negotiating table to attend to issues pertaining to liberalisation worldwide and in their own countries, but rather to ensure that they still receive beneficial treatment on the grounds of being developing countries or least developed countries.

Table 2.12: Features of the negotiating process concerning the AoA

Initial position (1990)	**US and its Cairns group allies:** All trade-distorting domestic and export subsidies should be phased out, and all import protection should be converted to tariffs, which should be reduced sharply. **EU and its allies:** There should be an arrangement to reduce aggregate spending on domestic and export subsidies and some limits on border protection.
December 1990 ministerial meeting	It was thought that the Uruguay Round would be concluded during this meeting, but developing country members of the Cairns group rejected the EU's position. This situation resulted in the realisation by the EU that CAP reforms are unavoidable and led to major reforms in the CAP in 1991.
The Dunkel Text (1991)	At the end of 1991 negotiations were still stalled on key issues in agriculture and other sectors. The Dunkel Text was put on the table as a benchmark for remaining negotiations. It called for immediate tariffication, the establishment of market access requirements, and a reduction in subsidies in terms of spending and volumes subsidised. It also established a framework for substantial different treatment for developing countries. The publication of the Dunkel Text resulted in the focus of agricultural groups shifting to what the proposed agreement would require in terms of changes in policy and levels of protection. Japan, Korea, France and Germany expressed their dissatisfaction with the Dunkel Text. France even went as far as to threaten to block EU approval of the Uruguay Round if changes were not made to bring it more in line with the reformed CAP. The US and the Cairns groups endorsed the Dunkel Text.
Further tensions (1992)	In 1992 it was established that the EU's reformed oilseed policy still violated GATT, resulting in the US threatening to retaliate against EU products if the situation was not rectified.
The Blair House agreement (1992)	The Blair house agreement dealt with all the outstanding issues between the US and the EU in the Dunkel Text and also contained an agreement to end the US-EU impasse over oilseed policy. It did not deal with issues directly affecting developing countries. It is commonly seen that the Blair House agreement went the way of the EU relating to reductions in the volume of subsidised exports, aggregation of minimum-access requirements and budgetary subsidy cuts that would take place on an aggregate basis. EU compensation payments and US deficiency payments would also be exempt from reduction. This agreement also included a "cease fire" that entailed that GATT complaints on certain issues could not be filed for the duration of the implementation period of six years if the country in question was complying with its Uruguay Round commitments. This was pushed mainly by the EU.
Amendments to the Blair House agreement (1993)	The new US administration that took office in January 1993 raised several issues about parts of the Blair House agreement that led another 12 months of high-level negotiations. The first amendment relates to the base period chosen for the reduction of export subsidies which effectively causes the EU and the US to subsidise significantly more products during the implementation period than would otherwise have been the case. The second amendment relates to allowing a few countries to postpone tariffication of some products by agreeing to minimum import levels higher than those required under tariffication. This benefited mainly the rice industries of Japan and Korea.
The final Uruguay Round agreement (1994)	It consists of two parts. One is a set of general commitments spelling out the new GATT rules and the second is a series of schedules setting out the individual nations' commitments in terms of the level of tariffs declared when non-tariff controls are converted to tariffs; tariff reductions on a line-by-line- basis; minimum access concessions and related details; the level of base-year spending, the volume of export subsidies, and the schedule of reductions on a yearly basis; the aggregate level of trade-distorting domestic supports in the base period; and the level of final commitments for reduction.

Source: Hathaway and Ingco, 1996.

Ingco and Townsend (1998) furthermore argue that had developing countries been at the negotiating table for the right reasons, i.e. finding ways and means to take advantage of the liberalisation process, they would in any case have received differential treatment. Hathaway and Ingco (1996) state that while many aspects of the modalities in the original Dunkel Text were the subject of keen attention and negotiation that led to changes, the portions relating to differential treatment for developing countries remained undiscussed and untouched even though developing countries won differential treatment in several regards. For example, their obligations regarding tariff reduction could be as low as two-thirds of that of industrial countries, many programmes regarded as export subsidies for industrial countries are not regarded as such for developing countries, and developing nations could even escape tariff reductions on a large number of products if they chose to do so. Ingco and Townsend (1998) are of the opinion that by resisting liberalisation and the opportunity to anchor domestic reform in an international framework, a region such as Sub-Saharan Africa (SSA) has foregone the opportunity to reap substantial gains from the Uruguay Round. This is reinforced by a study conducted on the possible impact of the Uruguay Round on developing countries by Brandão and Martin (1993). They mention that it seems that developing countries could expect to achieve small welfare gains if the Dunkel package were implemented by the developed countries alone and the developing countries choose not to participate in the liberalisation process. Larger gains would be realised if developing countries choose to participate wholeheartedly in the world trading system by undertaking agricultural reforms of their own.

2.3.2 Impact of the Uruguay Round on red meat prices

It should be clear from the previous section that trade liberalisation under the auspices of the WTO definitely has an effect on world production, trade patterns, prices of agricultural products, as well as the general welfare of countries. Several studies have attempted to quantify these effects by using different modelling frameworks, some of which were discussed earlier. In this section different studies using different approaches to model the impact of liberalisation on the red meat industry will be cited. It is, however, also important

to take note of the fact that results from such studies may differ considerably from what actually happens in reality.

According to Pearce (1996) the combination of declining grain stocks, shifting production patterns, major economic changes in transition economies, plus major policy changes in the EU and the US, not to mention the uncertainties regarding Chinese trade policy, makes any forecasts of the future behaviour of international agricultural markets extremely hazardous. One can add to this the uncertainties regarding the impact of international markets on changing consumption patterns in newly industrialised countries, and the even greater unknowns provided by the combined threats of global warming, biodiversity loss and population growth. Trying to isolate the separate effects of the AoA from the implications of these events is a very difficult task to accomplish. The difficulty of achieving this end is illustrated by comparing results between projected changes in international prices for selected commodities and the actual price trends since the Uruguay Agreement was signed (see Table 2.13). It is clear that the actual market prices determined by supply and demand factors could overshadow the possible impacts of the AoA.

Table 2.13: **Projected international price changes (1987/89) and actual prices (1994 - 1996) (WFM model)**

Products	Uruguay Round effect*	Actual**
	Percentage change from benchmark to end date	
Bovine meat	8	6[a]
Sheep meat	10	-1[b]

[a] - EU export unit value (1994-95); [b] – lamb: New Zealand wholesale prices London
*	Impact on prices due to the implementation of commitments reached in the AoA during the Uruguay Round.
**	What actually happened in terms of prices in the world market.
Source: Pearce, 1996.

Taking into account the fact that the estimated effect and the actual effect of liberalisation on prices can differ considerably, the rest of this section will be devoted to studies measuring the impact of the AoA.

Table 2.14 shows the results of different models that estimate changes in world market prices for selected red meat products as a result of liberalisation. The models used mainly considered the main elements of the AoA. The differences in the projections of different models can be attributed to different assumptions related to base periods used, transmission elasticities, whether they used a general or partial equilibrium framework, etc. For instance, the RUNS I model used 1982-83 (low protection) as base period, the RUNS III used 1991-93 (high protection) as base period, whilst the WFM used 1987-89 as base period. Nevertheless, there is sufficient agreement in the results to suggest that the overall trends may be viewed with a degree of confidence. Table 2.14 shows that all the models predict increases in market prices for bovine and sheep meat.

Table 2.14: Estimated changes in word market prices for bovine and sheep meat estimated with different world trade models

Products	WFM	ATPSM I	ATPSM II	RUNS I	RUNS III
	Percentage change from benchmark to end of implementation period, i.e. 2000				
Bovine meat	8.0	10.1	5.3	0.2	1.4
Sheep meat	9.9	10.2	5.5	0.2	1.4

WFM = World Food Model; ATSM = Agricultural Trade Policy Simulation Model; RUNS = Rural Urban North-South model.
Source: Pearce, 1996.

Another approach to modelling trade liberalisation involves considering the producer subsidy equivalent (PSE) and consumer subsidy equivalent (CSE). This approach encompasses a wider range of issues than only those related to the AoA. Table 2.15 shows the impact of liberalisation on world beef prices when removing producer and consumer subsidies as measured by PSE's and CSE's. A common feature of all the studies shown in Table 2.15 is an expected increase in the prices of beef if industrialised countries liberalise their agricultural policies.

The results of the study conducted by Zietz and Valdés (1990) is somewhat more modest than the results of other studies shown in Table 2.15. The reason for these differences lie in the application of different base or reference periods in the different studies and the fact that predictions are very sensitive to values attached to PSE's and CSE's, which can vary considerably over time.

The studies done by Tyers and Anderson (1987) serve as good examples to show the influence of different policy assumptions on results of such models. If protection levels of 1980 to 1982 are used Tyers and Anderson (1987) estimated the increase in red meat prices to be 21 per cent, but when the projected protection levels for 1988 are used, the estimated price increases amount to 43 per cent. Hence, when evaluating results from studies concerned with the impact of liberalisation one has to take into account the assumptions used regarding policies that will have an impact on agriculture, i.e. over and above those only pertaining to the AoA.

Table 2.15: Different estimates of the impact of liberalisation by industrialised countries on world beef prices by 2000 (percentage change)

Authors	Base year	Percentage reduction in PSE's and CSE's in industrialised countries		
		10%	50%	100%
Zietz and Valdés (1990)	81-83	0.9	4.9	10.5
Parikh, Fischer, Frohberg and Gulbransen (1988)	*			17
Tyers and Anderson (1987)	80-82			21
Tyers and Anderson (1987)	88			43
Zietz and Valdés (1986)	78-81			17.4
Frohberg, Fischer and Parikh (1990)**	81			17

*　　Econometric model of the International Institute for Applied Systems Analysis (IIASA)
**　 Estimated relative price change of bovine and ovine products to non-agricultural prices using a CGE

The studies cited above only considered the impact of liberalisation on the beef industry in industrialised countries. Table 2.16 shows the impact of a combination of agricultural liberalisation in industrialised and developing countries. Zietz and Valdés (1990) expect beef prices to increase moderately by 2.9 per cent if only developing countries liberalise their agricultural policies. Parikh *et al* (1988), on the other hand expect beef prices to drop by 3 per cent. The reason for this discrepancy is the fact that the latter authors only considered tariff and quota liberalisation, whilst the former authors considered total PSE's and CSE's. What these results indicate is that developing countries should consider their liberalisation strategies carefully, i.e. liberalising only certain policies could result in sub-optimal effects in the industry being liberalised.

Table 2.16: Impact of liberalisation on beef prices by 2000 in both industrialised and developing countries (percentage change)

Authors	Base year	Developing countries	All countries
Zietz and Valdés (1990)	81-83	2.9	13.3
Parikh *et al* (1988)	*	-3	11
Tyers and Anderson (1987)	88		13

*   Econometric model of the International Institute for Applied Systems Analysis (IIASA)

Table 2.16 furthermore shows that when the combined effect of liberalisation and total liberalisation in industrialised countries is also taken into account, world beef prices are expected to increase by between 11 and 13 per cent.

In contrast to the studies cited above Table 2.17 shows the relative impact of liberalisation on all the different red meat products considered in this study for both Developing Market Economies (DME) and Industrialised Market Economies (IME).

Table 2.17: Impact of liberalisation on different red meat products by 2000 (percentage change) (Base year = 1986)

Authors	Beef and veal		Pork		Mutton and lamb	
	IME	DME	IME	DME	IME	DME
Krisoff *et al* (1990)	16-17*	7**	12-14*	8**	25-30*	21**

*   Liberalisation in industrialised market economies (IME) under different scenarios pertaining to aggregate incomes.
**   Liberalisation also in developing market economies (DME) with respect to exchange rates to reflect estimated free market levels.

It is clear from Table 2.17 that if DME's realign their exchange rates to estimated free markets levels, increases in world prices are considerably less than when only IME's liberalise their agricultural policies. Krissoff, Sullivan and Wainio (1990) state that the smaller world price increases reflect the significant overvaluation of national currencies by governments in the developing world. The simultaneous effect of liberalisation of agricultural markets in IME's and a devaluation of currencies in DME's should result in a considerable rise in domestic prices of agricultural commodities in DME's which should encourage further production and less consumption. Thus, with expanded world production and contracted world consumption there is less pressure on world prices to increase as a result of increased excess demand in the IME's.

2.3.3   The overall impact of and lessons learned from liberalisation

Goldin, Knudsen and Van der Mensbrugghe (1993) estimated worldwide benefits due to liberalisation in the order of US$190 billion with tariff reductions in the order of 30 per cent. About US$70 billion of this total would accrue to non-OECD countries. The total gains would increase to US$430 billion with full agricultural reform, with the gain for non-OECD countries in the order of US$180 billion. With the levels of tariffication agreed in the Uruguay Round agreement, the gains are much smaller, particularly for those agricultural exporters who do not subsidise their agricultural activities.

From a Sub-Saharan Africa (SSA) point of view, studies by Harrison, Rutherford and Tarr (1995) and Hertel, Masters and Elbehri (1997) show losses amounting to 0.24 per cent and 0.13 per cent of the SSA's base GDP respectively in the year 2005 as a result of the reforms under the Uruguay Round. Harrison *et al* (1995) concluded that there exists a large potential for improvement, or even reversal, of the situation through domestic policy reforms which are stated to be necessary for taking advantage of the new trading opportunities opened up by the Uruguay Agreement. The OECD (1998a) and Gulbransen (1995), while also recording welfare losses as a result of the implementation of the AoA, support the view of Harrison *et al* (1995).

2.3.3.1   Did the Uruguay Round deliver?

It should be noted that although the OECD (1998a) acknowledges that the disciplines introduced by the Uruguay Round agreement were a step forward in the process of incorporating of agriculture into multilateral trade negotiations, they state that the results of tariffication were far below the expectations of the developing countries. Those developing countries that export agricultural commodities without subsidies, and which were largely powerless to influence the course of the negotiations in agriculture, did not see much improvement in market access for their products.

This view is also supported by Ingco and Townsend (1998) who mention that several studies that have attempted to measure the impact of the Uruguay Round on agriculture have indicated their concerns about the high cost of complying with the new obligations set out in the new Act and the limits these may put on developing strategies, whilst others raised concerns about the potential market losses due to the erosion in the value of preferential exports, as overall cuts in tariffs will reduce the value of the preferences.

Sharma, Konandreas and Greenfield (1998) state that the AoA is expected to cause beneficial effects for aggregate world income, as inefficiencies in production and trade will be removed gradually, but it is generally agreed that the impact on global trade would be fairly small over the implementation period, reflecting the limited extent of the reforms achieved.

According to Tangermann (1996) the rules under which the new commitments were established under the AoA were relatively clear-cut. However, the way in which they were implemented when it came to inserting numbers in the schedules differed significantly from case to case. Not surprisingly, there was a tendency to build some slack into schedule commitments. Also the base period chosen for defining the starting point of the new commitments was relatively "generous". As a result, many of the new commitments turn out not to bind current policies very much, or not at all, with the important exception of the constraints on the quantities of subsidised exports. As a consequence, the AoA may change market conditions in the immediate future less than might have been expected from an agreement which was negotiated with so much effort, and which established disciplines which go far beyond past GATT rules for agriculture.

2.3.3.2   Positive consequences of the Uruguay Round

From the above discussion one could easily be misled into thinking that the Uruguay Round negotiations were a waste of time and money. However, several important lessons are to be learned, especially by developing countries, in view of the next round of

negotiations. Tangermann (1996) mentions that while GATT rules on agricultural trade were vague and weak in the past, governments now have to observe clearly defined constraints when making agricultural policy and trade decisions. He goes further by stating that all participating countries now have schedule commitments in quantitative terms which define what they can and cannot do, in areas of market access, export competition and domestic support. The agreement should be judged in comparison with the state of affairs in agricultural trade before the Uruguay Round began, e.g. GATT Article XVI:3, that was supposed to constrain export subsidies in the era before the Uruguay Round was powerless. Hathaway and Ingco (1996) share his optimism by stating that despite the substantial retreat by the advocates of liberalisation, the Uruguay Round agreement on agriculture appears to hold great promise. Cognisance is taken of the fact that some of the binding powers laid down during the Uruguay Round may be weak, but the essence is that new rules have been laid down to which role players must adhere in future. The efficiency of the application of these rules will depend mainly on the outcome of the next Round of negotiations. Also, the fact that countries have agreed to lower their tariffs to the committed bound rates, although they may be high in some cases, means that they come closer to within-quota tariffs under tariff rate quotas (TRQ), hence TRQs could loose much of their significance. Tangermann (1996) furthermore states that the existence of the new WTO disciplines for agriculture have already began to impact on the process of agricultural policy-making in many countries, e.g. the EU and the US, make explicit reference to their WTO commitments in their efforts to reform their respective agricultural sector policies. It was also stated that the failure of many developing countries to reform their domestic agricultural sectors to meet WTO rules was the main cause for the new rules not having any significant impact in terms of welfare gains; in fact it was shown that the developing world will probably suffer welfare losses. According to Gulbransen (1995), welfare loss could be reduced substantially if the exogenous price changes are transferred to domestic markets of the food importing countries and markets are allowed to act. Hertel *et al* (1997) concluded in their study that losses due to the AoA could be reversed if (i) freight costs on exports are reduced to the level of other developing countries, and (ii) yield rates were to grow at the same rate as that in South Asia. This

conclusion clearly illustrates the importance of a well-functioning and efficient transport system and the importance of technological innovation and transmission.

Hence, provided that these countries learned from the past, reform their agricultural sectors to be more in line with the WTO rules and address other structural inefficiencies, the impact of the WTO could be expected to be much more significant (hopefully in a positive sense) in the years to come.

2.3.4 Issues of importance in preparing for new WTO negotiations

From the above discussion it is clear that many issues that is contained in the AoA as it stands today need to be revisited. Furthermore, since the signing of the AoA, several changes have taken place in the world's trade structure, e.g. the ongoing integration of economies and accompanying agricultural policy reforms, which provide an environment for further trade liberalisation. Miner (2001) states that the expansion of regional trade agreements and EU enlargement negotiations add urgency to the multilateral negotiating process. Furthermore, issues such as the anticipated expiry of the Peace Clause in 2003, export subsidies, other forms of export competition, unfair pricing practices, and dumping require urgent attention.

- **Article 20**

  Ingco and Townsend (1998) and Miner (2001) state that the issues that will dictate the agenda for negotiations, and that are embedded in Article 20, are the following:

  - Experience of implementing the reduction commitments under the AoA;
  - the effects of these commitments on world trade in agriculture;
  - non-trade concerns; special and differential treatment for developing country members of the WTO and the objectives of establishing a fair and

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market-orientated trading system and other objectives mentioned in the preamble of the agreement; and

– further commitments necessary for achieving the objectives of the AoA.

According to Ingco and Townsend (1998) Article 20 of the AoA mandates countries to work towards "substantial progressive reductions in protection in agriculture" and adoption of least-trade distortionary policies. Article 20 also provides for the negotiations involving further commitments which may be necessary to achieve long-term liberalisation objectives, i.e. the agricultural negotiating mandate will incorporate commitments for further liberalisation of restrictions under market access, domestic support and export subsidies, and will also cover topics that go beyond reductions in support and trade barriers, such as strengthened rules and disciplines (Ingco and Townsend, 1998). With regard to the latter Valdés and Zietz (1987) suggest that in order to give the AoA a lasting eminence, present rules and disciplines on subsidies and quantitative restrictions need to be strengthened.

- **The Peace Clause**

According to Sharma, Greenfield and Konandreas (1998) and Miner (2001) Article 13, the so-called Peace Clause, is the most important article that requiring negotiation. As was stated in Table 2.12, the Blair House agreement included a cease-fire that entailed that GATT complaints on certain issues could not be filed for the duration of the implementation period if the country in question was complying with its Uruguay Round commitments (Hathaway and Ingco, 1996). Sharma *et al* (1998) state that the importance of the Peace Clause lies in the fact that it prevents members from challenging export subsidies, Green and blue box, and *de minimus* payments.

Green box policies are not deemed to have a major effect on production and trade, and include a variety of direct payment schemes that subsidise farmers' incomes in a manner that is deemed not to influence production decisions. It also includes

assistance programs, e.g. producer retirement programmes, resource retirement programmes, environmental protection programmes, regional assistance programmes, certain types of investment aid and general services that provide, for example, research, training and extension, marketing information and certain types of rural infrastructure. Blue box policies, also exempted from aggregate measure of support (AMS) commitments[1], include the compensatory payments and land set-aside schemes of the EU's CAP and the deficiency payment scheme of the US. Such direct payments under production-limiting programmes are exempted from AMS reduction if (i) such payments are based on fixed area and yields or (ii) such payments are made on 85 per cent or less of the base level of production or livestock payments are made on a fixed number of heads. The *de minimis* exemptions allows any support for a particular commodity (or non-specific support) to be excluded from the total AMS calculation if that support is not greater than a given threshold level, i.e. where the value of total domestic support for a particular commodity is not greater than 5 per cent (10 per cent for developing countries) of the total value of production of that product, then that support need not be included in the calculation of the current total AMS, which means that it will not have to be reduced (FAO, 1998b). Hence, the *de minimis* provision offers policy makers additional room to manoeuvre (Pearce, 1996). He also states that it is important to note that the *de minimis* provisions are specified in relation to total production, not to total marketed production. Thus, in countries where a substantial percentage of total production is retained on the farm, the protection of marketed production that subsidies need to exceed before AMS commitments come into effect, will be considerably higher than 5 per cent.

Given the above it is clear that most of the subsidies that are allowed under the AoA could become subject to challenge in the Disputes Settlement Mechanisms of the WTO if a member can show injury. According to Sharma *et al* (1998), countries

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[1] The AMS commitments require a 20 per cent (13.3 per cent for developing countries) reduction in the Base Total AMS (base period 1986 – 1988) starting in 1995 and lasting for six years for developed countries and 10 years for developing countries. The AMS applies to all domestic policies that are considered to have a significant effect on the volume of production.

that rely on these subsidies would have a strong interest in negotiating an extension of Article 13, whilst countries that may be harmed by such subsidies would have a strong interest in insisting on the termination thereof. The Cairns Group can be expected to have a strong stance in this regard. During the 18th Cairns Group ministerial meeting it was clearly stated that all trade-distorting subsidies must be eliminated and that market access must be improved substantially so that agricultural trade can proceed on the basis of market forces. The Cairns Group are also of the opinion that in many cases agricultural subsidies and access restrictions have stimulated farm practises that are harmful to the environment, and hence reform of these policies could contribute to the development of environmentally sustainable agriculture (Cairns Group, 1998).

Miner (2001) suggests that if Article 13 is not extended or replaced, domestic support measures and export subsidies could be challenged under countervail legislation, or for nullification or impairment of benefits, whether or not they meet the existing commitments. This would place many agricultural exports from the major subsidising countries at risk to be challenged, a situation that would be particularly difficult not only for the EU, but also for the United States, Canada and a number of other countries. Since the Peace Clause is due to disappear in the year that a new US Farm Bill is due, which is also a crucial time in the EU enlargement exercise, there will be strong pressures on the key negotiating countries to reach agreement on agriculture in the WTO by that time.

• **Tariff Rate Quotas**

Another issue that is deemed very important is the rules on Tariff Rate Quota (TRQ) administration and allocation (Incgo and Townsend, 1998). A TRQ is the volume of imports that is permitted to enter a country at below the normal tariff rate. TRQs relate to the minimum access commitments of countries, which entail that exporters of tarrified products should be allowed to supply at least 3 per cent of the domestic consumption at the beginning of the implementation period,

rising to 5 per cent at the end of the implementation period in 2004 at reduced tariff rates. Tangermann (1996) states that some people are of the opinion that minimum access may be the only real improvement to market access. He disagrees, since there are no guarantees that the TRQs will serve this purpose, and hence that they will affect the actual trade flows and constrain policies of the importing countries. Also it should be remembered that there is no commitment regarding imports, but only a commitment to charge no more than the specified reduced rates of tariffs specified, i.e. whether products could be exported under the TRQs will depend on whether these reduced tariffs are still prohibitive or not.

Incgo and Townsend (1998) mention that the establishment of the new TRQs created interest groups which promise to uphold inter-governmental restrictions on trade through licensing procedures and other administrative arrangements. The FAO (1998b) states that there is also uncertainty surrounding the procedures for allocating minimum access quotas, i.e. the recipients of licences to import at in-quota tariff rates will benefit from economic rents, and therefore countries have an interest in allocating these licenses to domestic traders rather than foreign traders even though this may not be entirely consistent with most favoured nation (MFN) principles. Incgo and Townsend (1998) add by stating that traders in turn will have an incentive to lobby for the continuation of the high levels of applied and bound tariffs. They are of the opinion that the challenge for the next Round in this area is to prevent the TRQs from interfering more than is necessary in the competitive development of trade. Tangermann (1996) and the FAO (1998b) suggest auctioning licences under minimum access TRQs. Ingco and Townsend (1998) state that auctioning, however, also has disadvantages, i.e. if the TRQs were auctioned to the exporter, the effects would be similar to the system of tariffs that the quota was designed to avoid. This is because the exporter would tend to bid up the size of the tariff for the right to make more profit in the import market.

It should be clear that, although only a few issues that require urgent attention during follow-up negotiations on agriculture were mentioned and discussed, there is still a lot to

be done as far as liberalisation of trade is concerned. The answers to pressing questions are far from clear, which is alarming, as world trade is not going to remain static until such answers are found. From a developing country point of view, matters are even more worrying, especially considering that some developing countries, especially least developed countries, have been facing difficulties regarding lack of trained personnel to fully appreciate the implications of the provisions of the AoA and its implementation in practice (Ingco and Townsend, 1998). These economies are also experiencing difficulties in adapting ongoing domestic agricultural policies to the new rules, which will exacerbate their future positions. Sharma *et al* (1998) mention the following problems that confront developing countries in their efforts to keep pace with their commitments and ongoing negotiations:

- **The inadequate administrative/legal capacity** to meet the requirements of WTO membership, including preparation of notifications, defending interests of national agriculture in the WTO, assessing the impact on agriculture of policy changes agreed upon at the WTO, and developing systems of plant variety protection, as requested by the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS).

- **The insufficient national policy formulation capacity** in agriculture, forestry, and fisheries sectors and the inadequate analytical capacity to assess the impact of policy changes being proposed at the WTO.

- **The limited scientific, administrative and infrastructure capability** to deal with food standards, plant and animal health inspection services and quality assurance requirements of developing countries' imports.

- **The lack of plant variety protection** and the necessity to develop such protection rapidly, by patents or *sui generis* legislation, or mixture of both, by all WTO members, including developing countries with no prior experience.

- **The lack of capacity to prepare and negotiate in Rounds**, including eventually the preparation/revision of national schedules of commitments to the WTO, requiring additional skills and a forward-looking capacity in their ministries.

Apart from the issues mentioned, Miner (2001) states that a myriad of newer issues and non-trade concerns have become linked to the trade agenda, whether or not they belong there. Most are legitimate issues, but they are also complex, sensitive and emotional ones, without easy or obvious solutions. A surprising number of these emerging issues are related to the food business and many are being raised in relation to agricultural trade negotiations, no doubt for both substantive and tactical reasons. In addition to issues already identified in the AoA, including food security, food safety and quality, environmental concerns, resource conservation and rural development, WTO members have raised such desperate issues as animal welfare, biotechnology, species preservation, safeguarding the landscape, poverty reduction and preservation of rural culture. Governments are under growing pressure to address these issues either directly or in trade talks (Miner, 2001).

2.3.5   The WTO and meat trade

Kerr (2001) states it has become abundantly clear over the last few years that the WTO cannot be relied upon to solve all the issues in livestock trade. He is of the opinion that building private relationships is increasingly important for solving issues with common interest among role players in the market.

Nevertheless, some of the most pressing issues relating to meat trade involve better access to foreign markets. The ban by the EU on beef production by using hormones provides a good example of the problems being experienced in this field. New issues such as animal welfare and biotechnology are also emerging. Old issues that remain on the trade agenda and that have to be dealt with include dumping, export subsidies and technical barriers to trade (Kerr, 2001).

2.3.5.1   Export subsidies

As far as export subsidies are concerned, Kerr (2001) states that while ongoing reform of the European Union's CAP has reduced the degree of export support required for the

beef industry, considerable latitude for using of export subsidies remains. While the United States and the Cairns Group have proposed that export subsidies be removed completely, it seems unlikely that the EU will agree. A likely compromise is that there will be further reductions in export subsidies. Obtaining commitments on the basis of individual commodities rather than allowing for averaging subsidy reductions across a range of commodities would reduce the EU's ability to disrupt international meat markets during a domestic market downturn (Kerr, 2001).

2.3.5.2   Market access

Market access issues are also likely to be important during the negotiations. As mentioned previously, liberalisation of tariff quotas and their administration could become major points of contention during negotiations. From a meat trade point of view the issues surrounding tariff quotas are likely to involve some other dimensions as well. Kerr (2001) states that allowing disease-free subnational zones in the WTO has made it possible for some South American countries, particularly Argentina, to begin shipping foot-and-mouth-free chilled beef to markets that have traditionally been closed to their products. Total quotas were, however, set prior to the entry of the South American countries into the fresh beef trade, and it is expected that they will have considerable export capacity in place in the near future. Hence, they will favour expansion of the quota portion of the existing tariff quotas, to reflect the new international reality. Failing that, given their likely cost advantage, they may also wish to have the over-quota tariff reduced. The smaller the market access they are able to obtain elsewhere through expansions in tariff quotas, the more cost competitive they will become in the over-quota market. Negotiations on liberalisation of tariff quotas, namely reductions in within-quota tariffs, over-quota tariffs, and the quota quantity, thus need to be conducted carefully because they will be subject to the dynamics of the international beef market (Gainsford and Kerr, 2001).

One way of distributing quotas more equitably is moving to market-based allocation mechanisms, such as auctions. The question that arises is how fair such allocations

will be. For example, Kerr (2001) mentions that the US would be able to secure large proportions of some countries' beef or pork markets due to their economic power rather than their inherent competitiveness. However, one should keep in mind that the WTO's preference for tariffs over quantitative restrictions as border instruments, arose in part because tariffs ensure that the low-cost country will become the import supplier. This is particularly important when major changes are taking place, such as the entry of South American countries into the international chilled beef market. Thus, the ability of the US to secure market access through their size rather than their inherent competitiveness, raises questions over the "fairness" of quota allocation, and will definitely result in some heated debate during trade negotiations.

As far as pork is concerned, Canada has proposed zero-for-zero reductions in tariffs for trade in pork products. The level of protection for pork in the EU is, compared to many agricultural products, relatively low. It seems unlikely, however, that Japan would be interested in opening its market completely and, hence, it may not be possible to achieve an agreement (Kerr, 2001). Furthermore, while China is not yet a member of the WTO, if the agricultural negotiations are sufficiently protracted it may well have acceded prior to a new agreement being reached. China has shown little indication that it wishes to liberalise its pork market, although, in its accession agreement, it has promised to place its pork import regime on a "scientific basis" and to reduce its tariffs from 20 to 12 percent (Kerr, 2000). These concessions were wrested from a China that is desperate to join the WTO. Once it has obtained membership, further liberalisation in agriculture, particularly for meat products, is likely to become very difficult to achieve.

2.3.5.3   Other issues pertaining to meat trade

Other major issues pertaining to meat trade that actually fall outside the AoA are (1) dumping, (2) sanitary measures, and (3) technical barriers to trade.

● Anti-dumping

As far as dumping is concerned, several role players in the meat industry have already expressed their dissatisfaction with the "selling below cost" definition (Kerr, 2001; NCBA, 2000). Canada and the National Cattlemen's Beef Association (NCBA) in the US are of the opinion that the definition must be removed as sole criterion for the imposition of anti-dumping duties. Kerr (2001) states that while the intent of this definition relates to predatory pricing, the definition cannot be used in isolation. The reason for this is that the livestock industry worldwide is characterised by production cycles, i.e. when a production cycle is at a low point, prices tend to be high and vice versa. Hence, it is argued that claims with respect to dumping are being made at times when prices are forced downwards by economic and natural factors. In other words, cyclical patterns could result in producers making a loss (prices received are lower than production costs), and for this reason it is argued that if such producers sell their produce internationally at the same prices it should not be regarded as dumping. However, the issue is not that simple to diffuse. Producers in countries such as the US and the EU receive various types of green box payments, as discussed above. Such payments could easily make up the deficit between the price and the production cost, although the payments may not have been introduced for this purpose. The result is that producers may not feel the pressures of the market that much, or not at all. Many other producers worldwide do not have this safety net at their disposal (Kerr, 2001).

Also, one should remember that consumption patterns of different products differ between different countries, which could cause products that are seen as by-products in one country to be highly sought after in another country. But the country that has surpluses of the "by-product" could easily use price discrimination to get rid of the product, or stated alternatively sell the product at well below international market prices, whilst the average returns in terms of a commodity package could still be above production costs (NCBA, 2000). It should be clear that the issue of dumping has no simple solution, but given that it would most probably be tabled for renegotiation, it is the responsibility of countries that could be affected most by changes in dumping rules

to take action in advance and make sure that they are in a strong negotiating position (Kerr, 2001).

- Sanitary measures

As mentioned previously, the EU's position on hormone-fed beef has already had serious implications with respect to trade as it relates to market access. This case, however, also has implications for the implementation and adherence to Sanitary and Phyto-Sanitary (SPS) measures as spelled out in the AoA, namely that to ensure a scientific basis for trade barriers relating to human, animal, and plant health. According to Kerr (2001), one of the new agreement's first tests was the long-standing beef hormone dispute between the EU on the one side and Canada and the United States on the other. The EU prohibits the use of beef hormones domestically and also the import of beef products produced using these growth promoters. With the SPS in place, as well as the new arbitration-based dispute settlement system, Canada and the United States challenged the EU ban. The EU lost the case. According to Kerr and Perdikis (1995) the EU based its case largely on technicalities because it was clear that its ban did not have a solid scientific basis. The EU, however, decided not to comply with the WTO dispute panel ruling and, instead, chose to accept retaliation, as is its right (Kerr and Perdikis, 1995). Kerr (2001) states that, while it is possible to accept retaliation and breach WTO commitments legally, these occurrences are rare and usually indicate that the political consensus that underlies the WTO has broken down. When this happens it usually signals that renegotiation at the WTO is necessary. The EU has made it clear that it wishes to renegotiate the SPS to include consumers' concerns. The hormone case proves that the SPS is working as intended — to prevent the capricious use of extreme health regulations to protect producers. Applying the SPS is important for the future functioning of trade in red meat products (Kerr and Hobbs, 2000).

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● Technical Barriers to Trade

In respect of Technical Barriers to Trade (TBT) issues relating to requirements in some countries that all meat sold through commercial channels should carry domestic labels raises questions about the aims, functioning and application of TBTs. Kerr (2001) is of the opinion that TBTs need to be strengthened if the red meat industry is to be better protected from regulations such as country-of-origin labelling requirements. Currently, technical barriers must have a legitimate purpose. Further, the TBT states that the "costs of implementing the standard must be proportional to the purpose of the standard". The intent of this statement is ensuring that the benefits received from the standard by consumers should not exceed the costs to exporters of implementing the standard. The point to be made is that the South African red meat industry must note that such issues will probably be put forward for negotiations, and hence a proactive stance must be taken in this regard. Such a "simple" issue may have wide-ranging repercussions in the red meat industry, especially if the combined effect of the issues discussed above is not in South Africa's favour.

2.4   The European Union and its Common Agricultural Policy

Three issues necessitate a comprehensive discussion of the EU and its agricultural policy. Firstly, various authors already cited clearly indicated the possible impact of the EU's agricultural policy on agricultural markets worldwide. Secondly, the EU is South Africa's largest trading partner, hence a study such as this would be incomplete without due cognisance of new developments as far as the agricultural policy of the EU is concerned. Thirdly, the EU is the largest import source of beef to South Africa. The EU-SA FTA, however, falls beyond the scope of this study as trade in red meat was put on the reserve list by both countries, and as such falls within the MFN principle of the WTO.

The Common Agricultural Policy (CAP) of the EU that was first developed in the early 1960's has been the source for much discussion and conflict amongst agricultural

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producers worldwide; also in the EU itself (Corbett, 2000). It can also be regarded as one of the most controversial agricultural policies in existence today. The objective of the CAP, to encourage and support increased agricultural production in the EU, was attained to such a degree that by 1990 the EU was self-sufficient in most of the commodities being produced there. In fact, by the early 1990's, the EU started to experience problems with excessive supplies of agricultural commodities (Corbett, 2000). This, apart from the pressures exerted on the EU by the international community to reform the CAP, was one of the main reasons for major reforms to the CAP since the early 1990's (Hathaway and Ingco, 1996). It was accepted that the costs associated with the CAP could not be sustained indefinitely (see Atkin, 1993 for a discussion on costs associated with the CAP). The latest reforms to the CAP are embedded in the so-called Agenda 2000. Figure 2.7 shows the evolution of the CAP reform.
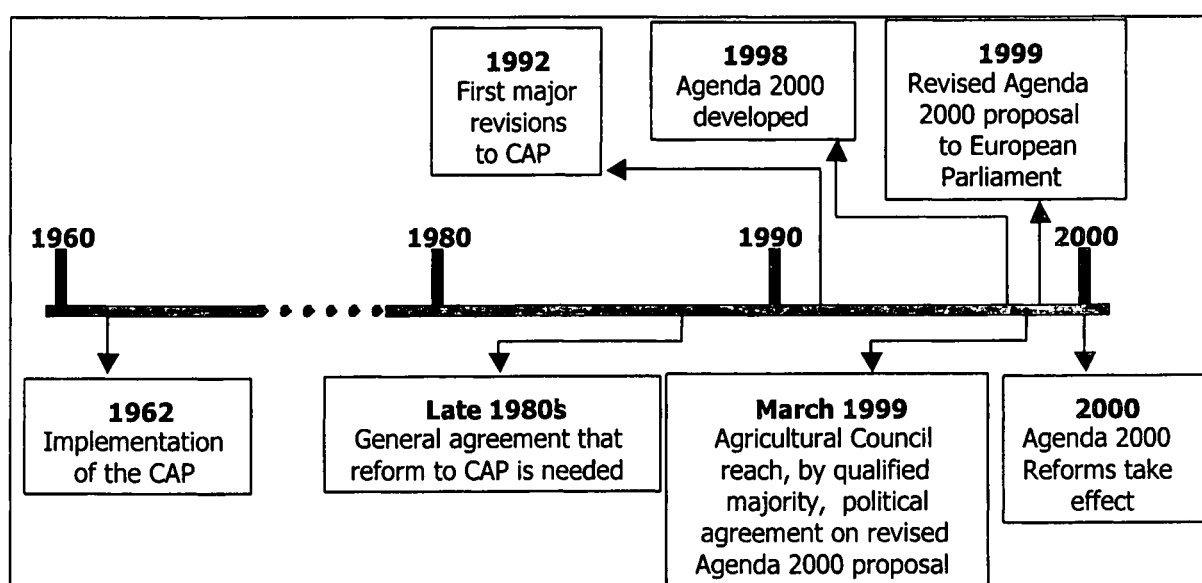
Figure 2.7: Evolution of the CAP

Source: Reich, 1999.

Several factors, internal and external to the EU, served as catalysts for the recent reforms to the CAP as entrenched in Agenda 2000. According to the European Commission (1999) the major external factors include growing world demand for food, further moves towards a more liberal global trading environment, and the challenge of the European

Union's eastward enlargement. According to Reich (1999) the enlargement of the EU placed, and is still placing, increasing pressure on the budget needed to fund the CAP, in fact the CAP now takes the bulk of the EU budget. There also exist imbalances between the extent to which countries fund the EU budget and the amount of CAP support they receive. Furthermore Eastern European countries currently seeking EU accession have large agricultural sectors, and supporting them to current CAP levels would be beyond the EU budget. As was mentioned previously, the EU also recognises the need to liberalise world agriculture under the auspices of the WTO further. Thus, the reforms undertaken can also be seen as an effort of the European Commission to prepare the EU agricultural sector for greater liberalisation (Reich, 1999).

From an internal point of view there are four broad factors that need to be addressed. Firstly, there is the very real risk of a return to market imbalances in some sectors. Secondly, the Treaty of Amsterdam, which came into force on May 1, 1999, makes it the responsibility of Community lawmakers to integrate environmental concerns into all legislation. Thirdly, the CAP needs to rise to the challenge of greater consumer interest in food safety, quality and animal welfare. Lastly, the CAP must adapt and respond to the need for further decentralisation, greater transparency and simpler rules (European Commission, 1999). In an effort to address these four factors three key priorities were identified, namely (European Commission, 1999):

- to ensure the competitiveness of the European Union agricultural sector both on the Community market and on growing export markets;
- to promote ways of farming that contribute to the maintenance and enhancement of rural development and landscapes;
- to contribute to sustaining the livelihood of farmers while promoting the economic development of the wider rural economy.

According to Reich (1999) it would appear that the major emphasis of Agenda 2000 is the protection of farmers' livelihoods, rather than implementing policies that encourage increased production efficiencies and environmental protection. To what extent such an

allegation is valid is difficult to measure at this stage, but time and the new Round of agricultural negotiations will surely provide answers.

According to the European Commission (1999), Agenda 2000 resulted in several new regulations, and restricts the agricultural budget to an average of EUR 38 billion annually for market policy (including veterinary and plant health measures) and EUR 4.3 billion for rural development measures. The new regulations which will come into force (with the exception of milk) from the year 2000 onwards, concern the arable crop, beef, milk and wine sectors, the new rural development framework, the horizontal rules for direct support schemes and the financing of the CAP.

2.4.1   CAP and the red meat sector

The beef and veal sector is the second largest production sector in the EU, accounting for around 10 per cent of total agricultural production (after dairy with a share of 18% in 1998) (European Community, 2000a). Hence, it is understandable that the beef sector was high on the agenda for further liberalisation and will be the main point of discussion in this section, although reference will also be made to pork and sheep meat.

Rodriguez (2000) supports the idea that further liberalisation of the beef sector is needed, even though there was a 15 per cent price reduction for beef since 1992, to align EU beef prices with world prices. EU price support is facilitated by an intervention scheme that involves purchasing beef to maintain market prices above certain levels. The benchmark for intervention is the so-called intervention price that effectively places a floor under domestic wholesale prices. Intervention into the market is triggered when the market price in the EU falls to 80 per cent of the intervention price. This price was set at EUR 3 475 per ton for the first six months of 2000. This is also the basis for further reductions as stipulated in Agenda 2000. More specifically, Agenda 2000 introduced a 20 per cent reduction in the level of price support in three equal steps with EUR 3 475 per ton as basis (see Table 2.18). The change in the intervention scheme also involves a change from intervention purchasing by government to an EU-funded

Private Storage Aid (PSA) scheme for beef that is currently being used by the EU's pork industry.

Table 2.18: Reductions in beef support prices (EUR per ton)

Year	Intervention price	Safety Net Trigger	Basic Price	Trigger price
1999/2000	3 475	2 085		2 780
2000/2001	3 242	1 910		
2001/2002	3 013	1 735		
2002/2003			2 224	2 291

Source: Adapted from Reich, 2000.

Table 2.18 shows that the intervention price will be replaced by a basic price for storage, fixed at EUR 2 224 per ton during 2002/2003. The basic price serves as proxy for triggering the PSA scheme, i.e. when the market price falls below 103 per cent of the basic price for beef (EUR 2 291 per ton) the PSA scheme will come into play. According to Reich (2000) the PSA scheme effectively acts as an incentive scheme since certified storage vendors can receive payments from the EU for the storage of commodities for the agreed length of time. She argues that this essentially maintains the market price at EUR 2 291 per ton, because if the price falls to this level, the PSA scheme is triggered.

It should be noted that from July 1, 2002 producers may also benefit from a "safety net" intervention system. Reich (2000) states that the EU always had a "safety net" system in place, which was triggered when market prices fell below 60 per cent of the intervention price. Agenda 2000 stipulates that the level for the "safety net" trigger price should be reduced to 25 per cent, i.e. when the average market price for bulls or steers in a Member State (or region thereof) is less than EUR 1 560 per ton for two consecutive weeks, buying-in tenders will be organised in the respective Member State by the Commission through the Management Committee procedure (European Commission, 2000a).

Rodriguez (2000) suggests that it is evident that reducing EU prices will take time and that, at the end, there will still be a significant difference between the Community prices and those of other world producers. According to the European Commission (1997),

with an average support level of 80 per cent of the intervention price, i.e. a price of around EUR 2 780 per ton, the EU price would still be nearly about 20 to 25 per cent higher than the projected US price after 2000 (depending on the US$-EUR exchange rate) and 30 per cent or more higher than other major exporters.

Rodriguez (2000) also mentions that since early 1995 beef subsidies have dropped on numerous occasions. In 2000 subsidies were less than half what were in 1995. The total annual expenditure on beef subsidies has been reduced by 66 per cent compared to the case before the WTO agreement was accepted. He also mentions that in the swine sector the amounts exported without subsidies are now more important than the subsidised pork.

Over and above the reforms to the price support system for beef, Agenda 2000 also involves support to beef farmers through direct payment to offset income reductions resulting from reform in the price support system. Direct payments take several forms, and include special premiums, slaughter premiums, extensification premiums and deseasonalisation premiums.

Table 2.19 shows the special and slaughter premiums as embedded in Agenda 2000. The former entails an annual premium granted per calender year and per holding within the limits of regional ceilings for not more than 90 animals. The latter involves that farmers receive premiums if they provide proof that animals are slaughtered or exported to a third country, and were owned by the farmer for at least 2 months.

Table 2.19: Special and slaughter premiums for beef (Agenda 2000)

Type of premium	Type of animal	1999	2000	2001	2002
		EUR per head			
Special premium payments*	Bulls	135	160	185	210
	Steers	108.7	122	136	150
	Suckler cow	144.9	163	182	200
Slaughter premium**	Bulls	0	27	53	80
	Steers	0	27	53	80
	Dairy cows	0	27	53	80
	Suckler cows	0	27	53	80
	Heifers	0	27	53	80
	Calves	0	17	33	50

* This premium is paid only once in the lifetime of bulls older than 9 months or at a minimum carcass weight of 185 kg. This premium is also paid only once in the lifetime of a suckler cow, but twice in the lifetime of steers (9 months and 21 months)

** Bulls, steers, dairy cows, suckler cows and heifers eligible for this premium should be older than 8 months. Calves qualify if they are older than 1 month but younger than 7 months and less than 160 in carcass weight (kg).

Source: Reich, 2000; European Commission, 2000a.

Reich (2000) also mentions that Agenda 2000 affords what is called national envelopes for each member state, to supplement direct payments made for male and female bovine animals and provide extra flexibility when making direct payment.

Agenda 2000, in an effort to promote environmental sustainability, also entails an extensification premium. This involves farmers qualifying for special premiums receiving an additional premium of EUR 100 per premium granted, provided that the stocking density on their holdings per calender year did not exceed 1.4 livestock units per hectare. However, Member States may decide to grant the "extensification" payment as follows (European Commission, 2000a):

- In respect of the calendar years 2000 and 2001 an amount of:
  - EUR 33 for a stocking density of 1.6 livestock units per hectare or more, and less than or equal to 2.0 livestock units per hectare;
  - EUR 66 for a stocking density of less than 1.6 livestock units per hectare.
- In respect of the calendar year 2002 and the subsequent years an amount of:
  - EUR 40 for a stocking density of 1.4 livestock units per hectare or more, and less than or equal to 1.8 livestock units per hectare;

-      EUR 80 for a stocking density of less than 1.4 livestock units per hectare.

The qualification criteria are rendered more rigorous by taking account of all the adult cattle actually present on the farm as well as sheep on which premia are claimed. The number of hectares considered is limited to temporary and permanent pasture and all the other forage areas, except arable crops (European Commission, 2000a).

The "deseasonalisation" premium aims to encourage slaughtering out of the traditional slaughter season, in order to reduce surges in supply at particular times of the year, as well as to reduce the pressure on prices. The premiums are available in Member States, where steers slaughtered in a given year account for more than 60 per cent of total number of male animals slaughtered and where more than 35 per cent of the slaughtering takes place between September 1 and November 30. The premium levels function on a sliding scale depending on the time of slaughter (from EUR 72.45 for animals slaughtered in the first 15 weeks of the year, to EUR 18.11 for animals slaughtered between the 22nd and 23rd weeks of the year) (European Commission, 2000a).

In order to illustrate the situation from a South African point of view it is useful to apply the various support measures to an actual production situation to and convert the values to South African Rand (EUR1 = R7.14). Table 2.20 shows the situation before Agenda 2000, and for two different situations after the implementation of Agenda 2000. In Situation 1 it is assumed that a beef producer receives the highest extensification and deseasonalisation premiums possible under Agenda 2000. In Situation 2 it is assumed that no extensification premium is payable, whilst the beef producer receives the lowest deseasonalisation premium payable. Comparing Situation 1 with the original situation it is clear that the EU beef farmer will secure a higher price than was the case before the implementation of Agenda 2000. In Situation 2 the EU beef farmer is worse off than was the case before the implementation of Agenda 2000. At present Situation 2 is more likely, due to the fact that beef farmers in the EU could experience some problems

with respect to extensification (Reich, 2000). Most notable in Table 2.20 is the extremely high returns to the EU farmer in Rand denominated terms, even in the case before the implementation of Agenda 2000. At the time of writing this document the South African producer (carcass) price ranged between R7.50 per kg and R8.50 per kg; this was far below the producer price EU beef producers receive, as is shown in Table 2.20.

Table 2.20: Level of support payments for a European farmer producing a 550 kg steer for slaughter

Support measures	Original situation		Situation 1		Situation 2	
	EUR per head	Rand equivalents per head	EUR per head	Rand equivalents per head	EUR per head	Rand equivalents per head
	EUR1 = R7.14					
Price support	1 529.00	10 917.06	1 260.00	8 996.40	1 260.00	8 996.40
Special premium	217.40	1 552.24	300.00	2 142.00	300.00	2 142.00
Slaughter premium	0.00	0.00	80.00	571.20	80.00	571.20
Extensification premium	0.00	0.00	100.00	714.00	0.00	0.00
Deseasonalisation premium	0.00	0.00	72.45	517.29	18.11	129.31
Total	1 746.40	12 469.29	1 812.45	12 940.89	1 658.11	11 838.91
Price per kg	3.18	22.67	3.30	23.53	3.01	21.53

Although the sheep and goat industry is not directly affected by Agenda 2000, this sector seems to be indirectly influenced by two elements of it. There is, firstly, the expected lower price for the other types of meat and, secondly, the higher cattle premiums combined with the density factors and the new rules on extensification (European Commission, 2000b).

Regarding the first aspect, there is a risk that sheep/goat prices could come under pressure due to increased competition caused by the probability of falling prices for the other types of meat. This is especially true for beef, for which the price cut of 20 per cent in three years is substantial, but also pig meat and poultry prices which are expected to decrease to some extent due to expected lower cereal prices.

Ashworth (2000) states that sheep and goat meat production in the EU has declined since 1990 partly due to the reform of the Common Market Organisation (CMO) in

1992. However, according to the European Commission (2000b), more recent declines in sheep and goat numbers can probably be attributed to reforms in the beef industry under Agenda 2000. In other words, the anticipated increase in cattle premiums and the new rules on extensification could have provided an incentive for mixed farms (cattle/sheep) to switch from sheep/goat to cattle, as the density factors for animals have to be respected. The magnitude of this impact is, however, extremely difficult to quantify since it depends mostly on individual circumstances on a given farm. A variety of elements may influence such an adjustment, for instance the number of available premium rights, farm size in ha, individual constraints concerning the density factor farmer preferences regarding the type of farming, expected price, and market developments. The decision to switch from a headage to area payments for sheep and goat farmers within less favoured areas (LFA) could also have resulted in de-stocking.

Ashworth (2000) states that at present sheep and goat meat production is the least significant of the livestock enterprises commonly found in the EU, accounting for only 3 per cent of meat production by volume. However, in terms of the total agricultural output of the EU, sheep and goat meat production accounted for around ECU 4 bn in 1997. Hence, although it only accounted for 2 per cent of the total value of agricultural production, sheep meat and goat meat producers receive a disproportionately high level of support. For example, in 1997 they received 3.5 per cent (ECU 1.4 bn) of the total European Agricultural Guarantee and Guidance Fund (EAGGF) expenditure. This compares with 1.2 per cent on pig meat, 16.3 per cent on beef and 7.7 per cent on milk. The EU Court of Auditors (CEC, 1995) estimated that, in 1992, each kilo of sheep meat received 1.7 ECU of support; more than three times the support paid per kilo of beef. By 1997 this gap had narrowed, but it is estimated that support per kilo of meat is 50 per cent greater in the sheep and goat sector at ECU 1.3 per kilo of meat than the beef sector.

2.4.2   The impact of Agenda 2000

The European Commission (2000c) summarises the results of three separate studies conducted to estimate the impact of the Agenda 2000 CAP reform in the year 2005 with reference to a *status quo* policy situation. The *status quo* situation corresponds with a policy scenario based on the continuation of the 1992 CAP reforms. However, it should be noted that the *status quo* scenarios vary substantially across studies, mainly with regard to medium-term developments on world agricultural markets and key policy (e.g. compulsory set-aside rate) as well as economic variables (e.g. €/$ exchange rate). Therefore, for comparative purposes, the simulation results are presented in the form of deviations from the reference scenario. This enables the depiction of the likely impact of Agenda 2000 on the economy while reducing (though not avoiding) any potential bias generated by the models and the starting point, when both *status quo* scenario and Agenda 2000 situations are compared in terms of absolute levels. Furthermore, results should not be interpreted as changes relative to the current (unreformed) situation (European Commission, 2000c).

The separate studies were carried out by the University of Bonn using the SPEL/EU-MFSS model, the Food and Agricultural Policy Research Institute (Fapri) and the Centre for World Food Studies of the University of Amsterdam, using the CAPMAT model of the EU agricultural sector.

The European Commission (2000c) states that the various policy changes to be implemented in the beef sector are expected to have countervailing effects. On the one hand, the reduction of the current support prices, the removal of the current intervention system and its replacement by a private storage scheme and a new "safety net" intervention system, the adjustment in the suckler cow ceilings and the eligibility of heifers for suckler cow premium (to a maximum of 20%) should exert downward pressure on supply. On the other hand, the increase in the existing direct payments and the introduction of the slaughter premium, combined with lower feed costs and higher milk quotas, should support production. Table 2.21 shows the estimated impact of the

Agenda 2000 CAP reform in the year 2005 with reference to a *status quo* policy situation. Overall, the three studies foresee that the former elements would outweigh the latter, resulting in a small decline in beef production compared to the *status quo* scenario. Beef consumption would benefit from the fall in domestic prices. However, it is expected that after a short-term increase in absolute value supported by lower prices, beef consumption would resume its long-term decline from 2003 onwards (European Commission, 2000c). Assuming constant stock levels, higher internal demand combined with lower supply levels would strongly diminish exportable surplus.

Table 2.21: Outlook for beef balance in 2005 under Agenda 2000

Simulation in 2005	Status quo scenario	Agenda 2000			
		SPEL/EU-MFSS	Fapri – I*	Fapri – II*	CAPMAT
Production	100	99.9	97.8	99.5	98.6
Consumption	100	101.8	102.8	103.1	106.4
Net exports	100		37.8	92.1	17.5**
Ending stocks	100		0	19	100
Producer price	100	80	87.9	87.1	80

* The study by FAPRI consists of two quantitative analyses. The first one was conducted by the FAPRI unit at the University of Missouri (Fapri – I) using an experimental version of an EU model, whereas the second analysis was carried out in the FAPRI unit at the University of Iowa (Fapri – II) using their set of models of major world agricultural markets.
** Gross exportable surplus.
Source: European Commission, 2000.

The European Commission (2000c) also states that policy changes in the beef and arable crop sectors are expected to have an impact on the pork sectors (See Table 2.22). Lower feed prices are expected to favour production of white meat whereas more competitive beef prices should exert pressure on white meat consumption and, in turn, on domestic prices and production levels. The degree to which lower feed prices and more competitive beef prices will impact on the pork sector differs across studies, which provides diverging results. On the one hand, the Fapri-Missouri and the SPEL/EU-MFSS model expects pork consumption to suffer as a result of cheaper beef, with declines ranging between -0.3 per cent and -1.2 per cent. Lower consumption levels would exert pressure on market prices for outweighing the impact of lower feed prices, and generating a slight fall in pork production of roughly the same magnitude.

Conversely, the feed cost reduction effect dominates in the Fapri-Iowa and CAPMAT model, with a modest rise projected for pork production, ranging between 0.1 per cent and 0.6 per cent. Consumption would also develop accordingly, although the CAPMAT model foresees some adjustments between internal and external demand (European Commission, 2000c).

Table 2.22: Outlook for pork meat balance in 2005 under Agenda 2000

Simulation in 2005	Status quo scenario	Agenda 2000			
		SPEL/EU-MFSS	Fapri – I*	Fapri – II*	CAPMAT
Production	100	99.7	99.5	100.3	100.1
Consumption	100	99.7	99.4	100.3	100.4
Net exports	100		100.7		97
Producer price	100	93.3	96.8	95.4	95.6

* Fapri – I = Fapri Missouri; Fapri – II = Fapri Iowa.
Source: European Commission, 2000.

The decline in the price of pork due to Agenda 2000 also varies across studies, but the general direction of prices compared to the status quo scenario is downwards. The SPEL/EU model shows the largest drop in pork prices (-6.7%), whilst a much more modest drop (-3.2%) is predicted by the Fapri – Missouri model (European Commission, 2000c).

2.5 The Lomé Convention

The EU offered South Africa a qualified membership of the Lomé Convention, which came into force following the approval of the ACP/EU Council in April 1997, and after the ratification of the Lomé IV in May 1998. It should be noted that, although several articles within the framework of the Convention are applicable to South Africa, special protocols on bananas, rum, beef and veal, sugar, coal and steel products were not afforded to South Africa. However, the protocol on beef is applicable to several of South Africa's neighbouring countries and could have an influence on the South African red meat industry. This justifies a short discussion on the Lomé Convention (Corbett, 2000).

Davenport, Hewland and Koning (1995) state that an investigation into Lomé IV by a GATT working group concluded that the Convention is in breach of GATT rules. This conclusion is based on the fact that the Convention is non-reciprocal and that it discriminated between developing countries. The EU and the African-Caribbean-Pacific (ACP) countries sought a waiver, which was granted until the year 2000. At a meeting held in Brussels, Belgium, from 2 to 3 February 2000, the EU and ACP states concluded a new agreement, an extension of the Lomé Convention that regulates development cooperation and trade relations between the two regions.

According to Buhera (2000), one of the major agreements entered into is the determination of an eight-year transition period during which new negotiations on trade and economic arrangements with the EU are to be negotiated and concluded. This transition will run from 1 March 2000 to 31 December 2007, during which period market access into the EU will continue under current arrangements. A further 12 years was agreed upon as the implementation period. In addition, 13.5 billion euros were made available under the extended Environment Development Fund (EDF) to assist development efforts of ACP countries for the period 2000 to 2005. This assistance would be used to support and promote efforts of ACP countries, which include poverty reduction, private sector development and reform of ACP economies and gradual integration of ACP countries into the global economy. Other assistance relate to relieving the debt positions of ACP countries.

Among other issues discussed at the Brussels meeting were the level of aid to ACP nations, good governance, corruption, market access for countries not classified as least developed and the duration of the new convention (Buhera, 2000). The outcome of the talks was generally favourable for the ACP countries and a number of important agreements were reached. In order for this arrangement to be compatible with World Trade Organisation (WTO) rules and regulations, the EU is expected to request for a waiver to continue with the current trade preferences. Internal arrangements are being made to ensure continuity of trade flows from ACP to EU (Buhera, 2000).

The implications of these agreements for the ACP countries are that they will continue to benefit from the current trade preferences without disruptions during the eight-year preparatory period. Duty-free items and those on concessionary duty will continue to benefit during the transition period. The more favourable preferential terms granted to the ACP countries for accessing the Common European Market is seen to be more important than the financial development assistance covered by the agreement (Buhera, 2000). The new agreement also involves the strengthening of political relations between the ACP and EU states. In addition, due cognisance was also taken of the fact that the parties concerned are expected to take part in the negotiations and implementation of agreements leading to further multilateral and bilateral trade liberalisation. At the same time recognition was given to the fact that this wider process of liberalisation could lead to a deterioration in the relatively competitive position of the ACP States, which would threaten their development efforts. In the light of this, the EU and the ACP countries agreed to examine all necessary measures in order to maintain the competitive position of the ACP countries on the Community market during the preparatory period. This examination may include, inter alia, calendar requirements, rules of origin, sanitary and phytosanitary measures and implementation of specific measures addressing supply side constraints in the ACP countries. The objective will be to offer ACP countries opportunities to exploit their existing and potential comparative advantage on the Community market. Bearing in mind their commitment to cooperation in the WTO, the Parties agree that this examination will also take into account any extension within the WTO of the trade advantages which may be offered by member countries to developing countries (Buhera, 2000).

For Botswana, Mauritius, Namibia, Swaziland and Zimbabwe, the current quotas on beef and sugar will stay in place. More specifically, Declaration XXVI of the final agreement states that the EU undertakes to ensure that the beneficiaries of the Protocol on beef and veal in ACP countries derive full benefits from it (European Commission, 2000d). To this end, the EU committed itself to enact appropriate rules and procedures in a timely fashion. The EU also committed itself to implementing the protocol, so that

ACP States can market their beef and veal without undue restrictions throughout the year.

At present ACP states that qualify for preferential beef quotas can market their beef to the EU at reduced costs in terms of tariffs and duties, e.g. an exporter in South Africa who wants to export beef to the EU will be liable to pay 12.8% plus 303.4 EUR per 100 kg, but an exporter in Botswana will pay 0% plus 24.2 EUR per 100 kg as far as the preferential quota is concerned (TARIC, 2001). Apart from only providing preferential access to ACP countries for their beef and veal, the EU also declared its willingness to assist the ACP beef and veal exporters in improving their competitiveness through, inter alia, addressing supply-side constraints, in accordance with the development strategies set out in this Agreement and within the context of National and Regional Indicative Programmes.

Table 2.23 shows historical trends in EU imports of boneless beef from ACP countries free of customs duties and at a reduced rate of the EU import tariff. It is clear that in most years the mentioned countries were not able to fulfil their quotas, except Zimbabwe that exported well over its quotas in 1994 and 1995. It should also be noted that if any ACP country is not able to supply its annual quota, a decision may be taken to devide the quantities between the other states concerned, up to a limit of 30 000 tons, for the same or following year. The other interesting trend to note is that in total the quotas exported to the EU declined continuously from 1994. This can be attributed to, amongst other reasons, the stringent health regulations applied by the EU, e.g. the stringent animal health rules of the EU have on several occasions led to the suspension of beef exports, in particular from Botswana and Swaziland. Zimbabwe has also experienced problems with health regulations applicable to beef exports to the EU (CAP-monitor, 1995).

Table 2.23: EU beef imports (tons) from ACP states (1994 - 1998)

Year	Total	Botswana	Namibia	Madagascar	Swaziland	Zimbabwe
Allocated quota	52 100	18 916	13 000	7 579	3 363	9 100
1994	42 484	12 425	11 087	2 087	642	16 242
1995	41 146	16 521	12 369	4 024	720	10 512
1996	31 298	11 511	9 770	1 753	533	7 753
1997	25 181	10 670	6 026	435	225	7 825
1998	26 302	11 859	8 292	15	149	5 986

Source: Bruwer, 2000.

2.6   Conclusions

This chapter discussed a wide range of issues important to the red meat industry internationally, which will also cascade down to the domestic red meat industry. It should be clear that it is difficult to highlight specific issues without also referring to related issues, i.e. the process of policy reform and trade liberalisation in the international red meat market are interlinked to such an extent that they are mutually influential.

Nevertheless, it is clear that liberalisation and policy reform will lead to higher international prices for red meat. The worrying factor, however, is that the speed of this process differs considerably between countries, which raises the question whether it is beneficial to all countries. Another issue of importance is the fact that estimations on the effect of liberalisation to a large extent ignores the risks associated with changing climate patterns and consumer preferences. Hence, when evaluating estimates that relate to trade liberalisation, one should be aware of the fact that other factors, such as climate, may have a greater influence on how markets behave.

Furthermore, it is clear that the Uruguay Round has set the table for further liberalisation efforts, but that role players have also become more "devious" in their approach to trade liberalisation. Imbedded in the AoA are also various opportunities for rent-seeking that may defy the purpose of further negotiation on liberalisation. The

case of TRQs serves as good example. Also, several new issues have come to the fore and may prove even more difficult to reach agreement on than the issues tabled during the Uruguay Round. These issues relate to product identification, food safety, etc. It is thus important to take cognisance of these issues when preparing for further negotiations on trade liberalisation.

Of particular importance is the stance of developing countries towards trade liberalisation. It is clear that these countries could reap substantial benefits from trade liberalisation, but the question remains whether the economies of these countries are geared to participate fully in a more liberalised trade environment. In other words, one must ask whether the supply chain, institutional environment and infrastructure in developing countries have been adapted to enhance their favourable participation in a more open market environment. The answer to this question warrants a debate on its own, but of significance to South Africa is the fact that all neighbouring countries fall within either the developing or least developed country classification. In other words, the state of openness of the economies of these countries and to what extent they are able to benefit from a more open market environment will definitely have an influence on, not only South Africa's trade relations internationally, but also the economy. This is especially important from a Southern African Development Community (SADC) perspective.

CHAPTER 3

OVERVIEW OF THE SOUTH AFRICAN
RED MEAT SECTOR

3.1 Introduction

The South African red meat industry was, and will in the future remain, one of the most important agricultural sub-sectors in South Africa. This can be attributed largely to natural circumstances. For example, approximately 70 per cent of South Africa's total area of 1.2 million km^2 is only suitable for livestock production. Furthermore, the red meat industry evolved from a highly regulated environment to one that is totally deregulated today. Various policies, such as the distinction between controlled and uncontrolled areas, compulsory levies payable by producers, restrictions on the creation of abattoirs, the compulsory auctioning of carcasses according to grade and mass in controlled areas, supply control via permits and quotas, the setting of floor prices and the floor price removal scheme, etc. characterised the red meat industry before deregulation commenced in the early 1990's (Jooste, 1996). The final nail in the coffin of the regulated red meat market dispensation came in 1997, when all control boards were abolished. Since then the red meat industry has experienced several structural changes, e.g. an increasing number of animals being raised in feedlots and the mushrooming of abattoirs in the previously uncontrolled areas. Also, informal trade in red meat increased tremendously (Schutte, 2000).

In terms of SACU the red meat industry is also very important, especially for Namibia and Botswana. Schneider (1992) reports that 90 per cent of the 690 000 square kilometres of land used for agriculture in Namibia is utilised for extensive livestock farming (i.e. cattle ranching, 48%; mixed cattle and small stock ranching, 14,5%, and small stock ranching, 37,5%). Beef processing in Botswana accounts for around 80 per cent of agricultural output. Nevertheless, although Botswana's climate and soil renders it suitable for large scale ranching water shortages bring about that only 20 per cent of the land area can be grazed by stock (The Economist Intelligence Unit, 1995). According to

Fourie (1972), the soil in the largest part of Botswana is also unsuitable to arable agriculture.

In addition the livestock industries in Southern Africa is highly dualistic. For example, in Zimbabwe the commercial sector comprises between 25 to 30 per cent of the Zimbabwean cattle herd, whilst it contributes about 80 per cent of total beef production (Takavarasha, Mafurirano, Zitsanza and Mfote, 1997; The Economist Intelligence Unit, 1996). Mupotola-Sibongo, Kadhikua and Sakaria (1997) reports that the communal and commercial herds are approximately equal in Namibia, whereas nearly 90 per cent of cattle marketed at livestock auctions originate from the commercial sector. They also state that productivity in the communal sector is low. Similar situations are reported for South Africa, Botswana and Zambia by Jooste, Van Schalkwyk, Bekker and Lourens (1997), Fidzani, Makepe and Tlhalefang (1997) and Kafuli and Mawele (1997), respectively. In general the commercial sectors are characterised by capital intensity, livestock fattening, proper land tenure, availability of infrastructure, etc., whilst the small-scale sector is characterised by low offtake rates, overgrazing, lack of tenure, and use of livestock for several purposes over and above that of marketing (e.g. draft power, security or store of wealth, provision of manure, etc.). Given the size of the small-scale or communal livestock sectors in Southern Africa it can, and should, play a much more important role in contributing significantly to the improvement of welfare. However, the emergence of these sectors will be determined largely by factors such as accessibility to markets, opportunities to trade, as well as price and policy variables (especially tariffs).

The reason for also mentioning other Southern African countries is the fact that the problems experienced by these countries with regard to their red meat sectors are to a large extent similar to the situation in South Africa. Thus, even though this chapter specifically discusses the South African red meat industry, it may provide insight into issues of common interest. This chapter will focus mainly on the trade of red meat products. However, trade is derived from production and consumption in different regions, and hence brief mention will also be afforded to these two issues.

3.2   Production of red meat in South Africa

o   **The beef sector**

Figure 3.1 shows the South African cattle herd and the number of animals slaughtered annually since 1973. The commercial cattle herd comprises approximately 65 per cent of the total cattle herd. This means that approximately 35 per cent of all cattle in South Africa are owned by non-commercial farmers. Sixty-eight per cent of the commercial herd comprises female animals, of which the majority is for meat production. The composition of the national herd is not expected to change significantly in future. The main feature depicted in Figure 3.1 is the cyclical trend in herd numbers. Lubbe (1990) states that the cyclical behaviour of beef supply is attributable largely to cyclical behaviour of female slaughterings.

The main contributor to this phenomenon is climatic conditions. The correlation between national herd numbers and the three-year moving average of rainfall was estimated at 0,62 by the Sunnyside Group (1991). Lubbe (1990) investigated the decomposition of price time series components of the red meat industry. He states that the combined effect of rainfall, the variation in production capacity and price expectations produce an environment for relatively stable prices. Furthermore, livestock expansion and liquidation processes are fueled by the rainfall cycle and rainfall expectations. Lubbe (1990) concluded that agricultural policy and farmers' strategies could be more effective if the existence and nature of price and rainfall cycles are known.
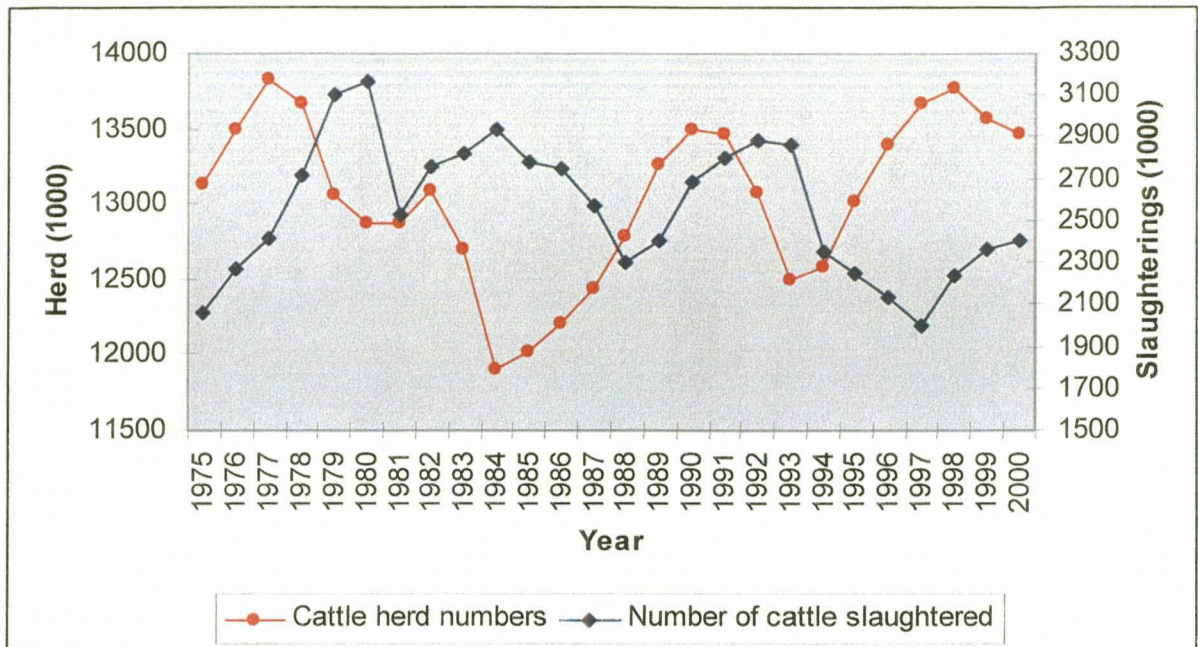
Figure 3.1: The South African cattle herd and slaughtering (1975 - 2000)
Source: Agrimark Trends, 2000; NDA, 2000.

Since the deregulation process started in the red meat industry in 1992 there has been a marked increase in the number of cattle slaughtered in previously non-controlled areas. Before deregulation the slaughtering of red meat was demarcated into controlled and uncontrolled areas. In other words, red meat producers in the uncontrolled areas were not allowed to slaughter animals in uncontrolled areas and then sell the meat in controlled areas. They were, however, allowed to transport the live animals to the controlled areas for slaughtering, after which the meat could be sold there. According to Venter (1996) this means that the beef industry has moved to a marketing system aimed at reducing the direct and indirect costs of marketing (direct costs include transport and other transaction costs, as well as social costs, whilst indirect costs include issues such as weight loss and deaths). The result of this state of affairs is that direct marketing and the number of animals slaughtered in primary production areas has increased at the expense of carcass auctions in large metropolis. Venter (1996) also states that this phenomenon is not unique to South Africa, and cites Tomek and Robinson (1990) who described a similar situation in the US.

- ## The pork sector

Figure 3.2 shows the relation between the number of commercial pigs slaughtered and the domestic pig herd. The growth in terms of the pig herd and the number of animals slaughtered can be attributed largely to big investments in this industry, e.g. computerised feeding and environmental maintenance equipment, better disease control by improving the housing environment, etc., that contributed to improved production circumstances and efficiency.
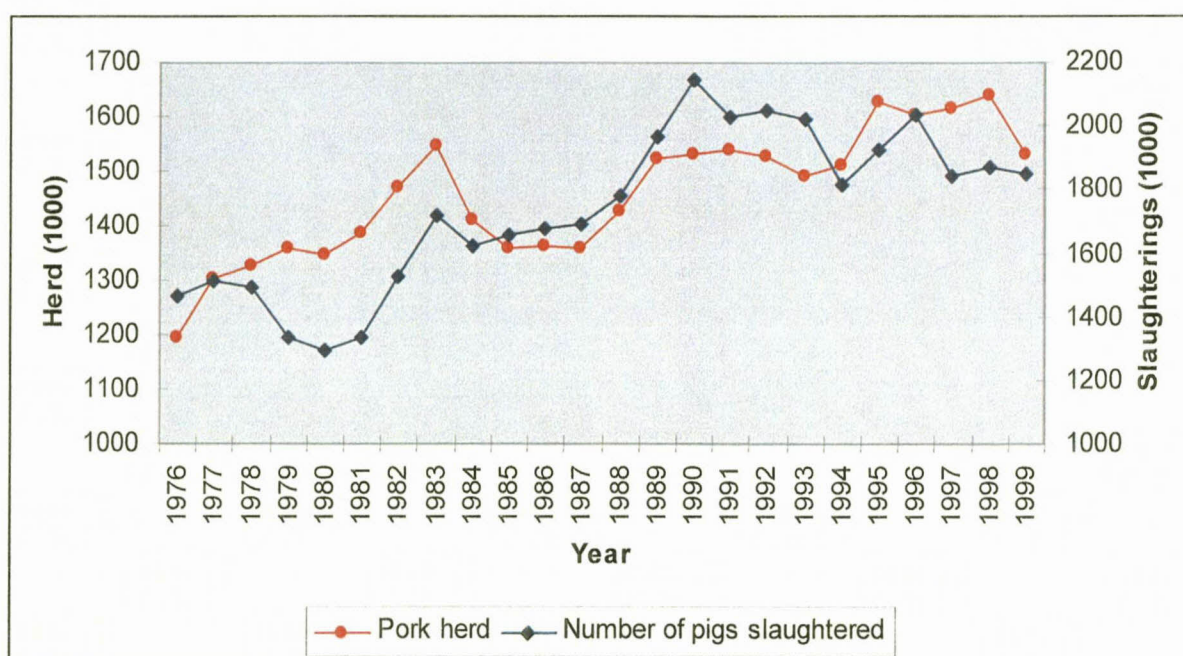
Figure 3.2: The South African pig herd and slaughtering (1976 - 1999)
Source: Agrimark Trends, 2000; NDA, 2000.

- ## The sheep industry

Figure 3.3 shows the South African sheep flock and the number of sheep slaughtered. Sheep numbers started to drop quite drastically during the mid 1980's, mainly due to a collapse of the wool industry, but recovered well up to 1990, whereafter it dropped again and stabilised at around 29 mio animals. Similarly, sheep meat production dropped to an all-time low in the mid 1990's. The main reasons for this phenomenon can be traced back to the following:

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- Severe drought in the early nineties;

- escalation of stock theft; and

- the breakdown of vermin control.
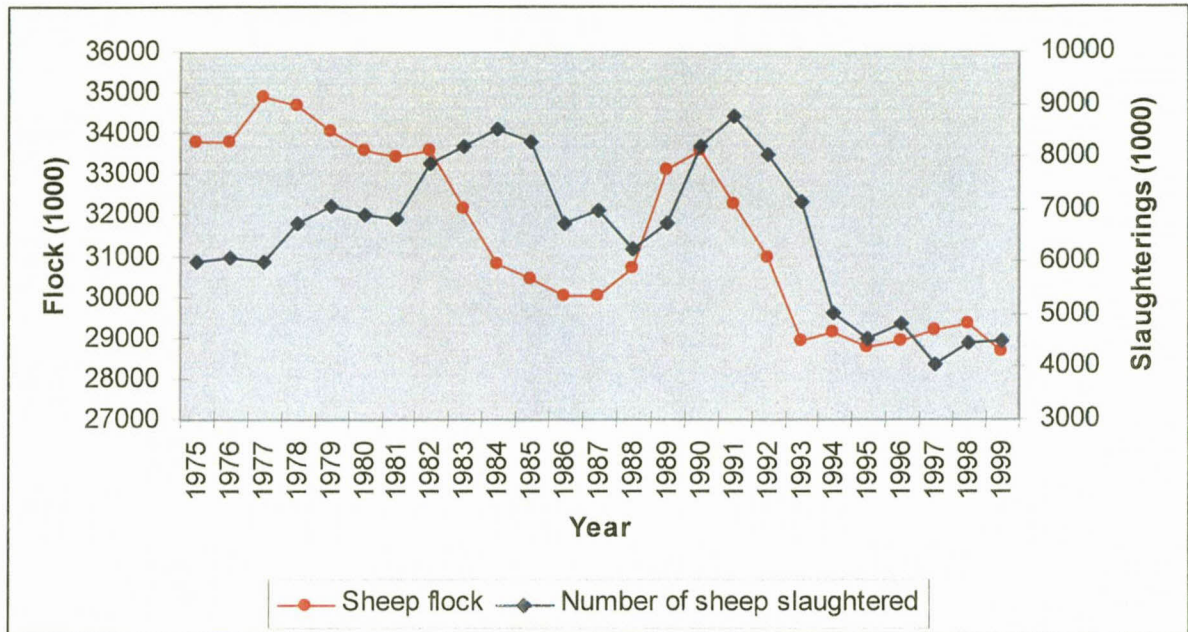
Figure 3.3: The South African sheep flock and slaughtering (1975 - 1999)
Source: Agrimark Trends, 2000.

Since the deregulation process started in 1985, a healthy informal market has been created, with its own distribution network. Today approximately 1,6 mio sheep are marketed in the informal market, growing at approximately 2 per cent per annum. For example, Karaan and Myburgh (1992) report that the marketing of sheep in the Western Cape Townships has grown tremendously and has developed its own marketing distribution system. However, this system is not without problems, e.g. there are sporadic shortages of sheep, a relatively low degree of competition, high risk and concerns about health and hygiene hazards. Despite these problems it appears as if the entrepreneurs in this market segment are able to exploit the opportunities that exist. In fact, there are important lessons to be learned from the study by Karaan and Myburgh (1992), e.g. sheep that used to grade badly in the formal marketing channels are highly sought after in the townships. They state that it is ironic that low graded sheep meat attain much higher prices than the better graded sheep/carcasses at the

auctions, but that retailing to the consumers takes place at cheaper prices than formal prices on average. This can be attributed to lower cost of distribution and lower opportunity cost of their labour, whilst at the same time these entrepreneurs succeed to provide constant form, place, time and possession utilities that consumers in this market segment need.

3.2   Consumption of red meat in South Africa

* **The beef sector**

The per capita consumption of beef has come under increased pressure since the early 1990's. This can be attributed mainly to a decreasing or stagnating per capita disposable income and the price advantage that poultry has over beef. Figure 3.4 shows the relation between real per capita disposable income and the per capita consumption of beef. It is clear that per capita disposable income and beef consumption are very closely linked. This is emphasised by the fact that beef has a high income-elasticity of demand (Nieuwoudt, 1998).

Nieuwoudt (1998) suggests that the expected racial mix of the South African population has important implications for food demand. This entails, for example, that with the Black population growth rate being higher than those of the other groups, the average per capita food consumption of all groups taken together may decline over time even although the per capita growth rate of each group may be increasing. The reason for this phenomenon, as suggested by Nieuwoudt (1998), is that the group with the highest population growth often has the lowest per capita demand consumption of livestock products.
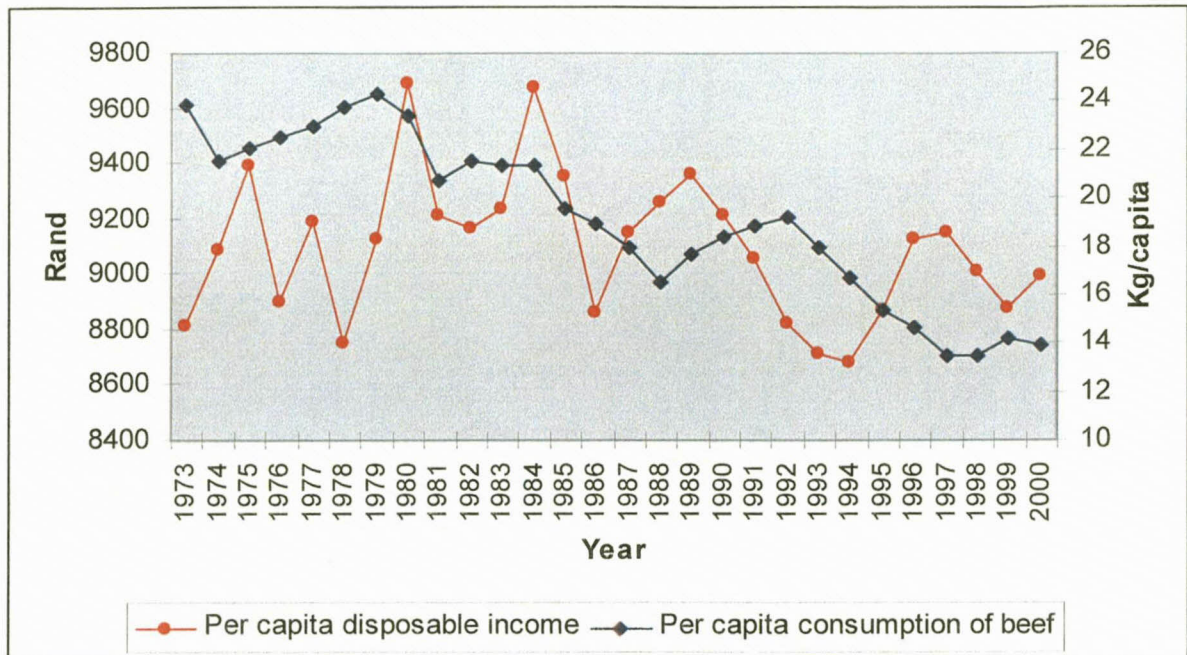
Figure 3.4: Relation between real per capita disposable income and the per capita consumption of beef (1973 - 2000)
Source: SARB, 2000; NDA, 2000; own calculations.

Nieuwoudt (1998), by considering (i) population growth rate, (ii) income elasticity, (iii) economic growth rate and (iv) urbanisation, estimated the demand for various livestock products under different economic growth scenarios until 2020/2021 (for a detailed description of the analytical framework see Nieuwoudt (1998)). Taking a short-term view the expected increase in the demand for beef under a 3 per cent growth in the economy and low income scenarios could range between 12 and 25 per cent for 2000/2001 with 1995 as basis. Estimations for a 5 per cent economic growth rate were also made, but given the state of the world economy, and specifically the South African economy, such a growth rate is not foreseen. In fact, even when taking an optimistic view, a 3 per cent growth rate in the economy over the next few years is unlikely. Given this assumption, per capita demand for beef is expected to remain relatively constant or even decline in the foreseeable future.

• **The pork sector**

The per capita consumption of pork has been moving sideways over the last couple of decades. This is contrary to the trend with regard to the per capita beef and mutton consumption. As is the case worldwide, pork and poultry serve primarily as substitutes for beef consumption. In certain instances pork is regarded as the other white meat. Although a misconception, it proves to be to the benefit of pork producers. Figure 3.5 shows the relation between real per capita disposable income and the per capita consumption of pork.
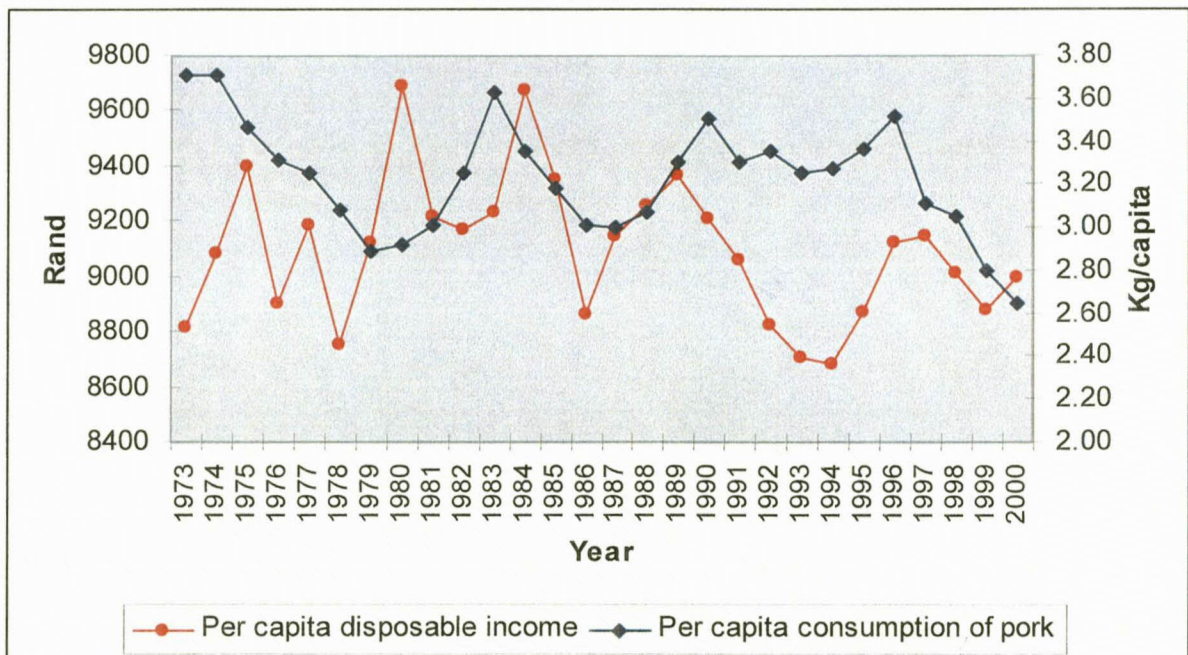
Figure 3.5: **Relation between real per capita disposable income and the per capita consumption of pork (1973 - 2000)**
Source: SARB, 2000; NDA, 2000.

Nieuwoudt (1998) states the income elasticity of pork is relatively low compared to other red meat products. This entails that when per capita disposable income increases consumers will purchase, in relative terms, more other red meat products, and vice versa. Nieuwoudt (1998) expects that under a 3 per cent growth in the economy and low income scenarios, the demand for pork will increase between 8 and 12 per cent for 2000/2001 with 1995 as basis. Compared to growth in demand for other meats reported in

Nieuwoudt's study, this expected increase is relatively low. The reason is that pork is consumed mainly by whites, who under an income growth scenario of 3 per cent will have the lowest increase in per capita income.

- **The sheep sector**

South Africa is only able to supply approximately 80 per cent of the local demand for sheep meat. Shortages in the domestic market are supplemented by imports, mostly from Namibia (live animals) and Australia. As with the other red meats, especially beef, sheep meat consumption is highly sensitive to changes in per capita income. Figure 3.6 illustrates the correlation between per capita consumption of sheep meat and the per capita income of people in South Africa. According to Nieuwoudt (1998), the expected increase in the demand for sheep meat under a 3 per cent growth in the economy and low income scenarios could range between 12 and 25 per cent for 2000/2001 with 1995 as basis.
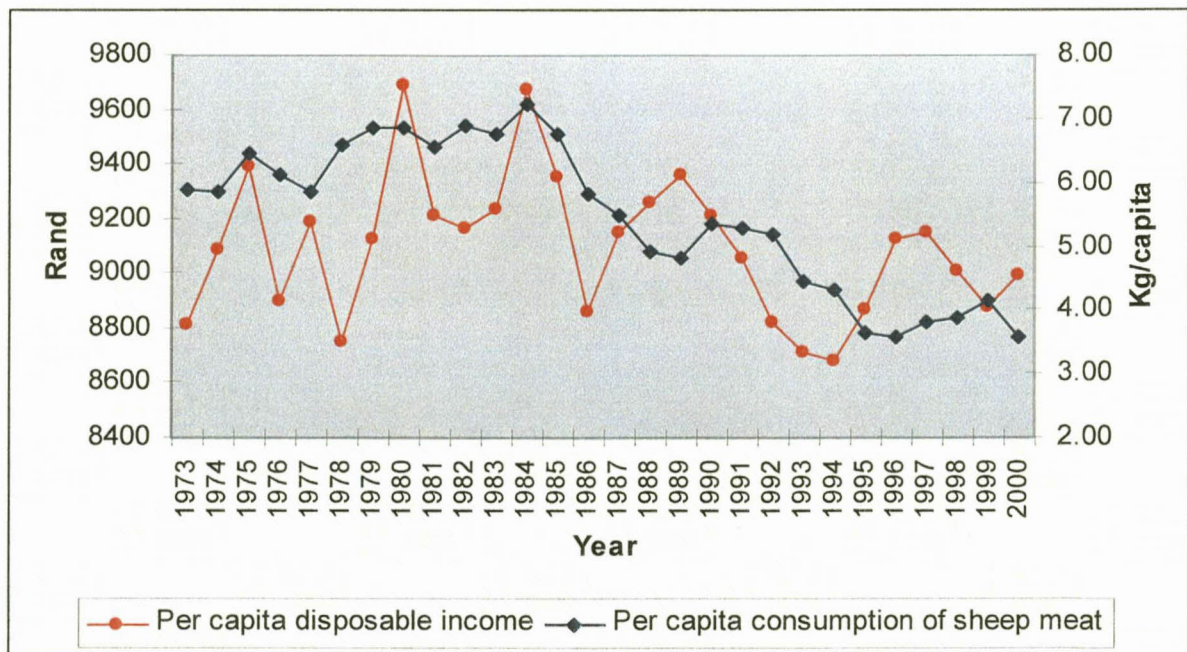
Figure 3.6: Relation between real per capita disposable income and the per capita consumption of sheep meat (1973 - 2000)
Source: SARB, 2000; NDA, 2000.

- **Per capita expenditure on red meat**

Table 3.1 shows the real per capita expenditure on red meats for 1993 and 1999. The methodology followed to calculate the real per capita expenditure on red meats is similar to that used by Nieuwoudt (1998). Nieuwoudt (1998) used a system of two equations to estimate rural and urban per capita expenditure per population group (see Nieuwoudt 1998 for the methodology used). Expenditure data per population group and per product were obtained from Martins (1994) and Martins (1999). The assumption underlying the calculation of the real per capita expenditure on red meats is that there is no growth in the size of the rural black population.

Table 3.1 shows that real per capita expenditure for beef, pork and sheep meat has declined since 1993. The largest decline in per capita expenditure was experienced by beef, followed by sheep meat and then pork. In terms of the total population per capita, expenditure on beef is still the highest. On a per capita expenditure basis whites spend the most on beef, followed by blacks in urban areas, but it is important to note that the real per capita expenditure by both has declined considerably between 1993 and 1999. In the case of sheep meat, Asians spend the most, followed by whites and then coloureds. Also note the decline in real per capita expenditure by especially whites and Asians. Real per capita expenditure on pork is dominated by whites, followed distantly by the other population groups. Interesting to note is the increase in the per capita expenditure of blacks in rural areas in terms of all three red meats. This could probably be attributed to increases in real income from a very low base.

Table 3.1: Real per capita expenditure on red meat in South Africa

Population group	Beef		Sheep meat		Pork	
	Rand per capita (1993 = base period)					
	1993	1999	1993	1999	1993	1999
Asians	179.73	115.47	396.20	280.80	17.81	25.14
Blacks (urban)	223.00	136.45	65.48	53.12	18.25	19.95
Blacks (rural)	53.57	71.85	15.73	27.97	4.38	10.51
Coloureds	203.55	105.58	158.19	144.69	33.45	29.23
Whites	540.30	325.34	303.56	245.00	139.91	120.04
Total population	187.53	127.38	91.29	77.33	29.35	27.74

3.4   Imports and prices of red meat

o   **The beef sector**

Beef imports from overseas saw a substantial increase since 1994, averaging more than 40 000 tons annually up to 1998. Since 1998 beef imports have ranged between 15 000 and 20 000 tons annually. The decline in beef imports since 1998 is attributed firstly to the establishment of Agri Inspec, who are responsible for policing agricultural imports from overseas, and secondly due to the sharp drop in EU intervention stocks. One of the biggest problems experienced by the red meat industry was the underinvoicing of imported red meat, incorrect classification of meat by importers and poor inspection of containers. The establishment of Agri Inspec rectified this problem to a large extent. This emphasises the importance of proper policing of imports.

Figure 3.7 shows a close relation between domestic prices and imports during the period 1994 to 1998. This trend is still visible after 1998, but to a smaller extent. Imports exert pressure on domestic prices to fall back to lower levels. Another important factor that will have an influence on the competitiveness of domestic producers is the depreciation of the rand. Another issue of importance is that, although the EU was traditionally the major exporter of beef to South Africa, imports from countries such as Uruguay and Argentina may also pose a threat to South African producers. The reason for this is the decline in the exchange rate of these countries against the South African Rand, making it much more profitable for them to export beef to South Africa.
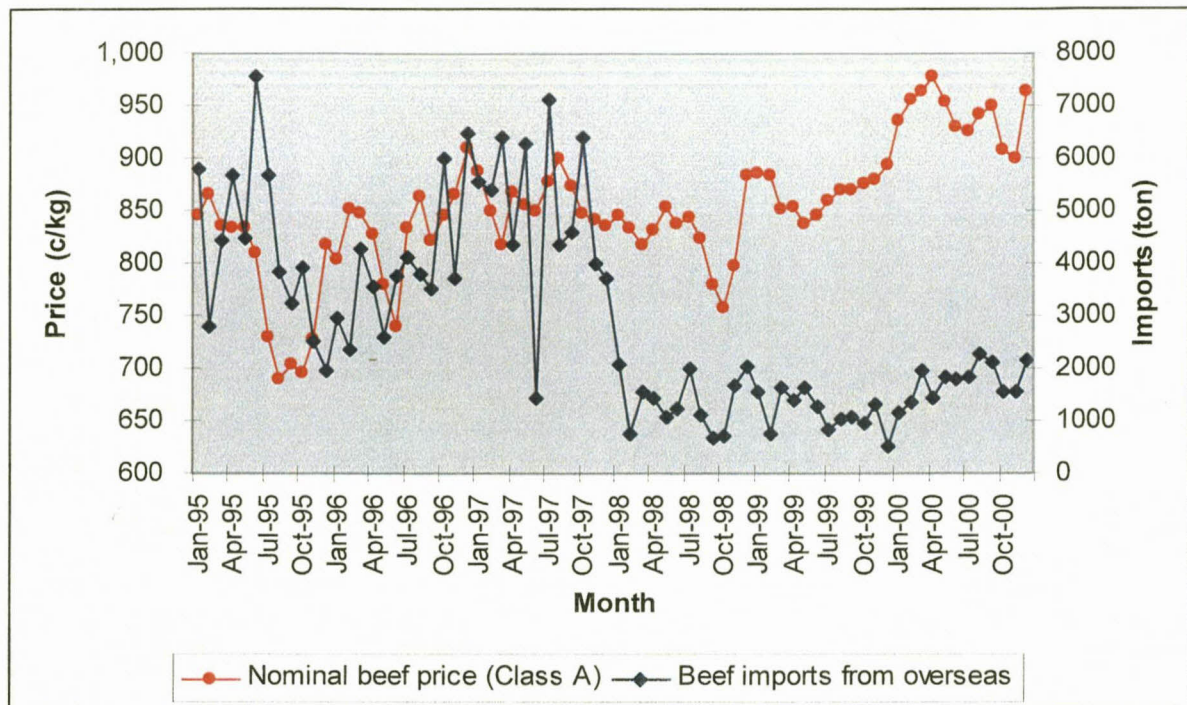
Figure 3.7:   The relation between beef imports and the domestic Class A price (Jan 95 – Dec 00)
Source: SAMIC, 2000.

Figure 3.8 shows the relation between the beef producer price and per capita consumption of beef. It is important to note that the real producer prices and per capita consumption of beef are, too a large degree, mirror images of each other. What is, however, of concern is the general downward trend in both variables shown in Figure 3.8. The reasons for this is, firstly, the pressure on per capita disposable income which render consumers unable to react to more favourable prices, secondly, the beef to poultry price ratio that favours poultry and, thirdly, the influence of non-economic factors such as product consistency and quality, food safety, health and nutrition concerns, and convenience.
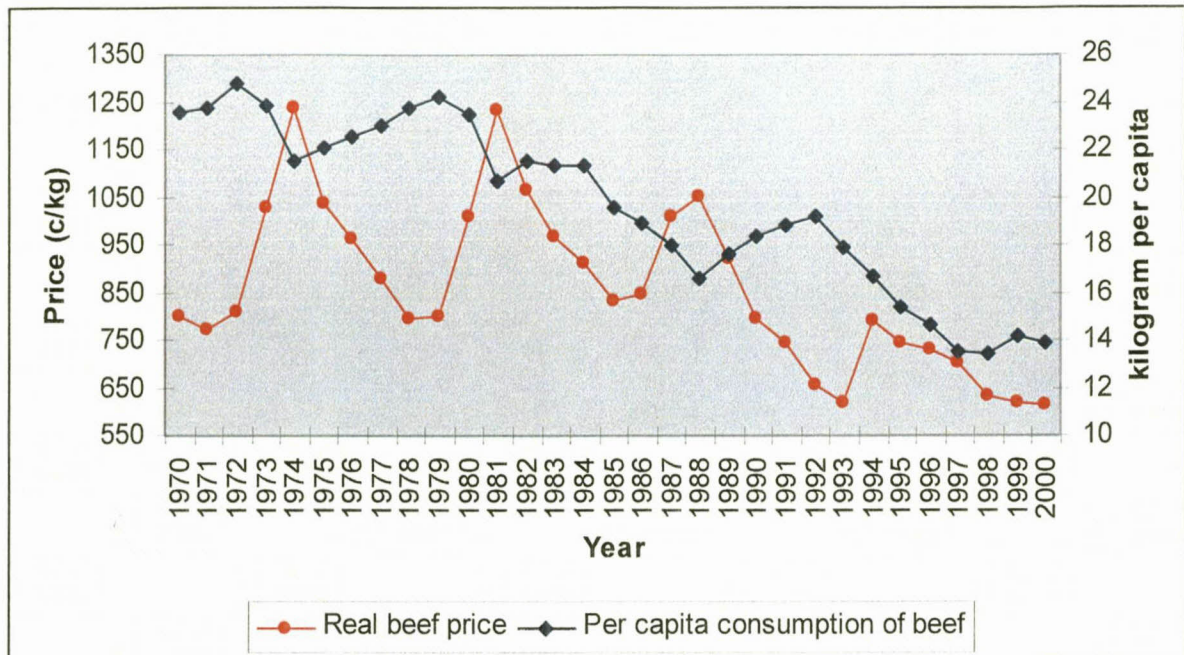
Figure 3.8: **The relation between the real average auction price of beef and per capita consumption of beef (1970 - 2000)**
Source: NDA, 2000; Agrimark Trends, 2000.

• **The pork sector**

As was stated, pork imports from overseas increased substantially once the deregulation process commenced in 1994. Figure 3.9 shows the relation between domestic pork prices and imports. This serves as a measure of the influence of imported pork on domestic pork prices. It is shown that whenever domestic prices increase, imports tend to increase. This has important implications for domestic pork producers, since any expected increases in domestic pork prices will be dampened by increased imports. A factor that does, however, count in the favour of domestic pork producers is the weak rand, though low international prices may erode this advantage.
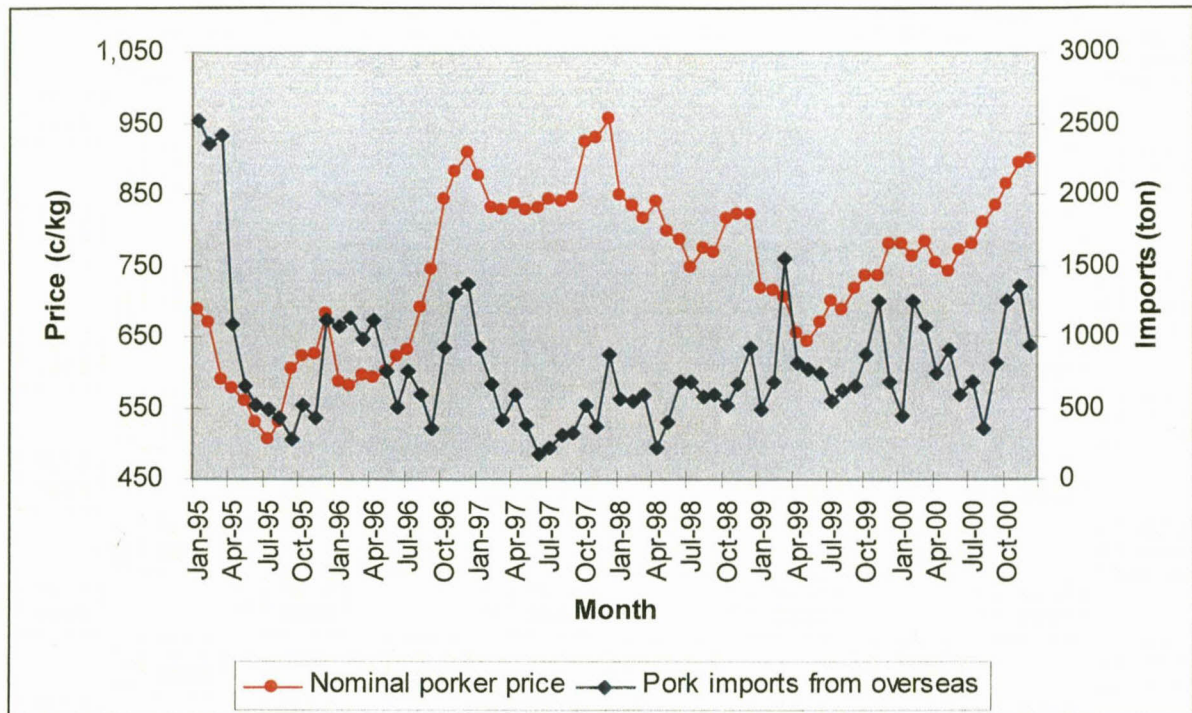
Figure 3.9: **The relation between the nominal porker price and pork imports (Jan 95 – Dec 00)**
Source: SAMIC, 2000.

Figure 3.10 shows the relation between the pork producer price and per capita consumption of pork. Relatively stable per capita consumption of pork, improved efficiency and the ability of producers to react more swiftly to market conditions than other red meat producers, are probably the reasons for real prices of pork not showing a similar downward trend as that of beef.

Lubbe (1992a) states that the effects of marketing arrangements applied to red meat during the control board era were weaker than on beef and sheep due to the relatively low volumes of pork marketed via the controlled markets. This implies that the substitution of red meat for poultry due to the inability of the red meat marketing scheme to adjust to changes in the socio-economic environment was not as severe in the pork industry as it was in the beef and sheep industries. The significance of this state of affairs lies in the fact that, according to Schiffman and Kanuk (1987) and Kotler (1988), consumers' tastes and preferences change slowly over time. Uys (1986) states that these preferences consist of utility and memory components.
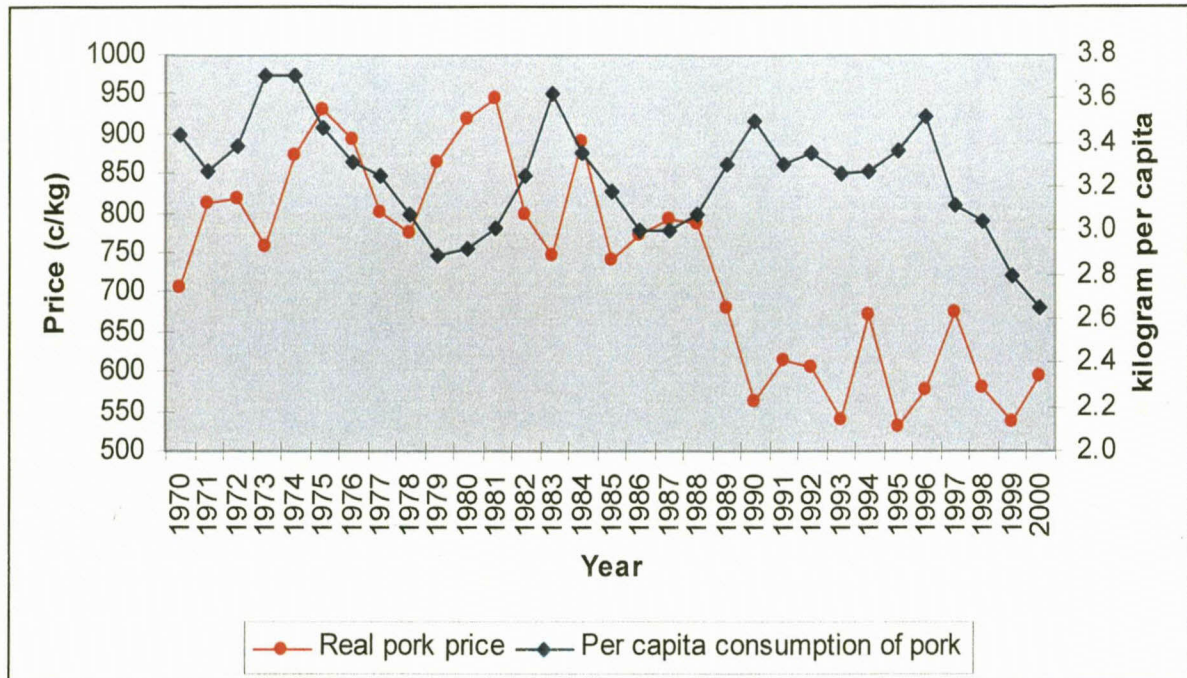
Figure 3.10: The relation between the real average auction price of pork and per capita consumption of pork (1970 - 2000)
Source: NDA, 2000; Agrimark Trends, 2000.

The utility is the rational behaviour or reaction to income and prices on the one hand, whilst the memory component is a continuation of the influences of past reasons for reaction on the utility component in current or future decisions, on the other hand. In other words, although consumers' buying behaviour will still be influenced by price and income variables, development of consumption patterns over time will also to a large extent influence current buying behaviour. Thus, one could conclude that the less significant impact of the red meat marketing scheme on the pork industry in the past is today one of the reasons why this industry performs better than beef and sheep as far as per capita consumption is concerned. In fact, Lubbe (1992a) states that had pork not been regulated or restricted by the same regulations, the controlled marketing practices and policies of beef and mutton would have benefited the demand for pork.

● **The sheep industry**

As was the case for beef and pork, the sheep industry has experienced a drastic increase in imports since 1994. Figure 3.11 shows the relation between mutton imports from overseas and the Class A price of mutton. It is clear that imports closely follow the trends in Class A prices, i.e. if Class A prices starts to increase it stimulates imports of mutton from overseas which in turn pull domestic prices down. It is, however, important to take cognisance of the fact that South Africa has to import sheep meat to satisfy domestic demand. Thus, if imports are restricted it could create shortages on the domestic market that could have implications for the industry similar to that of the previous marketing scheme. The red meat marketing scheme attempted to create shortages of sheep meat on the market to improve price "prospects" (Lubbe (1992) and Venter (1996) argue that these prospects actually never reached the primary producer), but through these endeavours succeeded in antagonising consumers, or stated differently, benefited poultry consumption. As Lubbe (1992) states, the market share lost to the poultry industry is most probably permanent. The case to be made is that such mistakes could not be afforded again, as it will surely lead to the demise of the sheep industry in South Africa, especially in the absence of established export markets.

Figure 3.12 shows the relation between the per capita consumption of sheep meat and the real producer price of sheep. It is clear that whenever real prices go down, consumption tends to increase. Also note that per capita consumption and real prices both are showing a declining trend. In other words, although sheep meat should be cheaper from a consumer point of view, consumers still prefer to substitute sheep for other commodities. The reason for this state of affairs may be the fact that sheep meat is considerably more expensive that other red meats and poultry. Hence, although real prices have declined the price wedge between other products and sheep meat is still limiting consumption. Although this is not only a South African problem, the domestic sheep industry will have to consider strategies to reverse the current situation. Neglecting to do so will cost this industry dearly.
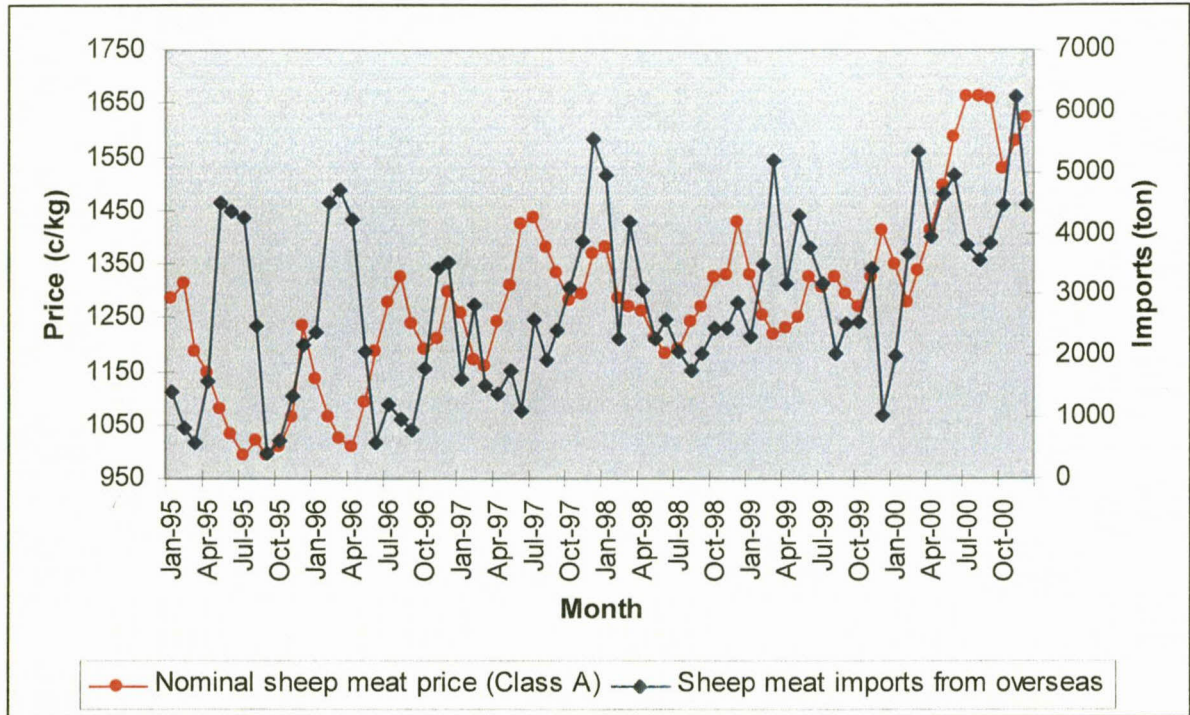
Figure 3.11:   The relation between the nominal sheep meat price and sheep meat imports (Jan 95 - Dec 00)

Source: SAMIC, 2000.
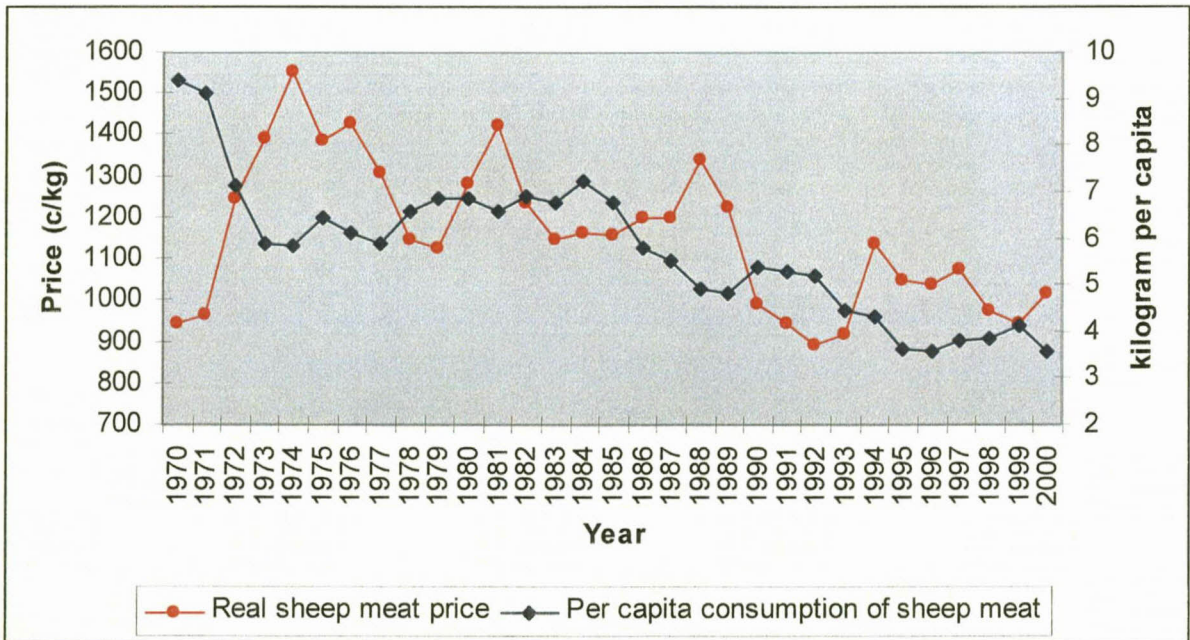
Figure 3.12: The relation between the real average auction price of sheep meat and per capita consumption of sheep meat (1970 - 2000)

Source: NDA, 2000; Agrimark Trends, 2000.

3.5 Trade in red meat products by SACU

Before discussing the trade performance of red meat products, a short overview will be provided on how imports and exports of all the major meat products relate to the international situation. Note that trade statistics for of red meat products are only reported for the SACU. In terms of exports one would expect that the figures reported are mostly those of Namibia and Botswana, whilst imports are mostly that of South Africa. Figure 3.13 depicts the situation for imports.

The diagonal line in Figure 3.13 represents the line of constant world market share and divides the figure into two parts. Imports of products to the right of this line have grown faster than world exports and have thereby increased their share in the world market. Conversely, products to the left of the diagonal line have experienced a decline in their share of world market imports. (Note the reference bubble in the bottom right corner indicates the scale of bubbles and helps to assess the value of the major national import products represented by the other bubbles.)

It is clear from Figure 3.13 that there are several products of which the growth rate in terms of imports exceeds the trend internationally. For example, imports of sheep cuts (bone in, frozen) have grown by more than 20 per cent on the domestic market, whilst growth of exports internationally of this product was around 2 to 3 per cent from 1995 to 1999. In the case of swine cuts (fresh or chilled) world exports experienced negative growth, whilst SACU experienced an increase in imports of this product of over 20 per cent. As far as lamb carcasses and half carcasses (frozen) are concerned, imports into SACU experienced negative growth, but to a lesser extent than the decrease in world exports of this product from 1995 to 1999. This information may also be interpreted as export opportunities for countries exporting these products, i.e. SACU presents an opportunity for exports of products being imported by SACU at a rate higher than that of world exports. On the one hand it may also signal to domestic producers that competition from overseas producers are on the increase, whilst on the other hand opportunities to expand local production do exist.
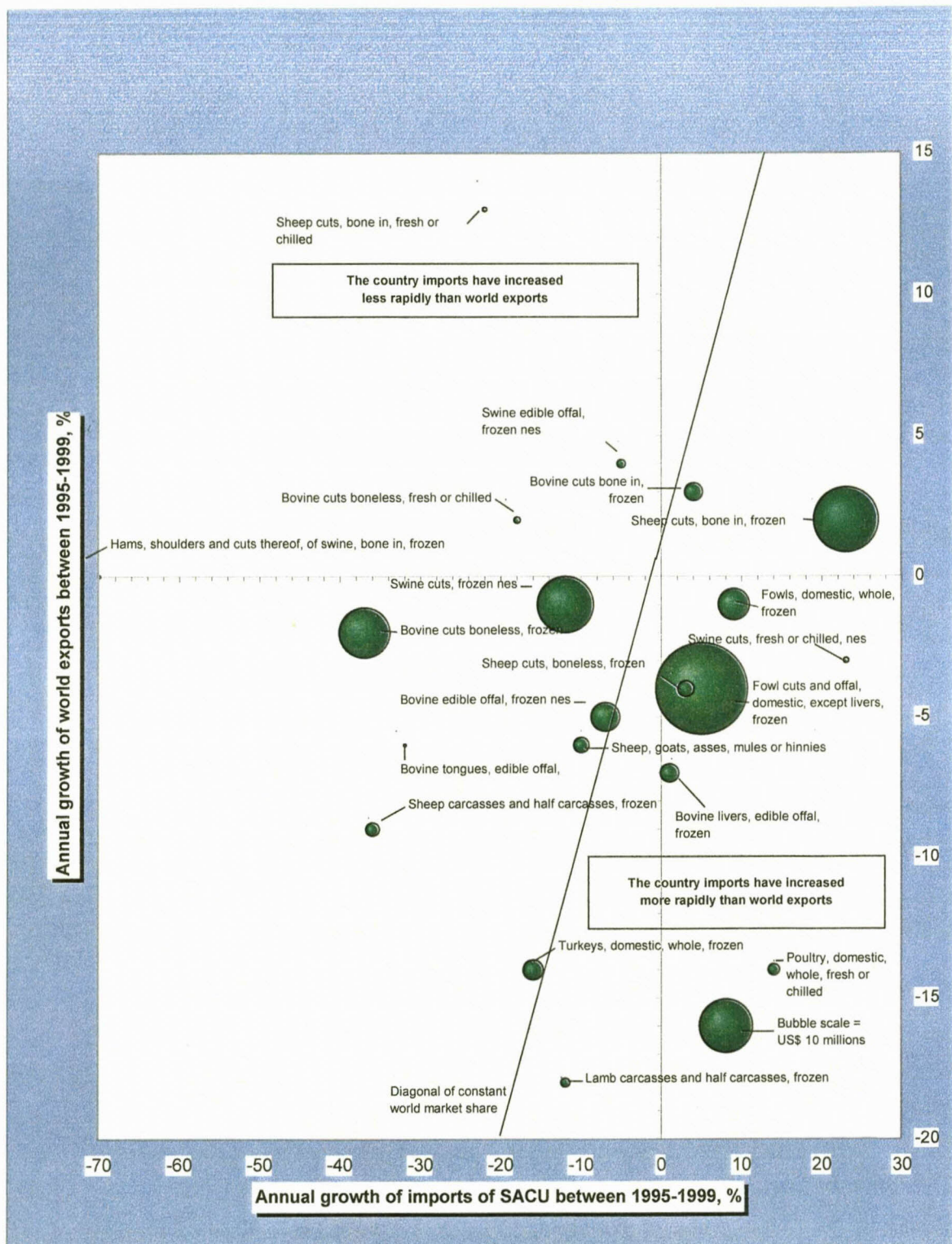
Figure 3.13: Growth of national demand and international supply of meat products to SACU

Source: ITC calculations based on COMTRADE statistics, 2000.

The left-hand side of the diagonal line can be interpreted in a similar fashion. For example, growth in imports of bovine cuts (fresh or chilled) is growing at a slower rate than world exports of this product, or imports of this product experienced negative growth domestically, whilst the world market experienced positive growth.

Figure 3.14 depicts the situation for exports. The interpretation of the data depicted in Figure 3.14 is similar to that of Figure 3.13. Note that Figure 3.14 has been divided into 4 different quadrants. The first quadrant shows the products that can be classified as underachievers in the world market, i.e. international demand (imports) for these products has been growing at above-average rates, whilst exports from SACU have either declined or have grown less dynamically than world trade. This implies that SACU has been losing international market share as far as these products are concerned. Furthermore, the fact that these products are classified as underachievers signals that export opportunities do exist. In order to take advantage of this opportunity the domestic industry needs to identify destination markets, solve problems within the domestic supply chain and become involved in active trade promotion programmes. Each of these factors encompasses a complex set of issues that need to be investigated, but falls beyond the scope of this study.

The second quadrant designated for products classified as champions is empty. This state of affairs is alarming as any country should ultimately strive towards concentrating its products in this quadrant. Products referred to as champions are those products of which exports are growing faster than world trade in general, i.e. the country succeeded in outperforming world market growth to such an extent its share in world imports increased. Underachievers have the potential to move to this quadrant provided that the troubling issues mentioned are addressed. Also, this quadrant is seen as a measure of international competitiveness.
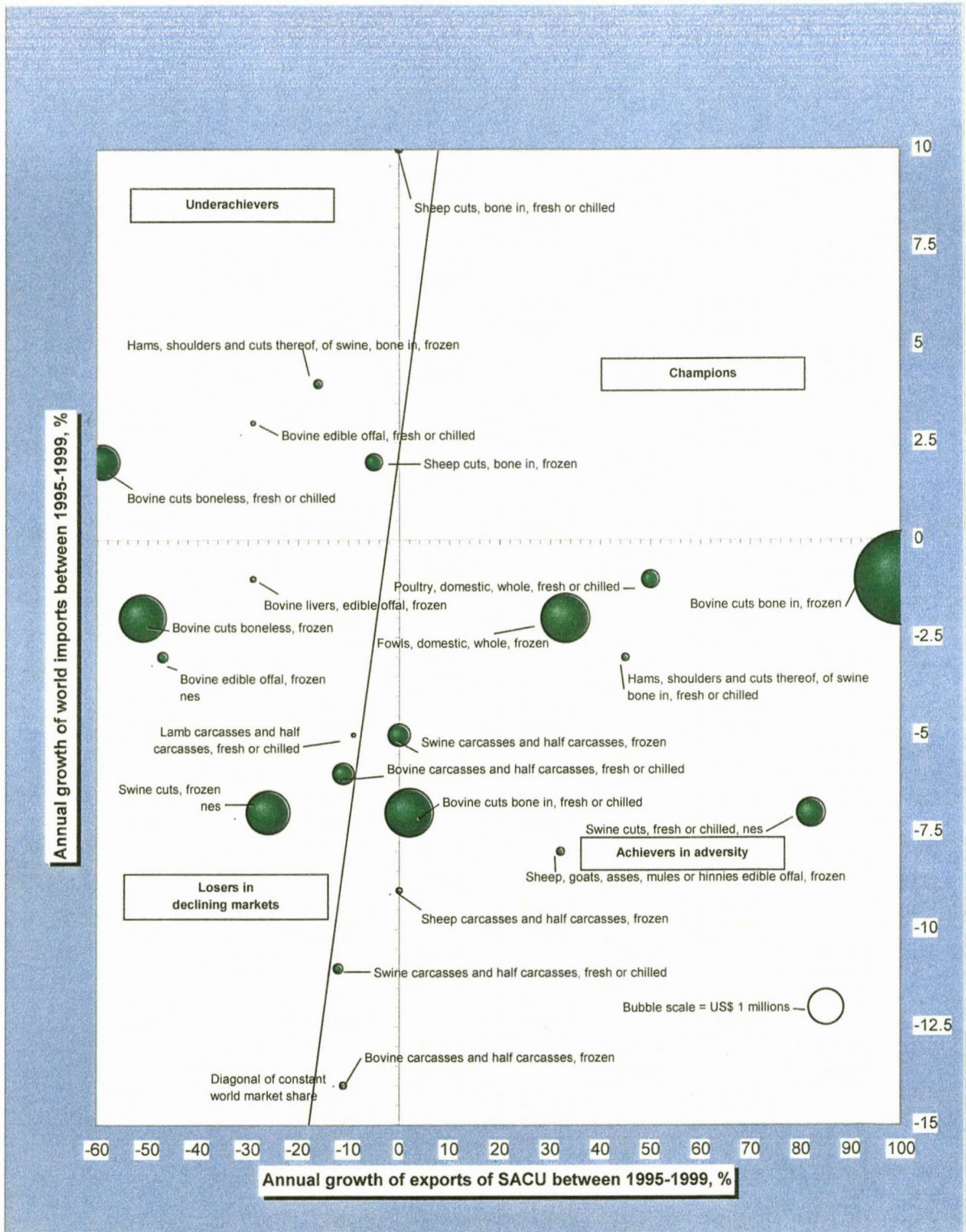
Figure 3.14: Growth of national supply and international demand for exported meat products from SACU

Source: ITC calculations based on COMTRADE statistics, 2000.

It is clear from Figure 3.14 that quite a number of meat products falls in the quadrant called losers in declining markets. This entails that world imports of a product in this quadrant have increased at a below-average rate or have actually declined. Similarly, exports of the products in this quadrant have also declined quite dramatically. The important aspect to note is that imports of this product by major countries in the world have declined, which may be an indication of increased production of this product in major importing countries, hence increased competition from domestic producers in such countries. Secondly, it may indicate that consumers have experienced changes in their tastes and preferences worldwide. For example, bovine cuts (boneless, fresh or chilled) lies in the first quadrant, i.e. imports of this product have increased, whilst bovine cuts (boneless, frozen) lies in the third quadrant, i.e. world imports have dropped. Hence, world demand favours the fresh or chilled rather than the frozen form of this product. This holds implications for promotion strategies for both of these products within the international arena. A third issue that may have contributed to world imports of the products in this quadrant declining is supply bottlenecks in supplying countries, which drove prices up, leading to a drop in world demand. Successful exports of these products will therefore be heavily reliant on (i) finding growing import markets (niche markets) and (ii) identifying and solving problems in the supply chain.

The largest number of meat products being exported by SACU is situated in the quadrant called achievers in adversity. A product falling in this quadrant is gaining market share internationally, but in a market that is experiencing below average or negative growth internationally. Product diversification and identification of positively growing niche markets can be regarded as extremely important for products in this quadrant.

The discussion until now focussed on meat trade in general. A more focussed approach is, however, necessary for the discussion on red meat trade. (See Appendix C for a detailed list of countries from which SACU imported and exported different red meat products. Appendix D provides justification for the use of ITC statistics.)

• **Beef trade**

Table 3.2 shows the imports of bovine meat products from overseas. From 1995 to 1999 SACU experienced negative growth in the imports of bovine cuts (boneless, fresh or chilled) and bovine cuts (boneless, frozen), but positive growth in bovine cuts (bone in, frozen).

Table 3.2: Imports of bovine meat products from overseas

HS rev.	Product	Value 1999 in US$ thousand	Quantity 1999 (tons)	Unit value	Annual growth in value between 1995-1999, %	Annual growth in quantity between 1995-1999, %	Annual growth in value of world exports between 1995-1999, %
20130	Bovine cuts boneless, fresh or chilled	146	97	1.5	-18	-12	2
20220	Bovine cuts bone in, frozen	1 125	1 887	0.6	4	19	3
20230	Bovine cuts boneless, frozen	8 913	14 439	0.6	-37	-30	-2

Source: ITC calculations based on COMTRADE statistics, 2000.

In terms of bovine cuts (bone in, frozen), Uruguay was the most important exporter to SACU with an import value of US$709 thousand and more than a thousand tons. Although Australia is also an important exporter of this product to SACU, the value and quantity imported from Australia declined from 1995 to 1999.

Imports of bovine cuts (boneless, frozen) have decreased considerably over the period 1995 to 1999. This is largely attributed to the fact that imports from SACU's most important trading partner, namely Ireland, have declined by 17 per cent. This was supported by lower imports from Argentina, the United Kingdom, Iran and Germany. Import quantities from Zimbabwe, Australia and Uruguay, on the other hand, increased. The import trends in respect of Zimbabwe and Uruguay are especially important in the light of the SADC FTA and the envisaged FTA with the MERCOSUR countries, of which Uruguay is a member. As far as Zimbabwe is concerned, one could expect further growth in exports with the implementation of the SADC FTA. Also, Zimbabwe has preferential access to the EU market due to its Lomé membership, under which Zimbabwe exported just over 8 000 tons of beef annually from 1995 to 1999. Given the

developments regarding Lomé one could expect Zimbabwe to investigate additional markets for its beef and/or improve its market share in existing markets, such as South Africa. With respect to Uruguay, a FTA with MERCOSUR may result in Uruguay becoming a much more important role player to contend with, depending on the specific trade arrangements embedded in such a FTA. This would not only exert pressure on the South African beef industry, but also on other SADC members such as Namibia, Botswana and Zimbabwe.

Figure 3.15 depicts that Uruguay is a dynamic supplier specialising in SACU. The reason for this classification is that Uruguay has experienced growth in its exports of this product internationally and domestically since 1995 to 1999. This development adds to the notion that Uruguay will probably become an even bigger force to be reckoned with as far as beef imports to SACU are concerned. Note should also be taken of Australia which is regarded as a dynamic supplier of this product in the world market. As present Australia is not taking advantage of its position to gain market share in SACU, but this situation could change relatively quickly if one takes into account Australia's global market share.

Zimbabwe is regarded as a non-dynamic supplier of bovine cuts (boneless, frozen), since it experienced negative growth in exports to the world from 1995 to 1999, but on the other hand its exports to SACU has experienced tremendous growth over the same period. This may indicate that Zimbabwe regards SACU as an increasingly important market for exports of this product.

Export to the world by Ireland also decreased between 1995 and 1999. The same is true with respect to SACU, hence its classification as a non-dynamic supplier that is under-represented. Taking a holistic view of the information presented in Figure 3.15 one could argue that there is a change in terms of the EU's dominance on the SACU market as far as bovine cuts (boneless, frozen) are concerned. Cognisance should be taken of this by the beef industry since new competitors essentially mean that new marketing strategies will have to be developed to counteract them.
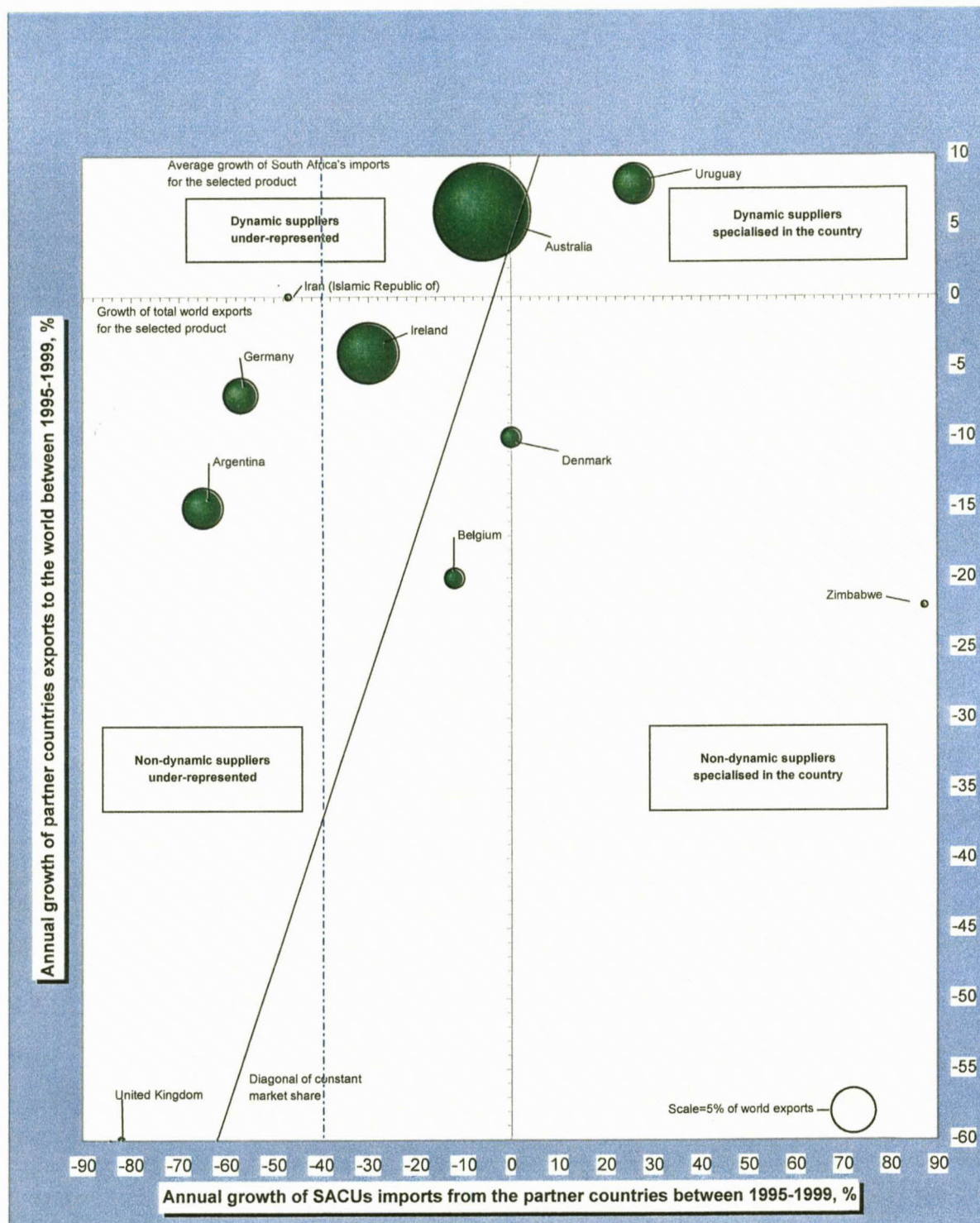
Figure 3.15: Competition between suppliers to SACU for the selected import product in 1999 (Product: 020230 Bovine cuts boneless, frozen)

Source: ITC calculations based on COMTRADE statistics, 2000.

Table 3.3 shows SACU's exports of selected bovine meat products. Only in two instances have the value of exports increased from 1995 to 1999, namely bovine cuts (bone in, fresh or chilled) and bovine cuts (bone in, frozen); the largest growth was experienced in the latter. This growth comes mainly from other African countries, namely Mozambique, Angola, Côte d'Ivoire, the Democratic Republic of the Congo and Tanzania. Other markets that also experienced considerable growth include Hong Kong, Malaysia, Singapore and the Congo.

Table 3.3: Exports of selected bovine meat products from SACU

HS rev.	Product	Value 1999 in US$ thousand	Quantity 1999 (tons)	Unit value	Annual growth in value between 1995-1999, %	Annual growth in value of world imports between 1995-1999, %
20110	Bovine carcasses and half carcasses, fresh or chilled	361	155	2.3	-11	-6
20120	Bovine cuts bone in, fresh or chilled	1 840	730	2.5	2	-7
20130	Bovine cuts boneless, fresh or chilled	949	1 276	0.7	-59	2
20210	Bovine carcasses and half carcasses, frozen	37	43	0.9	-11	-14
20220	Bovine cuts bone in, frozen	6 835	1 637	4.2	122	-1
20230	Bovine cuts boneless, frozen	1 720	802	2.1	-51	-2

Source: ITC calculations based on COMTRADE statistics, 2000.

The exports of bovine cuts (bone in, frozen) are classified as being an achiever in adversity in Figure 3.15, i.e. world exports are contracting. Although world demand has not declined that much it should still be a source of concern. Aspects that can be considered as extremely important for this product to maintain its performance are increased penetration of new markets through active promotion, price competitiveness and strategies to compete with rivals in the same market.

Bovine cuts (boneless, frozen) and bovine cuts (boneless, fresh or chilled) have experienced considerable negative growth in value exported from 1995 to 1999. In contrast the world has seen positive growth in terms of the latter product, and only a 2 per cent decline in growth in the former product.

Exports of bovine cuts (boneless, frozen) are largely concentrated in three countries, namely Kuwait, Mozambique and the Comoros, with an export market share of 27.27 per cent, 18.84 per cent and 11.34 per cent, respectively. The value of exports to Mozambique declined by 44 per cent, whilst that of the Comoros increased by 47 per cent over the period 1995 to 1999 (information on Kuwait is not available). Export destinations with an export share of less than 10 per cent but higher than 5 per cent include the Libyan Arab Jamahiriya, Angola and the United Arab Emirates.

* **Pork trade**

Table 3.4 shows the imports of selected swine products by SACU from overseas countries. Imports of swine cuts (fresh or chilled, nes) have increased both in terms of value and quantity imported, whereas the value of world exports of this product has declined. This may be an indication that SACU is a more lucrative market to export to than most other countries in the world. The value and quantity of imports of swine hams, shoulders and cuts thereof (bone in, frozen) have decreased significantly from 1996 to 1999. Neither was there growth in the value of exports of this product from a world perspective. From an international exporter point of view, it would be more lucrative to target other markets for exports of this product.

There was also considerable growth in the imports of swine cuts (frozen, nes) into SACU, although the value of imports decreased. World growth in value of exports of this product also decreased, but by only 1 per cent. The combined effect of the decline in the value of imports and the increase in quantity imported may be an indication that competition for the SACU market is increasing. This does not only exert pressure on traditional exporters to SACU, but also on SACU producers. The top four exporters to SACU are France, Hungary, Belgium and the United Kingdom, with market shares of 53.31 per cent, 14.06 per cent, 11.94 per cent and 9.81 per cent, respectively. With respect to the latter three exporters, the value of imports decreased, whilst the quantity exported to SACU increased. France recorded increases in both the value and quantity exported to SACU.

Table 3.4: Imports of swine meat products from overseas

HS rev.	Product	Value 1999 in US$ thousand	Quantity 1999 (tons)	Unit value	Annual growth in value between 1995-1999, %	Annual growth in quantity between 1995-1999, %	Annual growth in value of world exports between 1995-1999, %
20319	Swine cuts, fresh or chilled, nes	100	40	2.5	23	15	-3
20322	Hams, shoulders and cuts thereof, of swine, bone in, frozen	23	18	1.3	-70	-68	0
20329	Swine cuts, frozen nes	11 253	11 426	1.0	-12	29	-1

Source: ITC calculations based on COMTRADE statistics, 2000.

Figure 3.16 shows the most important import origins with respect to swine cuts (frozen nes). France is regarded as a dynamic supplier that specialises in SACU. This is due to her growth in exports to both the world and the SACU market. It is also clear that France is one of the world's largest exporters of this product. Hungary and Belgium, respectively the second and third largest exporters to SACU, do not find themselves in such a favourable position. Both are regarded as non-dynamic exporters due to the fact that their export growth was negative internationally. Countries that currently export to SACU and who are of major importance include Australia, Spain, Germany, Brazil, Austria and the US. The reason for this is that they are regarded as dynamic suppliers that are currently under-represented in SACU. They owe their dynamic status to the fact they were able to show positive growth in exports of swine cuts (frozen nes) internationally from 1995 to 1999. They are, however, under-represented since they were not able to improve their market share in SACU. This may change as they become more price competitive, i.e. most of these countries recorded a decline in the unit value of their exports to SACU.
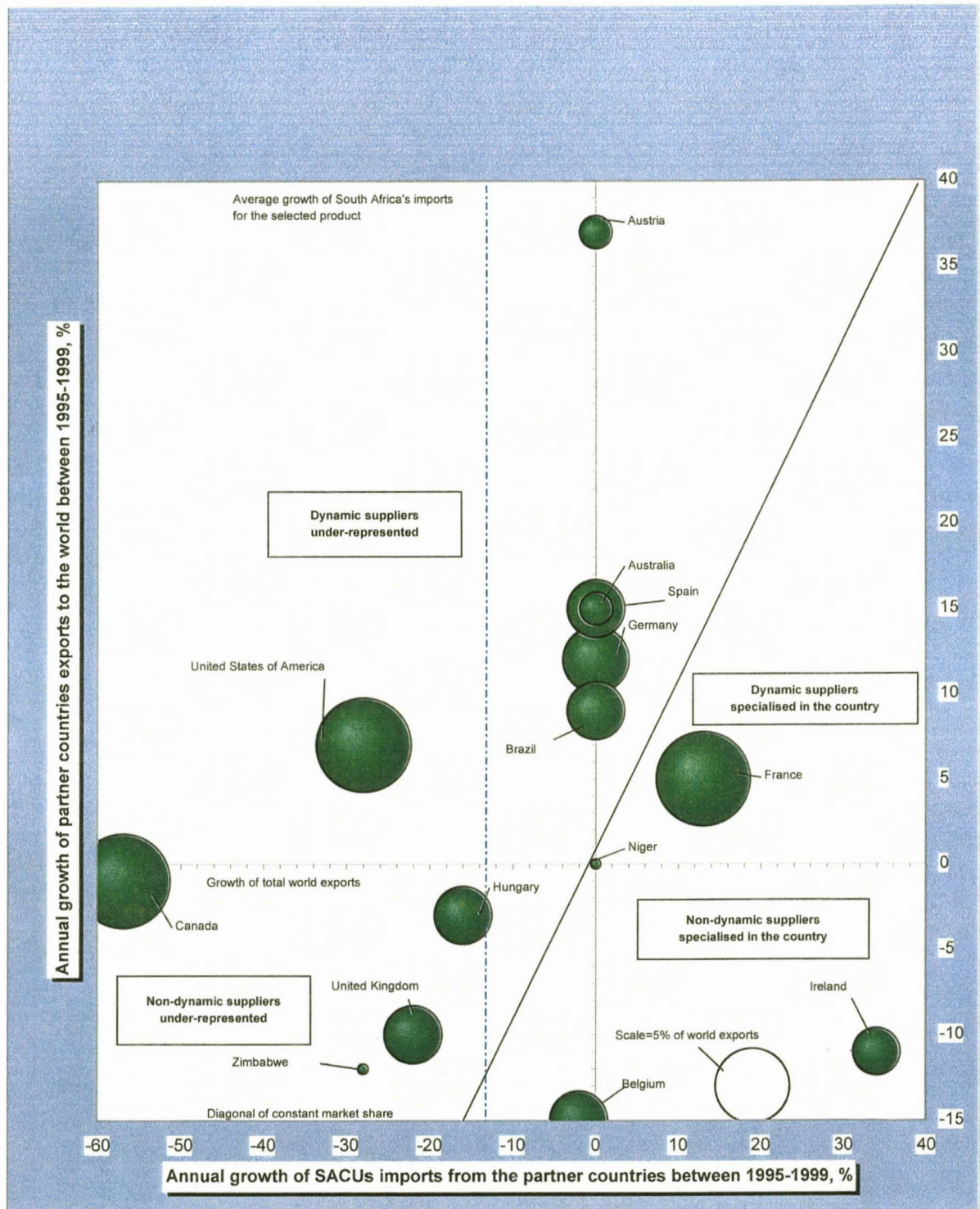
Figure 3.16: Competition between suppliers to SACU for the selected import product in 1999 (Product: 020329 Swine cuts, frozen nes)

Source: ITC calculations based on COMTRADE statistics, 2000.

Table 3.5 shows exports of selected pork products. The performance in terms of the value exported was mixed. Swine hams, shoulders and cuts thereof (bone in, fresh or chilled) and swine cuts (fresh or chilled, nes) recorded significant growth, 45 per cent and 82 per cent respectively. What makes it even more significant is the fact that the world has experienced negative growth in these two products. As far as the other products are concerned, SACU experienced larger declines in the value exported than the rest of the world. This may be an indication that SACU has been targeting the wrong markets, but conversely it may also indicate that SACU is more price competitive on a unit-value basis than most other countries and could secure niche markets provided that export promotion is directed as such and the supply chain allows for it.

Table 3.5: Exports of selected swine products from SACU

HS rev.	Product	Value 1999 in US$ thousand	Quantity 1999 (ton)	Unit value	Annual growth in value between 1995-1999, %	Annual growth in value of world imports between 1995-1999, %
20311	Swine carcasses and half carcasses, fresh or chilled	71	198	0.4	-12	-11
20312	Hams, shoulders and cuts thereof, of swine bone in, fresh or chilled	41	6	6.8	45	-3
20319	Swine cuts, fresh or chilled, nes	651	1 261	0.5	82	-7
20321	Swine carcasses and half carcasses, frozen	383	363	1.1	Na	-5
20322	Hams, shoulders and cuts thereof, of swine, bone in, frozen	60	23	2.6	-16	4
20329	Swine cuts, frozen nes	1 481	934	1.6	-26	-7

Source: ITC calculations based on COMTRADE statistics, 2000.

- **Sheep meat trade**

Table 3.6 shows the imports of selected sheep meat products. On average SACU has seen considerable growth in imports of sheep meat products. The largest growth was recorded by sheep cuts (bone in, frozen), with an increase in value and quantity imported of 23 per cent and 53 per cent, respectively. This growth was fuelled by increases in imports from both Australia and New Zealand, with the latter increasing its

exports to SACU by 129 per cent from 1995 to 1999. Australia, however, remains the largest import origin for this product, with a SACU market share of 90.19 per cent. New Zealand has a market share of only 9.04 per cent, but given its export growth to SACU one could expect this share to increase over time.

Table 3.6: Imports of sheep meat products from overseas

HS rev.	Product	Value 1999 in US$ thousand	Quantity 1999	Unit value	Annual growth in value between 1995-1999, %	Annual growth in quantity between 1995-1999, %	Annual growth in value of world exports between 1995-1999, %
20422	Sheep cuts, bone in, fresh or chilled	62	91	0.7	-22	-16	13
20430	Lamb carcasses and half carcasses, frozen	287	564	0.5	-12	13	-18
20441	Sheep carcasses and half carcasses, frozen	624	1 449	0.4	-36	-21	-9
20442	Sheep cuts, bone in, frozen	14 958	35 106	0.4	23	53	2
20443	Sheep cuts, boneless, frozen	922	1 633	0.6	3	17	-4

Source: ITC calculations based on COMTRADE statistics, 2000.

Table 3.7 shows the exports of sheep meat products by SACU. It is clear that SACU exported very small quantities of sheep meat products in 1999. The value of sheep meat products exported showed a decline from 1995 to 1999, with the exception of sheep cuts (bone in, fresh or chilled), which remained constant.

Of some concern may be the fact that sheep cuts (bone in, frozen) show a drop in the value of exports, whilst the world in general experienced positive growth. It may indicate that opportunities exist, but have not been exploited to their potential. The same can be said with respect to sheep cuts (bone in, fresh or chilled). The other side of the coin, however, is that export prices of SACU cuts may have been forced to become more in line with that in the world market.

Table 3.7: Exports of selected sheep products from SACU

HS rev.	Product	Value 1999 in US$ thousand	Quantity 1999	Unit value	Annual growth in value between 1995-1999, %	Annual growth in value of world imports between 1995-1999, %
20410	Lamb carcasses and half carcasses, fresh or chilled	10	2	5.0	-9	-5
20422	Sheep cuts, bone in, fresh or chilled	39	14	2.8	0	10
20441	Sheep carcasses and half carcasses, frozen	24	11	2.2	Na	-9
20442	Sheep cuts, bone in, frozen	226	48	4.7	-5	2

Na – not available
Source: ITC calculations based on COMTRADE statistics, 2000.

The latter is probably also true regarding sheep cuts (bone in, frozen), since the calculated unit value of world exports is US$1.83 per kg whilst the unit value for SACU exports of this product amounts to US$4.70 per kg (the unit value for world imports of this product in 1999 was US$1.98 per kg).

With respect to sheep cuts (bone in, fresh or chilled) the world export price amounts to US$3.59 per kg, whilst the SACU price is US$2.8 per kg (the unit value for world imports of this product in 1999 was US$5 per kg). Hence the former argument that opportunities on the world market have not been fully exploited probably applies for this product.

Nevertheless, one should take into account that SACU is a net importer of sheep meat products. One could argue that SACU should increase exports of those products for which the returns on the world market is better than on the domestic market, and import lower-priced shortages. For instance, SACU exported sheep cuts (bone in, fresh or chilled) at a unit value of US$2.8 per kg, while the import price for the same product was US$0.4 per kg. The fact of the matter is, however, that to exploit such opportunities fully, exporters have to take account of the following:

-        The needs and preferences of consumers in other markets;

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- quality of the exported product;
- continuity of supply;
- proper supply chain functioning; and
- regulations pertaining to health, food safety and trade.

The above factors are by no means the only factors that need to be accounted for, but they surely encompass some of the most important issues. Furthermore, these factors can't be isolated from each other, i.e. they are inter-related. For example, suppose that a product adheres to quality standards and regulations and is price competitive, but there is supply chain and continuity problems. It would be remarkable if such a product can be exported successfully according to its full potential. Furthermore, successful exports are as much the responsibility of a particular industry/individual/company as it is the responsibility of government.

3.4   Conclusion

It is quite clear from this chapter that the red meat industry in South Africa has undergone some drastic economic and structural changes in recent years. It is also clear that much remains to be done. It was shown that there are definite export opportunities to exploit, but that this would entail some adjustments in the red meat supply chain. In this regard one only has to mention the fact that although a large number of animals is kept by the non-commercial sector, they contribute very little to output. This state of affairs needs urgent attention. For example, this sector can contribute significantly to improved continuity of red meat which is currently a problem as far as exports are concerned. One could also argue that it would contribute to greater price stability; a luxury in "free" market system.

One might ask why so much emphasis is placed on the international market and opportunities that exist for exports. The answer to this a question is quite simple. Being able to export and to increase one's market share internationally implicitly also relates to one's competitiveness. This in turn means that concerns about imports from other

countries could receive less prominence and the industry could use scare human and capital resources to serve the industry more efficiently. Such a task cannot, however, not be accomplished by the industry itself. The active involvement of government is of the utmost importance. This entails that government should actively pursue issues that relate to disease prevention (not control), animal welfare, traceability, stock theft and trade.

Finally, it would appear that new role players are targeting the South African market as export destination. In this regard Uruguay is most prominent in the beef market since it has not only increased exports to South Africa, but has shown considerable export growth internationally. Cognisance should also be taken of countries that are not yet prominent on the South African red meat market, but that have shown export growth on the international market. In this regard Australia, in terms of beef, and the US, in terms of pork, are important role players.

CHAPTER 4

DEVELOPMENT OF A SPATIAL PARTIAL EQUILIBRIUM MODEL FOR THE SOUTH AFRICAN RED MEAT INDUSTRY

4.1 Introduction

In this chapter a spatial partial equilibrium model is developed to measure the impact of trade-related issues and demand and supply shift factors on the South African red meat industry. The model considers the effects of different tariff regimes, changes in the exchange rate, population and per capita income, as well as supply shocks on prices, consumption, production and the optimal flow of red meat products between different regions. The method of approximation and procedure is based largely on that followed by Takayama and Judge (1971) in their approximation of mathematical programming models applicable to the analysis of spatial price and allocation problems.

The first part of this chapter will provide justification for the modelling approach used, and it will be followed by a discussion on selected models currently being used internationally. This is followed by a discussion on the product specification, regional delineation and data used to develop the model. The latter part of this chapter will be used to develop a quasi-welfare maximisation model.

4.2 Justification of the mathematical programming approach to trade modelling

During the last century mathematical programming methods pertaining to specifically equilibrium analysis was embedded firmly in agricultural sciences. Methodological advances in this field were enormous. According to Takayama and Judge, (1971) there were several pioneers in the field of developing a modelling framework where production and allocation of commodities is permitted, e.g. Koopmans (1949 and 1951), Dantzig (1951), Enke (1951), Samuelson (1952), McKenzie (1954), Marschak (1955), Judge (1965) and others. The work concluded by these pioneers, whether directly or

indirectly, is still in use today. Models were improved by applying more of the economic theory, as well as institutional and economic reality. The modelling of consumer demand, market equilibrium in both product and factor markets, risk and risk aversion, and the role of instruments of economic policy, received much attention and substantial advances were made in these areas. The ability to model decisions of the farming household also improved (Hazell and Norton, 1986). According to Hazell and Norton (1986), the cumulative effect of these advances has been to provide a tool of analysis that is much more adaptable to different situations and it presents a potentially more realistic portrayal of agricultural reality.

The question might, however, rightfully be asked why mathematics should be used as vehicle to derive answers sometimes quite obvious to observers in the field of economics. In this regard it should be remembered that mathematical economics is merely an approach to economic analysis. Chiang (1984) supports this by stating that it should not, and does not differ from the non-mathematical approach to economic analysis in any fundamental way. He goes further by stating that the major difference between "mathematical economics" and "literary economics" lies principally in the fact that, in the former, the assumptions and conclusions are stated in mathematical symbols rather than words, and in equations rather than sentences. The main advantages for going beyond the geometric approach of economic modelling lie in the following (Chiang, 1984):

- The "language" used in the mathematical approach is more concise and precise.
- There exists a wealth of mathematical theorems.
- Mathematical programming forces the analyst to state explicitly all assumptions as a prerequisite to the use of the mathematical theorems.
- Mathematical programming allows the analyst to treat the general n-variable case.

Given the above, observers of research in this field could rightfully ask why the analyst uses mathematical programming instead of econometrics. Chiang (1984) states that the latter refers almost exclusively to the study of empirical data by statistical methods of estimation and hypothesis testing, whereas the application of mathematics to the purely theoretical aspects of economic analysis has come to be referred to as mathematical economics. He concludes that econometrics and mathematical economics are coordinate terms instead of being subordinate to each other. Arfini and Paris (1995) are of the opinion that econometric analysis, powerful as it might be, is impractical in dealing with agricultural development issues, since adequate data are extremely difficult to obtain. In most cases the agricultural scenario is indeed quite fragmentary, being made up of a productive and organisational pattern that is typical of, and heavily affects the farmers' environment, in addition to leading to oversimplifications that make it virtually impossible for the models to thoroughly and comprehensively interpret the existing phenomena. According to them a sound alternative to econometric analysis is provided by mathematical programming which, while requiring a limited amount of information, can nevertheless handle the analysis of economic issues through a two-stage approach, namely estimate (or calibration) and forecasting.

The normative character of mathematical programming has often been the reason for criticism directed at this way of conducting economic analysis, which is in sharp contrast to the positive nature of econometric models. Arfini and Paris (1995) reply to this criticism is that if the degree of specialisation associated with the optimisation of a goal does make LP models normative in character, it is equally true that mathematical programming is not designed solely to solve maximisation and minimisation problems. For instance, no normative qualification can be applied to models intended to identify equilibrium conditions.

McCarl and Spreen (2000) mention that mathematical programming analysis generally has a comparative advantage of the problem, and not in algorithm development procedures. Consequently, the problem analyst should be thoroughly informed on the

topics of the problem formulation, results interpretation and model use, but in large part can treat the solution processes as a "black box".

Another issue of which cognisance should be taken is that in the field of economic research one often hears that economic models do not portray reality, or that it is an unrealistic representation of reality. Sydsaeter and Hammond (1995) mention that one would, for example, never be able to consider all the factors that influence such a complex phenomenon as inflation since the outcome would be a hopelessly complicated theory. A model that intends to explain a phenomenon like inflation is at best only an approximate representation of reality (Sydseater and Hammond, 1995). Chiang (1984) goes further, and states that the epithet "unrealistic" cannot be used in criticising economic theory in general, whether or not the approach is mathematical. According to Sydseater and Hammond (1995) theory is, by its very nature, an abstraction from the real world, since it is a device for singling out only the most essential factors and relationships so that we can study the crux of the problem at hand, free from the many complications that exist in the actual world. Finally, Hazell and Norton (1986) state that models provide the link between economic theory and data, on the one hand, and practical appreciations of problems and policy orientations, on the other. Models are imperfect abstractions, but by virtue of their logical consistent framework they provide the analyst and policy-maker with valuable economic representations of the real world and a laboratory for testing ideas and policy proposals (Hazell and Norton, 1986). When modelling trade policy, one should therefore try to develop a reasonable, though stylised representation of complex policy, demand, and production relationships (Francious, 1999). The trade-off is between keeping the model workable, and keeping it realistic enough to actually be useful.

Given the aforementioned discussion it should be clear that the analyst is to decide which tool is most suitable for the problem to be researched, and would provide answers that are realistic and easy to interpret. The decision regarding the most suitable tool is also influenced by issues relating to the availability of data, the suitability of data and the underlying assumptions to be used. Hence, given that this study

endeavours to investigate the implications of trade liberalisation on the red meat industry that could provide information on trade flows and price changes on a regional basis, and that data on transport costs, demand and supply on a regional basis are available, the mathematical programming approach to economic analysis was deemed most appropriate. Developing a mathematical programming model also allows for investigating broader issues than merely those relating too trade liberalisation, for example the impact of population growth and income changes.

4.2.1   The scope of equilibrium trade models

According to Francious (1999), when building computational trade models, decisions have to be made whether to work in partial or general equilibrium, working with a single or multi-country model, and/or working with a single or multi-product model.

Although partial equilibrium models have known limitations, for example it suppresses interactions between commodities that are actually linked together by substitution and competition (Houck, 1992), they offer some unbeatable advantages. Partial equilibrium models, by definition, do not take into account many of the factors emphasised in general equilibrium theory, but by focussing on a very limited set of factors, such as few price and policy variables and limited sectoral linkages, applied partial equilibrium models allow for a relatively rapid and transparent analysis of a wide range of policy issues. According to Houck (1992) most real-world policy interventions are targeted at specific commodity problems, and hence partial equilibrium analysis is the most useful approach to assessing direct and immediate economic impacts even though one should not ignore the broader and more diffuse results of policy decisions. In many cases it may be difficult to justify devoting otherwise scarce resources to more complex and less transparent models, when they may yield only marginal extensions of the basic insights drawn from simpler approaches (Francious, 1999).

There are, however, questions for which answers can only be provided by larger multi-sector models. These are generally known as Computational General Equilibrium

(CGE) models, and capture linkages between different sectors in an economy by modelling firm's use of factors and intermediate inputs. CGE models, for example, allows for explicit assessment of many liberalisation commitments and their welfare impacts simultaneously. It is thus understandable that Hertel (1993) found sizable discrepancies between the results derived from SPE and CGE models used to predict the changes in the global pattern of food sales due to reform of the Common Agricultural Policy (CAP). Hertel (1993) also mentions that it is the "accounting", as opposed to behavioural equations in an applied general equilibrium model, that provides its general equilibrium nature.

Francious (1999) states that the complexity of CGE models, combined with their data requirements, limits their applicability. In this regard, the aggregation problem is of special concern since, by necessity, sectors and regions are left out of CGE assessments by a data construction process that buries them in aggregates. It is important to note that the data focus of a particular model can bias the results. For example, an aggregated structure may prove to be useful for assessing the impact of liberalisation on an economy or even different sectors in an economy, but is much less useful when assessing the effect of liberalisation on specific industries at a disaggregated level (Francious, 1999).

Furthermore, Hertel (1993) is of the opinion that a general equilibrium framework should not preclude selective partial equilibrium analysis since many problems are best addressed in the partial equilibrium framework. It is thus clear that both SPE and CGE models have their own special place when it comes to modelling trade and policy reform issues. The choice of a modelling framework should be influenced by the specific problem at hand, the answers that are needed, the availability of data, the time required to derive answers, the sector or regional focus of the model and the representation of trade. For instance, the policy questions at hand (like the impact on a particular country or sector) are likely to guide the focus of particular modelling efforts. Francious (1999) states that the regional and sectoral structure of the model determines which effects are caught by the model. He uses the following illustration: the aggregation structure can

be compared to *maskevidden* (the Norwegian word for the weave of a fish net). In casting a narrow-meshed net on agricultural products and a wide-meshed net on industry, one can expect to catch the agricultural effects but miss the industrial effects, and vice versa. Computer software, data, and time constraints, along with the disadvantages of overly complex models (which tend to become "black boxes"), simply prohibit one from casting a fine-meshed net everywhere.

Another important aspect of model structure that follows from the specification of competition between imports and domestic goods relates to the modelling of trade flows as net or gross flows. Homogeneous goods models are consistent with basic trade theory, and are also consistent with the assumption that primary agricultural goods are commodities. However, this assumption is also inconsistent with the reality of two-way trade within product categories. The way in which this is handled theoretically can affect the qualitative nature of modelling results (Francious, 1999). He mentions that the Armington approach explains two-way trade by assuming that products within the same product category, but originating in different nations, are imperfect substitutes (the so-called "Armington" assumption). Models with Armington specifications yield smaller trade and output effects than models with homogeneous goods. The implied adjustment costs of trade liberalisation are hence much greater in homogenous goods models than in Armington models (Francious, 1999). The Armington approach to trade modelling is obviously superior than homogeneous goods models, as it allows for endogenously determined two-way trade that will provide the policymaker or producer with product specific information. However, cognisance should be taken of the fact that the Armington approach also requires more specific information that relates to the substitutability of different products. Hence, in cases where such information is not available or could not be estimated due to time and cost limitations, the homogeneous goods models are the next-best alternative.

4.2.2   The nature of spatial equilibrium models

Krishnaiah (1995) states that a spatial model is a theoretical construction having space as one of its components. Spatial equilibrium models characterise several economic activities: the regional locations of production, the regional levels of consumption and the relative level of prices, as well as the formulation of the equilibrium situation pertaining to a particular sector or economy. In a sector or economy where demands, supplies and transport costs are known for each geographical area, the model could be used to determine the optimum set of prices and geographical flows. Given two or more locations, the demand and supply functions for a given product in terms of its market price at that location, and unit transport costs for carrying the product between these regions, spatial equilibrium models provide competitive equilibrium prices in each location, and the level of imports and exports. These models include formulations commonly called activity analysis models, inter-regional competition models, transportation models, spatial equilibrium models, plant location models and simulation models (Krishnaiah, 1995).

More specifically, Krishnaiah (1995) states that equilibrium models reflect specifications that permit economic forces over sectors and space to act in unison to determine the optimum price and allocation outcomes. A great variety of situations can be handled by these specifications. In an economy where demands, supplies, and transport costs are known for each geographical area, the spatial equilibrium model could be used to determine the optimum set of geographical flows and prices. Alternatively, if the prices and the demands for the final commodities are assumed known, along with the primary commodity endowments, technical conditions of production, and transport costs for each geographical area, the spatial equilibrium model could be used to determine the competitive spatial price and allocation scheme. Factors such as trade agreements, import tariffs, export subsidies, import quotas, or ad valorem tariffs can be handled in spatial equilibrium models by introducing additional restrictions or modifying the data used. In addition, the gains to society through inter-regional trade, such as producers'

and consumers' surplus, can be effectively assessed through partial equilibrium models (Krishnaiah, 1995).

The general principles involved in developing inter-regional trade models can be illustrated with the aid of diagrams (geometric approach) showing aggregate supply and demand functions for two regions and one homogeneous product (see Figure 4.1). Consider a situation where a state of autarky exists, i.e. there is no trade between the two regions. If this is the case-demand and supply in Region A will be in equilibrium at point **g**, whilst demand and supply in Region B will be in equilibrium at point **h**. Suppose the state of autarky is relaxed, i.e. there are no barriers to trade between the two regions, and that the international price P_1 is available to both sellers and buyers, and is higher than the price in Region A and lower than the price in Region B. Since the international price is higher in Region A, production will be stimulated since producers would wish to take advantage of this situation (point **b**), i.e. they will divert their supplies to the market where they receive better prices. Conversely, consumers in Region A will demand less of the product (point **a**) since lower supply in the domestic market will result in higher prices. The result is that Region A will become an exporter of the product concerned. This tendency to export when international prices are above domestic prices is depicted by the excess supply curve, in this case the function ES_A shown on the right-hand side of the vertical price line of the graph in the centre in Figure 4.1. Note that should the international price be equal to the domestic price, there will be no excess supply (point **g** = point **k**). The situation for Region B is different from that of Region A. The international price P_1 is lower than the domestic price, resulting in consumers in Region B demanding more of the particular product (point **f**), whilst producers in Region B would reduce production at this price level (point **e**). The net effect is a shortage of the product in Region B. This situation is depicted by the excess demand curve (ED_B). Where the international price is equal to the domestic price, excess demand will be zero, i.e. where point **i** is equal to point **h**. Note that **ab** represents exports from Region A and **ef** represents imports to Region B, where **ab=ef=cd**. Another feature of Figure 4.1 is that trade expands to a level where prices

are equalised in both regions. The assumption underlying this is that transportation and other transfer costs are ignored.
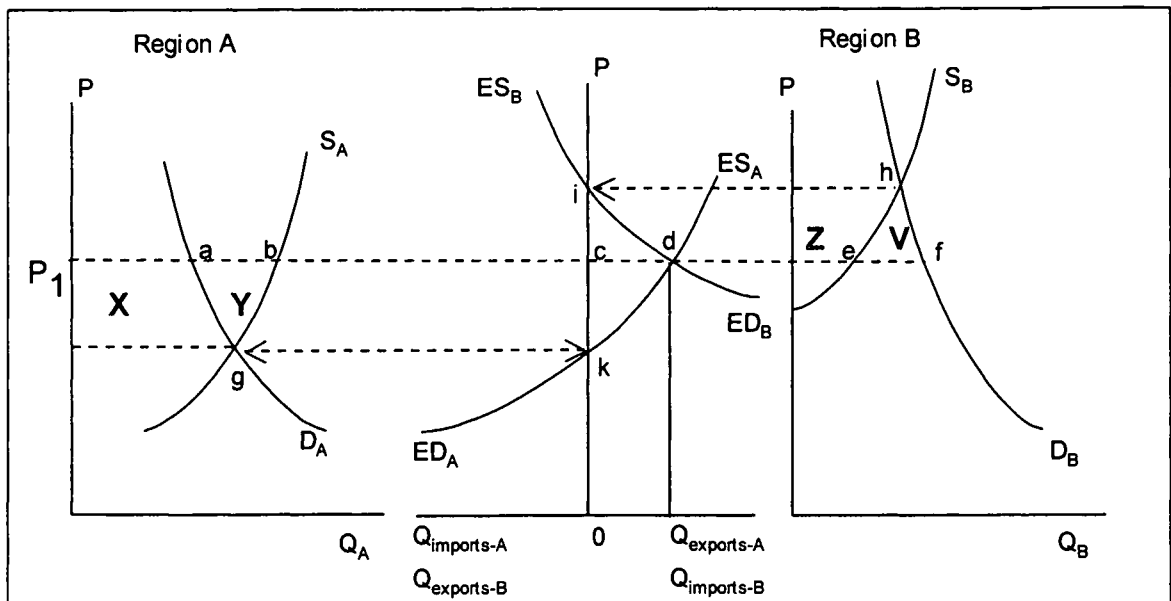
Figure 4.1: A geometrical diagram representing a two region-trading regime
Source: Houck, 1992.

The gains from trade resulting from the shifts in the initial equilibrium situation are also depicted in Figure 4.1. A rise in prices in Region A will result in producers gaining areas **X + Y**, but consumers on the other hand will lose area **X**. On the other hand, consumers in Region B will benefit areas **Z** and **V**, but producers will lose area **Z**. The sum of areas **Y** and **V** is defined as the net social payoff or net welfare. The objective of spatial equilibrium modelling is to maximise these surpluses.

As mentioned before, the influence of transportation and other transfer costs are ignored in Figure 4.1. However, in reality, account should be taken of these costs. Figure 4.2 depicts a situation where transfer costs are taken into account when two regions trade with each other.

Transfer costs are depicted by **mn** in Figure 4.2. This entails that the domestic prices in Regions A and B in equilibrium will differ by this amount. Note that in Figure 4.1 the prices were the same in both regions, whereas the situation with transfer cost results in

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a lower price in Region A (P_A) and a higher price in Region B (P_B). The price differential is equal to **mn** (P_A + **mn** = P_B). Equilibrium in a situation where transfer costs play a role is located at that point (trade volume) where the difference in the price between two regions is exactly equal to the price differential. In Figure 4.2 this is equal to $0q_1$. Also note that should the situation arise where the transfer costs are equal or greater than **gh**, no trade will take place between the two regions.
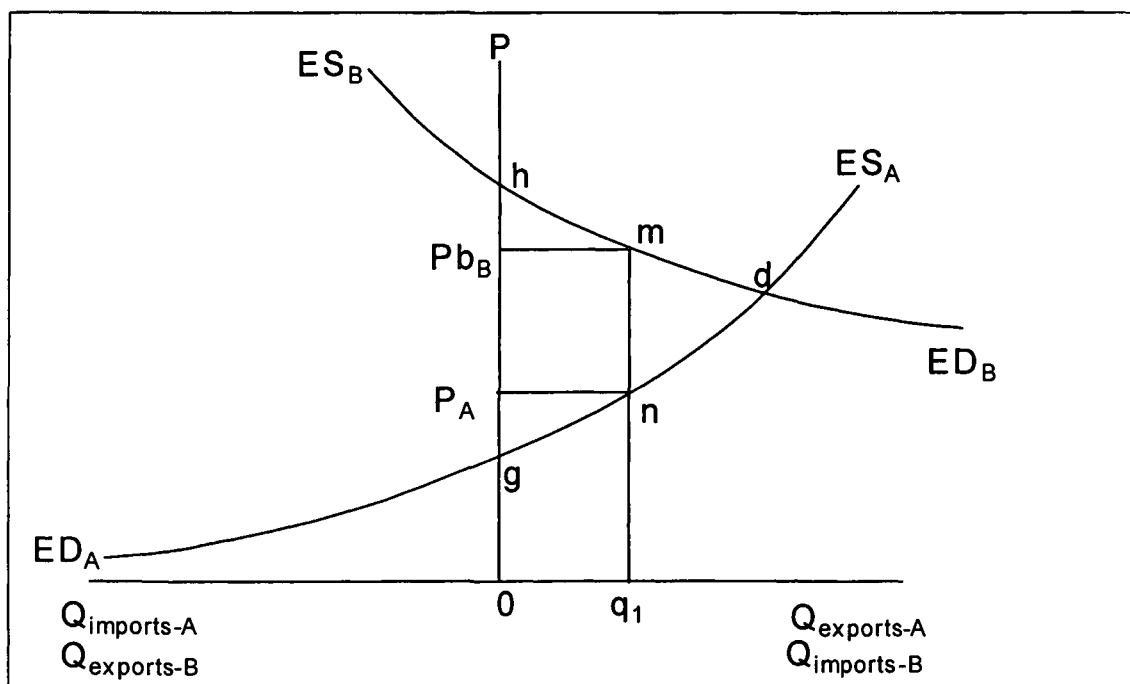
Figure 4.2: The influence of transfer cost on regional pricing
Source: Houck, 1992.

4.2.3 Selected world trade models

This section focuses on partial equilibrium modelling efforts undertaken internationally. Only a few of the most prominent models used are highlighted by referring to their basic aims, general characteristics, the regions and commodities they cover, as well as their strengths and weaknesses. It should be understood that there are many more equilibrium modelling efforts in development or currently being used than the models cited below. Not all of them are within the partial equilibrium framework. Probably the

best known of these models are the CGE GTAP model and the econometrically based FAPRI model.

* **World Food Model**

According to the FAO (1998a), the World Food Model (WFM) is an interactive, dynamic, price equilibrium multi-commodity trade model. It is interactive in that it allows for the simultaneous determination of supply, demand, trade, stock levels and prices for all the commodities covered. The dynamic nature of the model stems from the fact that it allows for the outcome of one year or a sequence of years to influence the outcome of future years. According to Von Lampe (1999) this enables the model to capture the adjustment paths of the market after the introduction of certain shocks. It is a price equilibrium model, as all commodity prices are determined at the level where world supply is equal to world demand and all variables are determined simultaneously. Although sources and destinations of trade flows are not identified by the WFM, it is solved for world market clearing prices by equating the sum of gross imports and the sum of gross exports (FAO, 1998a). In principle, the WFM was not designed to simulate policy, but rather concentrated on making projections of the world food situation. However, modifications were made to the WFM to simulate the impact of trade liberalisation scenarios, more specifically the impact of the Uruguay Round commitments (FAO, 1998a, De Nigris, 1999). It covers only measurable Uruguay Round commitments that encompass bound tariffs and their reductions, minimum access and limits on subsidised exports. It is furthermore important to note that the WFM is basically a determinist model, i.e. it does not contain stochastic elements. In essence, the approach followed aims to examine the impact of production shocks on world price stability in order to verify if tariffication and reduction of tariffs have the expected effect (De Nigris, 1999).

The WFM includes 13 food commodities, i.e. five cereals, four meat markets, one each for milk, butter, oilseeds and fats, and oil meals. Table 4.1 shows the commodity coverage of the WFM.

Table 4.1: Product coverage by the WFM

Product	Description
Wheat	Wheat in primary product equivalent
Maize	Maize in primary product equivalent
Sorghum and millet	Sorghum and millet in primary product equivalent
Coarse grains, others	Coarse grains nes in primary product equivalent
Rice	Rice in milled rice equivalent
Bovine meat	Bovine meat measured in carcass weight
Pig meat	Pig meat measured in carcass weight
Sheep/goat meat	Meat from sheep and goats measured in carcass weight
Poultry meat	Poultry meat measured in carcass weight
Milk	Milk in primary product weight
Butter	Butter
Oilseeds and fats	Oilseeds and fats measured in oil equivalent
Oilmeals	Oilmeals, cakes measured in product weight

Source: FAO, 1998a.

The model covers 146 countries or country groups. The 15 member countries of the EU are grouped together (the EU15 group). Developing countries are covered in detail, with 112 countries and country groups defined. The disaggregation of the countries in transition is also fairly detailed – with 23 countries and groups representing Eastern Europe and the former USSR.

The current version of the WFM is used to project to the year 2005, the model uses 1993-95 as the base period. Lagged data are also needed as some equations contain 2-period lagged variables. In order to smooth the base data itself, and thus avoid unusual movements during the early years of the projections, the model uses three-year averages for each year of the base period, i.e. 1991-1993 average for 1992, 1992-1994 average for 1993 and 1993-1995 average for 1994. Thus, model solutions are assumed to reflect the average or normal situation. Intra-trade is excluded for the EU15 (FAO, 1998a)

Due to the unavailability of domestic producer and consumer prices for all the countries/commodities covered, prices are normalised by setting the base year prices equal to unity. It is also not possible to account explicitly for domestic price wedges between border, producer and consumer levels. Elasticities and parameters used in the equations are mainly from estimates made by the Food and Agricultural Organisation

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(FAO), supplemented by the elasticity data bases of the United States Department of Agriculture's (USDA) SWOPSIM model and the Organisation for Economic Cooperation and Development's (OECD) MTM model (De Nigris, 1999). These parameters are held constant when projections are made with the WFM.

- **AGLINK model**

The AGLINK model that was developed by the OECD in close co-operation with OECD member countries is basically a dynamic supply-demand model of world agriculture. The main focus of the model is to provide information on the potential influence of agricultural policy on agricultural markets in the medium term. One of the main strengths of the AGLINK model is that the model structure closely represents the agricultural situation in member countries. Hence, it has the ability to capture interaction between commodities and between countries since it not only provides indications of directional flows/impact, but also information on the magnitude of these impacts (OECD, 1998).

More specifically, the following key factors or assumptions are embedded in the AGLINK model (OECD, 1998a):

- World markets for agricultural commodities are competitive, i.e. buyers and sellers do not behave as if they have market power. Market prices are also determined through global supply and demand.

- Domestically produced and traded commodities are viewed to be perfect substitutes by buyers and sellers. Importers do also not distinguish commodities by country of origin.

- The model is partial equilibrium in nature and includes major OECD agricultural commodity markets with respect to supply, demand and prices. The products included are wheat, coarse grains, oilseeds, oilseed meals and oils, dairy

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products, milk, meats and eggs. As far as non-agricultural markets are concerned, they are treated exogenously and feedback to the macro-economy is not accounted for. This may be considered as a weakness of the model with respect to countries where agriculture plays a significant part of the domestic economy. Rice, sheep meat, fish and wool are either not modelled, at all or incompletely modelled which may affect the interpretation of model properties.

- The model consists of complete modules for seven OECD countries/regions. That is Australia, Canada, EU15, Japan, Mexico, New Zealand and the US. The model also takes account of one non-OECD country, namely Argentina, and also one non-OECD region, namely the Rest of the World. The scope and nature of the linkages between OECD and non-OECD modules depends on the specific commodity. For example, in the case of cereals, oilseeds and dairy products the non-OECD regions interact separately with OECD-7 countries. However when it comes to beef and pork, markets are segmented, e.g. beef is segmented into the foot and mouth disease free areas, the Mercosur countries and the EU, whereas beef is not included in the Rest of the World component.

- Market determination of equilibrium prices for most commodities is simulated. This entails that prices on markets must adjust to equate total demand exactly, including carry-over, to total supply, including carry-in based on specific reference prices.

The functional relationships linking supply and demand to prices are in most cases linear in the logarithms of the variables, and the equation coefficients used are partial elasticities.

Von Lampe (1999) states that a major shortcoming of the AGLINK model is its inflexibility and inability to differentiate current regional aggregates embedded in the model further, namely the rest of the OECD and the Rest of the World. He states that in aggregating important developing countries such as China, India and the African Rim

within a single region makes it difficult to reflect the impact of the considerable changes in those regions on the world market. Another shortcoming is the absence of important food crops in many southern hemisphere countries and in Asia, since the substitution of these products in favour of higher-quality food cannot be modelled.

- **The Country-Link System**

The Country-Link System (CLS) of the Economic Research Service (ERS) of the USDA is used to conduct global supply, demand and trade projections in general, whilst different scenarios, such as the Asian crisis, could also be modelled. It also allows for individual country analyses. It is a decentralised system that is linked to expertise based in different regions. Regional models are then linked to each other to form a complete system capable of simultaneous multi-commodity, multi-region solutions within the partial equilibrium framework over the medium and long term. Another distinguishing feature of the CLS is that it has the capability to analyse bilateral trade flows with the Armington facility (Landes, 1998).

The CLS covers wheat, rice, corn, barley, sorghum, other coarse grains, beef and veal, pork, poultry, eggs, soybeans, rapeseed, sunflower seed, other seeds, cotton and sugar. The countries and regions covered are shown in Table 4.2.

The major strengths of the CLS can be summarised as follows:

- Established linkages to regional and commodity expertise exist, supported by an appropriate software interface, since analysts in different countries do not use the same software for model construction.

- The country and commodity coverage is broad.

- It exhibits multi-commodity and multi-region consistency through a simultaneous solution framework.

- The model can be adapted with relative speed as far as "non-model" approaches are concerned.

Table 4.2: Regional coverage of the CLS

Regions	Countries	
Asia and Oceania	Australia Bangladesh China Hong Kong India Indonesia Japan Malaysia Myanmar (RI)	New Zealand Other Asia Pakistan Philippines South Korea Taiwan Thailand Vietnam
Western Hemisphere	Argentina Brazil Canada Central America	Caribbean Mexico Other South America United States
Africa and Middle East	Algeria Egypt Iran Iraq Morocco Saudi Arabia	Sub-Saharan Africa South Africa Tunisia Turkey West Africa-10 (CT)
Europe	Czech Republic EU-15 Hungary Other Central Europe Other FSU	Other Western Europe Poland Russia Slovak Republic Ukraine

Source: Landes, 1998.

The CLS, however, also has some weaknesses, namely:

- The non-standardised modelling formats slows the process of linking models and theoretical consistency cannot always be enforced in all models.

- A lack of regional expertise exists in some areas, whilst some models are also poorly maintained.

- Some key areas are not modelled endogenously.

- It is not suitable for short-term forecasting.

According to Von Lampe (1999) the Country-Link system, in addition to including several policy measures such as tariffs, quotas, etc., also considers a number of other exogenous variables, i.e. changes in population, income and exchange rates, etc. He also regards the absence of a number of products, such as pulses and various starchy products that are particularly important for developing countries, as a minor disadvantage of the CLS.

- **World Agricultural Trade Simulation Model**

Few of the models that have been developed to project agricultural world market developments due to changes caused by, for example, the Uruguay Round and CAP reforms, are suitable for calculations beyond six to ten years, whilst those models that are capable of longer-term projections lack the ability to reflect the political environment for these market developments properly. The World Agricultural Trade Simulation Model (WATSIM) developed at the University of Bonn in 1999 attempts to fill this gap (Von Lampe, 1999). According to Von Lampe (1999) the WATSIM includes a broad set of policy measures that influence domestic and world markets by altering price, production, demand and trade quantities. The model focuses mainly on those key factors that will influence supply and demand prospects, for example, socio-economic and natural variables that have a direct impact on supply and demand, urbanisation, changes in real per capita income, etc.

The main characteristics of the WATSIM model are as follows (Von Lampe, 1999):

- **It is partial equilibrium in nature.** In other words, the WATSIM does not account endogenously for the linkages between other sectors and the agricultural sector, nor does it account for the interrelationship with macro-economic conditions. Information and data on the macro-economic environment are, however, introduced exogenously.

- **It is multi-regional with multi-products.** The multi-regional with multi-product approach entails that the interaction between different regions and different products are captured simultaneously if different scenarios are modelled. The model comprises 15 regions and regional aggregates. Table 4.3 shows the products included. The WATSIM model distinguishes between 29 products and 3 product groups.

Table 4.3: Products and product groups included in the WATSIM

Products	
Wheat Barley Corn Other cereals Rice Starchy products Sugar Pulses Soybeans Sunflower seed Rape seed Other oilseeds Soybean oil Sunflower oil Rape oil	Other vegetable oils Soybean cake Sunflower cake Rape cake Other oil cakes Beef and veal Pig meat Other meat Poultry Eggs Milk Cheese Butter and cream Skimmed milk products
Product groups	
Fruits Vegetables	Other crops for technical use, e.g. tobacco, rubber and fibre crops

Source: Von Lampe, 1999.

- **It is deterministic in nature.** In other words, uncertainty and risk associated with, for example variability in weather conditions, are not accounted for. Average conditions are assumed for particular target years. Endogenous changes in stock levels are furthermore only accounted for when stock levels react to politically determined prices and when limited export possibilities exist. Private stocks are assumed to be zero but could be included exogenously.

- **It is non-spatial.** The WATSIM model does not account for trade flows or bilateral exchanges of products, whilst traded commodities are assumed perfect substitutes in that no differentiation can be made between the imports and exports of a region's foreign trade regime.

-   **It is synthetic.** The behavioural parameters, i.e. income elasticities and price elasticities of demand and supply are not estimated endogenously in the model, but are sourced from literature and other models.

-   **Use of supply and demand shift factors.** Demand and supply shift factors entail those natural and macroeconomic variables that could influence demand and supply, and hence prices over the long terms for example growth in population and changes in per capita income.

The WATSIM model does, however, also have some weaknesses. Firstly, due do the lack of data on agricultural policies in many developing countries, changes in policies of these countries cannot be simulated, and hence it is assumed that price incentives from the world market to domestic producers in such countries are transmitted fully. Secondly, issues such as market access commitments and import tariffs applicable to net-exporting regions are not properly represented in the model. Thirdly, although not a weakness, but rather an area for refinement, is the fact that some statistics, such as the impact of urbanisation on consumption patterns, were assumed to be the same in regions where such information does not exist (Von Lampe, 1999).

According to Henrichsmeyer, Von Lampe, and Moellmann (2001) further improvements have been made to the WATSIM model since 1999. The WATSIM model now incorporates gross imports and exports by making use of a modified Armington approach, whilst it also addresses the issue of tariff rate quotas and limits on subsidised exports.

•   **The USDA WTO project**

The SWOPSIM model is possibly the best known partial equilibrium model developed by the Economic Research Service (ERS) of the USDA. This model is spreadsheet based, using medium-term elasticities to analyse world agricultural market development using PSE's and CSE's. The ERS also endeavoured to develop country-specific

spreadsheet-based models using specific policy instruments for simulation purposes. However, in light of the new developments as far as liberalisation and the WTO are concerned, the ERS started to design a new modelling framework with the aim of analysing trade liberalisation options under the new WTO negotiations (ERS, 1999).

It is a non-spatial partial equilibrium model that is policy specific, e.g. tariff rate quotas (TRQ's) and subsidies are some of the policy parameters embedded in the new model. It uses both long and short-term elasticities and assumes that goods are largely homogeneous. The model is built around three different market levels, namely (ERS, 1999):

- **Single-market level:** The single-market level entails trade in raw products that includes demand for food, demand for feed and other products, inventory demand, area planted and supply, as well as price equations. Products falling into this category are corn, other coarse grains, rice, sugar, high fructose corn sweetener, tropical oils and wheat. Trade in processed products pertaining to meat is also modelled at single-market level and entails demand, animal inventory, supply and price equations. Meat products in this category include beef and veal, pork and poultry.

- **Two-market levels:** The two-market level involves both raw and processed products, with the emphasis on oilseeds, and entails demand for oil and meal, seed area and production, crushing and price equations. Products in this category are soybeans, soybean oil, soybean meal, other oilseeds, other oilseed oil and other oilseed meal.

- **Three-market levels:** The emphasis is on processed products that entail final product demand and imports, supply of milk, use of fat and non-fat solids and price equations. Products in this category include butter, cheese and skim milk powder.

4.2.4   Summary

The models discussed above are by no means the only models used internationally to model issues pertaining to food security, changes in domestic policies and trade liberalisation.   Nevertheless, the characteristics discussed are represented to a lesser or greater extent in most models used today.   Important to note is that the model structure is dependent on what modellers wish to quantify.   For example, a model aimed at quantifying the effect of policy issues on food security will have a different structure than a model designed to quantify liberalisation issues on trade.   This is not to say that a model developed to quantify the effects of policy issues on food security would not be able to provide information on the impact of such issues on trade, but that detail pertaining to trade issues would be much less specific, and vice versa.   In fact, many models, including some of the models mentioned, have been adapted, so that they are more versatile, i.e. amendments were made in terms of model structure.

A further distinction between the models discussed is the differences in terms of commodity and regional coverage, time frame for projections and inclusion of non-agricultural demand and supply shift factors.   Hence, one would expect predictions to differ between these models.   This does not mean that one is better than the other, but rather that results of such predictions should be interpreted bearing in mind the original aim of the modelling exercise.

One area of concern with respect to the models discussed above is the fact that sub-Saharan Africa, and more specifically southern Africa, is under-represented in the sense that there is a lack of data and information pertaining to technical and economic issues related to agriculture.   This concern is not meant as criticism towards the modellers of the mentioned models, but towards government agencies responsible for gathering and disseminating of such information in the respective countries.   As mentioned, the main issues covered by these models relate to food security, changes in domestic policies and liberalisation, which is again associated with the welfare situation in southern African countries.   It is therefore difficult to understand why so little has

been done to improve the information basis that could, in its turn, assist modellers in quantifying the effect of, for example, liberalisation, which could in turn be used as tool during trade negotiations. A further problem associated with this state of affairs is that results generated by these models are used for planning and policy design purposes, which could lead to poorly directed policy initiatives. It is thus no wonder that developing countries are discontented regarding the conclusion of trade negotiations. The fact of the matter is that the responsibility of a country to ensure it is in a good negotiating position lies within the country and not with modellers or other governments. However, from an international point of view it would be to the benefit of both developed and developing countries if policies initiated in developing countries should lead to improvements in welfare. Hence, the idea that much more emphasis should be placed on improving developing countries' information systems could be considered, i.e. directing a portion of development funds towards the development of internationally comparable information systems.

4.3   Model specification

The previous section discussed models currently being used internationally to model the effects of trade liberalisation, issues relating to food security and socio-economic variables, such as population growth. In the section that follows a SPE model for the South African red meat industry will be developed. This entails, amongst other factors, a discussion of the products, regions, and supply and demand data used, as well as the specification of the model parameters and variables.

4.3.1   Product specification and regional delineation

Two different product categories are specified in the model, namely primary products and secondary products. The primary products category is further divided into three sub-categories, namely cattle, sheep and pigs. Similarly, the secondary products group is divided into three sub-categories, namely beef, mutton and pork. Products from different regions are assumed to be perfect substitutes, and consequently buyers are assumed to

be indifferent as to the sources of supply. Armington (1969) states that this assumption implies – leaving aside any factors that lead buyers to spend more on a given item than necessary – that elasticities of substitution between different supplies are infinite and that the corresponding price ratios are constant. According to Tomek and Robinson (1990) this assumption is often unrealistic. Armington (1969) suggests an approach to trade modelling that entails a general theory of demand for products that are distinguished not only by their kind, but also by their place of production (generally known as the Armington approach). Products are distinguished from one another in the sense that they are assumed to be imperfect substitutes in demand. In other words, not only is each good different from any other good, but each good is also assumed to be differentiated according to the suppliers' area of residence from a buyers' viewpoint. For example, buyers may view fruit produced in Chile as different from fruit produced in Brazil. Nevertheless, although cognisance is taken of the Armington approach, paucity of relevant data and information pertaining to elasticities of substitution resulted in reverting to the more general assumption of perfect substitution among products of the same kind. Within this framework let:

i,j denote all commodities; $i, j = 1, 2, ..., n$.

where $i = j$

ip, jp denote all primary commodities (Cattle, sheep and pigs);

$ip, jp = 1, 2, ..., n$.

where ip and $jp \subset i$

is, js denote all final commodities (Beef, mutton and pork);

$is, js = 1, 2, ..., n$.

where is and $js \subset i$

The model consists of 12 regions among which livestock and meat are shipped. Eleven are classified as domestic regions and one as a foreign region. Domestic regions are the Western Cape, Eastern Cape, KwaZulu-Natal, Northern Cape, North West, Free State, Gauteng, Mpumalanga and Northern Province. Namibia and Botswana are also

regarded as domestic regions. Foreign regions consist of a Rest-of-the-World component. In addition three transit points, namely Cape Town Harbour, Port Elizabeth Harbour and Durban Harbour, are included. Note that it is also assumed that all three transit points have the infrastructure for the importation of meat products. The regions are denoted as follows:

$r, r1$	denote all regions; $r, r1 = 1, 2, ..., 13$.
rd	denote all domestic regions; $rd = 1, 2, ..., 9$.
	where $rd \subset r$
rfn	denote all foreign regions; $rfn = 1$.
	where $rfn \subset r$

Production is assumed to originate at a single location in each region (except in the transit regions). Likewise, consumption and processing is assumed to occur at a specific location. Within the current modelling framework, production, consumption and processing are assumed to take place at the same location and correspond to that used by Jooste (1996). This convention was also adopted by Wallace and Judge (1959), Bawden (1966), Commer (1991), Halbrendt et al, (1995) and Yavuz et al, (1996). According to Tomek and Robinson (1990) this assumption may cause derived prices of products to not correspond closely to observed prices. He states that such discrepancies may be attributable to errors in data, the rigid assumptions underlying SPE's, or the failure to take account of special trading relationships and/or "irrational" preferences among buyers and sellers. A specific problem encountered in this study was that the price differentials between regions with respect to the producer price of livestock hardly ever corresponded to associated observed transport costs. In this regard it is important to note that price differences between any two regions (or markets) that trade with each other will merely equal transfer costs (Tomek and Robinson, 1990; Takayama and Judge, 1971; Halbrendt et al, 1995; Caves and Jones, 1985). Mathematically this is expressed as follows: $P_r^i - P_{r1}^i \leq TC_{r,r1,i}$ where P_r^i denotes the demand price of commodity i in region r; P_{r1}^i denotes supply price of commodity i in

region *r1* and $TC_{r,r1,i}$ denotes the transport cost of commodity *i* between region *r* and *r1*. The discrepancies in observed prices and associated transport cost are caused by several factors, namely (i) observed prices are reported as regional averages which includes "just-across-regional-border-trade" and trade over long distances and (ii) that transport costs were only calculated to correspond with the central locations identified in each region. With respect to the latter, sample data pertaining to the transport cost of livestock and meat were obtained from Hestony Transport (2000), Nel (2000), Durr (2000) and Milton (2000). Road transport cost for live animals was assumed to be fixed per animal per kilometer, but different according to the type of animal transported as a result of truck capacity utilisation. Road transport rates of meat between all the market and supply source points were not available, and hence a similar model previously used by Wallace and Judge (1959) and Jooste (1996) was used to reflect road transport rates for meat. This model is reflected by the following functional relationship: $TC_{ij} = \beta_1 M_{ij} + \beta_2 \sqrt{M_{ij}} + e$; where TC_{ij} represents the cost in rand of shipping a ton of meat from point *i* to point *j*; M_{ij} is the kilometers between *i* and *j*; β_1 and β_2 are unknown parameters to be estimated and *e* is an unobservable random error. This functional form was postulated in the belief that transport rates are an increasing function of kilometers but should increase at a decreasing rate.

In order to overcome the discrepancies between observed and estimated transport costs, transport costs were adjusted to reflect observed price differentials between different regions. One could argue that due to the fact that prices are reported as regional averages it would be more justifiable to adjust prices instead of observed transport costs, but due to a lack of data and a justifiable methodological framework to adjust prices, this could not be done. Also, such intervention would defy the objective of the study since it is the impact of liberalisation on prices that is to be measured, and not on transport cost.

4.3.2   Data specification

Data on demand, supply and prices of livestock and meat on a regional basis presented several problems. The reason for this is fourfold, namely (i) information that is important for planning purposes, such as slaughter statistics is, since the demise of the Meat Board of South Africa, no longer gathered, (ii) most information gathered since 1997 was only done on a national basis, (iii) the red meat industry has not yet fully restructured its information gathering and dissemination structures and (vi) industry role players are reluctant to provide information within the "free market" environment as they consider it a possible threat to their own existence. Hence, 1996 was the last year that official statistics spanning 12 months of importance for this study was published. This, coupled with the fact that the full force of deregulation and liberalisation caught up with the red meat industry in 1996, resulted in this year being used as base year in the model.

4.3.3   Supply and demand of livestock

In order to model the supply of livestock in South Africa, data are needed on the size of the national herd and off-take rates of animals per region, i.e. the herd size multiplied by the off-take rate equals supply. Thus, in order to determine regional supply of livestock, information is needed on regional herd numbers and off-take rates. However, although information on regional herd numbers was sourced from the NDA (2000) and Meat Boards (1997) there exists a paucity of data as far as regional off-take rates are concerned.

In order to overcome this problem, commercial and non-commercial off-take rates were calculated on a national basis. It was then assumed that the commercial off-take rate would be the same for all commercial herds, whilst the non-commercial off-take rate, will be the same for all non-commercial herds. In order to calculate the national commercial off-take rate live imports from other countries, such as Namibia, were subtracted from the reported total commercial slaughterings. Cognisance should furthermore be taken of the fact that the ratio between commercial and non-commercial herds differs between regions. The implication of this is that regional off-take rates will be different, i.e. a region with a

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large commercial herd compared to the non-commercial herd, will have a higher off-take rate than a region where the commercial herd is relatively small compared to the non-commercial herd. To account for this, weighted off-take rates were calculated, which was then used to calculate regional supply of livestock.

In terms of the demand for livestock, regional commercial slaughter statistics were sourced from the Meat Board (1997). In order to derive regional slaughter numbers for the non-commercial sector, the national non-commercial sector off-take rate was calculated and multiplied by the non-commercial sectors' herd numbers in the respective regions. Herd numbers on a regional basis for the non-commercial sector were obtained from the NDA (2000), whereas slaughter numbers for this sector were only available on a national basis from the same source. The total number of animals slaughtered in South Africa per region was calculated by adding commercial and non-commercial slaughter numbers.

From a modelling point of view exogenous/original demand and supply of livestock is represented as follows:

DEM_r^{ip} denotes the given quantity demanded of a primary commodity ip in region r.

$$SUP_r^{ip} = HrdSiz_r^{ip} \times O_r^{ip}$$

where:

SUP_r^{ip} denotes the given quantity supplied of a primary commodity ip in region r.

$HrdSiz_r^{ip}$ denotes the amount of the primary product ip that could be utilised for further processing in domestic region r.

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O_r^{ip} denotes the rate (constant proportion at all output levels) at which a primary commodity *ip* is made available for further processing in region *r*.

4.3.4 Supply and demand of meat

The supply of meat on a regional basis for all domestic regions was calculated on the basis of a conversion factor associated with each primary product sub-category. For example, conversion ratios used to convert cattle, sheep and pigs into meat were 175, 17 and 60, respectively. For example, this implies that one head of cattle will produce 175 kg of meat. The other conversion ratios could be interpreted in the same manner. It should already be clear that there is a direct relation between the number of cattle slaughtered and the supply of meat on a regional basis.

Demand for meat was more cumbersome to calculate. Since meat demand per province was not available it had to be calculated. This was done by calculating the proportional demand for different red meats per region so that the total demand equates to total availability in the base year. The procedure followed entails the calculation of total regional spending by using the real per capita expenditure on different red meats per population group as discussed in Chapter 3, i.e. per capita spending per population group was multiplied by the number of people per population group per region to derive total weighted spending per region. It was then assumed that the proportional spending per region is equal to the proportional consumption per region in such a manner that it equates to the total availability in the base year. Due to a paucity of data it is assumed that the calculated spending on red meat products in 1993 is a good approximation of spending in the base year. Although this approach may result in rough estimates of regional demand for different types of red meat, it is still a better approximation of regional demand than applying the national per capita consumption uniformly over all regions. In other words, by multiplying the national per capita consumption estimate by regional population without taking cognisance of the fact that different population groups have

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different consumption patterns will grossly over or under-estimate regional consumption.

From a modelling point of view exogenous/original demand and supply of meat is represented as follows:

DEM_r^{is} denotes the given quantity demanded of a secondary commodity *is* in region *r*.

$$SUP_r^{is} = CONV_r^{ip,is} \times DEM_r^{ip}$$

where:

SUP_r^{is} denotes the given quantity supplied of a secondary commodity *is* in region *r*.

$CONV_r^{ip,is}$ denotes the rate (constant proportion at all output levels) at which a primary commodity *ip* is converted, per unit, into a final commodity *is* in region *r*.

DEM_r^{ip} denotes the given quantity demanded of a primary commodity *ip* in region *r*.

4.3.5   Prices for livestock and meat

Prices for livestock per region were determined by multiplying the producer price received per kg by the carcass mass and then adding income from offal (cattle, sheep and pigs) and hides (only cattle and sheep). The income from offal and hides is not necessarily realised by the farmer since it is common for abattoirs to take ownership of these products as payment for the service they provide. It is furthermore important to take cognisance of the fact that the market for offal and hides is not modelled in this study, and hence market developments in these markets are not accounted for in terms of livestock prices. Hide and offal returns are merely handled as constants. Nevertheless, it is important that returns on hides and offal are considered for in the determination of cattle prices, in order

to portray a more realistic picture. Offal and hide prices, regional producer prices and regional wholesale prices for meat were sourced from the Meat Board (1997).

The wholesale price was selected, since this price includes, amongst others, processing costs and reflects the efficiency of the industry. Hayes, Green, Jensen and Erbach (1991) as cited by Jooste (1996) also regard the price of wholesale cuts as most useful for measuring of the protection level afforded to different livestock industries. They warned against the use of average prices for determining protection levels, since a country or region imports certain cuts and exports simultaneously. However, as prices pertaining to individual cuts were not available on a regional basis, average prices had to be used to investigate the impact of tariffs and changes in the exchange rate on the livestock industry as a whole. The argument by Hayes *et al* (1991) cannot be discarded completely for the SACU region due to political, economical, geographical and topographical differences across country borders, and it was therefore decided to use the average wholesale prices pertaining to Namibia and Botswana to reflect their own situations.

From a modelling point of view exogenous/original livestock and meat prices in domestic regions is represented as follows:

$BASPRD_{rd}^{ip}$ denotes the base price of a primary commodity *ip* in region *rd*.

$BASPRD_{rd}^{is}$ denotes the base price of a secondary commodity *is* in region *rd*.

The tariff protection method was used to calculate world prices for the different secondary sub-category products. According to Bradfield (1987), tariff protection rates are an indication of the percentage deviation of domestic prices from international prices. The derivation of the world prices, using the tariff protection method, is denoted as follows:

$$W_p = D_p / (1 + T_{pr})$$

where:

W_p = World price;

D_p = Domestic price; and

T_{pr} = Tariff protection rate.

The assumption underlying this method is that *ad valorem* duties represent the deviation between the domestic price and the world price. The derived world price was also adjusted for cost insurance and freight (cif) costs.

From a modelling point of view exogenous/original meat prices that enter through the transit regions are represented as follows:

$$BASPRD_{rfn}^{is} = BASPRD_{row}^{is} + CIFCST^{is}$$

where:

$BASPRD_{rfn}^{is}$ denotes the base price of secondary commodity *is* in region *rfn (in this case the transit regions)*.

$BASPRD_{row}^{is}$ denotes the base price of secondary commodity *is* in region *row (in this case the rest of the world)*.

$CIFCST^{is}$ denotes the cif cost associated with secondary commodity *is*.

It is further important to note that the meat price of the rest of the world is subject to import tariffs. The import tariffs are calculated on an *ad valorem* basis on the free-on-board (fob) price of the imported product. The import tariff is then added to the price differential between domestic and international prices. From a modelling point of view tariffs are represented as follows:

$$TARIFF^{is}_{row,rfn} = BASPRD^{is}_{rfn} \times PAVTRB^{is}_{rfn} + PSPTRB^{is}_{rfn}$$

where:

$TARIFF^{is}_{row,rfn}$ denotes the tariff applied on imports of the secondary commodity *is*

from region *rfn*.

$BASPRD^{is}_{rfn}$ denotes the fob rest of the world price for secondary commodity *is*

$PAVTRB^{is}_{rfn}$ denotes the *ad valorem* tariff applicable to commodity *is* originating

from region *rfn*.

$PSPTRB^{is}_{rfn}$ denotes the specific tariff applicable to commodity *is* originating from

region *rfn*.

Note that parameter $PSPTRB^{is}_{rfn}$ is zero in the base year, since no specific tariffs are currently applied to the imports of red meat. However, such a scenario would be entertained at a later stage.

4.3.6   Specification of the demand and supply equations

Each region has primary commodity supply, conversion and secondary commodity demand functions. Given the above mentioned problem statement, prices are expressed as a function of the quantities in the different functional relations, and are referred to as the quantity formulation. The formulation of the supply and demand functions is specified in this manner to comply with the Takayama and Judge (1971) approach to calculating the net quasi-welfare function. Elasticities of demand and supply were derived from Nieuwoudt (1998), whilst unknown elasticities at primary production and intermediate level were estimated by means of the methodology suggested by Nicholls (1941).

Given the above clarification, the supply, demand and conversion functions used in the model are specified as follows:

- **Supply function**

$$PP_r^{ip} = \alpha_r^{ip} + \beta_r^{ip} QS_r^{ip}$$

where:

PP_r^{ip} denotes the endogenous producer price of primary commodity ip in region r.

α_r^{ip} and β_r^{ip} denotes the intercept and slope coefficients respectively for the supply function of primary commodity ip in region r.

QS_r^{ip} denotes the endogenous quantity supplied of the primary commodity ip in region r.

The set of quantity-dependent regional supply relations may be written in matrix form as:

$$\mathbf{P}_{qs} \equiv \begin{bmatrix} pp_1 \\ pp_2 \\ . \\ . \\ pp_n \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ . \\ . \\ \alpha_n \end{bmatrix} + \begin{bmatrix} \beta_1 & & & \\ & \beta_2 & & \\ & & . & \\ & & & . \\ & & & \beta_n \end{bmatrix} \begin{bmatrix} QS_1 \\ QS_2 \\ . \\ . \\ QS_n \end{bmatrix}$$

or more compactly $P_{qs} = \chi + \delta QS$ (χ = intercept and δ = slope). The underlying assumption of the above specification is that the actual supply quantity QS_r^{ip} is to be greater than or equal to the effective supply from region r to all other regions. Mathematically this is expressed as follows: $QS_r^{ip} \geq \sum_{r1}^{n} QS_{r,r1}^{ip}$.

- **Demand function**

$$PD_r^{is} = \lambda_r^{is} + \omega_r^{is} QD_r^{is}$$

where:

PD_r^{is} denotes the endogenous consumer price of secondary commodity is in region r.

λ_r^{is} and ω_r^{is} denotes the intercept and slope coefficients respectively for the demand function of secondary commodity *is* in region *r*.

QD_r^{is} denotes the endogenous quantity demanded of the secondary commodity *is* in region *r*.

The set of quantity-dependent regional demand relations may be written in matrix form as:

$$
\mathbf{P}_{qd} \equiv
\begin{bmatrix} pd_1 \\ pd_2 \\ . \\ . \\ pd_n \end{bmatrix}
=
\begin{bmatrix} \lambda_1 \\ \lambda_2 \\ . \\ . \\ \lambda_n \end{bmatrix}
+
\begin{bmatrix} \omega_1 & & & \\ & \omega_2 & & \\ & & . & \\ & & & . \\ & & & & \omega_n \end{bmatrix}
\begin{bmatrix} QD_1 \\ QD_2 \\ . \\ . \\ QD_n \end{bmatrix}
$$

or more compactly $P_{qd} = v + \xi QD$ (v = intercept and ξ = slope). The underlying assumption of the above specification is that the actual demand QS_r^{is} is less than or equal to the quantity shipped from all the supply regions. Mathematically this is expressed as follows: $QD_r^{is} \leq \sum_{r1}^{n} QD_{r1,r}^{is}$.

– **Conversion function**

The conversion functions denote the intermediate industry, i.e. the demand for livestock and the supply of meat. The matrix for the conversion functions is different from the above functions insofar as it represents prices for final products and prices for live animals. It also contains both commodity groups, i.e. the demand side contains only live animals and the supply side only meat. The conversion functions are denoted as follows:

$$PP_r^{ip} = \theta_r^{ip} + \upsilon_r^{ip} QC_r^{ip}$$

$$PD_r^{is} = \theta_r^{is} + \upsilon_r^{is} QP_r^{is}$$

where:

PP_r^{ip} denotes the endogenous producer price of primary commodity *ip* in region *r*.

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PD_r^{is}	denotes the endogenous consumer price of secondary commodity *is* in region *r*.
θ_r^{ip} and θ_r^{is}	denotes the intercepts respectively for the demand and supply functions of primary and secondary commodities in the processing sector in region *r*.
υ_r^{ip} and υ_r^{is}	denotes the slope coefficients respectively for the demand and supply functions of the primary and secondary commodities in the processing sector in region *r*.
QC_r^{ip}	denotes the endogenous quantity demanded of the primary product for conversion into secondary commodities in region *r*.
QP_r^{is}	denotes the endogenous quantity supplied of the secondary commodity in region *r*.

4.3.7 Determination of the slope variables and constant parameters

As mentioned before, supply and demand functions were specified in a way that they comply with the Takayama and Judge (1971) approach to calculating the net quasi-welfare function. This has certain implications for behavioural parameter specification. The reason for this is that demand and supply elasticities are derived with quantity expressed as a function of prices, and are referred to as the price formulation. According to Tomek and Robinson (1990) this means that if a demand function is written $Q = f(P)$, then the slope of the function is $\partial Q / \partial P$, and the price elasticity at a point $(\overline{Q}, \overline{P})$ is $\varepsilon_p = (\partial Q / \partial P)(\overline{P} / \overline{Q})$. In other words, the slope coefficients of price in the supply and demand equations are computed from the elasticities pertaining to final demand and supply of primary and secondary commodities in region *r* by means of the following simple algorithm:

$$\varphi_r^i = \varepsilon_r^i \, \frac{q_r^i}{p_r^i}$$

where:

φ_r^i denotes the slope coefficient of price in the demand and supply functions of commodity i in region r.

ε_r^i denotes the elasticity of supply (demand) of commodity i in region r.

q_r^i denotes the quantity supplied (demand) of commodity i in region r.

p_r^i denotes the supply (demand) price of commodity i region r

However, if P = f(Q), then the slope of the function is $\partial P / \partial Q$, and the price elasticity is $\varepsilon_p = [1/(\partial P / \partial Q)](\overline{P}/\overline{Q})$. Hence the slope of the inverse demand and supply functions can be calculated easily using the following notation:

$$\vartheta_r^i = \frac{1}{\varphi_r^i}$$

where:

ϑ_r^i denotes the slope of the inverse demand and supply functions of commodity i in region r.

φ_r^i denotes the slope of the ordinary demand and supply functions of commodity i in region r.

Given the slope coefficients, the intercept terms ($\alpha_r^{ip}, \lambda_r^{is}$ and θ_r^{conv}) are computed as follows:

$$\lambda_r^{is} = BASPRD_r^{is} - \omega_r^{is} DEM_r^{is}$$

$$\alpha_r^{ip} = BASPRD_r^{ip} - \beta_r^{ip} SUP_r^{ip}$$

$$\theta_r^{conv} = BASPRD_r^{conv} - v_r^{conv} CONV_r^{conv}$$

4.4 The mathematical model

The model contains two stages. The first is a production stage, where farmers supply livestock to processors who, in turn, manufacture meat. The second is a processing stage where processors supply meat to wholesalers for further sale. Given the aforementioned parameter specification, the quasi-welfare function to be optimised is measured as producers' surplus and consumers' surplus minus transport cost and tariffs.

The concave quadratic function is derived as follows:

$$W_r(QD_r^{is}, OS_{r,}^{ip}QC_r^i) \equiv \int_{qd_0}^{qd_{is}}(\lambda_r^{is} - \omega QD_r^{is})dQD_r^{is} - \int_{qs_0}^{qs_{is}}(\alpha_r^{is} + \beta_r^{ip}QS_r^{ip})dQS_r^{is}$$
$$- \int_{qc_0}^{qc_1}(\theta_r^i + v_r^iQC_r^i)dQC_r^i$$

where:

W_r	denotes the welfare function dependent on demand quantity QD_r^{is}, supply quantity QS_r^{ip} and quantity converted QC_r^i.
qd_0 and qd_{is}	denotes the change in welfare from a pre- to post-trade equilibrium in the demand function.
qs_0 and qs_{is}	denotes the change in welfare from a pre- to post-trade equilibrium in the supply function.
qc_0 and qc_i	denotes the change in welfare from a pre- to post-trade equilibrium in the conversion function.

The integration operation above captures the consumer and producer surplus in each of the specified regions, and hence qualifies as a regional welfare function that must be maximised. Thus, this integral function would yield the following non-linear quasi-welfare function:

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$$W_r(QD_r^{is}, OS_{r,}^{ip}QC_r^i) = k + \lambda_r^{is}QD_r^{is} - \frac{1}{2}\omega_r^{is}(QD_r^{is})^2 - \alpha_r^{ip}QS_r^{is} - \frac{1}{2}\beta_r^{ip}(QS_r^{ip})^2$$
$$- \theta_r^i QC_r^i - \frac{1}{2}v_r^i(QC_r^i)^2$$

where:

k   denotes the constant of integration and can be dropped from the above equation.

The community quasi-welfare function over all *n* regions is derived by taking the sum of the welfare function that results in the total quasi-welfare function:

$$W(QD^{is}, OS_{,}^{ip}QC^i) = \sum_{i=1}^{n} [\lambda^{is}QD^{is} - \frac{1}{2}\omega^{is}(QD^{is})^2 - \alpha^{ip}QS^{is} - \frac{1}{2}\beta^{ip}(QS^{ip})^2$$
$$- \theta^i QC^i - \frac{1}{2}v^i(QC^i)^2]$$

Until now the equation $W(QD^{is}, OS^{ip}, QC^i)$ has not taken into account the transport cost associated with the trans-shipment of primary and secondary commodities between different regions. Takayama and Judge (1971) state that since transport costs are determined exogenously, it represents a negative benefit to the society. Hence, transport cost needs to be deducted from the total quasi-welfare function as follows:

$$W(QD^{is}, OS_{,}^{ip}QC^i) = [\sum_{i=1}^{n} \lambda^{is}QD^{is} - \frac{1}{2}\omega^{is}(QD^{is})^2 - \alpha^{ip}QS^{is} - \frac{1}{2}\beta^{ip}(QS^{ip})^2$$
$$- \theta^i QC^i - \frac{1}{2}v^i(QC^i)^2] - \sum_{r,r1=1}^{n} X^i TC^i$$

where:

X^i denotes the variable quantity of a commodity *i*, shipped between regions.

TC^i denotes the transport cost of commodity *i*, shipped between regions.

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As stated previously, imports of red meat in South Africa are regulated by means of import tariffs which will have an effect on the welfare situation within a particular country or region. Hence, it is important to take into account the tariff regime applied to meat imports in the welfare calculation. According to Takayama and Judge (1971) the presence of a tariff implies that when the flow from region r to $r1$ of commodity i is positive, the differential between the market demand price and the market supply price, $P_r^i - P_{r1}^i$, must be exactly equal to the transportation cost plus the import tariff, i.e. $P_r^i - P_{r1}^i = TC_{r,r1,i} + Tariff_{r,r1}^i$. Hence the function to be maximised becomes:

$$W\ (QD^{is}, OS^{ip}, QC^i) = [\sum_{i=1}^{n} \lambda^{is} QD^{is} - \frac{1}{2}\omega^{is}(QD^{is})^2 - \alpha^{ip}QS^{is} - \frac{1}{2}\beta^{ip}(QS^{ip})^2$$

$$-\theta^i QC^i - \frac{1}{2}v^i(QC^i)^2] - \sum_{r,r1=1}^{n} X^i \times (TC^i + Tariff^i)$$

where:

$Tariff^i$ denotes the tariff applied on imported commodity i.

Since the condition for SPE's is that the quantity demanded and supplied should be equal to each other in order to attain a market equilibrium price, the following market clearing equation was specified:

$$QS_r^i + QC_r^i + \sum_{r1} X_{r1,r}^i = QD_r^i + \sum_{r1} X_{r,r1}^i$$

4.5   Model characteristics

The main characteristics of the model is as follows:

—   *Spatial partial equilibrium in nature:* The model only considers one sub-sector of South African agriculture, namely the red meat sector. Account is not given of the linkages with other agricultural sub-sectors, nor with the rest of the economy. Issues such as changes in per capita income could, however, be

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introduced exogenously. Furthermore, the model reflects trade through endogenously determined trans-shipments of the respective commodities between different regions.

- *Multi-region, multi-product in nature*: The model comprises nine different provinces of South Africa, three external regions and three transit points. Three livestock and three red meat products are included. It is, however, important to note that it is assumed that consumers do not distinguish between commodities imported from other regions and those produced within the domestic region.

- *Deterministic:* Risk and uncertainty associated with, for example, weather changes, are not taken into account. Hence, average conditions are assumed with respect to different simulations. Shocks associated with, for example, increased livestock supply during drought periods, can however be introduced exogenously.

- *Synthetic:* Behavioural parameters, i.e. different elasticities, are not estimated endogenously within the model, but are sourced from literature.

4.6 Summary

There are currently several multi-commodity, multi-region agricultural trade models in use internationally for measuring the impact of issues related to trade liberalisation, food security, etc. Most of these models have the ability to do forecasts over the medium term, whereas the WATSIM model was designed specifically to go beyond the medium term. None of these models, however, provide specific information on the red meat industry in South Africa.

Furthermore, although the red meat industry in South Africa was researched extensively in terms of its structure, economic behavioural parameters, etc., limited research has been conducted from a mathematical programming point of view that encompasses a partial spatial equilibrium model, focussing specifically on the red meat industry.

The model developed in this chapter aims to maximise a quasi-welfare function to optimise producers' surplus and consumers' surplus minus transport cost and tariffs, using GAMS. The main characteristics of the model are that it is spatial partial equilibrium, multi-region and multi-product, deterministic and synthetic in nature. The model is for the exclusive use of modelling changes in trade policy and selected demand and supply shift factors on the market for red meat products in South Africa. The model is not suitable for reaching conclusions about resource use on farm level, nor is it suitable for deriving answers on market variables over the short run. Assumptions underlying the model can be summarised as follows: (i) production, processing and consumption takes place at the same location in each region, (ii) average prices are used for each region, (iii) price differences between any two regions (or markets) that trade with each other will merely equal transfer costs, (iv) surplus regions will first meet own demand before trading, and deficit regions supply their own demand before importing, (v) homogeneous products are traded, and (vi) conversion and off-take rates are constant over time.

These assumptions have implications for the results generated by the model, e.g. just-across-the-border-trade will not be captured, which entails that all trade in reality will not be shown. Also, there is good reason to believe that behavioural parameters have changed from those estimated during the period of regulation of the red meat industry. In other words, the current model may not reflect the current status of economic behaviour, but will nonetheless provide plausible orders of change in important variables. Lastly, the homogeneous product assumption entails perfect substitution between products, which in reality is not the case. However, due to a paucity of data, the Armington approach to trade modelling could not be used. This is not to say that the homogeneous product assumption will result in unrealistic results, but rather that there is room for improvement in the current modelling framework.

CHAPTER 5

VALIDATION OF THE SPATIAL PARTIAL EQUILIBRIUM MODEL

5.1 Introduction

In Chapter 4 a spatial partial equilibrium model for the red meat industry was developed. This model is solved using the quadratic programming procedure in the General Algebraic Modelling System (GAMS). It is presumed that the commodity markets represented by the data are in a static SPE state. This assumption becomes credible if there exists a spatial welfare maximisation model which, when solved, attains an SPE state with optimal values that closely match the existing production, consumption, and price data. The aim of this chapter is therefore to investigate the extent to which the developed model matches the data discussed in Chapter 4.

5.2 The validation procedure

According to Hazel and Norton (1986) validation of a model encompasses four different issues, namely a numerical report of a model's fidelity to the historical data set, improvements of the model as a consequence of imperfect validation, a qualitative judgement on how reliable the model is for the stated purposes, and a conclusion regarding the kinds of uses that it should not be used for.

The validation procedure followed in this study involved a comparison between observed supply, demand for and prices of livestock and red meat products and the values as calculated in the base run. The model was first solved only with respect to minimum cost transport flows across regions to, firstly, check the consistency of observed transport costs given observed prices in different regions, and secondly to check the validity of net trans-shipment quantities. This implies that demand and supply quantities in each region were fixed to the observed values.

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In respect of the consistency check the results indicated that observed transport costs did not conform to the theoretical principle that the price in a deficit region will be equal to the price in a surplus region plus transport/transaction costs. The reason could be, firstly, that there may exist discrepancies in the observed prices as reported by the Meat Board (1997), and secondly that quoted transport costs between regions may not be the same as the actual transport costs incurred. This again emphasises the importance of accurate and timely information on market variables, such as prices (see Louw, Jooste, Van Schalkwyk, and Frick (2000) and Jooste and Groenewald (2000) for a comprehensive discussion on this issue). This problem was solved by recalculating the transport costs so that it conformed to the theoretical principles mentioned in Chapter 4. This allowed for checking of the validity of net trans-shipment of products, between regions. From a qualitative judgement point of view the model generated a realistic picture of net trans-shipment of the different products taking into account that just-across-the-border trade will not be reflected. These trade flows were then used to re-calculate the prices in different regions.

However, to check the accuracy of the model as far as it simulates actual demand, supply and prices, the solution space of the SPE model could not be restricted, i.e. demand and supply quantities, as well as prices in each region cannot be fixed to the observed values. Thus, for the base run the upper and lower bounds of supply were set by multiplying actual supply by 100 and 0.01, respectively. The same was done with respect to demand. Hence, allowing the model to derive an optimal solution independent of specific restrictions, will provide insight in how accurate the model simulates reality. In other words, the better the situation is simulated in the base period, the more reliable the model, but it is, however, important to take note of the fact that it is unlikely for any model to capture all real-world effects. This is also echoed by Yavuz *et al* (1996) and Miranda (2000).

In this respect it is important to note that the model used is synthetic in nature (see Chapter 4). Thus, given that pre-defined elasticities are used to calibrate the inverse supply and demand functions, there is no need for further calibration on observed

values. Stated alternatively, the construction of the inverse supply and demand functions is a kind of model calibration, since it assures that, given unchanged conditions, the original values are repeated.

5.3 Validation results

Tables 5.1 and 5.2 compare the actual data with the results of the base run for cattle and beef. It is clear that the base run yielded exactly the same supply and demand values as the actual/observed supply and demand of cattle and beef in the different regions of South Africa. With respect to cattle, the Western Cape, Northern Cape, Mpumalanga, Gauteng and the North West are regarded as deficit regions for cattle, i.e. more cattle are demanded than actually supplied. Shortages of cattle in these regions are supplemented from surplus South African regions and from Namibia. As far as beef is concerned, the Western Cape, Eastern Cape, KwaZulu-Natal, Northern Province and Gauteng are deficit regions. Shortages are supplemented from other South African surplus regions, Namibia, Botswana and the rest-of-the-world.

Table 5.1: Validation of cattle supply and demand

Region	Cattle supply (number)		Cattle demand (number)		Surplus/deficit
	Observed	Base run	Observed	Base run	
Western Cape	82407	82407	146647	146647	-64240
Northern Cape	80437	80437	123686	123686	-43249
Free State	363323	363323	214892	214892	148431
Eastern Cape	337208	337208	263475	263475	73733
Kwazulu-Natal	406158	406158	363961	363961	42197
Mpumalanga	230499	230499	273306	273306	-42807
Northern Province	170197	170197	137180	137180	33017
Gauteng	44642	44642	447720	447720	-403078
North West	257878	257878	281008	281008	-23130
Imports*: Namibia (number)					279126

* Equal to actual imports in 1996.

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Table 5.2: Validation of beef supply and demand

Region	Beef supply (ton)		Beef demand (ton)		Surplus/deficit
	Observed	Base run	Observed	Base run	
Western Cape	25663	25663	63445	63445	-37782
Northern Cape	21645	21645	11917	11917	9728
Free State	37606	37606	34075	34075	3531
Eastern Cape	46108	46108	50208	50208	-4100
Kwazulu-Natal	63693	63693	69826	69826	-6133
Mpumalanga	47829	47829	48620	48620	-791
Northern Province	24007	24006	22297	22297	1709
Gauteng	78351	78351	125265	125265	-46914
North West	49176	49176	28920	28920	20256
Imports*: Namibia (ton)					9589
Botswana (ton)					3842
Rest-of-the-World (ton)					47064

*Equal to actual imports in 1996

Table 5.3 shows the deviation between the actual prices and those that resulted from the base run for cattle and beef respectively. The base run cattle prices deviated relatively little from the observed cattle prices. The deviation in beef prices was greater than those of cattle prices. The discrepancies between the observed and base run prices can be attributed to the fact that observed prices and reported transport costs are not consistent. This can also be traced back partly to the spatial assumptions of regional spot markets. Note should also be taken that other transaction costs related to, for example administration, negotiations, etc. are also excluded, and will probably never be captured.

Table 5.3: Validation of cattle and beef prices

Region	Cattle price (R/kg)			Beef price (R/kg)		
	Observed	Base run	Deviation	Observed	Base run	Deviation
Western Cape	7.70	7.70	0.00%	14.22	12.77	-10.20%
Northern Cape	7.50	7.50	0.00%	11.49	12.67	10.28%
Free State	7.35	7.49	1.92%	11.72	12.69	8.23%
Eastern Cape	7.20	7.35	2.08%	12.62	12.79	1.35%
Kwazulu-Natal	7.47	7.45	-0.24%	12.98	12.77	-1.65%
Mpumalanga	7.74	7.69	-0.70%	11.70	12.78	9.24%
Northern Province	7.40	7.61	2.83%	11.85	12.70	7.18%
Gauteng	8.10	7.65	-5.61%	12.80	12.80	0.00%
North West	7.60	7.59	-0.12%	11.50	12.74	10.77%

Figure 5.1 and 5.2 show the net trans-shipment of cattle and beef among different regions in South Africa that correspond with the surpluses and deficits identified.
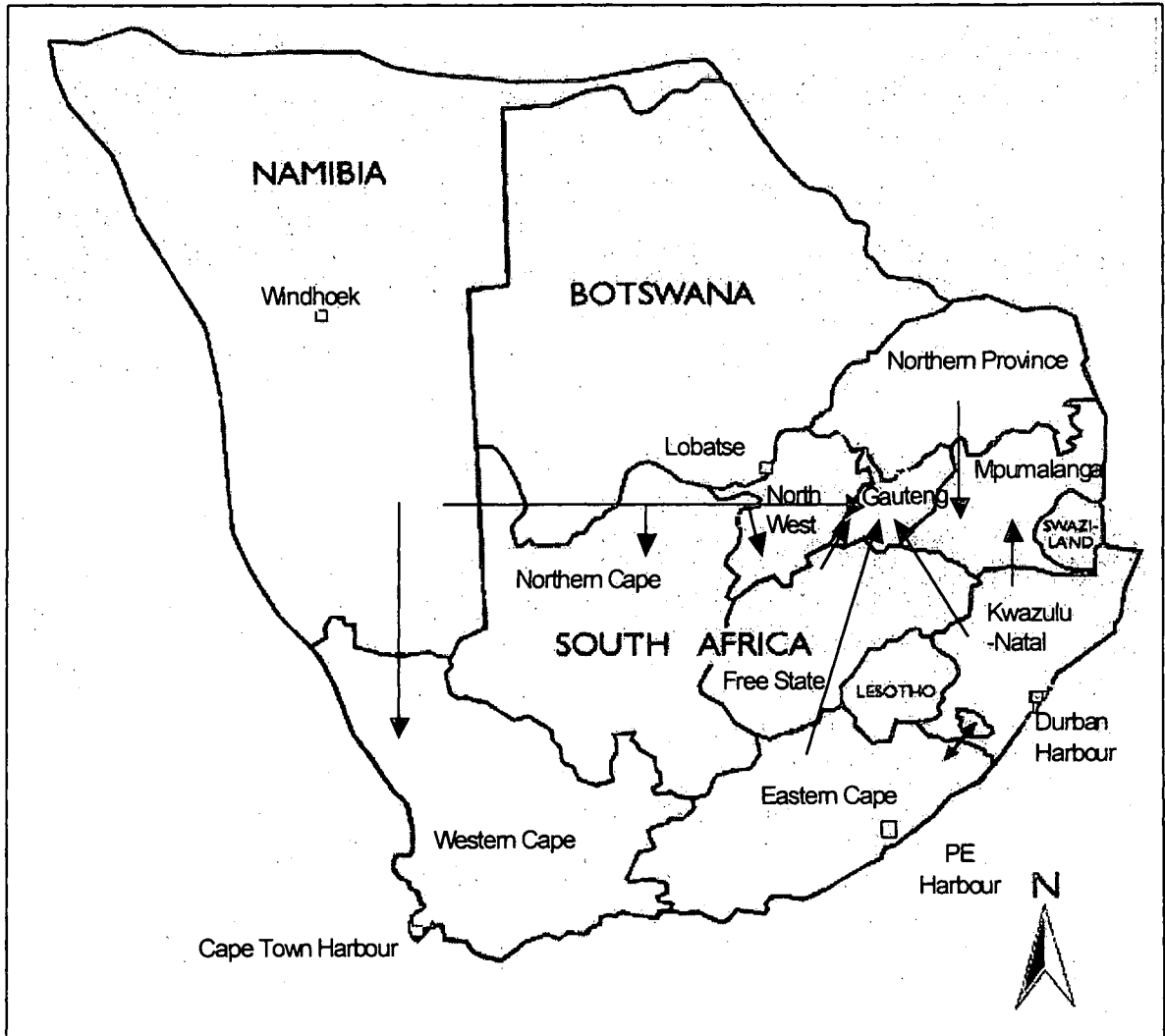
Figure 5.1: Net trans-shipment of cattle in the base run (1996)
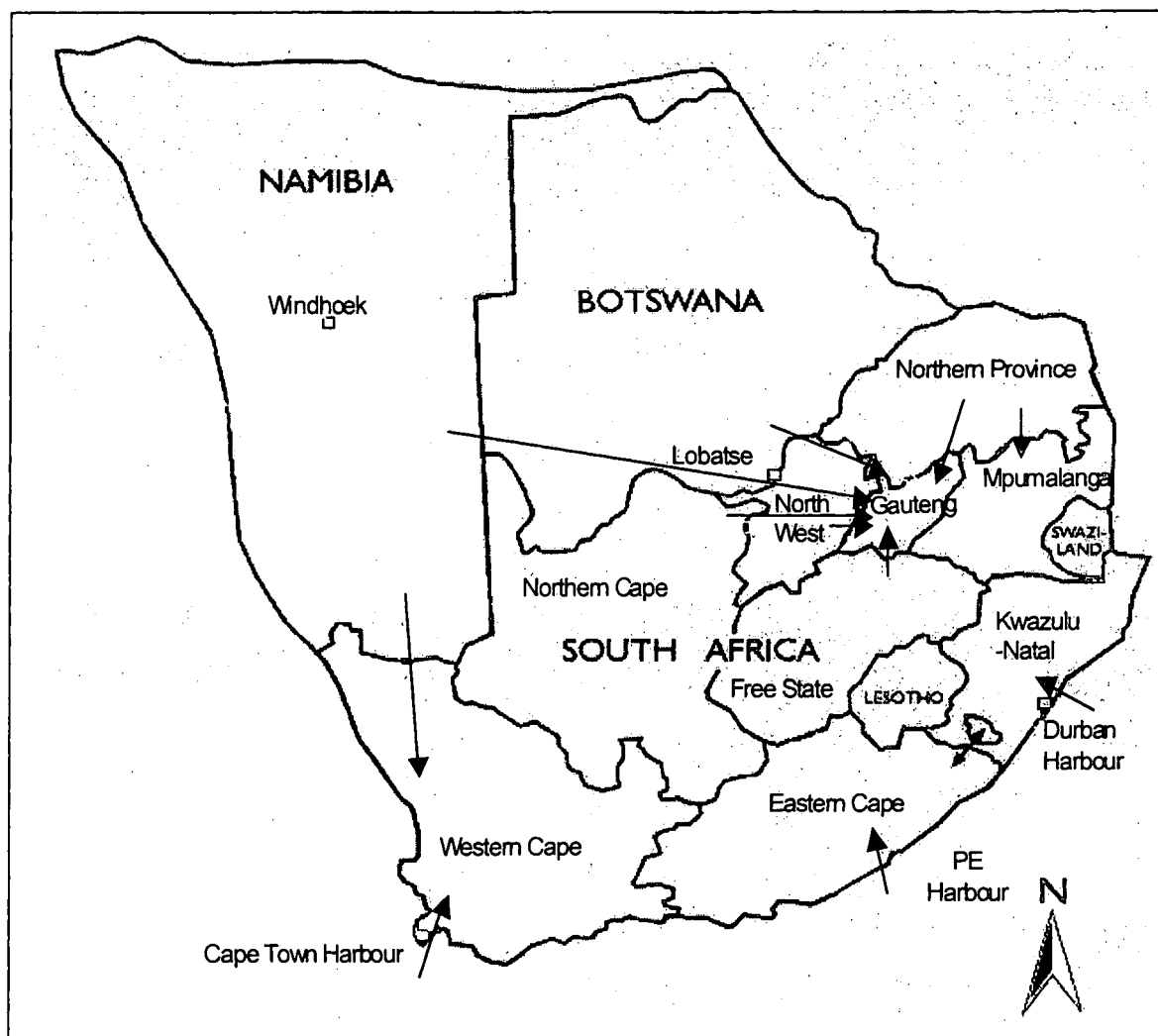
Figure 5.2: Net trans-shipment of beef in the base run (1996)

In Tables 5.4 and 5.5 the observed versus base-run results pertaining to the supply and demand of sheep and sheep meat is shown. As was the case for cattle and beef, the base-run results conformed to the observed demand and supply. With respect to sheep, the Western Cape, Northern Cape, KwaZulu-Natal, Gauteng and the North West are deficit regions. These shortages are supplemented from surplus South African regions, whilst all non-South African sheep are imported from Namibia. As far as sheep meat is concerned, the KwaZulu-Natal, Mpumalanga, Northern Province, Gauteng and North West are deficit regions. For the base-year scenario all sheep meat imports to

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satisfy domestic demand, over and above those from surplus South African regions, originated from the rest-of-the-world.

Table 5.4: Validation of sheep supply and demand

Region	Sheep supply (number)		Sheep demand (number)		Surplus/deficit
	Observed	Base run	Observed	Base run	
Western Cape	523956	523956	1297722	1297722	-773766
Northern Cape	1184503	1184503	1585265	1585265	-400762
Free State	924448	924448	584044	584044	340404
Eastern Cape	1050895	1050895	889929	889929	160966
Kwazulu-Natal	152274	152274	204434	204434	-52160
Mpumalanga	296189	296189	141310	141310	154879
Northern Province	25328	25328	22435	22435	2893
Gauteng	16638	16638	237639	237639	-221001
North West	106514	106514	145736	145736	-39222
Imports*: Namibia (number)					827769

*Equal to actual imports in 1996

Table 5.5: Validation of sheep meat supply and demand

Region	Sheep meat supply (ton)		Sheep meat demand (ton)		Surplus/deficit
	Observed	Base run	Observed	Base run	
Western Cape	22061	22061	21365	21365	696
Northern Cape	26950	26950	3739	3739	23211
Free State	9929	9929	7638	7638	2291
Eastern Cape	15129	15129	11495	11495	3634
Kwazulu-Natal	3475	3475	22571	22571	-19096
Mpumalanga	2402	2402	9510	9510	-7108
Northern Province	381	381	4084	4084	-3703
Gauteng	4040	4040	30523	30523	-26483
North West	2478	2478	6233	6233	-3755
Imports*: Rest-of-the-World (ton)					30313

*Equal to actual imports in 1996

Table 5.6 shows the deviation in observed sheep and sheep meat prices and those obtained from the base run. The absolute difference between model derived and actual sheep prices varies from 0 to 5.45 per cent. The largest deviation occurred in Gauteng, followed by Mpumalanga. For sheep meat the largest deviation occurred in the Northern Cape followed by KwaZulu-Natal. Except for the Northern Cape, the deviations are relatively small, and were expected given the model specifications.

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Table 5.6: Validation of sheep and sheep meat prices

Region	Sheep price (R/kg)			Sheep meat price (R/kg)		
	Observed	Base run	Deviation	Observed	Base run	Deviation
Western Cape	11.76	11.76	0.00%	16.59	16.61	0.13%
Northern Cape	11.12	11.00	-1.06%	14.25	16.75	17.55%
Free State	10.76	10.71	-0.55%	16.24	16.77	3.23%
Eastern Cape	10.41	10.35	-0.56%	16.80	16.69	-0.68%
Kwazulu-Natal	12.06	11.59	-3.90%	17.77	16.77	-5.62%
Mpumalanga	11.12	10.65	-4.23%	16.25	16.88	3.87%
Northern Province	11.00	10.71	-2.67%	16.30	16.88	3.55%
Gauteng	11.88	11.24	-5.45%	16.88	16.88	0.00%
North West	11.18	11.06	-1.05%	16.75	16.84	0.56%

Figures 5.3 and 5.4 show the net trans-shipment of sheep and sheep meat as determined in the base run among different regions in South Africa, as well as imports.
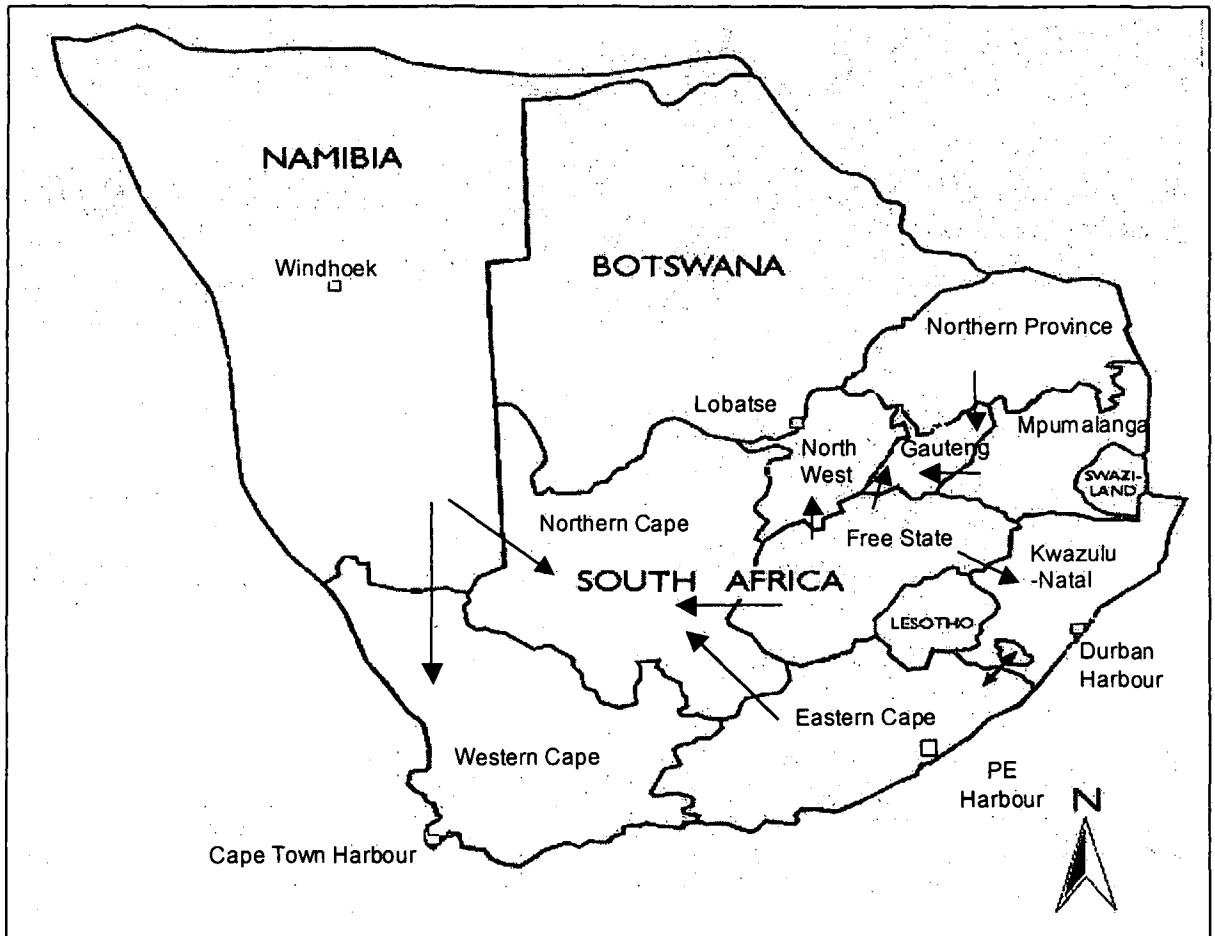
Figure 5.3: Net trans-shipment of sheep in the base run (1996)
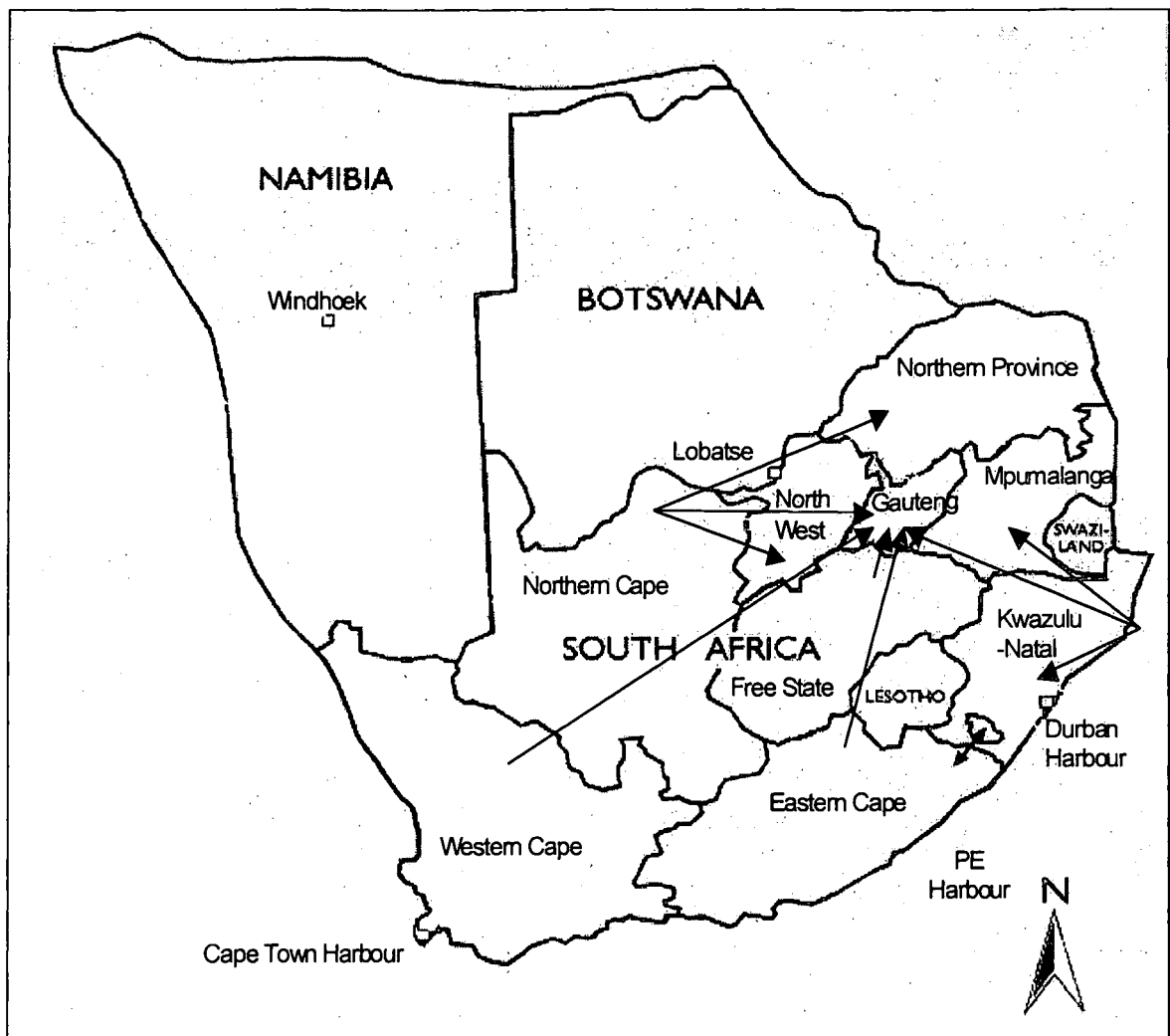
Figure 5.4: Net trans-shipment of sheep meat in the base run (1996)

Tables 5.7 and 5.8 compare between observed supply and demand of pigs and pork in different regions and supply and demand computed in the base run. Similar to the other red meats discussed, the estimated supply and demand figures conform to the observed supply and demand figures. Deficits regarding pigs exist in KwaZulu-Natal and Gauteng. Observed data suggest that no pigs are imported to South Africa.

As far as pork is concerned, the Western Cape, Northern Cape, Free Sate, Eastern Cape, Mpumalanga and North West are all deficit regions. Pork demand in these

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regions is supplemented by exports from surplus South African regions and imports from the rest-of-the-world.

Table 5.7: Validation of pig supply and demand

Region	Pig supply (number)		Pig demand (number)		Surplus/deficit
	Observed	Base run	Observed	Base run	
Western Cape	334475	334475	334475	334475	0
Northern Cape	29666	29666	25883	25883	3783
Free State	250451	250451	157838	157838	92613
Eastern Cape	159419	159419	153328	153328	6091
Kwazulu-Natal	331256	331256	372461	372461	-41205
Mpumalanga	296974	296974	70614	70614	226360
Northern Province	182505	182505	134162	134162	48343
Gauteng	296355	296355	757763	757763	-461408
North West	263320	263320	137897	137897	125423

Table 5.8: Validation of pork supply and demand

Region	Pork supply (ton)		Pork demand (ton)		Surplus/deficit
	Observed	Base run	Observed	Base run	
Western Cape	20069	20069	25251	25251	-5182
Northern Cape	1553	1553	4222	4222	-2669
Free State	9470	9470	10334	10334	-864
Eastern Cape	9200	9200	13739	13739	-4539
Kwazulu-Natal	22348	22348	18570	18570	3778
Mpumalanga	4237	4237	12197	12197	-7960
Northern Province	8050	8050	4938	4938	3112
Gauteng	45466	45466	41937	41937	3529
North West	8274	8274	8388	8388	-114
Imports*: Rest-of-the-world					10910

*Equal to actual imports in 1996

The deviation between observed prices for pigs and pork and those obtained in the base run is shown in Table 5.9. For pigs the largest deviation occurred in the Northern Cape, followed by the North West. In general, however, deviations between observed and base run prices are relatively small.

The largest difference in terms of pork prices occurred in the Eastern Cape and KwaZulu-Natal. Nevertheless deviations between observed and base-run prices are relatively small.

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Table 5.9: Validation of pig and pork prices

Region	Pigs price (R/kg)			Pork meat price (R/kg)		
	Observed	Base run	Deviation	Observed	Base run	Deviation
Western Cape	6.20	6.02	-2.96%	10.80	10.38	-3.87%
Northern Cape	5.95	5.52	-7.28%	10.53	10.49	-0.41%
Free State	5.80	5.63	-2.87%	10.20	10.46	2.51%
Eastern Cape	5.37	5.43	1.24%	11.00	10.40	-5.43%
Kwazulu-Natal	6.03	6.03	0.00%	10.93	10.31	-5.65%
Mpumalanga	5.53	5.60	1.20%	10.51	10.51	0.00%
Northern Province	5.62	5.63	0.30%	10.50	10.40	-0.91%
Gauteng	6.20	6.02	-2.96%	10.40	10.40	0.01%
North West	5.65	5.83	3.24%	10.47	10.46	-0.08%

Figures 5.6 and 5.7 show the net trans-shipment of pigs and pork among different regions in South Africa as calculated during the base run.
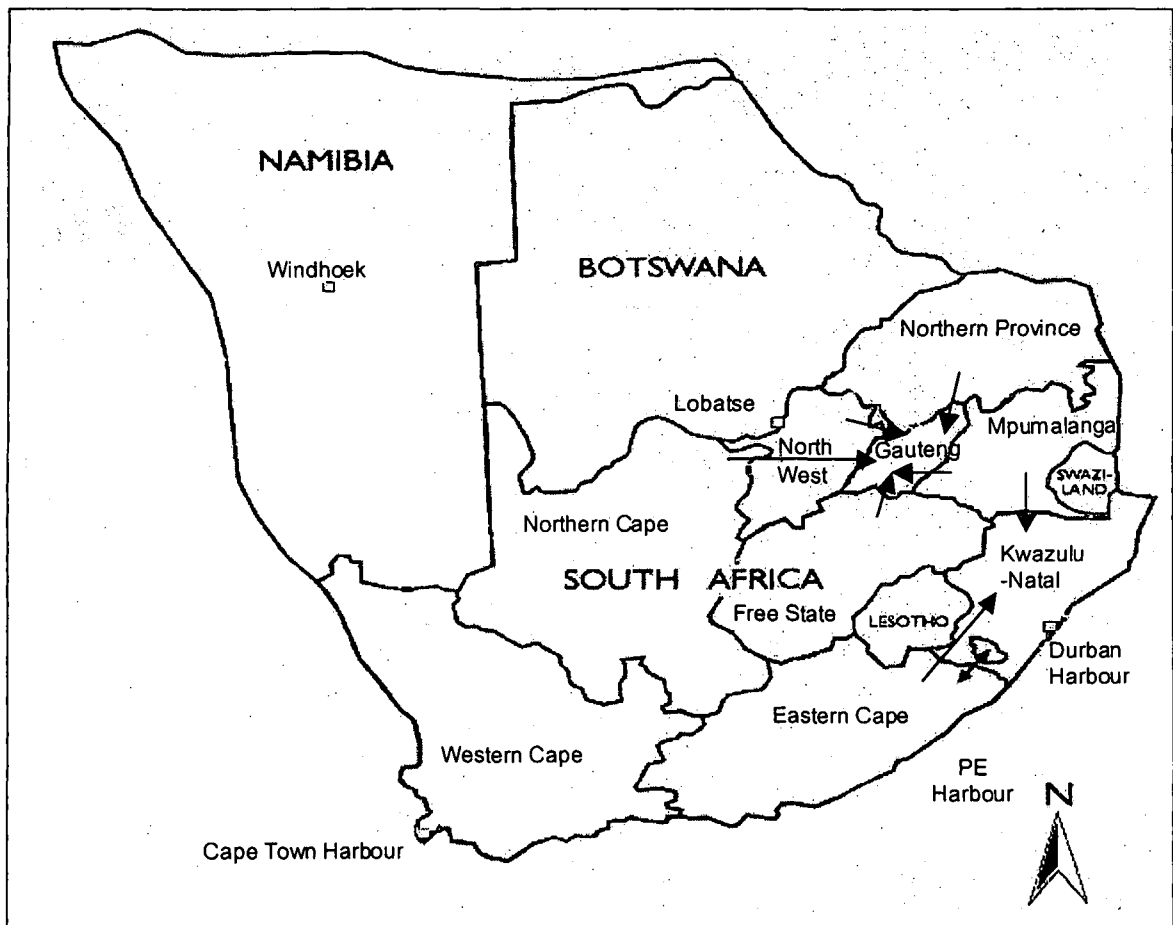
Figure 5.6: Net trans-shipment of pigs in the base run (1996)

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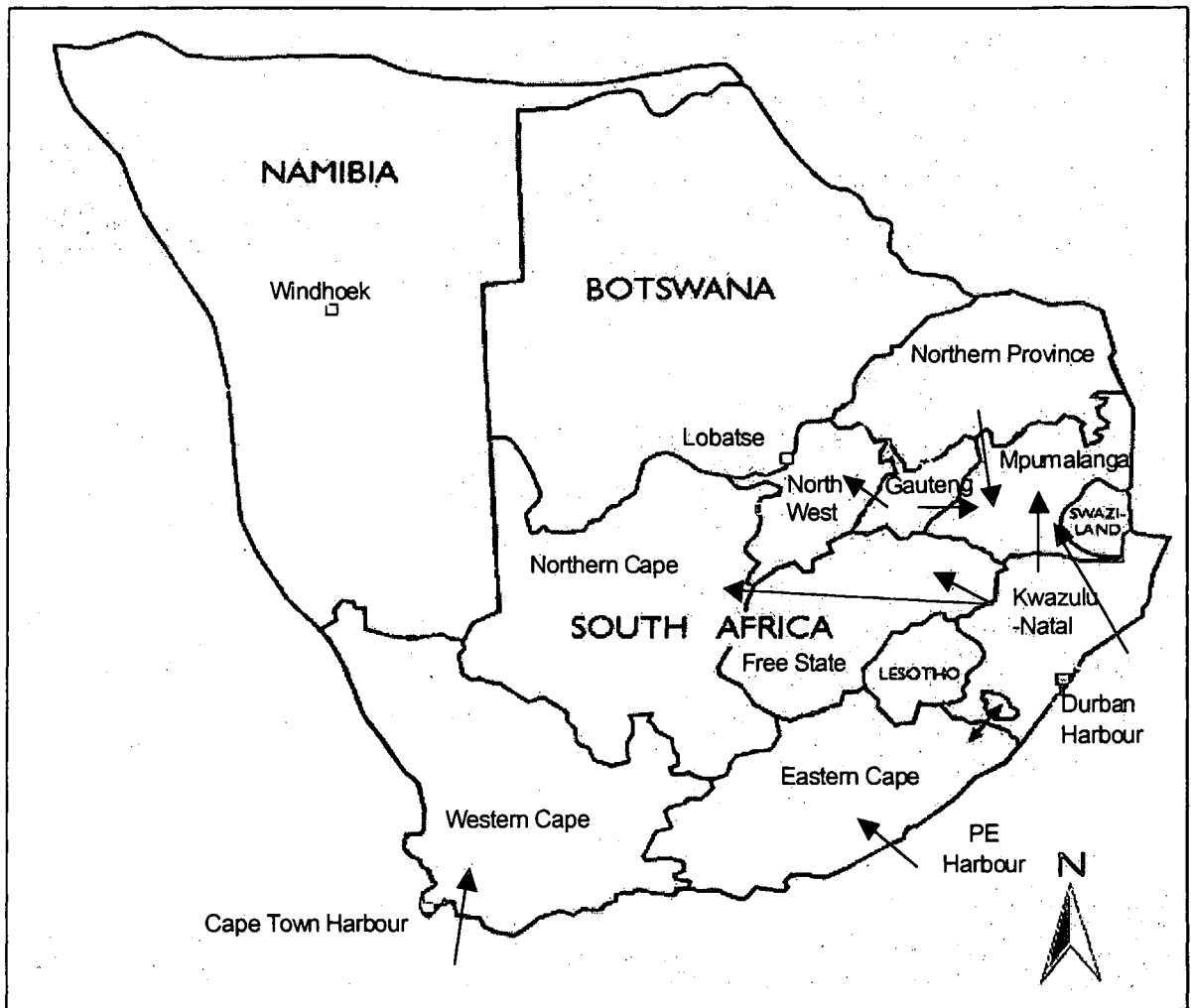
Figure 5.7: Net trans-shipment of pork in the base run (1996)

5.4 Conclusion

With respect to demand and supply of livestock and different red meat products, the base run yielded observed values. However, the validation process did not yield exactly the same prices for the different products as the observed prices. This was expected, given the above mentioned assumptions underlying the model. Nevertheless, the deviations are relatively small and hence one can conclude that the model would predict the impact of, for example policy changes, with a high degree of accuracy.

CHAPTER 6

THE IMPACT OF LIBERALISATION
ON THE RED MEAT INDUSTRY

6.1 Introduction

South Africa has clearly demonstrated its commitment to "reform" its agricultural sector in recent years. This was mainly achieved through two processes, namely deregulation and liberalisation. According to Vink (1993) the deregulation of agriculture in South Africa started as early as the late 1970's. when the financial sector was extensively liberalised following the publication of the De Kock Commission report. Since then various reforms relating to deregulation have taken place (Brand, Cristodoulou, Van Rooyen and Vink, 1992; Kassier, 1992; LAPC, 1993; Jooste and Van Zyl, 1999) that culminating in the abolishment of the agricultural control boards in 1997. One could argue that this process actually "prepared" South African agriculture for the process of liberalisation that commenced in 1995. In actual fact the main thrust towards deregulation coincided with the start of the liberalisation process. This has exerted considerable pressure on the South African agriculture to adapt to the emergence of a new marketing environment, resulting in several structural changes regarding industry organisation, agribusiness and producer level (Jooste, Van Schalkwyk, Viljoen, Meyer and Kassier, 2001).

This chapter will focus on issues that relate to the liberalisation process. Of particular importance is the issue of tariff liberalisation as discussed in Chapter 2. In addition, the possible impact of increases in world market prices for red meats due to liberalisation or a devaluation of the exchange rate will be investigated. The possible impact of the abolishment of Lomé will also be investigated.

6.2   Justification of existing tariffs applicable to red meat imports

Table 6.1 shows South Africa's commitment with regard to scaling down tariffs on red meat as stipulated in its country schedule under the WTO.

Table 6.1: Current RSA tariff regime on imports of red meat products

Tariff Line	Description of product	Base Rate %	Bound Rate %	Applied Tariff %
02.01	**Meat of Bovine Carcasses, Fresh or Chilled:**			
0201.10	-Carcasses and half carcasses	115	69	40%
0201.20	-Other cuts with bone in	115	69	40%
0201.30	-Boneless	400	160	40%
02.02	**Meat of Bovine Animals, Frozen:**			
0202.10	-Carcasses and half carcasses	115	69	40%
0202.20	-Other cuts with bone in	115	69	40%
0202.30	-Boneless	400	160	40%
02.03	**Meat of Swine, Fresh, Chilled or Frozen:**			
0203.1	-Fresh or chilled:			
0203.11	=Carcasses and half carcasses	50	37	15%
0203.12	=Hams, shoulders and cuts thereof, with bone in	50	37	15%
0203.19	=Other			
0203.19.10	- Rib	50	37	free
0203.19.90	-Other	50	37	15%
0203.2	-Frozen:			
0203.21	=Carcasses and half carcasses	50	37	15%
0203.22	=Hams, shoulders and cuts thereof, with bone in	50	37	15%
0203.29	=Other			
0203.29.10	-Rib	50	37	free
0203.29.90	-Other	50	37	15%
02.04	**Meat of Sheep or Goats, Fresh, Chilled or Frozen:**			
0204.10	-Carcasses and half-carcasses of lamb, fresh or chilled	190	95	40%
0204.2	-Other meat of sheep, fresh or chilled:			
0204.21	=Carcasses and half carcasses	190	95	40%
0204.22	=Other cuts with bone in	110	66	40%
0204.23	=Boneless	110	66	40%
0204.30	-Carcasses and half-carcasses of lamb, frozen	190	95	40%
0204.4	-Other meat of sheep, frozen			
0204.41	=Carcasses and half carcasses	190	95	40%
0204.42	=Other cuts with bone in	110	66	40%
0204.43	=Boneless	110	66	40%
0204.50	-Meat of goats	150	82	40%

In terms of the Marrakech Agreement the actual rate of duty should be phased down from a level which does not exceed the base rate to a level which does not exceed the bound rate within the specified period.
Source: NDA, 2000.

It is clear that South Africa is well within its WTO commitments. The question can, however, rightfully be asked whether tariffs on red meat imports are justifiable. The answer to this question is provided by Van Schalkwyk, Van Zyl and Jooste (1995). They regard the South African agricultural producer to be entitled to protection against the negative effects of price distorting aid measures of foreign countries on their produce prices and sales. The validity of this argument is clearly demonstrated when one compares the Producer Support Estimate (PSE) of different countries are compared. From Table 6.2 it is clear that South Africa can be regarded as one of the least subsidised countries in the world. Only New Zealand had a lower PSE than South Africa in 1998.

Table 6.2: International comparison of PSE's (1998) (percentage)

Country	PSE for 1998
New Zealand	0.80
South Africa	2.70
Australia	6.80
Hungary	11.80
Canada	16.10
Mexico	16.70
Czech Republic	17.50
USA	21.60
EU	45.30
Japan	63.20
Iceland	68.90

Source: Kirsten, Tregurtha, Gouse and Twai, 2000.

The argument made by Van Schalkwyk *et al* (1995), is also of particular importance to the South African red meat industry, especially if one takes into account the direct and indirect support afforded to, for example beef producers in the EU (see Chapter 2), South Africa's largest trading partner when it comes to red meat trade.

Table 6.3 shows the PSE's for the South African red meat industry as calculated by Kirsten *et al* (2000). They mention that government expenditure had a limited influence on the PSE results and it is expected that the percentage PSE per commodity will vary according to the market price support, which could be influenced by tariffs. In other words, the high PSE's shown for beef and sheep meat is largely due to the current tariff

dispensation for these two commodities. However, Kirsten *et al* (2000) make a very important observation in that variations in the world reference price plays an extremely important role in PSE calculations. For example, the PSE for beef and veal shown in Table 6.3 was calculated by using the average price (or unit value) of low-quality meat imports from the EU. If the reference price is changed to EU FOB prices (good-quality beef) the 1998 PSE changes to –61.73 per cent from +21.20 per cent. Similarly, using the international world unit value for sheep cuts (bone in, frozen) the PSE changes to +19.18 per cent from +49.28 per cent.

Table 6.3: PSE's for red meat in South Africa (1996 - 1998) (percentage)

Product	1996	1997	1998
Beef and Veal	10.77	13.64	21.20
Pork	-27.43	-11.99	-0.03
Sheep meat	47.66	40.36	49.28

Source: Kirsten *et al*, 2000.

Table 6.4 shows the PSE for red meat in selected OECD countries. Beef and sheep producers in the EU receive the highest subsidies as measured by the PSE, followed distantly by the US, Australia and New Zealand. EU pork producers, on the other hand, are not afforded the same luxuries. In fact Table 6.4 shows that, of the three red meats, pork is the least subsidised in the world with recorded PSE's of lower than 10 per cent since 1996. On average Canada recorded the highest PSE's for pork. From Table 6.4 it is evident that New Zealand is the least subsidised country as far as all three commodities are concerned.

Table 6.4: Red meat PSE's for selected countries in the world (1996 – 1998)

Country	1996	1997	1998
Beef			
EU	43	55.4	61.7
Australia	5.5	4.1	3.7
US	2.8	3	3.9
New Zealand	1.3	1	0.9
Sheep			
EU	66.4	63.9	64.7
Australia	4.6	3.8	3.5
US	4	4.2	3.9
New Zealand	0.3	0.3	0.4
Pork			
EU	1	1.8	7.8
Australia	3.1	3.3	3.2
US	3.1	3.4	3.3
New Zealand	2.3	2.2	2.3
Canada	7	4.6	6

Source: OECD, 1998b.

It should be clear from the above that, taking into account the sensitivity of PSE's to changes in the reference price used, the PSE's for beef and pork compares very favourably with that recorded for the major overseas producers of these commodities, and hence the level of tariffs could be justified. On the other hand, the PSE's calculated for sheep meat do not compare very favourably with countries like Australia and New Zealand, South Africa's major trading partners as far as sheep meat is concerned. These two countries could argue that the 40 per cent tariff applicable to sheep meat imports is too high. However, one should consider the following factors:

• The MFN principle does not allow countries to discriminate against each other on the basis of tariffs, i.e. South Africa is not allowed to lower sheep meat tariffs only for Australia or New Zealand. A reduction in tariffs will have to apply all other countries, which will increase import competition considerably.

• When considering reductions in tariffs, one should also consider the impact on related industries. The reason for this is the strong cross-price effects evident in the red meat industry. In other words, a drop in tariffs for sheep meat will also have a considerable influence on the beef and pork industries, which can't

be justified on the basis that the PSE's for these two red meats compare favourably as far as the countries that are shown in Table 5.4 are concerned.

- Since the democratic elections in 1994 Government has redirected its efforts in the agricultural sector to place much more emphasis on the developing agricultural sector as this sector was largely neglected previously. Regarding sheep, between 11 and 12 per cent of the total herd belongs to small-scale or emerging farmers. Of these farmers, 84 per cent reside in the Eastern Cape. In other words, a reduction in tariffs will greatly diminish efforts by Government to enhance sheep production among small-scale and emerging farmers, especially in the Eastern Cape. Added to this are the recent successes achieved in the wool industry as far as small-scale and emerging farmers are concerned (Moore, 2001). A reduction in tariffs will undoubtedly also have a negative impact on the developmental efforts in the wool industry since sales of sheep supplement the income obtained from wool.

- The fact that South Africa is part of the SACU and the SADC should also be considered. A reduction in sheep meat tariffs will have wide ranging repercussions in the southern African region as a whole, especially for Namibia.

It is clear from the above that tariffs on sheep meat imports can't merely be reduced on the basis that the PSE for the sheep industry does not compare favourably. In fact, these issues also hold for the beef and pork subsectors, even though their PSE's are favourable. A wide range of issues need to be considered. Van Schalkwyk et al (1995) also mention that the consumer may rightfully claim that food should be as cheap as possible, which implies that it may also be imported if this is cheaper than the locally produced product. The availability of affordable food within a policy of food security is also a priority of the current government. The question may therefore rightfully be asked about the extent to which the interests of producers and consumers differ or coincide.

According to Van Schalkwyk et al (1995), the objectives of consumers and of producers are, viewed over the longer term, not necessarily opposed to each other, but may be

identical. This view must be seen in the light of factors influencing local producers' competitiveness *vis-à-vis* imported commodities, as well as how these factors are likely to vary in future. Van Schalkwyk *et al* (1995) regard the two main factors that will undoubtedly influence local competitiveness of local producers *vis-à-vis* imported products to be the world price of that product and the exchange rate (the impact of both of these factors will be quantified in this chapter). They pointed out that, in the medium to long term, it is in the consumer's interest to have locally produced products available because it will probably be competitive with imported products in the long term in view of the expected trend in world prices and exchange rates. In Chapter 2 the possible impact of liberalisation on world red meat prices was discussed. Several studies have shown that red meat prices are expected to increase considerably due to liberalisation. In other words, large-scale imports at lower prices could destroy current production capacity to such an extent that the red meat industry may not be able to meet demand in the near future when competitiveness has recovered. This entails that concentration on only a short-term view will not be in the interest of neither consumers nor producers of red meat.

Several issues were discussed above that need to be quantified, e.g. the impact of a reduction in tariffs, an increase in the world price of red meat and the possible effect of a depreciation in the exchange rate. In addition, the possible impact of changes in population combined with a reduction in tariffs will also be quantified. This will be done in the following sections using the model developed in Chapter 4.

6.3 The impact of a total reduction in tariffs

6.3.1 Theoretical principles of applying tariffs

The discussion in Chapter 2 only considered a trade regime where price formation takes place in the absence of any trade distortion measures such as tariffs, quotas, etc. This assumption is somewhat unrealistic, since the measures that distort trade are widely applied all over the world. The discussion of the theoretical concept underpinning trade in a world characterised by such measures will be restricted to a

small country case. This entails that the share of a small country in world imports, which is typically the case of the South African livestock sector, will affect the level of world supply negligible. In other words, meat imports from South Africa will not have any significant impact on world supplies of meat and, hence not on world prices. This situation is depicted in Figure 6.1. The small nation characteristic is reflected by the horizontal excess supply function for the rest-of-the-world, **ES(R)**.

If no trade distortion measures are applied by country A, the international and domestic price in country A will be equal to P_1. At price P_1 production in and imports to country A will equate to **ab** and **bc**, respectively. This brings total consumption in country A to **ac**. Note that the intersection of the excess demand curve, **ED**, and the excess supply curve, **ES(R)**, represent total imports into country A, i.e. **bc** is equal to **df**.
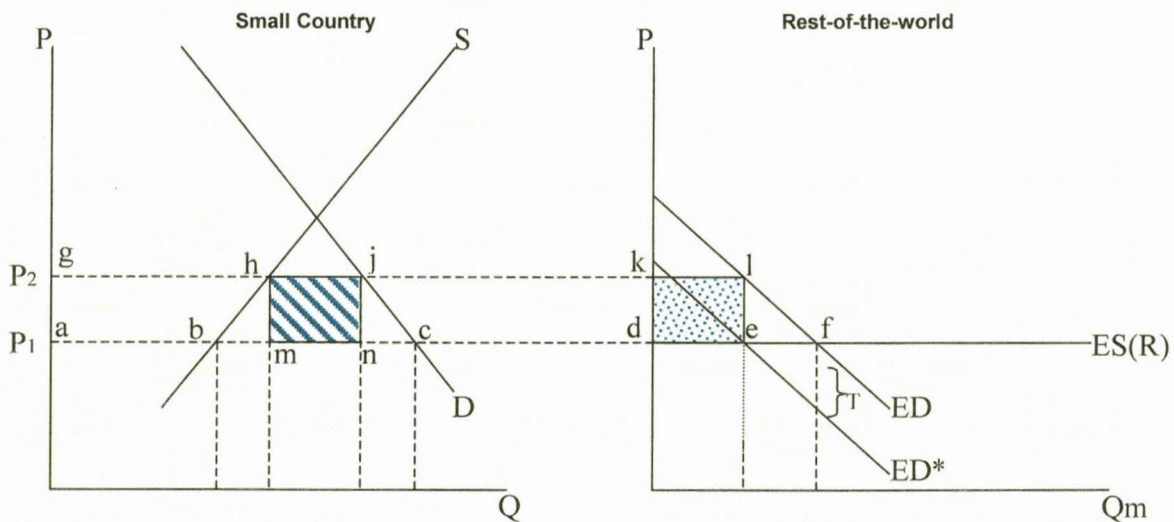
Figure 6.1: Effects of an import tariff: A small nation case
Source: Houck, 1992.

However, suppose the government in country A decides to restrict imports from the rest of the world by means of a specific tariff, **T**. The effect of this restriction is that the per unit price of the product will increase, more specifically $P_1 + T = P_2$. In line with micro-economic theory, demand for the product in country A will decrease (**ac** to **gj**), whilst supply will increase (**ab** to **gh**). The level of imports in country A will also decline from **bc** to **hj**. The reason for these changes can be traced back to a displacement of the excess demand curve, **ED**, to a new position represented by the tariff-burdened excess

demand curve, **ED***. The result is a reduction in imports of **ef (df − de)**. Lower imports cause domestic prices in country A to increase along the original excess demand curve, **ED**. Thus, the result of the specific tariff is that domestic consumers in country A have to face higher priced **(P₂)** imports ("international price") and will hence reduce their consumption of the product. Producers in country A will take advantage of the increase in price and start to produce more of the product.

The above discussion focussed mainly on the shifts in demand, supply and prices as a result of the imposition of a tariff. Cognisance should, however, also be taken of the resulting welfare effects, i.e. the changes in consumer and producer surplus. The total change in welfare is represented by area **agjc**. As the discussion becomes clearer it will be evident that that there are losers and winners as a result of imposing a tariff. Producers will gain area **aghb,** which could be translated as an increase in producer surplus. The area **mhjn** that is taken away from consumers is transferred to the government in the form of tariff revenues. On the other hand, the area **bhm** lost by consumers goes to sellers of variable inputs. In other words, for producers to be able to expand production by **hb**, they will need to purchase additional variable inputs. These additional resources needed to expand production will not be available to other sectors, which constitute an opportunity cost, and hence area **bhm** can be considered as a deadweight loss. For this reason area **bhm** represents a decline in production efficiency. Area **jnc** is not redistributed to anyone in the economy and is also regarded as a deadweight loss, since it represents a real income loss to consumers.

The above discussion may give the impression wrongly that trade distortion measures such as tariffs are all bad. However, there may be good reasons for imposing tariffs, or other trade restrictions, on imported goods. Houck (1992) mentions the following reasons why countries impose trade restrictions:

- Protection of a new industry;
- to protect national security;
- to protect national health;

- protection against unfair foreign trade policy;
- to protect domestic programs;
- to protect balance of payments;
- improvement of international terms of trade;
- to provide revenue; and
- protection against painful economic adjustment.

Although not all of the above reasons apply to the South African red meat industry, constructive and valid arguments have already been made in Section 6.2 regarding protection against unfair foreign trade policy, protection of domestic programs and protection against painful economic adjustment.

6.3.2 The impact of zero tariffs

The impact of zero tariffs on red meat imports is derived by comparing the base-run situation discussed in Chapter 4 with a situation where all tariffs have been reduced to zero.

Table 6.5 shows the impact of zero tariffs on the cattle subsector in different provinces in South Africa. In total, cattle numbers will reduce by 6.03 per cent or 118 989. The number of cattle slaughtered will reduce by 6.75 per cent or 151 931 animals. Producer prices will decline by 21.11 per cent or R1,60 per kg. The Eastern Cape and KwaZulu-Natal will experience the greatest fall in prices. The reason for mentioning this is that in these two provinces the number of cattle in the hands of small-scale or emerging farmers exceeds that of commercial farmers. Hence, efforts to commercialise the small-scale cattle industry should obviously start in these provinces, but any such efforts will be seriously hampered by zero tariffs.

Table 6.5: The impact of zero tariffs on the cattle industry

Region	Cattle supply (number)			Cattle demand (number)			Producer price(R/kg)		
	Base run	Scenario	Change	Base run	Scenario	Change	Base run	Scenario	change
Western Cape	82407	78253	-5.04%	146647	136307	-7.05%	7.70	6.10	-20.72%
Northern Cape	80437	75362	-6.31%	123686	115696	-6.46%	7.50	5.90	-21.27%
Free State	363323	341072	-6.12%	214892	201502	-6.23%	7.49	5.90	-21.30%
Eastern Cape	337208	318171	-5.65%	263475	244539	-7.19%	7.35	5.75	-21.71%
Kwazulu-Natal	406158	381942	-5.96%	363961	337926	-7.15%	7.45	5.85	-21.42%
Mpumalanga	230499	216274	-6.17%	273306	255474	-6.52%	7.69	6.09	-20.76%
Northern Province	170197	159919	-6.04%	137180	128873	-6.06%	7.61	6.01	-20.97%
Gauteng	44642	41958	-6.01%	447720	417618	-6.72%	7.65	6.05	-20.87%
North West	257878	240809	-6.62%	281008	262009	-6.76%	7.59	6.00	-21.02%
Total	1972749	1853760	-6.03%	2251875	2099944	-6.75%	7.56	5.96	-21.11%
Deviation	-118989			-151931			-1.60		

Table 6.6 shows the impact of a zero tariff scenario on the beef subsector in South Africa. Beef prices will, on average, decline by 27.88 per cent, whilst beef supply will decline by 8.11 per cent. Conversely, demand will increase substantially as a result of lower beef prices. The combined effect of a reduction in beef supply domestically and an increase in beef demand entails a drastic increase in imports.

Table 6.6: The impact of zero tariffs on the beef industry

Region	Beef supply (ton)			Beef demand (ton)			Beef price (R/kg)		
	Base run	Scenario	change	Base run	Scenario	Change	Base run	Scenario	change
Western Cape	25663	23503	-8.42%	63445	85183	34.26%	12.77	9.12	-28.55%
Northern Cape	21645	19954	-7.81%	11917	15862	33.10%	12.67	9.18	-27.59%
Free State	37606	34759	-7.57%	34075	45187	32.61%	12.69	9.24	-27.17%
Eastern Cape	46108	42151	-8.58%	50208	67381	34.20%	12.79	9.15	-28.50%
Kwazulu-Natal	63693	58253	-8.54%	69826	93757	34.27%	12.77	9.12	-28.56%
Mpumalanga	47829	44067	-7.87%	48620	64739	33.15%	12.78	9.25	-27.63%
Northern Province	24006	22235	-7.38%	22297	29500	32.30%	12.70	9.28	-26.92%
Gauteng	78351	72023	-8.08%	125265	167214	33.49%	12.80	9.23	-27.91%
North West	49176	45183	-8.12%	28920	38651	33.65%	12.74	9.17	-28.04%
Total	394077	362128	-8.11%	454573	607474	33.64%	12.74	9.19	-27.88%
Deviation	-31949			152901			-3.55		

Table 6.7 shows the impact of a zero tariff scenario on the sheep subsector.

Table 6.7: The impact of zero tariffs on the sheep industry

Region	Sheep supply (number)			Sheep demand (number)			Producer price (R/kg)		
	Base run	Scenario	change	Base run	Scenario	change	Base run	Scenario	change
Western Cape	523956	498423	-4.87%	1297722	1232018	-5.06%	11.76	10.24	-13.00%
Northern Cape	1184503	1113382	-6.00%	1585265	1498747	-5.46%	11.00	9.47	-13.90%
Free State	924448	877864	-5.04%	584044	552386	-5.42%	10.71	9.18	-14.29%
Eastern Cape	1050895	999062	-4.93%	889929	841838	-5.40%	10.35	8.82	-14.77%
Kwazulu-Natal	152274	144756	-4.94%	204434	193514	-5.34%	11.59	10.06	-13.20%
Mpumalanga	296189	280462	-5.31%	141310	133532	-5.50%	10.65	9.12	-14.36%
Northern Province	25328	24021	-5.16%	22435	21203	-5.49%	10.71	9.18	-14.29%
Gauteng	16638	15775	-5.19%	237639	224831	-5.39%	11.24	9.71	-13.61%
North West	106514	101166	-5.02%	145736	137822	-5.43%	11.06	9.53	-13.83%
Total	4280745	4054911	-5.28%	5108514	4835891	-5.34%	11.01	9.48	-13.90%
Deviation	-225834			-272623			-1.53		

The supply of sheep and the number of sheep slaughtered are expected to decrease by 5.28 per cent and 5.34 per cent, respectively. On average sheep prices are expected to drop by 13.90 per cent, with the largest decline in the Eastern Cape where, as stated previously, the number of sheep that reside in the hands of small-scale farmers are the largest. The results therefore provide proof for the argument made in Section 5.2 that a reduction in tariffs could seriously impede on development efforts in the sheep industry.

Table 6.8 shows the impact of a total reduction of tariffs on the sheep meat subsector. Demand will increase substantially. This, combined with a decline in sheep meat supply, would result in an increase in sheep meat imports. The reason for this state of affairs could be traced back to the fact that, on average, sheep meat prices will decline by 28.56 per cent as a result of the removal of the tariff.

Table 6.8: The impact of zero tariffs on the sheep meat industry

Region	Sheep meat supply (ton)			Sheep meat demand (ton)			Sheep meat price (R/kg)		
	Base run	Scenario	change	Base run	Scenario	Change	Base run	Scenario	change
Western Cape	22061	20825	-5.60%	21365	32951	54.23%	16.61	11.95	-28.09%
Northern Cape	26950	25325	-6.03%	3739	5820	55.66%	16.75	11.92	-28.84%
Free State	9929	9334	-5.99%	7638	11838	54.99%	16.77	11.99	-28.49%
Eastern Cape	15129	14224	-5.98%	11495	17770	54.59%	16.69	11.97	-28.28%
Kwazulu-Natal	3475	3270	-5.90%	22571	35120	55.60%	16.77	11.94	-28.80%
Mpumalanga	2402	2256	-6.08%	9510	14764	55.25%	16.88	12.05	-28.62%
Northern Province	381	358	-6.04%	4084	6340	55.24%	16.88	12.05	-28.62%
Gauteng	4040	3799	-5.97%	30523	47385	55.24%	16.88	12.05	-28.62%
North West	2478	2329	-6.01%	6233	9683	55.35%	16.84	12.01	-28.68%
Total	86845	81720	-5.90%	117158	181671	55.06%	16.79	11.99	-28.56%
Deviation	-5125			64513			-4.79		

Table 6.9 and 6.10 show the impact of a reduction of tariffs on the pig and pork industries, respectively. The number of pigs demanded for slaughter is expected to decrease by 4.64 per cent on average. The supply of pigs will decline with the same percentage. Pig prices will drop by 11.99 per cent on average or R0.69 per kg.

Pork prices will decrease by 13.16 per cent as a result of a zero tariff on pork imports. This will, in turn, stimulate domestic demand for pork, but depress the supply of pork, resulting in increased imports of pork.

Table 6.9: The impact of zero tariffs on the pig industry

Region	Pig supply (number)			Pig demand (number)			Producer price (R/kg)		
	Base run	Scenario	Change	Base run	Scenario	Change	Base run	Scenario	Change
Western Cape	334475	318787	-4.69%	334475	318787	-4.69%	6.02	5.28	-12.19%
Northern Cape	29666	27941	-5.81%	25883	24628	-4.85%	5.52	4.83	-12.39%
Free State	250451	238315	-4.85%	157838	150241	-4.81%	5.63	4.95	-12.13%
Eastern Cape	159419	152613	-4.27%	153328	145355	-5.20%	5.43	4.75	-12.58%
Kwazulu-Natal	331256	316260	-4.53%	372461	355566	-4.54%	6.03	5.35	-11.33%
Mpumalanga	296974	283222	-4.63%	70614	67006	-5.11%	5.60	4.92	-12.20%
Northern Province	182505	173882	-4.72%	134162	127279	-5.13%	5.63	4.95	-12.13%
Gauteng	296355	282902	-4.54%	757763	724594	-4.38%	6.02	5.33	-11.36%
North West	263320	250994	-4.68%	137897	131462	-4.67%	5.83	5.15	-11.71%
Total	2144421	2044916	-4.64%	2144421	2044918	-4.64%	5.75	5.06	-11.99%
Deviation	-99505			-99503			-0.69		

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Table 6.10: The impact of zero tariffs on the pork industry

Region	Pork supply (ton)			Pork demand (ton)			Pork price (R/kg)		
	Base run	Scenario	Change	Base run	Scenario	change	Base run	Scenario	change
Western Cape	20069	18961	-5.52%	25251	31598	25.14%	10.38	8.98	-13.51%
Northern Cape	1553	1465	-5.67%	4222	5243	24.18%	10.49	9.12	-13.01%
Free State	9470	8937	-5.63%	10334	12840	24.25%	10.46	9.09	-13.04%
Eastern Cape	9200	8644	-6.04%	13739	17185	25.08%	10.40	9.00	-13.49%
Kwazulu-Natal	22348	21157	-5.33%	18570	23048	24.11%	10.31	8.98	-12.97%
Mpumalanga	4237	3985	-5.95%	12197	15226	24.83%	10.51	9.11	-13.35%
Northern Province	8050	7570	-5.96%	4938	6176	25.07%	10.40	9.00	-13.49%
Gauteng	45466	43121	-5.16%	41937	51823	23.57%	10.40	9.08	-12.67%
North West	8274	7822	-5.46%	8388	10404	24.03%	10.46	9.11	-12.92%
Total	128667	121662	-5.44%	139576	173543	24.34%	10.42	9.05	-13.16%
Deviation	-7005			33967			-1.37		

Table 6.11 shows the welfare implications of a total reduction of tariffs on the red meat industry. It is clear that consumers will experience considerable welfare increases. The largest gains will be accrued by Gauteng, KwaZulu-Natal, the Western Cape and the Eastern Cape. In total, welfare gains by consumers due to a total reduction of tariffs will amount to R2 829 mio. This translates into a 0.49 per cent increase in the real gross national income, which is very low. In respect of real disposable income, a total reduction of tariffs would add a mere 0.75 per cent. However, cognisance should be taken of the fact that a considerable proportion of the gains by consumers are merely a transfer from the national treasury to consumers. This transfer is represented by area **mhjn** in Figure6.1. Table 6.11 furthermore shows that producers will experience a drop in welfare if tariffs are reduced. The provinces that will experience the largest decline in producer welfare are the Free State, KwaZulu-Natal and the Eastern Cape. This is to be expected since these provinces contribute the largest proportion to livestock production. The total loss in producer welfare would amount to R868 mio. The loss in producer welfare amounts to 2.71 per cent of real gross farm income and 10.72 per cent of real net farm income, which is substantial.

It is clear that a reduction of tariffs in the red meat industry would result in net welfare gains to society which are relatively small, but that the impact on the agricultural sector would be substantial. Nevertheless note should be taken that the above results do not

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provide an overall insight into welfare gains or losses. The wider economic implications can only be investigated by a much more complicated model within the CGE framework, that falls beyond the scope of this study.

Table 6.11: Change in welfare as a result of a total reduction in tariffs

Region	Consumer surplus	Producer surplus
	Total monetary change (Million rand)	
Western Cape	438	-56
Northern Cape	78	-59
Free State	199	-157
Eastern Cape	305	-148
Kwazulu-Natal	465	-156
Mpumalanga	278	-98
Northern Province	122	-66
Gauteng	772	-28
North West	172	-101
South Africa	2 829	-868

The results discussed above clearly show the impact of a zero tariff situation on the domestic red meat sector. Not only will such a situation depress prices, but it will substantially reduce red meat production in South Africa, which could lead to income and job losses in the red meat industry. As mentioned in Section 6.2, the efforts by Government to commercialise or to improve the livelihoods of small-scale or emerging farmers could be hampered.

Another issue of importance that relates to the results shown in this section is that South Africa clearly demonstrated its willingness to participate in FTA's, of which the SADC and EU-SA FTA's are the most recent examples. Government also made its intentions to negotiate a FTA with the MERCOSUR countries clear. The question that arises is what will be the impact if a decision is made to grant red meat imports preferential access under such agreements. Depending on the specific agreement, it could result in a two-tier situation. Firstly, if a portion of red meat imports is allowed to enter South Africa at lower tariffs it would in principle have no or a very small impact on prices and quantities demanded and supplied. The reason for this is the fact that the marginal import tariff remains unchanged. In other words, only if the last ton of imports

enters South Africa at a lower tariff than formally applied there would be significant changes in prices and quantities. Secondly, within a FTA situation this could transpire easily. For instance, should South Africa allow MERCOSUR to export beef to South Africa at lower or no tariffs, it could mean that prices and quantities demanded and supplied will change from the *status quo* situation if MERCOSUR are in a position to fully meet South Africa's import requirements. This is not a far fetched scenario if one considers the increase in imports from these countries over the last two years. Should they, for example, only meet three-quarters of the import demand, the rest could easily be supplied by other countries with whom South Africa also has FTA's, such as the SADC and the EU – in the latter case agreements duty free or lower duties on, for instance, beef imports, must still be negotiated since it was put on the reserve list when the EU-SA FTA was concluded in 2000. Should South Africa grant the MERCOSUR countries preferential access to the South African red meat market, one can expect the EU to press hard for the same preferential access during the next round of negotiations. Given the powerful negotiating position of the EU it would be very difficult not to grant the EU the same preferential access. Hence, South Africa should carefully consider its tariff "strategy" when granting preferential access to its red meat market since preferential access to too many trade partners could result in a lower marginal tariff that will affect the red meat industry negatively.

6.4 The impact of an increase in the world price of red meat commodities

In Chapter 2 various studies were cited that indicated that world red meat prices are expected to increase due to the world-wide liberalisation of policies applied to the red meat sector. In this section the possible impact of such increases on the South African red meat sector will be quantified under the assumption that the price transmission from the rest of the world takes on the same magnitude as that between regions within South Africa. This may be a rigorous assumption but due to a paucity of data this assumption will have to suffice.

It should be noted that the price increases projected in the studies cited in Chapter 2 for beef, sheep meat and pork are higher than the price increase used. The reason for this is he fact that simulations of different price increases showed that a price increase above 10 per cent for beef, 18 per cent for mutton and 6 per cent for pork will result in zero imports, thus stabilising the domestic market through domestic demand and supply forces. Also note that the price increases are over and above the tariff that is applied. Table 6.12 shows the impact of a 10 per cent increase in the world price of beef on the cattle subsector. Producer prices will, on average, increase by 4.81 per cent. There will also be an increase in the number of cattle supplied and the number of cattle slaughtered. The increase in the number of cattle slaughtered can be derived from the fact that higher beef prices in the secondary industry create an incentive to supply more beef from domestic sources. This in turn creates a higher demand for slaughtered animals.

Table 6.12: The impact of a 10 per cent increase in the world price of beef on the cattle subsector

Region	Cattle supply (number)			Cattle demand (number)			Producer price (R/kg)		
	Base run	Scenario	change	Base run	Scenario	change	Base run	Scenario	change
Western Cape	82407	83357	1.15%	146647	149860	2.19%	7.70	8.06	4.72%
Northern Cape	80437	81598	1.44%	123686	125860	1.76%	7.50	7.86	4.85%
Free State	363323	368412	1.40%	214892	218469	1.66%	7.49	7.85	4.85%
Eastern Cape	337208	341562	1.29%	263475	266580	1.18%	7.35	7.71	4.95%
Kwazulu-Natal	406158	411696	1.36%	363961	368892	1.35%	7.45	7.81	4.88%
Mpumalanga	230499	233752	1.41%	273306	276205	1.06%	7.69	8.05	4.73%
Northern Province	170197	172547	1.38%	137180	139206	1.48%	7.61	7.97	4.78%
Gauteng	44642	45256	1.38%	447720	454292	1.47%	7.65	8.01	4.76%
North West	257878	261782	1.51%	281008	285156	1.48%	7.59	7.95	4.79%
Total	1972749	1999962	1.38%	2251875	2284520	1.45%	7.56	7.92	4.81%
Deviation	27213			32645			0.36		

The impact of a 10 per cent increase in the world price for beef on the South African beef subsector is shown in Table 6.13. Beef prices will increase by 6.35 per cent on average, whilst the demand for beef will drop by 7.59 per cent. Supply of beef will, on average, increase by 1.76 per cent.

Table 6.13: The impact of a 10 per cent increase in the world price of beef on the beef sub-sector

Region	Beef supply (ton)			Beef demand (ton)			Beef price (R/kg)		
	Base run	Scenario	change	Base run	Scenario	change	Base run	Scenario	change
Western Cape	25663	26314	2.54%	63445	57724	-9.02%	12.77	13.73	7.52%
Northern Cape	21645	22096	2.08%	11917	10947	-8.14%	12.67	13.53	6.79%
Free State	37606	38352	1.98%	34075	31369	-7.94%	12.69	13.53	6.62%
Eastern Cape	46108	46787	1.47%	50208	46748	-6.89%	12.79	13.53	5.75%
Kwazulu-Natal	63693	64749	1.66%	69826	64749	-7.27%	12.77	13.54	6.06%
Mpumalanga	47829	48472	1.34%	48620	45362	-6.70%	12.78	13.50	5.59%
Northern Province	24006	24435	1.79%	22297	20608	-7.58%	12.70	13.50	6.31%
Gauteng	78351	79741	1.77%	125265	115850	-7.52%	12.80	13.60	6.27%
North West	49176	50053	1.78%	28920	26736	-7.55%	12.74	13.54	6.30%
Total	394077	400999	1.76%	454573	420093	-7.59%	12.74	13.55	6.35%
Deviation	6922			-34480			0.81		

Table 6.14 shows the impact of a 18 per cent increase in the world price of sheep meat on the sheep sub-sector. Sheep supply and the number of sheep slaughtered are expected to increase by 2.18 per cent and 2.19 per cent, respectively. Producer prices for sheep will, on average, increase by 5.88 per cent.

Table 6.14: The impact of a 18 per cent increase in the world price of sheep meat on the sheep sub-sector

Region	Sheep supply (number)			Sheep demand (number)			Producer price (R/kg)		
	Base run	Scenario	change	Base run	Scenario	change	Base run	Scenario	change
Western Cape	523956	534484	2.01%	1297722	1325277	2.12%	11.76	12.41	5.50%
Northern Cape	1184503	1213828	2.48%	1585265	1619650	2.17%	11.00	11.65	5.88%
Free State	924448	943656	2.08%	584044	596978	2.21%	10.71	11.35	6.04%
Eastern Cape	1050895	1072267	2.03%	889929	909993	2.25%	10.35	11.00	6.25%
Kwazulu-Natal	152274	155374	2.04%	204434	209286	2.37%	11.59	12.24	5.58%
Mpumalanga	296189	302674	2.19%	141310	144539	2.29%	10.65	11.29	6.08%
Northern Province	25328	25867	2.13%	22435	22925	2.18%	10.71	11.35	6.04%
Gauteng	16638	16994	2.14%	237639	242729	2.14%	11.24	11.88	5.76%
North West	106514	108719	2.07%	145736	148881	2.16%	11.06	11.71	5.85%
Total	4280745	4373863	2.18%	5108514	5220258	2.19%	11.01	11.65	5.88%
Deviation	93118			111744			0.65		

Table 6.15 shows the impact of a 18 per cent increase in the world sheep meat price on the domestic sheep meat sub-sector. This would result in an overall price increase of 11.74 per cent for the domestic market for sheep meat. Demand is expected to decline

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substantially (-22.79%) as a result of the price increase. Supply of sheep meat will increase marginally by 2.42 per cent. This is due to the fact that only a marginal increase in domestic supply is needed to meet domestic demand. Note that exports are not modelled and therefore the increase in domestic supply on both sheep and sheep meat could be under-estimated. This applies only, if South Africa has access to markets overseas in order to take advantage of the increase in world prices for sheep meat. This again emphasised the importance of export markets, even though the country as a whole may be a net importer of sheep meat. In fact, this also holds for the other two red meats.

Table 6.15: The impact of a 18 per cent increase in the world price of sheep meat on the sheep meat sub-sector

Region	Sheep meat supply (ton)			Sheep meat demand (ton)			Sheep meat price (R/kg)		
	Base run	Scenario	change	Base run	Scenario	change	Base run	Scenario	change
Western Cape	22061	22580	2.35%	21365	16535	-22.61%	16.61	18.56	11.71%
Northern Cape	26950	27596	2.40%	3739	2901	-22.41%	16.75	18.70	11.61%
Free State	9929	10172	2.45%	7638	5916	-22.55%	16.77	18.72	11.68%
Eastern Cape	15129	15506	2.49%	11495	8888	-22.68%	16.69	18.65	11.75%
Kwazulu-Natal	3475	3566	2.62%	22571	17130	-24.11%	16.77	18.87	12.49%
Mpumalanga	2402	2463	2.54%	9510	7334	-22.88%	16.88	18.88	11.85%
Northern Province	381	391	2.62%	4084	3176	-22.23%	16.88	18.82	11.52%
Gauteng	4040	4136	2.38%	30523	23738	-22.23%	16.88	18.82	11.52%
North West	2478	2537	2.38%	6233	4844	-22.28%	16.84	18.79	11.54%
Total	86845	88947	2.42%	117158	90462	-22.79%	16.79	18.76	11.74%
Deviation	2102			-26696			1.97		

Table 6.16 shows the impact of a 6 per cent increase in the world price of pork on the domestic pig sub-sector. Pig prices will, on average, increase by 3.16 percent. Pig supply and the number of pigs slaughtered will both increase by 1.20 per cent for the country as a whole. The increase in the number of pigs slaughtered is attributable to the supply response in the secondary industry as a result of higher pork prices.

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Table 6.16: The impact of a 6 per cent increase in the world price of pork on the pig sub-sector

Region	Pig supply (number)			Pig demand (number)			Pig price (R/kg)		
	Base run	Scenario	change	Base run	Scenario	Change	Base run	Scenario	change
Western Cape	334475	340835	1.90%	334475	340835	1.90%	6.02	6.32	4.99%
Northern Cape	29666	30064	1.34%	25883	26194	1.20%	5.52	5.68	3.02%
Free State	250451	253252	1.12%	157838	159773	1.23%	5.63	5.80	2.96%
Eastern Cape	159419	160990	0.99%	153328	156765	2.24%	5.43	5.60	3.07%
Kwazulu-Natal	331256	334717	1.04%	372461	376946	1.20%	6.03	6.20	2.76%
Mpumalanga	296974	300148	1.07%	70614	71228	0.87%	5.60	5.77	2.98%
Northern Province	182505	184495	1.09%	134162	135334	0.87%	5.63	5.80	2.96%
Gauteng	296355	299460	1.05%	757763	764217	0.85%	6.02	6.18	2.77%
North West	263320	266165	1.08%	137897	138835	0.68%	5.83	6.00	2.86%
Total	2144421	2170126	1.20%	2144421	2170127	1.20%	5.75	5.93	3.16%
Deviation	25705			25706			0.18		

Table 6.17 shows the impact of a 6 per cent increase in world pork price on the domestic pork sub-sector. As was expected domestic demand will, on average, decrease (-6.47%) as a result of an overall increase in domestic pork prices (3.33%) due to an increase in the international pork price. Higher domestic pork prices will also cause supply to increase, even though there is a decline in demand. The end result is lower imports of pork meat.

Table 6.17: The impact of a 6 per cent increase in the world price of pork on the pork sub-sector

Region	Pork supply (ton)			Pork demand (ton)			Pork price (R/kg)		
	Base run	Scenario	change	Base run	Scenario	Change	Base run	Scenario	change
Western Cape	20069	20518	2.24%	25251	22677	-10.19%	10.38	10.95	5.48%
Northern Cape	1553	1575	1.42%	4222	3978	-5.78%	10.49	10.81	3.11%
Free State	9470	9605	1.43%	10334	9728	-5.86%	10.46	10.79	3.16%
Eastern Cape	9200	9429	2.49%	13739	12609	-8.22%	10.40	10.86	4.42%
Kwazulu-Natal	22348	22659	1.39%	18570	17465	-5.95%	10.31	10.64	3.20%
Mpumalanga	4237	4281	1.04%	12197	11586	-5.01%	10.51	10.79	2.69%
Northern Province	8050	8134	1.04%	4938	4688	-5.06%	10.40	10.69	2.72%
Gauteng	45466	45931	1.02%	41937	39817	-5.06%	10.40	10.68	2.72%
North West	8274	8344	0.85%	8388	8002	-4.60%	10.46	10.72	2.48%
Total	128667	130476	1.41%	139576	130550	-6.47%	10.42	10.77	3.33%
Deviation	1809			-9026			0.35		

Table 6.18 shows the welfare implications in South Africa of an increase in world prices of red meat. The losses in welfare to consumers are greater than the gains in welfare by producers. If the loss in consumer welfare is related to real disposable income it would amount to 0.16 per cent. However, if the gains by producers are related to net farm income it constitutes a gain of 2.84 per cent. What is important to note is that an increase in prices would result in net welfare losses to society. However, as was stated in the previous section, an exact estimate of welfare losses or gains would require a much more complex model.

Table 6.18: **Change in welfare as a result of an increase in world prices for red meat**

Region	Consumer surplus	Producer surplus
	Total monetary change (Million rand)	
Western Cape	-109	18
Northern Cape	-18	20
Free State	-44	42
Eastern Cape	-62	40
Kwazulu-Natal	-100	38
Mpumalanga	-54	25
Northern Province	-26	16
Gauteng	-161	7
North West	-35	25
South Africa	-607	230

The above discussion shows that an increase in the world price for red meat will definitely favour the South African red meat industry. Cognisance should, however, be taken of the following:

- The analysis was restricted to the assumption of homogeneous commodities. In other words, commodities were assumed to be perfect substitutes in the sense that consumers regard the imported commodity as exactly the same as the domestically produced commodity. In reality the situation is much more complex, and for this reason it would be unrealistic to conclude that an increase in world prices to the levels investigated will lead to a total displacement of imports by domestic produce. In any case, minimum market access requirements as stipulated under the WTO require that countries still

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import the amount of a commodity that was stipulated in its country schedule submitted during the Uruguay Round.

- The model used in this study does not account for the possibility of exports of red meat products by South Africa. The implication is that the model does not allow domestic producers to take advantage of higher world prices through increased exports. In other words, supply of beef, sheep meat and pork is restricted to such levels that will balance the domestic market. Thus, should export be introduced, one might see a higher supply response than indicated at present. On the other hand, this would depend on the extent to which the red meat industry is currently geared for exports. In Chapter 3 it was shown that export opportunities do exist for red meat exports by South Africa, but that these opportunities have not yet been utilised. This could be an indication that the South African red meat industry is at present not geared for exports, an issue that should receive serious attention if the red meat industry wishes to take advantage of opportunities in a liberalised trade environment. Having said this, the results provided in this section may not have under-estimated the supply response as one might expect, but this situation may change as the industry re-orientates itself to be more export orientated.

6.5   The impact of a depreciation of the exchange rate on the South African red meat industry

The South African Rand has performed dismally against most major international currencies during the past decade. This was the result of various factors, internationally and domestically. Although it falls beyond the scope of this study to investigate the reasons for the Rand's poor performance, some factors that had an influence include, amongst others, perceptions of investors, monetary controls and interventions by the Reserve Bank, the political climate, the performance of other currencies on the international market, etc. (Jooste, Van Schalkwyk, Geldenhuys, and Van Den Berg, 2000). From 1985 to 2001 the Rand depreciated by 307 per cent against the US Dollar, of this 123 per cent were since the beginning of 1996. The same trend was evident with

respect the AUS$ and the £. Södersten and Reed (1994) state that a devaluing of the exchange rate changes the prices of domestically produced traded goods relative to the prices of the same goods produced in other countries. That is, it reduces the relative prices of the devaluing country's goods and of its import competing goods, which will, in time, increase the volume of exports and decrease the volume of exports. Apart from the fact that changes in the exchange rate influence the world price at which commodities, such as red meat, are imported or exported, it also has an influence on the price of inputs used in the production process. Hence, the price of tradable inputs must also be adjusted with the exchange rate in order to gauge the effect of exchange rate changes fully, but this falls beyond the scope of this study.

In order to measure the impact of depreciation of the exchange rate on the South African red meat industry, a depreciation of 40 per cent of the Rand against the US$ was assumed. The results are shown in Table 6.19. The results are very similar to those in Tables 6.12 to 6.17, mainly due to the fact that a depreciation of the Rand results in higher prices for imported red meat.

Table 6.19: The impact of a 40 per cent depreciation of the exchange rate

Primary industry	Base run	Scenario	Change	Base run	Scenario	Change	Base run	Scenario	Change
	Supply (number)			Demand (number)			Price (R/kg)		
Cattle	1972749	2000105	1.39%	2251875	2284653	1.46%	7.56	7.93	4.87%
Sheep	4280745	4375510	2.21%	5108514	5222230	2.23%	11.01	11.65	5.88%
Pigs	2144421	2170311	1.21%	2144421	2170310	1.21%	5.75	5.93	3.16%
Secondary industry	Supply (tons)			Demand (ton)			Price (R/kg)		
Beef	394077	401026	1.76%	454573	419920	-7.62%	12.74	13.56	6.39%
Sheep meat	86845	88983	2.46%	117158	89996	-23.18%	16.79	18.79	11.95%
Pork	128667	130490	1.42%	139576	130487	-6.51%	10.42	10.77	3.35%

It should be noted that the 40 per cent depreciation in the Rand is not transmitted in full to the domestic red meat industry. The reason for this is the fact that the imports would effectively be reduced to zero since it becomes more expensive than domestically produced red meat. Price behaviour is then solely determined by domestic supply and demand factors, e.g. demand decreases for red meat due to an increase in prices, but

suppliers respond positively to the price increase. The dynamics in supply and demand on the domestic market would then determine the new equilibrium price.

As was stated previously this may be a oversimplification of the market situation if international prices increase, whether it is due to liberalisation or a devaluation of the Rand against other currencies. The reason is that the current model does not make provision for exports. In reality one would expect exports to increase if world market prices become more favourable, but as stated previously, this is not expected over the short run since South Africa is not fully geared for exports.

It is furthermore important to note that although competitiveness improves with a depreciation of the exchange rate, this does not imply improved efficiency on farm level. Thus, the increase in competitiveness is exogenous in nature and out of the producer's control. Relying entirely on exogenous factors for competitiveness it is a recipe for failure. Producers and agribusiness must look beyond the borders of their own industries when evaluating the influence of changes in the exchange rate. When the exchange rate depreciates it also influences the rest of the economy. Continued depreciation of the exchange rate will eventually exert pressure on the inflation rate to increase, which in turn will exert upward pressure on interest rates. Higher interest rates culminates in lower expenditure on food as income has to be directed to higher debt repayment. This will eventually lead to a slack in economic growth. Thus, a depreciation in the exchange rate may be favourable over the short term, but in the long term will lead to a decline in economic growth. As a simple example, the consumption of red meat is very closely related to consumers' per capita income, which is again closely related to the economic growth rate. Thus, should the economic growth rate be negatively affected by a continued depreciation in the exchange rate, consumers' per capita income will also be negatively influenced. This will lead to lower demand for red meat. It should be clear from this discussion that competitiveness gained by a depreciating exchange rate may not be sustainable over the long run.

6.6   The impact of the abolishment of Lomé on the South African beef industry

The Lomé Convention and the benefits it holds for ACP countries, and particularly other southern African countries in respect of beef, were discussed in Chapter 2. In this section a scenario whereby Namibia and Botswana are no longer afforded their preferential access to the EU market is tested in order to determine the impact on the South African beef industry. The underlying assumption of this scenario is that both these countries decide to export their surplus beef (Lomé quotas) to South Africa over the short run, i.e. processing of beef still resides in the countries mentioned whilst they investigate other markets for exports. Table 6.20 shows the results.

Table 6.20: Impact of the abolishment of Lomé on the South African beef industry

Primary industry	Base run	Scenario	change	Base run	Scenario	change	Base run	Scenario	change
	Supply (numbers)			Demand (numbers)			Price (R/kg)		
Cattle	1972749	1971620	-0.06%	2251875	2252596	0.03%	7.56	7.54	-0.18%
Secondary industry	Supply (tons)			Demand (ton)			Price (R/kg)		
Beef	394077	393829	0.02%	454573	456953	0.11%	12.74	12.73	-0.15%

It is clear that the effect on the South African market is minimal. Prices of beef and cattle reduce by less than 0.5 per cent. It should also be noted that these two countries could export beef free of tariffs to South Africa. Thus, increased imports from these two countries will not have any effect on the marginal tariff level at the levels used in this scenario, and hence the relatively small effect on domestic beef prices.

6.7   An alternative tariff regime for red meat in South Africa

It is commonly known that the red meat industry has been experiencing problems with respect to fraudulently invoiced imports to avoid *ad valorem* tariffs. It was for this reason that the red meat industry applied for a fixed tariff on red meat imports. The question that arises is what should the level of the fixed tariff be in order to maintain the *status quo*. The model developed in Chapter 4 could be used to provide answers to this

question. By introducing fixed tariffs and through an iterative procedure calibrate the model to reflect the *status quo* situation the fixed tariffs were determined. The results are shown in Table 6.21.

Table 6.21: Fixed tariffs for the South African red meat industry

Commodity	Fixed tariff equivalent (R/ton)
Beef	3470
Sheep	4700
Pork	1355

6.8   The impact of changes in the population on the red meat industry

In this section the impact of population growth until 2004 on the red meat industry is investigated. A combination of population growth and a reduction in tariffs are also quantified. Due cognisance is also taken of the possible impact of HIV/AIDS on population growth. The reason for using specifically 2004 is that a recent study by Balyamujura, Jooste, Van Schalkwyk, Geldenhuys, Crew, Carstens, Bopape and Modiselle (2000) estimated the divergence between population growth rates from a "With HIV/AIDS" and "Without HIV/AIDS" point of view. In addition, the impact of an increase in per capita income is also considered.

Cognisance should be taken of the fact that this section only uses total population figures, i.e. no distinction is made between different population groups. The reason for this is that there is little data available regarding the divergence between population growth rates per population group from a "With HIV/AIDS" and "Without HIV/AIDS" point of view. The average population growth rate in South Africa is expected to continue declining over the coming decades. The growth rate of the African population has decreased from 2,45 per cent in 1990/91 to an estimated 1,65 per cent in 2000/2001, while that of the total population has dropped from 2,13 per cent to 1,43 per cent over the corresponding period (CIAMD, 2000). The fact of the matter is however that population will continue to grow in the future, which will put increasing pressure on natural resources to fulfil in humans desire to meet at least their minimum nutritional requirements.

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The impact of HIV/AIDS is of particular importance when one considers further population trends. According to Van Aardt, Van Tonder and Sadie (2000)[1], the South African population will number between 46 to 70 million in 2020 (see Figure 6.2), depending on the impact of AIDS, declining fertility rates and migration.
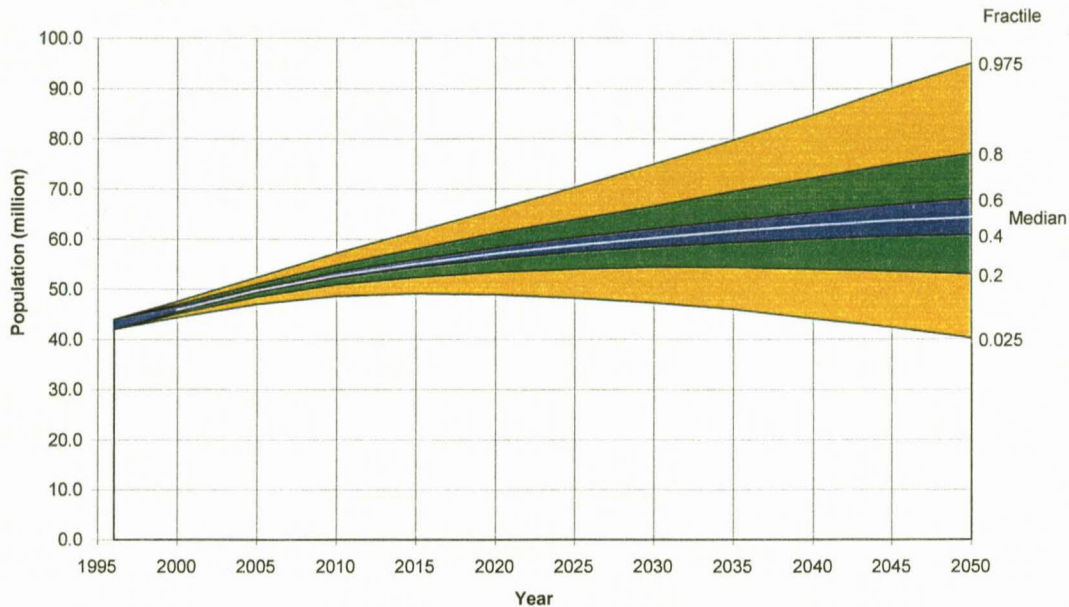
Figure 6.2: Population projection, 1995 - 2050
Source: Van Aardt *et al*, 2000.

It is also important to note that the impact of HIV/AIDS is not restricted to the individual infected. The impact of HIV/AIDS is much broader in that it has demographic, economic, social and developmental consequences. However, considering all these issues falls beyond the scope of this study, but is discussed comprehensively by Balyamujura *et al* (2000).

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[1] Van Aardt, Van Tonder, and Sadie (1999) performed a long-term projection for the South African population from 1996 onwards. Demographers would question the usefulness of such an exercise due to the vast number of uncertainties regarding key aspects such as: the true size and age distribution of the South African population in 1996; the magnitude and future impact that AIDS will have, and the number of immigrants and emigrants (migration). Hence, although not meant to produce accurate projections, the demographic model used in Van Aardt's research can produce useful plausible orders of magnitude as well as clear population trends.

Using the ASSA 600 model, Balyamujura *et al* (2000) estimated the possible impact of HIV/AIDS on population growth rates for 2004 (see Table 6.22). Continuing the present HIV/AIDS infection rate, South Africa's population would be 48.5 million in 2004. From a "Without HIV/AIDS" point of view the population would have been 50.5 million people. This translates into a 4.96 per cent difference in the growth of the population. This difference in population growth rates was used in this study to reflect the impact of HIV/AIDS on the consumption of red meat in South Africa for 2004. Since 1996 is used as base year, population growth had to be calculated from 1996 to 2004. In this regard population estimates by Van Aardt *et al* (2000) was used. According to them, the population growth rate between 1996 and 2004 would be 12.7 per cent.

Table 6.22: Population projections for 2004 and 2009

Description	2004	
	Without AIDS	With AIDS
Population	50 533 912	48 450 876
Population with HIV/AIDS	-	7 901 546
Normal Death	353 836	341 762
AIDS Death	-	609 810
Total Death	353 836	951 572
New Infection/Year	-	756 754
New AIDS Sick	-	748 713
Cumulative AIDS Death	-	2 715 075
Birth Rate	2,30%	2,29%
Death Rate	0,70%	1,96%
Dependency Ratio	57,6%	59,1%

Source: Balyamujura *et al*, 2000.

As mentioned, the possible changes of per capita income on the red meat industry will also be investigated. Van den Berg (1996) as cited by Nieuwoudt (1998) shows that under a scenario of total income growth of 3 per cent and 5 per cent, the per capita incomes of various population groups are expected to increase (see Table 6.23). Nieuwoudt (1998) also cited McGrath (1996) and Spies (1996) with respect to changes in real per capita income growth under different scenarios. It was, however, decided to use the estimates by Van den Berg (1996) since it distinguishes between the different population groups, i.e. his estimates indicate different increases in real per capita income for all the different population groups. This is important since consumption patterns differ between different population groups, and hence different population

groups will also use increases in per capita income in different ways when purchasing food (red meat).

Table 6.23: Growth in real per capita income

Population group	Growth in real per capita income		
	5 per cent	3 per cent	1 per cent
Asians	3.3	2.0	1.0
Blacks	6.1	3.7	-1.5
Coloureds	4.1	2.7	1.5
Whites	1.4	0.1	-0.3

Source: Van den Berg, 1996 as cited by Nieuwoudt, 1998.

Nieuwoudt (1998) however, expressed his doubts regarding whether a high-growth scenario of 5 per cent would result in such high increases in real per capita income as estimated by Van den Berg. But for the sake of consistency it was nevertheless decided to make use of Van den Berg's estimates. Nieuwoudt (1998) also states that a high-income scenario would probably overestimate demand since income elasticities will generally decline with high per capita income growth. Thus, even though this study investigates the impact of a high-income growth situation, the result of such a scenario must be interpreted with caution.

The income elasticity of red meat in respect of the demand for different red meat products by different population groups is an important factor when predicting the response of consumers when their income changes. Table 6.24 shows the income elasticities for different red meats as estimated by Nieuwoudt (1990).

Table 6.24: Income elasticities for red meat for different population groups, 1990

Product	Metropolitan				Rural Blacks
	Asians	Blacks	Coloureds	Whites	
Beef	0.65	1.04	0.70	0.34	1.33
Pork	0.40	0.00	0.60	0.32	0.25
Mutton and goat meat	1.65	1.30	0.65	0.23	1.52

Source: Nieuwoudt, 1990.

Note should be taken of the low income elasticities of pork for blacks. The implication of this is that a very small proportion of increases in the per capita income of blacks will be used to purchase additional pork on a per capita basis.

Since this study only accounts for total population it was necessary to derive aggregated (weighted) income elasticities for the different red meats. This was done by using the ratio between total expenditure per product group and the expenditure per population group. The calculated aggregated income elasticities for beef, pork and sheep meat are 0.77, 0.28 and 0.79 respectively, and was used in this study.

Table 6.25 shows the impact of population growth on the red meat industry. As stated, two different population growth rates were used in order to gauge the possible impact of HIV/AIDS. In the "Without HIV/AIDS" scenario demand for beef, sheep meat and pork will increase with 12.01 per cent, 12.22 per cent, and 11.92 per cent respectively. In the "With HIV/AIDS" scenario demand will only increase by 7.19 per cent, 7.31 per cent and 7.28 per cent for beef, sheep meat and pork, respectively. It should also be noted that the increase in demand for the different red meat products is only met marginally by increases in domestic supply. Most of the increase in demand is met by overseas imports. Similar results were found by Nieuwoudt (1998). Also, prices of red meat on the domestic market only show marginal increases. The reason for this state of affairs is the fact that red meats have relatively low supply elasticities as a result of biological production attributes and are hence not able to respond to increases in demand as rapidly as one might want too. Furthermore, cognisance should be taken of the fact that domestic prices are also a function of international prices, i.e. any expected increase in domestic prices due to an increase in demand will be dampened by the level of international prices. This also results in supply increases not being as high as what one might expect, since prices for red meat on the domestic market only increase marginally.

Table 6.25: Impact of population growth on the red meat industry (2004)

Product	Base run	Scenario	Change	Base run	Scenario	Change	Base run	Scenario	Change
	Supply (tons)			Demand (ton)			Price (R/kg)		
Growth in population of without AIDS (12.7%)									
Beef	394077	394720	0.16%	454573	509150	12.01%	12.74	12.83	0.64%
Sheep meat	86845	86887	0.05%	117158	131474	12.22%	16.79	16.81	0.15%
Pork	128667	128894	0.18%	139576	156213	11.92%	10.42	10.45	0.28%
Growth in population with AIDS (7.74%)									
Beef	394077	394591	0.13%	454573	487272	7.19%	12.74	12.81	0.48%
Sheep meat	86845	86883	0.04%	117158	125728	7.31%	16.79	16.81	0.13%
Pork	128667	128803	0.11%	139576	149742	7.28%	10.42	10.45	0.21%

Table 6.26 shows the impact of an increase in per capita income on the red meat industry. Demand increases are as expected. Note that the increase in pork consumption is lower than the increases in demand for beef and sheep meat. This can be attributed mainly to the fact that the aggregated income elasticity is considerably lower for pork than it is for the other two red meats for reasons already explained. As was the case in the population growth scenario there is limited supply response domestically and therefore the increases in demand is met mainly by imports. Prices also change marginally, if at all, due to the fact that most of the demand increase is met by imports.

Table 6.26: The impact of different per capita income growth scenarios on the red meat industry

Product	Base run	Scenario	Base run	Scenario	Change	Base run	Scenario
	Supply (tons)		Demand (tons)			Price (R/kg)	
Growth in income of 3.18 percent							
Beef	394077	394521	454573	463636	1.99%	12.74	12.80
Sheep meat	86845	86847	117158	120081	2.49%	16.79	16.79
Pork	128667	128675	139576	140780	0.86%	10.42	10.43
Growth in income of 5.35 percent							
Beef	394077	394575	454573	470975	3.61%	12.74	12.81
Sheep meat	86845	86859	117158	121900	4.05%	16.79	16.79
Pork	128667	128707	139576	141480	1.36%	10.42	10.43

Table 6.27 shows a combination of different scenarios, namely an increase in population, a reduction in tariffs and an increase in the world price, as discussed previously. It is clear that an increase in population and the world price will soften the

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impact of a total reduction in tariffs. However, it should be noted that the impact of a zero tariff regime is still significant.

Table 6.27: Combined effect of a change in population, reduction in tariffs and an increase in the world price of red meats

Product	Base run	Scenario	change	Base run	Scenario	change	Base run	Scenario	change
	Supply (Number/ton)			Demand (Number/ton)			Price (R/kg)		
Growth in population of 7.74% with AIDS, total reduction in tariffs and increase in world price									
Cattle	1972749	1886095	-4.39%	2251875	2140582	-4.94%	7.56	6.39	-15.40%
Beef	394077	370691	-5.93%	454573	610146	34.22%	12.74	10.15	-20.32%
Sheep	4280745	4154858	-2.94%	5108514	4955801	-2.99%	11.01	10.12	-8.02%
Sheep meat	86845	83976	-3.30%	117158	165238	41.04%	16.79	14.09	-16.05%
Pigs	2144421	2086706	-2.69%	2144421	2086706	-2.69%	5.75	5.34	-7.03%
Pork	128667	124602	-3.16%	139576	171678	23.00%	10.42	9.62	-7.70%
Growth in population of 12.7% without AIDS, total reduction in tariffs and increase in world price									
Cattle	1972749	1886343	-4.38%	2251875	2140463	-4.95%	7.56	6.40	-15.34%
Beef	394077	370678	-5.94%	454573	638088	40.37%	12.74	10.16	-20.30%
Sheep	4280745	4155032	-2.94%	5108514	4956011	-2.99%	11.01	10.12	-8.02%
Sheep meat	86845	83978	-3.30%	117158	172790	47.48%	16.79	14.09	-16.03%
Pigs	2144421	2086727	-2.69%	2144421	2086727	-2.69%	5.75	5.34	-7.03%
Pork	128667	124604	-3.16%	139576	179574	28.66%	10.42	9.62	-7.70%

6.9   Conclusions

This chapter investigated the possible impact of liberalisation on the red meat industry in South Africa. The results obtained in this chapter can be summarised as follows:

- Reducing tariffs on red meat imports to zero will lead to a substantial drop in red meat prices, which also has implications for production and processing of red meat products. Welfare gains by consumers due to a total reduction of tariffs will amount to R2 829 mio, whilst the total loss in producer welfare would amount to R868 mio. However, cognisance should be taken of the fact that a significant proportion of the gains by consumers are merely a transfer from the national treasury. Finally, the red meat industry should consider its tariff strategy carefully when it comes to granting preferential access to other countries, since it could ultimately lead to a reduction in the marginal tariff, to the detriment of local producers.

- Increases in the world price of red meat due to liberalisation or a depreciation of the exchange rate will benefit the South African red meat industry. However, the red meat industry should not rely merely on external factors to make it more competitive internationally. What is needed is a consumer-export orientated strategy backed by a well-functioning supply chain to take advantage of marketing opportunities, both domestically and internationally.

- The abolishment of the Lomé Convention will not have any severe repercussions for the beef sub-sector in South Africa.

- Growth in population is a more important determinant of growth in demand for red meats than growth in per capita income is, or at least this will hold over the short to medium term. Secondly, increases in demand are met mainly by overseas imports due to the inherently slow supply response of the industry over the short to medium term. However, an important issue of which cognisance should be taken is that off-take rates in the developing sector are very low, i.e. should the developing sector be in a position to increase its off-take rate it could take advantage of the increase in demand. Hence, given the expected increases in the demand for red meat in South Africa, government and the private sector should seriously consider additional programmes and initiatives to improve productivity (off-take) in the developing red meat industry. This would greatly enhance welfare in rural areas, especially in the Eastern Cape and KwaZulu-Natal. This could, however, not be done in isolation. The red meat industry needs to consider the efficiency of the red meat value chain and ways to improve the image of red meat amongst consumers.

- Finally, the combined effect of an increase in population size and world prices will not be sufficient to offset the negative effects on the red meat industry of a total reduction of tariffs.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7.1　　Introduction

Trade liberalisation has become a common phrase in the vocabulary of role players involved in the agricultural sector. This is not surprising if one considers the important implications of trade liberalisation, and the consequences for agriculture in South Africa. This is no different for the red meat industry in South Africa. It is therefore of the utmost importance that the possible impact of liberalisation is quantified in order to provide answers to pressing questions, such as what will be the impact of further tariff liberalisation, what will happen to international prices of red meat and what will be the impact on the domestic red meat industry, etc. This study concerned itself with investigating such issues. The methodological approach adopted relates to the spatial partial equilibrium framework used by Takayama and Judge (1971).

The rest of this chapter will summarise the conclusions drawn from this study, after which recommendations will be made. The last part of this chapter will highlight issues for further study.

7.2　　Major conclusions drawn from this study

7.2.1　　International red meat trade

- **Bovine meat**

From 1995 to 1999 the value of exports of bovine carcasses and half carcasses (fresh or chilled) decreased by 4 per cent, whilst the quantity exported remained the same. For bovine cuts (bone in, fresh or chilled) and bovine carcasses and half carcasses (frozen) annual growth in the value and quantity exported was negative from 1995 to 1999. Bovine cuts (boneless frozen), which are the most prominent bovine

meat product in terms of quantity exported, also experienced negative growth in the value of exports between 1995 and 1999. Only bovine cuts (boneless, fresh or chilled) saw growth in both the value and the quantity exported.

Imports of bovine carcasses and half carcasses (fresh or chilled) in the world showed no growth, whilst the value of imports declined by 6 per cent between 1995 and 1999. The value and quantity of bovine cuts (bone in, fresh or chilled) and bovine carcasses and half carcasses (frozen) declined from 1995 to 1999. Conversely, imports of bovine cuts (boneless, fresh or chilled) saw positive growth in terms of both value and quantity. In terms of bovine cuts (boneless, frozen), the value of imports dropped, whilst the quantity imported improved.

● **Pork**

All the pork products have shown growth in quantities exported from 1995 to 1999. The largest growth was reported for swine carcasses and half carcasses (frozen). In terms of the value exported, carcasses and half carcasses (fresh or chilled), hams, shoulders and cuts thereof (bone in, fresh or chilled) and swine cuts (frozen) experienced negative growth from 1995 to 1999, even though the quantity exported was positive. This translates into a lower per unit value of these products over the mentioned period and is probably a result of increased competition between exporters.

World imports of pork products increased from 1995 to 1999. However, in terms of the value of imports, only hams, shoulders and cuts thereof (bone in, frozen) experienced positive growth. Swine carcasses and half carcasses (fresh or chilled) experienced the largest drop in value of imports. The decline in the value of imports of swine cuts (frozen), the most important imported pork product, is largely attributed to negative growth in the value of imports in Japan and Germany; together they account for 57.45 per cent of world imports of this product.

- **Sheep meat**

Exports of lamb carcasses and half carcasses (fresh or chilled) and sheep carcasses and half carcasses (frozen) experienced negative growth in terms of value and quantity exported from 1995 to 1999. Sheep cuts (bone in, fresh or chilled) and sheep cuts (bone in, frozen) both experienced growth in value and quantity exported between 1995 and 1999. This growth can be attributed mainly to the export performance of New Zealand and Australia.

World imports of lamb and sheep products, lamb carcasses and half carcasses (fresh or chilled) and sheep carcasses and half carcasses (frozen) did not perform well over the period 1995 to 1999. As far as sheep carcasses and half carcasses (frozen) are concerned, negative growth in value and quantity imported was fuelled by Korea, Malaysia, Oman, Taiwan, the Russian Federation, Jamaica and the US. Growth in respect of the value of imports and quantity imported of sheep cuts (bone in, fresh or chilled) can be attributed to the fact that the top 17 importers of this product experienced positive growth in both value and quantity imported. Sheep cuts (bone in, frozen) also experienced positive growth in value and quantity imported.

7.2.2 Impact of the Uruguay Round on red meat prices

It should be noted that under the auspices of the WTO, liberalisation would affect world production, trade patterns, prices of agricultural products, as well as the general welfare of countries. Several studies have attempted to quantify the affects of trade liberalisation on world production, trade patterns and prices of red meat products by using different modelling frameworks. Although the models cited in this study differ in terms of assumptions used and manner in which liberalisation is simulated, they all predict an increase in world prices of red meat. It is expected that sheep meat will show the most notable increases in prices, followed by pork and beef. An important aspect that came to light is that when only industrialised countries liberalise trade, increases in red meat prices will be lower than when both industrialised and developing countries liberalise trade.

7.2.3   Issues of importance in preparing for new WTO negotiations

a)   Issues such as export subsidies, other forms of export competition, unfair pricing practices, and dumping require urgent attention. In this respect Article 20 is of particular importance. Article 20 provides for the negotiations to involve further commitments which would be necessary to achieve long-term liberalisation objectives, i.e. the agricultural negotiating mandate will incorporate commitments for further liberalisation of restrictions under market access, domestic support and export subsidies, and will also cover topics that go beyond reductions in support and trade barriers, such as strengthened rules and disciplines.

b)   The Peace Clause also requires urgent reconsideration. The importance of the Peace Clause lies in the fact that it stops members from bringing challenges against export subsidies, green and blue box, and *de minimus* payments. Removal of the Peace Clause would mean that most of the subsidies that are allowable in the AoA could become subject to challenge in the Disputes Settlement Mechanisms of the WTO if a member can show injury. Hence, countries that rely on these subsidies would have a strong interest in negotiating an extension of Article 13, whilst countries that may be harmed by such subsidies would have a strong interest in insisting on the termination thereof.

Another issue that is deemed very important is the rules on Tariff Rate Quotas (TRQ) administration and allocation. The reason for this is as follows:

–   There are no guarantees that the TRQs will lead to real improvements of market access, and hence that they will affect the actual trade flows and constrain policies of the importing countries. This is so since there is no commitment to imports, but only a commitment to charge no more than the specified reduced rates of tariffs specified, i.e. whether products could be

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exported under the TRQs will depend on whether these reduced tariffs are still prohibitive or not.

– New TRQs created interest groups which promise to apply inter-governmental restrictions on trade through licensing procedures and other administrative arrangements.

– There is uncertainty surrounding the procedures for allocating minimum access quotas, i.e. the recipients of licences to import at in-quota tariff rates will benefit from economic rents, and therefore countries have an interest in allocating these licenses to domestic traders rather than foreign traders even though this may not be entirely consistent with most favoured nation (MFN) principles.

These problems could largely be resolved by auctioning licences under minimum access TRQs. However, auctioning also has disadvantages, i.e. if the TRQs were auctioned to the exporter, the effects would be similar to the system of tariffs that the quota was designed to avoid. This is because the exporter would tend to bid up the size of the tariff for the right to make more profit in the import market. It is clear that the issues surrounding TRQs will not be solved easily, and for this reason it is of the utmost importance that countries are well prepared when the issue comes to table during negotiations.

c)   It is furthermore important to take cognisance of the fact that various newer issues and non-trade concerns have become linked to the trade agenda. Many of these issues are connected to the food business and many are being raised in relation to agricultural trade negotiations, no doubt for both substantive and tactical reasons. In addition to those already identified in the AoA, including food security, food safety and quality, environmental concerns, resource conservation and rural development, WTO members have raised disparate

issues such as animal welfare, biotechnology, species preservation, safeguarding the landscape, poverty reduction and preservation of rural culture. The emergence of these issues will put much more pressure on the negotiating process, which in turn means that countries will have to be well prepared for the next round of negotiations. This entails that industries, such as the red meat industry in South Africa, will have to act pro-actively in terms of understanding these issues, implementing strategies that embed the concerns surrounding these issues and making sure that cognisance is taken by government of such strategies, and how they are implemented. Apart from the issues mentioned above, due attention should also be given to the following:

- Inadequate administrative/legal capacity.
- Insufficient national policy formulation capacity.
- Limited scientific, administrative and infrastructure capability.
- The lack of capacity to prepare and negotiate in rounds.

Although not all of the above may be applicable to South Africa, it is nevertheless the responsibility of the red meat industry to remind government that they are accountable when it comes to these issues.

7.2.4   The European Union and its Common Agricultural Policy

Three issues necessitated the inclusion of the EU and its agricultural policy in this study. Firstly, due to the possible impact of the EU's agricultural policy on agricultural markets worldwide. Secondly, the EU is South Africa's largest trading partner. Thirdly, the EU is the largest import source of beef to South Africa.

Of red meat the beef and veal sector is the most important in the EU. It is the second largest production sector in the EU, accounting for around 10 per cent of total agricultural production. Therefore it is understandable that much emphasis is put on the

beef and veal sector in the EU, especially when it comes to reforming policies pertaining to this sector.

This study elaborated extensively on the reforms being implemented under Agenda 2000. It was also shown that despite the policy reforms EU beef producers are still heavily "supported". Nevertheless, several studies have shown that prices of beef and pork are destined to drop due to the Agenda 2000 reforms. However, it is suggested that prices will still be higher than prevailing world market prices for the same products.

7.2.5   Trade in red meat products by SACU

*   **Beef**

From 1995 to 1999 SACU experienced negative growth in the imports of bovine cuts (boneless, fresh or chilled) and bovine cuts (boneless, frozen), but positive growth in bovine cuts (bone in, frozen). In terms of bovine cuts (bone in, frozen), Uruguay was the most important importer in 1999 with an import value of US$709 thousand and more than a thousand tons.

The drop in imports of bovine cuts (boneless, frozen) can be attributed largely to the fact that imports from SACU's most important import origin, namely Ireland, have declined by 17 per cent. The import trends in respect of Zimbabwe and Uruguay are especially important in the light of the SADC FTA and the envisaged FTA with the MERCOSUR countries, of which Uruguay is a member. As far as Zimbabwe is concerned one could expect further growth in exports with the implementation of the SADC FTA. With respect to Uruguay, a FTA with MERCOSUR could result in Uruguay becoming a much more important role player to contend with, depending on the specific trade arrangements embedded in such a FTA. This would not only put the South African beef industry under pressure, but also other SADC members such as Namibia, Botswana and Zimbabwe. This becomes even more important in the light of the fact that Uruguay is regarded as a dynamic supplier internationally of this product.

Furthermore, note should also be taken of Australia, which is regarded as a dynamic supplier of this product in the world market. As present Australia is not taking advantage of its position to gain market share in South Africa, but this situation could change relatively quickly if one takes into account Australia's global market share.

As far as exports are concerned, only in two instances have the value of exports increased from 1995 to 1999, namely bovine cuts (bone in, fresh or chilled) and bovine cuts (bone in, frozen). Conversely, bovine cuts (boneless, frozen) and bovine cuts (boneless, fresh or chilled) have experienced considerable negative growth in value exported from 1995 to 1999. In contrast the world has seen positive growth in terms of the latter product, and only a 2 per cent decline in growth in the former product.

- **Pork**

Imports of swine cuts (fresh or chilled, nes) have grown in terms of both value and quantity imported, whereas the value of world exports of this product declined. This may be an indication that SACU is a more lucrative market to export to than most other countries in the world. The value and quantity of imports of swine hams, shoulders and cuts thereof (bone in, frozen) have decreased significantly from 1996 to 1999. There was also considerable growth in the imports of swine cuts (frozen, nes) into SACU, although the value of imports decreased. The combined effect of the decline in the value of imports and the increase in quantity imported may be an indication that competition for the SACU market is increasing. Countries of major importance that currently export to SACU include Australia, Spain, Germany, Brazil, Austria and the US, even thought their market shares may be relatively small in SACU. The reason for this is that they are regarded as dynamic suppliers that are currently under-represented in SACU. They owe their dynamic status to the fact they were able to show positive growth in exports of swine cuts (frozen nes) internationally from 1995 to 1999.

The performance in terms of the value exported was mixed. Swine hams, shoulders and cuts thereof (bone in, fresh or chilled) and swine cuts (fresh or chilled, nes)

recorded significant growth, 45 per cent and 82 per cent respectively. What makes it even more significant is the fact that the world has experienced negative growth in the value of exports of these two products. As far as swine carcasses and half carcasses (fresh or chilled), hams, shoulders and cuts thereof (of swine, bone in, frozen) and swine cuts (frozen nes) are concerned, South Africa experienced larger declines in the value exported than the rest of the world. This may be an indication that SACU has been targeting the wrong markets, but conversely it may also indicate that SACU is more price competitive on a unit value basis than most other countries and could secure niche markets provided that export promotion is directed as such and the supply chain allows for it.

- **Sheep meat**

On average SACU has experienced considerable growth in imports of sheep meat products. The largest growth was recorded by sheep cuts (bone in, frozen) with an increase in value and quantity imported of 23 per cent and 53 per cent, respectively.

Very little sheep meat was exported in 1999. The value of sheep meat products exported showed a decline from 1995 to 1999, with the exception of sheep cuts (bone in, fresh or chilled), which remained constant. Of some concern may be the fact that sheep cuts (bone in, frozen) and sheep cuts (bone in, fresh or chilled) show a drop in the value of exports, whilst the world in general experienced positive growth. It may indicate that opportunities exist, but have not been exploited to their potential. The other side of the coin, however, is that export prices of SACU cuts may have been forced to become more in line with that in the world market.

7.2.6   The impact of a total reduction in tariffs

The question frequently heard is what will be the impact if a decision is made to grant red meat imports preferential access under such agreements. Depending on the specific agreement it could result in a two-tier situation. Firstly, if a portion of red meat

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imports is allowed to enter South Africa at lower tariffs it would in principle have no or very little impact on prices and quantities demanded and supplied. The reason for this stems from the fact that the marginal import tariff is unchanged.

Within a FTA situation the marginal tariff could change easily. For instance, should South Africa allow MERCOSUR to export beef to South Africa at lower or no tariffs it could mean that prices and quantities demanded and supplied will change from the status quo situation if MERCOSUR are in a position to fully meet South Africa's import requirements. This is not a far-fetched scenario if one consider the increase in imports from these countries over the last two years.

South Africa should carefully consider its tariff "strategy" when granting preferential access to its red meat market, since preferential access to too many trade partners could result in a lower marginal tariff that will affect the red meat industry negatively.

In the case where all tariffs on red meat imports are abolished, changes in prices of red meat products will be substantial. This will also result in changes in the production and consumption of red meat products.

Cattle and livestock: In total cattle numbers will reduce by 6.03 per cent or 118 989. The number of cattle slaughtered will reduce by 6.75 per cent or 151 931 animals. Producer prices will decline by 21.11 per cent or R1,60 per kg. Beef prices will on average decline by 27.88 per cent, whilst beef supply will decline by 8.11 per cent. Conversely, demand will increase by 33.64 per cent as a result of lower beef prices. The combined effect of a reduction in beef supply domestically and an increase in beef demand entails a drastic increase in imports.

Sheep and sheep meat: The supply of sheep and the number of sheep slaughtered are expected to decrease by 5.28 per cent and 5.34 per cent, respectively. On average sheep prices are expected to drop by 13.90 per cent. Demand for sheep meat will increase substantially. This, combined with a decline in sheep meat supply, would

result in an increase in sheep meat imports. The reason for this state of affairs could be traced back to the fact that, on average, sheep meat prices will decline by 28.56 per cent as a result of the removal of the tariff.

Pigs and pork: The number of pigs demanded for slaughter is expected to decrease by 4.64 per cent on average. The supply of pigs will decline by the same percentage. Pig prices will drop by 11.99 per cent on average. Pork prices will decrease by 13.16 per cent as a result of a zero tariff on pork imports. This will in turn stimulate domestic demand for pork, but depress the supply of pork, resulting in increased imports of pork.

Welfare implications: Consumers will experience considerable welfare increases. Producers, on the other hand, will experience a drop in welfare. In monetary terms the welfare gains by consumers are by far greater than the welfare losses by producers. Improved welfare for consumers will add 0.75 per cent to total real disposable income. However, cognisance should be taken of the fact that a significant proportion of the gains by consumers are merely a transfer from the national treasury. The loss in producer welfare amounts to 2.71 per cent of real gross farm income or 10.72 per cent of real net farm income, which is substantial. The fact of the matter is that if tariffs are reduced it would result in net welfare gains to society, but to the detriment of the agricultural sector. Hence, given the strategic importance of this sector, government should consider support arrangements, for example, direct payments, should be reduced.

7.2.7   The impact of a world price increase in red meat commodities

Price increases showed that a price increase above 10 per cent for beef, 18 per cent for mutton and 6 per cent for pork would result in zero imports, thus stabilising the domestic market through domestic demand and supply forces. However, cognisance should be taken of the fact that tariffs as currently applied remain in place.

Cattle and beef: Producer prices for cattle farmers will on average increase by 4.81 per cent if international prices rise to 10 per cent. There will also be an increase in the number of cattle supplied (1.38%) and the number of cattle slaughtered (1.45%). The increase in the number of cattle slaughtered can be derived from the fact that higher beef prices in the secondary industry create an incentive to supply more beef from domestic sources. This in turn creates a higher demand for slaughter animals. Beef prices will increase by 6.35 per cent on average, whilst the demand for beef will drop by 7.59 per cent. Supply of beef will, on average, increase by 1.76 per cent.

Sheep and sheep meat: Sheep supply and the number of sheep slaughtered is expected to increase by 2.18 per cent and 2.19 per cent, respectively. Producer prices for sheep will on average increase with 5.88 per cent. An 18 per cent increase in the world sheep meat would result in an overall price increase of 11.74 per cent on the domestic market for sheep meat. Demand is expected to decline substantially (-22.79%) as a result of the price increase. Supply of sheep meat will increase marginally by 2.42 per cent. This is due to the fact that only a marginal increase in domestic supply is needed to meet domestic demand.

Pig and pork: Pig prices will on average increase by 3.16 percent. Pig supply and the number of pigs slaughtered will both increase by 1.20 per cent for the country as a whole. The increase in the number of pigs slaughtered is attributable to the supply response in the secondary industry as a result of higher pork prices. Demand for pork will on average decrease (-6.47%) as a result of an overall increase in domestic pork prices (3.33%), which is, in turn, due to an increase in the international pork price. Higher domestic pork prices will also cause supply to increase, even though there is a decline in demand.

Welfare implications: The losses in welfare to consumers are greater than the gains in welfare by producers. If the loss in consumer welfare is related to real disposable income it would amount to 0.16 per cent. However, if the gains by producers are related to net farm income it constitutes a gain of 2.84 per cent.

7.2.8   The impact of a depreciation of the exchange rate on the South African red meat industry

In order to measure the impact of depreciation of the exchange rate on the South African red meat industry, a depreciation of 40 per cent of the Rand against the US$ was assumed. The results are very similar to the situation when world prices are assumed to increase. The depreciation in the Rand is not transmitted in full to the domestic red meat industry. The reason for this is that the imports would effectively be reduced to zero since it becomes more expensive than domestically produced red meat. Price behaviour is then solely determined by domestic supply and demand factors, e.g. demand decreases for red meat due an increase in prices, but suppliers respond positively to the price increase. The dynamics in supply and demand on the domestic market would then determine the new equilibrium price.

The results obtained may, however, represent an oversimplification of the market situation if international prices increase, whether it is due to liberalisation or a devaluation of the Rand against other currencies. The reason is that the current model does not make provision for exports. In reality one would expect exports to increase if world market prices become more favourable but, as stated previously, this is not expected over the short run since South Africa is not fully geared for exports.

7.2.9   The impact of the abolishment of Lomé on the South African beef industry

The effect on the South African market is minimal. Prices of beef and cattle reduce by less than 0.5 per cent. It should also be noted that these two countries could export beef to South Africa free of tariffs. Thus, increased imports from these two countries will not have any effect on the marginal tariff level at the levels used in this scenario, and hence the relatively small effect on domestic beef prices.

7.2.10   An alternative tariff regime for red meat in South Africa

It is common knowledge that the red meat industry has been experiencing problems with respect to fraudulently invoiced imports aimed at avoiding *ad valorem* tariffs. In order to avoid these problems an alternative tariff regime, such as fixed tariffs, may be employed. In order to maintain the *status quo,* fixed tariffs on beef, sheep meat and pork were calculated at R3.47/kg, R4.70 and R1.35/kg, respectively.

7.2.11   The impact of population and income growth on the red meat industry

The impact of population growth on the red meat industry was considered from a "Without HIV/AIDS" and "With HIV/AIDS" point of view. In the "Without HIV/AIDS" scenario, demand for beef, sheep meat and pork will increase by 12.01 per cent, 12.22 per cent, and 11.92 per cent, respectively. In the "With HIV/AIDS" scenario, demand will only increase by 7.19 per cent, 7.31 per cent and 7.28 per cent for beef, sheep meat and pork, respectively. It should also be noted that the increase in demand for the different red meat products is only met marginally by increases in domestic supply. Most of the increase in demand is met by overseas imports. Also, prices of red meat on the domestic market only show marginal increases.

Demand for red meat will also increase as a result of an increase in per capita income. The increase in pork consumption is, however, lower than the increases in demand for beef and sheep meat. This can be attributed mainly to the fact that the weighted aggregated income elasticity is considerably lower for pork than for the other two red meats. There is also limited supply response domestically and therefore the increases in demand are met mainly by imports. Prices also change marginally, if at all, due to the fact most of the demand increase is met by imports.

Finally, the increase in population combined with an increase in world prices will only partly offset the impact of a total reduction in tariffs.

7.3 Policy recommendations

a) South Africa has clearly demonstrated its willingness to participate in FTA's. The question that arises is what impact this would have on the red meat industry in South Africa should domestic red meat products be included in such agreements, i.e. red meat products are afforded preferential tariffs, if any, under an FTA. In this regard it is important to take into account the export capacity of the country or countries with which such agreements are negotiated. The reason for this is that if South Africa negotiates, for example, an FTA with Mercosur under which red meat is awarded preferential status and these countries can export all domestically demanded red meat at preferential rates, it would mean that the marginal tariff will decline to the preferential tariffs, if any, agreed upon. This will result in a drop in domestic prices of red meat to approximately the difference between the marginal tariff and the preferential tariff, if any tariff is applied. In other words, if one assumes that under an FTA with Mercosur countries they are allowed to import red meat at zero tariffs and they have the ability to supply the domestic deficit in total, the price effect would be similar to a zero tariff scenario despite the fact that tariffs are still applied to all other third parties. The same situation would apply for red meat imported from SADC, i.e. if the domestic red meat deficit is met in total by imports from SADC, domestic prices will become a function of the landed price of imports from these countries.

The implication of this is that the red meat industry in South Africa should carefully consider granting preferential access to third countries under FTA's. Preferential access could easily lead to a reduction in the marginal tariff rate, which in turn would result in lower domestic prices of red meat. This would in turn have an impact on the supply of primary products and the profitability of red meat production. Also, it will have follow-on effects on the animal feed industry, which in turn will have an impact on the field crop sector.

b)   The study clearly demonstrated that reductions in tariffs would have the most severe impact on the coastal regions of South Africa. From a development point of view, the significance of this is that the Eastern Cape and KwaZulu-Natal Provinces are known to have the largest number of cattle and sheep in the developing sector. It is also known that much effort is afforded by government and industry organisations to improve the welfare of such farmers through training and better market access, and to ensure the sustainability of scarce resources. This also entails greater pressure on these farmers to produce the right quality animal, to apply proper animals and veldt management practices, etc. in an effort to take full advantage of the market and to ensure sustainability. Obviously prices received by these farmers will be very important since such income is, in its turn, used for other purposes, amongst others, improvement of household food security. Thus, should a reduction in tariffs lead to lower prices, incentives to apply proper marketing and farm management practices by these farmers will be greatly diminished. It will also mean that investment in human capital could be wasted.

In addition to the above, the study has shown that improvements in efficiency in the developing sector could benefit the whole industry. For example, under a *status quo* situation increased demand due to growth in population and per capita income will be met largely by increased imports. In other words, the domestic red meat industry will loose market share to overseas producers. However, if the developing sector lives up to the challenge to improve efficiency, this sector could largely offset increased imports. However, increased off-take rates will lead to a drop in cattle prices on the domestic market, but this would only happen if export opportunities are not developed and exploited (exports will be discussed in more detail later). Thus, initiatives to improve the participation of the developing sector in red meat markets should not take place in isolation. **In other words, initiatives aimed at strategic issues in the red meat industry, such as increased efficiency and exploitation of export opportunities, should be done in tandem to ensure the most beneficial outcome.**

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c)   This study has clearly shown that export opportunities for red meat products by SACU, and by implication also South Africa, do exist. In fact, growing markets currently being exported to are not optimised to its fullest potential. Exploitation of such opportunities becomes even more important in the light of expected world price increases due to liberalisation. Several reasons for this could be provided, e.g. stringent SPS requirements, issues related to food safety and other NTB's. Nevertheless, the question could rightfully be asked whether the red meat supply chain is structured and/or functioning efficiently. The reason for this is that issues related to SPS measures and food safety could be linked directly and indirectly to the supply chain. For example, one can only ask how many abattoirs in South Africa are export certified. The ITC (2000) also attribute the inability of countries to exploit export opportunities to inefficiencies in supply chains, i.e. the fact that export opportunities are not fully utilised cannot entirely be blamed on SPS measures and NTB's. **Thus, the red meat industry in South Africa should seriously consider investigating the red meat supply chain in an all-encompassing manner.** This would imply priorities being assigned to specific strategic issues, e.g. improvement of food safety and the image of red meat in the eye of the beholder – the consumer; greater continuity coupled with producer education, increased productivity in the commercial and developing sector, as well as output industry; addressing issues gaining importance in the international trade arena and assessing government's role in the red meat industry. In essence very basic questions need to answered – **what** is important for the red meat industry to survive in the globalised environment, **how** will such issues be addressed and **who** will be responsible. In the light of the SACU and SADC agreements much of what has been said also applies to South Africa's neighbours. Thus, one should consider joint efforts to address joint problems that could lead to mutually beneficial outcomes.

This section does not imply that nothing has been done in terms of the issues discussed. In fact, at present many initiatives called for in this section are under

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way in the red meat industry in South Africa. This section merely provides reasons for much more urgency in terms of these initiatives.

d)   Although this study has not specifically focussed on the consumers of red meat products, most of the issues related to trade are directly linked to the consumer, e.g. the reaction of consumers to changes in prices, food safety issues, etc. Hence, it is of the utmost importance that the consumer environment is taken into account when strategies or policies are designed.

As stated elegantly by Adam Smith – *"Consumption is the sole end and purpose of all production"*. Surely, this quote holds more truth today than ever before. It is for this reason that this section will elaborate in more detail on the factors that may or could influence the demand for red meat. Consumers will only consume those goods and products that fulfil their specific demand requirements. The globalisation process broadened consumers' demand space, and hence created the opportunity for countries to take advantage of trade opportunities. This, however, entails that producers' should understand the factors that affect consumers' demand behaviour and that producers adjust accordingly.

Degado (2000) mentions that, unlike the supply-led Green Revolution, the "Livestock Revolution" is driven by demand. From the early 1970's to the mid-1990's, the volume of meat consumed in developing countries increased by almost three times as much as it did in developed countries. Developing-world consumption grew at an even faster rate in the second half of this period, with Asia in the lead. According to Howells (2000) consumers world-wide are becoming more demanding regarding what they want, and this is clearly evident from the switch from "quantity" to "quality" issues. The form in which consumption is taking place is changing; this is expressed in a number of ways, for example:

–   The increased interest in food safety;
–   greater concern for environmental and animal welfare issues;

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- increased importance of eating quality; and

- the greater role of food service.

Huston (2000) is of the opinion that the market for meat is typically considered in terms of production and per capita consumption. He questions if this is the most meaningful measure of the world's beef (meat) market, and states that a more useful measure is demand. According to him demand is perhaps the most misunderstood term in the beef (meat) business; it is often translated into simply per capita consumption, price or profitability. Its nature is, however, much more complex in that it encompasses the interaction between what is offered in the market place and the price consumers are willing to pay. Beef (meat) demand increases if (1) more beef (meat) is sold at the same price, or (2) the same amount of beef (meat) is sold at a higher price. Huston (2000) elaborates by stating that there are several forces at work in the market place that undermine beef (meat) demand:

- Perceptions that beef (meat) is old-fashioned and boring with questionable safety.

- Consumers thinking that beef (meat) is too difficult and time-consuming to prepare.

- Questions surrounding meat's healthfulness, specifically concerns about fat and cholesterol.

- Prices being too high for some consumers to justify its purchase, leading than to select a product that they perceive as a better value. Price and disposable income issues will always be a barrier to some people.

Duffy (1999) and Huston (2000) state that there has been no shortage of analysis on the factors influencing the demand by consumers for meat in general. The issue at hand, however, is the fact that the simple relationship of price and consumption no longer applies (Duffy, 1999). Huston (2000) goes further and calls into question the ability of price movements alone to explain problems with

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meat demand. Duffy (1999) identifies two broad classifications for factors that influence the demand for meat, namely:

- Economic

    These factors include income and price. In other words, consumers will generally increase their consumption of meat when real income increases, whilst consumption falls when price relative to other meats rises.

- Non-economic

    These factors include issues pertaining to health and safety, convenience, quality, animal welfare and the environment.

Bansback (1995) attempted to identify the influence of price, income and other factors (non-economic in nature) on the demand for meat in the EU. The results of his analysis are shown in Table 7.1. The results show that for the period 1955 to 1979, price and income factors accounted for a higher proportion of the explanation of changes in meat consumption than the period 1975 to 1994. Bansback (1995) concludes that non price/income factors are becoming more important and that traditional forms of demand analysis by economists are now less satisfactory than in the past. Also, industry efforts, such as promotion programmes, quality assurance measures, new product development and product quality improvement, can influence consumption. In other words, both companies and meat organisations may be in unique positions to affect consumption trends.

Table 7.1: Importance of economic and non-economic factors in meat demand

Product	1955 – 1979		1975 - 1994	
	Economic	Non-Economic	Economic	Non-Economic
Beef	95	5	68	32
Pig meat	98	2	55	45
Sheep meat	84	16	58	42

Source: Bansback, 1995.

Huston (1999) adds to the above by stating that the primary demand drivers for red meat in the US are:

–   Product consistency and quality;

–   food safety;

–   health and nutrition concerns; and

–   convenience.

For example, by focussing only on these factors since 1998 the US beef industry were able to stabilise beef demand. In fact, demand averaged 5.2 per cent higher in the first half of 2000 than the first half of 1999. Consumer spending also increased about $2 billion. Similar initiatives are under way in countries such as Australia, New Zealand and Canada (Huston, 2000). It would thus appear that if the meat industry neglects to properly take account of all the factors that influence meat demand, it will be to their own detriment. Smith (1999) adds to this by stating that to accomplish the goal of producing the right kinds of beef, pork and lamb, producers and packers have to learn to differentiate between customers and consumers. For producers and packers to be both customer-driven and consumer-driven, the reward/punishment system must be directed toward sellers meeting the needs of buyers (customers) while simultaneously satisfying the desires of end-users (consumers).

More specifically Smith (1999) states: *"Seedstock producers can be successful if they sell breeding animals, to their customers, that are lean, muscular, fertile, prolific and/or heavy milkers. Feeder-animal producers can please their customers if the animals are lean, muscular, healthy, disease-free and grow rapidly and efficiently. Those who finish animals for slaughter can please their customers (packers) if the animals have high dressing percentages, are disease-free and defect-free, and yield carcasses that are of high quality/cutability. Those who harvest animals and sell carcasses/cuts to supermarkets and/or food-service customers can succeed if their products are lean, muscular, economically priced,*

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*properly packaged and of high quality/palatability. Principals in each of those sectors must constantly remind themselves though that satisfying their **customers** (those to whom they sell animals or products) is not enough—in the end they must also please **consumers** (those who eat the meat)."*

Taking into account the above discussion, Quinn (1999) is of the opinion that the meat industry world-wide is living in the past, instead of looking to the future. He states that the past is one of managed markets, with largely captive customers and endlessly rising demand. The future is one in which the customer calls the shots, and the businesses that succeed will be those who recognise this fact and who act on it. This is echoed by Smith (1999), who states that to be "consumer-driven" means that beef, pork and lamb producers can no longer just produce what they (individually or collectively) think is best (or easiest, or most economical, etc.) and expect the world to come begging for more; rather, it means that at each critical juncture in the beef, pork and lamb production sequences, consideration must be given to what the consumer wants and is willing to buy.

Finally, Smith (1999) and Quinn (1999) summarise the factors that need to be accounted for in order to turn around the depressed state of red meat demand. These are:

– Properties which influence consumer demand for processed (prepared) beef, pork and lamb products include:
  (a) **Novelty** (new and different, changed in form, modernised, with added value)
  (b) **Quality** (taste, tenderness, physical attractiveness, storage stability);
  (c) **Simplicity** (quick, fast, time-saving, uncomplicated);
  (d) **Convenience** (easy to prepare, easy to serve, easy to clean-up after);
  (e) **Safety** (bacteriologically safe, chemically safe), and

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(f) **Consistency** (sameness in appearance from purchase to purchase, sameness in performance from preparation to preparation, sameness in palatability from eating experience to eating experience).

–   Properties that influence consumer demand for fresh (unprocessed/unprepared) beef, pork and lamb include:

(a)   **Quality** (taste, tenderness, physical attractiveness, storage stability);

(b)   **Consistency** (sameness in appearance from purchase to purchase, sameness in palatability from eating experience to eating experience);

(c)   **Safety** (bacteriologically safe, chemically safe), and;

(d)   **Caring Attitude** (by producers, about the environment and animal welfare).

In conclusion it can be stated that research pertaining to consumer orientated production should increasingly receive more attention. This is not only important from a South African point of view, but also from an international point of view. Inroads into the international market is only attainable if consumers' tastes and preferences on this market is properly understood. Then, and only then, would it be worthwhile to promote South African products internationally. In other words, there is a need to determine whether South African red meat products appeal to consumers abroad, and also domestically. This can only be done through proper market research that encompasses issues such as product characteristics, form and place utilities of consumers, food safety requirements, etc. Neglecting to achieve this end will be to the detriment of all parties playing an active role in the red meat industry, e.g. research pertaining to veterinary issues will mean a waste of valuable research resources in a declining industry. Recognising consumers as the sole end and purpose of all production will have the opposite result.

This would, however, not mean that the "battle" has been won. As mentioned, the red meat supply chain also needs to be considered. In this regard one can also mention the fact that although a large number of animals is kept by the non-commercial sector, they contribute very little to output. This state of affairs needs urgent attention. For example, this sector can contribute significantly to improved continuity of red meat, which is currently a problem as far as exports are concerned.

Finally, one might wonder why so much emphasis is placed on the international market and opportunities that exist for exports. The answer to this question is quite simple. Being able to export and to increase one's market share internationally implicitly also relates to one's competitiveness. This in its turn means that concerns about imports from other countries could receive less prominence and the industry could use scare human and capital resources to serve the industry more efficiently. Such a task could, however, not be accomplished by the industry itself. The active involvement of government is of the utmost importance. This entails that government should actively pursue issues that relate to disease prevention (not control), animal welfare, traceability, stock theft and trade.

7.4 Recommendations for further studies

Further research on the following aspects is necessary:

a) **Application of the Armington approach on trade modelling in the red meat industry:** It is commonly known that the quality of products vary considerably between different sources. This is no exception in the red meat industry. Thus, a country will, for instance, export good quality red meat and import lower quality red meat. Such trade characteristics are best handled by the Armington approach. Within the current modelling framework only imports are handled

endogenously. The Armington approach would allow for handling both imports and exports endogenously.

b) **Re-estimation of behavioural parameters:** Most of the empirical work relating to supply and demand elasticities in South Africa was completed before the process of liberalisation and deregulation. The importance is that SPE models rely heavily on these parameters for result estimations. Thus, in order to have more accurate predictions on how markets react to external shocks, one would have to estimate behavioural parameters that reflect the marketing environment after deregulation. In addition, the inclusion of cross-price effects must also be considered. In fact, this is one of the most important shortcomings of the present analysis.

c) **Expansion of current modelling framework to include more products:** It is common knowledge that poultry is the most important substitute for red meat products, in particular beef and sheep meat. The present analysis, however, excludes poultry. Thus, in order to properly measure the impact of external shocks on the red meat industry, the inclusion of poultry is necessary. Furthermore, the red meat industry also has strong linkages to the animal feed sector. This entails that changes in the feed sector will also influence the red meat sector and vice versa. Inclusion of this sector in the modelling framework used in this study would provide a much better understanding of the red meat trade environment. Also it would provide important information regarding the red meat value chain.

d) **Expansion of current modelling framework to include other southern African countries:** This is particularly important in the light of the SADC agreement. Furthermore, very little information is also available on the extent of red meat trade in this region. Thus, by expanding the current model to include other southern African countries could provide valuable information on trade patterns and the impacts of external shocks on the region.

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Appendix A:
World exports of different red meat products

Table A.1: Exports of products 020110 (Bovine carcasses and half carcasses, fresh or chilled)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995 - 1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	1,047,813	314,027	Tons	-4	0	100
Netherlands	305,861	65,068	Tons	-2	0	29.19
France	205,345	57,733	Tons	-13	-9	19.60
Spain	160,699	52,136	Tons	40	48	15.34
Belgium	124,351	35,669	Tons	-11	-6	11.87
Germany	66,618	30,477	Tons	-7	4	6.36
Ireland	41,503	17,365	Tons	15	24	3.96
Canada	27,394	6,918	Tons	12	8	2.61
United States of America	27,219	10,194	Tons	-9	-2	2.60
Denmark	24,695	7,820	Tons	-13	-7	2.36
Austria	24,411	9,604	Tons	16	27	2.33
Italy	14,016	6,482	Tons	-29	-21	1.34
Nicaragua	6,665	3,458	Tons	-18	-17	0.64
Argentina	3,367	2,583	Tons	-30	-34	0.32
Colombia	2,200	997	Tons	6	10	0.21
Uruguay	2,192	1,682	Tons	Na	Na	0.21

Note: Only countries with an export value of more than US$10 000 000 or more than a 1000 tons are included.
Na - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.2: Exports of products 020120 (Bovine cuts bone in, fresh or chilled)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	2,604,564	836,976	Tons	-6	-4	100
Germany	506,772	154,774	Tons	-4	1	19.46
France	460,431	136,679	Tons	-6	-3	17.68
Netherlands	431,384	111,354	Tons	-6	-4	16.56
Ireland	245,125	52,164	Tons	5	2	9.41
Canada	210,037	87,762	Tons	-1	-6	8.06
Austria	136,655	45,613	Tons	-1	7	5.25
Denmark	118,435	42,047	Tons	-8	-4	4.55
United States of America	114,411	34,717	Tons	13	19	4.39
Spain	97,020	43,694	Tons	1	9	3.72
Belgium	86,497	24,681	Tons	-16	-11	3.32

Table A.2: Continues

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
Italy	80,704	38,581	Tons	6	14	3.10
Uruguay	22,528	19,441	Tons	10	10	0.86
Australia	18,186	8,169	Tons	-7	7	0.70
Hungary	16,840	6,961	Tons	3	3	0.65
Poland	13,969	8,016	Tons	175	212	0.54
Paraguay	11,058	9,036	Tons	8	Na	0.42
Slovenia	10,275	3,373	Tons	4	15	0.39
Croatia	4,367	900	Tons	-17	-14	0.17
Finland	3,949	1,284	Tons	-18	-25	0.15
New Zealand	2,507	890	Tons	-14	-13	0.10
Czech Republic	2,002	961	Tons	45	52	0.08
SACU	1,840	730	Tons	2	Na	0.07
Argentina	1,723	1,342	Tons	-52	-56	0.07
Bosnia and Herzegovina	1,540	513	Tons	23	31	0.06
United Kingdom	1,192	254	Tons	-79	-80	0.05
Mexico	899	260	Tons	Na	Na	0.03
Norway	865	1,008	Tons	Na	Na	0.03

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.3: Exports of products 020130 (Bovine cuts boneless, fresh or chilled)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	5,117,632	1,265,272	Tons	2	8	100
United States of America	1,276,390	326,008	Tons	0	9	24.94
Australia	811,370	241,023	Tons	-5	1	15.85
Canada	705,830	237,563	Tons	54	47	13.79
Netherlands	514,506	104,359	Tons	1	5	10.05
Ireland	481,880	51,473	Tons	-2	-10	9.42
Argentina	348,323	73,631	Tons	-1	2	6.81
France	195,832	45,348	Tons	-7	-3	3.83
Germany	151,784	29,205	Tons	10	13	2.97
Brazil	117,422	31,083	Tons	24	45	2.29
Denmark	96,726	17,452	Tons	-1	3	1.89
Belgium	92,576	18,765	Tons	5	9	1.81
Uruguay	88,101	23,047	Tons	22	37	1.72
New Zealand	72,462	17,212	Tons	1	8	1.42
Zimbabwe	24,721	5,405	Tons	-13	-4	0.48
United Kingdom	24,184	3,926	Tons	-45	-46	0.47

Table A.3: Continues

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
Nicaragua	20,997	8,037	Tons	1	2	0.41
Italy	14,499	3,810	Tons	40	39	0.28
Costa Rica	12,834	4,712	Tons	-11	-12	0.25
Panama	11,772	3,929	Tons	34	33	0.23
Paraguay	11,713	5,253	Tons	19		0.23
Finland	8,630	1,741	Tons	24	39	0.17
Austria	8,009	2,637	Tons	-1	7	0.16
Spain	7,503	4,408	Tons	37	67	0.15
Mexico	5,172	626	Tons	38	20	0.10
Japan	3,945	47	Tons	15	17	0.08
Sweden	1,978	579	Tons	-13	1	0.04
Guatemala	1,775	753	Tons	-13	-22	0.03
Hungary	1,352	334	Tons			0.03
Area Nes	1,106	248	Tons	-28	-27	0.02
SACU	949	1,276	Tons	-59		0.02

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.
Na - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.4: Exports of products 020210 (Bovine carcasses and half carcasses, frozen)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	209,637	173,003	Tons	-15	-10	100
Ukraine	139,701	125,535	Tons	-14	-9	66.64
Australia	16,441	12,042	Tons	-27	-22	7.84
United States of America	15,460	4,761	Tons	25	24	7.37
Lithuania	9,461	9,182	Tons	15	22	4.51
Belarus	5,509	4,473	Tons	Na	Na	2.63
Moldova	4,948	4,737	Tons	Na	Na	2.36
Kazakstan	4,081	3,561	Tons	-34	-31	1.95
Ireland	2,872	517	Tons	Na	Na	1.37
Spain	2,511	970	Tons	299	315	1.20
Belgium	2,424	956	Tons	42	63	1.16
Mongolia	2,299	3,174	Tons	28	60	1.10

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.
Na - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.5: Exports of products 020230 (Bovine cuts boneless, frozen)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	4,564,609	2,162,012	Tons	-2	0	100
Australia	1,038,776	609,323	Tons	6	7	22.76
United States of America	1,024,026	341,088	Tons	-1	5	22.43
New Zealand	543,431	285,442	Tons	-4	-1	11.91
Ireland	388,675	116,264	Tons	-4	-15	8.51
Brazil	326,145	119,471	Tons	24	38	7.15
Uruguay	202,114	97,698	Tons	8	12	4.43
Argentina	169,537	81,096	Tons	-15	-13	3.71
Netherlands	139,798	61,385	Tons	1	1	3.06
Germany	123,219	83,192	Tons	-7	-1	2.70
Italy	89,880	45,343	Tons	5	18	1.97
India	80,250	70,305	Tons	-6	-2	1.76
France	73,747	47,606	Tons	-22	-20	1.62
Canada	62,982	32,994	Tons	13	11	1.38
Spain	59,011	36,363	Tons	4	20	1.29
Denmark	37,559	18,113	Tons	-10	-9	0.82
Belgium	32,271	13,536	Tons	-20	-25	0.71
China	24,837	18,472	Tons	-1	4	0.54
Ukraine	17,450	11,561	Tons	-15	-8	0.38
Costa Rica	14,525	8,933	Tons	-17	-16	0.32
Nicaragua	14,109	8,116	Tons	-9	-8	0.31
United Arab Emirates	10,121	7,197	Tons	35	26	0.22
Poland	9,831	5,174	Tons	4	33	0.22
Paraguay	9,596	4,165	Tons	-21		0.21
Austria	8,998	9,215	Tons	8	27	0.20
Moldova	6,094	4,605	Tons			0.13
Greece	5,335	1,703	Tons	-6	-9	0.12
Zimbabwe	4,629	2,560	Tons	-22	-8	0.10
Georgia	4,603	1,928	Tons			0.10
Area Nes	4,411	1,962	Tons	0	9	0.10
Hungary	4,287	1,906	Tons			0.09
United Kingdom	4,048	1,023	Tons	-60	-66	0.09
Mexico	3,759	1,896	Tons	-7	-4	0.08

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.

Na   - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.6: Exports of product 020311 (Swine carcasses and half carcasses, fresh or chilled)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	987,595	729,130	Tons	-9	4	100
Belgium	223,452	171,246	Tons	-14	1	22.63
Netherlands	188,690	144,678	Tons	-18	-5	19.11
France	107,868	73,333	Tons	-15	-3	10.92
United States of America	80,124	29,571	Tons	54	41	8.11
Spain	79,154	62,858	Tons	5	23	8.01
Denmark	57,188	51,207	Tons	-7	10	5.79
Germany	50,503	39,152	Tons	5	26	5.11
United Kingdom	46,673	46,946	Tons	-17	0	4.73
Australia	35,788	15,044	Tons	209	236	3.62
Austria	34,054	25,568	Tons	16	37	3.45
Canada	20,773	12,334	Tons	-1	2	2.10
Ireland	13,567	11,257	Tons	-12	-1	1.37
Hungary	12,499	12,186	Tons	24	43	1.27
Sweden	8,116	7,374	Tons	9	31	0.82
Belarus	4,979	3,565	Tons	Na	Na	0.50
Finland	4,196	3,542	Tons	-13	6	0.42
Czech Republic	3,761	4,060	Tons	458	635	0.38
Italy	3,177	2,460	Tons	-11	2	0.32
Estonia	2,666	2,048	Tons	579	Na	0.27
Poland	2,117	3,474	Tons	-28	-16	0.21
Norway	1,704	2,082	Tons	148	201	0.17
Portugal	1,177	1,152	Tons	16	34	0.12

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.

Na   - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.7: Exports of product 020312 (Hams, shoulders and cuts thereof, of swine bone in, fresh or chilled)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	1,695,543	1,084,145	Tons	-3	7	100
Netherlands	504,106	358,749	Tons	-10	3	29.73
Denmark	425,436	251,653	Tons	-4	7	25.09
Germany	145,578	94,865	Tons	5	17	8.59
Belgium	143,859	99,744	Tons	-7	6	8.48
France	100,689	61,811	Tons	-11	-1	5.94
United States of America	96,250	38,558	Tons	36	39	5.68
Spain	95,568	58,404	Tons	13	27	5.64
Canada	84,717	62,901	Tons	-4	4	5.00

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Table A.7: Continues

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
Austria	33,889	21,892	Tons	13	27	2.00
Ireland	20,476	7,683	Tons	2	7	1.21
Hungary	13,260	7,946	Tons	33	46	0.78
Italy	12,231	4,887	Tons	53	43	0.72
Sweden	9,953	6,012	Tons	32	52	0.59
United Kingdom	6,644	6,955	Tons	-29	-10	0.39

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons
are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.8:   Exports of product 020321 (Swine carcasses and half carcasses, frozen)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	278,966	305,256	Tons	3	15	100
Germany	94,865	96,425	Tons	47	71	34.01
Poland	54,092	81,398	Tons	2	15	19.39
France	24,402	29,792	Tons	31	60	8.75
United States of America	16,143	7,828	Tons	6	11	5.79
Spain	15,145	10,481	Tons	49	66	5.43
China	11,581	9,284	Tons	-29	-25	4.15
Vietnam	9,128	5,369	Tons	33	38	3.27
Ukraine	6,298	6,283	Tons	-27	-18	2.26
Moldova	6,180	6,352	Tons	Na	Na	2.22
Netherlands	5,090	7,213	Tons	29	64	1.82
Hungary	4,860	5,571	Tons	53	99	1.74
Belarus	4,227	3,968	Tons	Na	Na	1.52
Finland	4,069	5,196	Tons	102	135	1.46
Norway	3,384	6,147	Tons	91	152	1.21
Ireland	3,002	1,228	Tons	11	20	1.08
Austria	2,920	5,126	Tons	74	117	1.05
Kazakstan	2,461	2,160	Tons	27	39	0.88
Belgium	1,994	4,057	Tons	-26	9	0.71
Sweden	1,817	2,930	Tons	286	388	0.65
Romania	1,750	2,855	Tons	-53	-46	0.63
Denmark	1,155	1,738	Tons	41	80	0.41
Italy	1,066	1,103	Tons	13	35	0.38

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons
are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.9: Exports of product 020322 (Hams, shoulders and cuts thereof, of swine, bone in, frozen)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	328,072	236,572	Tons	0	12	100
USA	112,111	45,709	Tons	-1	2	34.17
Hungary	35,209	19,574	Tons	36	38	10.73
Denmark	27,396	26,729	Tons	-8	8	8.35
France	25,844	38,364	Tons	9	48	7.88
Netherlands	23,401	24,788	Tons	-9	10	7.13
Canada	21,044	16,263	Tons	11	19	6.41
Belgium	15,784	13,997	Tons	-15	2	4.81
Spain	15,075	10,776	Tons	-3	14	4.60
Germany	11,119	8,142	Tons	31	54	3.39
Mexico	7,993	3,654	Tons	193	143	2.44
Ireland	7,074	4,246	Tons	-9	-1	2.16
United Kingdom	5,193	6,726	Tons	-22	-5	1.58
Italy	4,478	2,350	Tons	33	59	1.36
Sweden	3,581	2,523	Tons	70	99	1.09
Austria	2,265	3,009	Tons	57	115	0.69
China	1,588	1,379	Tons	-29	-25	0.48
Kazakstan	1,435	1,287	Tons	134	173	0.44
Korea	1,319	663	Tons	50	106	0.40
Brazil	1,042	2,086	Tons	-19	8	0.32

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.

Na   - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.10: Exports of product 020329 (Swine cuts, frozen nes)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	3,377,848	1,760,419	Tons	-1	12	100
Denmark	1,156,719	469,032	Tons	-5	7	34.24
France	262,416	171,950	Tons	5	22	7.77
Canada	260,794	142,658	Tons	-1	10	7.72
USA	259,592	133,568	Tons	7	15	7.69
Korea	223,141	67,803	Tons	30	55	6.61
Netherlands	188,436	126,121	Tons	-9	7	5.58
Germany	120,047	93,677	Tons	12	31	3.55
Belgium	115,282	76,886	Tons	-15	-1	3.41
Brazil	113,679	73,292	Tons	9	23	3.37
Spain	109,981	85,238	Tons	15	39	3.26
Mexico	99,429	29,935	Tons	27	40	2.94
Hungary	90,794	46,049	Tons	-3	2	2.69

Table A.10: Continues

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
United Kingdom	89,292	61,948	Tons	-10	8	2.64
Ireland	72,042	25,906	Tons	-11	-1	2.13
China	53,335	42,262	Tons	-21	-18	1.58
Italy	31,518	27,534	Tons	4	34	0.93
Australia	29,636	11,022	Tons	15	34	0.88
Austria	28,408	29,811	Tons	37	66	0.84
Chile	20,846	5,587	Tons	51	40	0.62
Sweden	20,445	14,711	Tons	-6	10	0.61
Finland	13,361	9,575	Tons	18	28	0.40
Area Nes	2,092	1,463	Tons	-28	-25	0.06
Portugal	2,077	2,232	Tons	0	21	0.06
Czech Republic	2,009	1,042	Tons	54	70	0.06
SACU	1,481	934	Tons	-26		0.04
Slovenia	1,392	1,135	Tons	110	149	0.04
Poland	1,271	2,558	Tons	14	32	0.04
Norway	1,246	2,233	Tons	72	118	0.04
Greece	1,175	548	Tons	-2	1	0.03
Cyprus	1,096	790	Tons	43	63	0.03

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.11: Exports of product 020410 (Lamb carcasses and half carcasses, fresh or chilled)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	505,353	115,595	Tons	-6	-10	100
United Kingdom	257,031	80,999	Tons	-12	-10	50.86
Ireland	154,917	7,918	Tons	1	-27	30.66
Spain	22,500	5,166	Tons	17	21	4.45
Bulgaria	18,370	4,677	Tons	24	26	3.64
France	11,641	2,794	Tons	-5	3	2.30
Australia	11,334	5,328	Tons	-5	-3	2.24
Turkey	5,417	1,276	Tons	23	19	1.07
New Zealand	5,063	2,235	Tons	-3	0	1.00
Netherlands	4,374	1,094	Tons	-5	1	0.87
Hungary	2,923	638	Tons	9	16	0.58
Italy	2,909	644	Tons	155	185	0.58
Belgium	2,811	662	Tons	15	16	0.56
Uruguay	1,254	849	Tons			0.25

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.12: Exports of product 020422 (Sheep cuts, bone in, fresh or chilled)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	285,381	79,457	Tons	13	17	100
New Zealand	115,507	27,133	Tons	14	20	40.47
Australia	107,431	38,903	Tons	18	19	37.64
Belgium	17,396	3,203	Tons	31	25	6.10
United Kingdom	16,775	3,953	Tons	-6	-1	5.88
France	13,592	2,123	Tons	11	19	4.76
Ireland	9,894	2,935	Tons	-1	4	3.47
Netherlands	1,464	199	Tons	94	84	0.51

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.13: Exports of product 020441 (Sheep carcasses and half carcasses, frozen)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	38,369	40,852	Tons	-9	-8	100
Australia	22,782	23,909	Tons	2	6	59.38
New Zealand	9,544	12,504	Tons	-26	-23	24.87
India	1,110	461	Tons	-10	-13	2.89
Chile	1,074	1,055	Tons	24	23	2.80
Moldova	1,041	1,088	Tons	Na	Na	2.71

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table A.14: Exports of product 020442 (Sheep cuts, bone in, frozen)

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
World estimation	619,357	337,399	Tons	2	7	100
New Zealand	412,700	192,613	Tons	0	4	66.63
Australia	140,968	122,501	Tons	7	13	22.76
Belgium	21,919	5,250	Tons	4	5	3.54
Uruguay	9,451	5,465	Tons	30	18	1.53
United Kingdom	7,130	2,165	Tons	-5	0	1.15
Germany	4,356	1,083	Tons	20	24	0.70
Chile	3,474	1,681	Tons	32	39	0.56
Korea	3,015	1,060	Tons	323	329	0.49
USA	2,479	1,275	Tons	-6	1	0.40
Ireland	2,011	781	Tons	36	27	0.32

Table A.14: Continues

Exporters	Value exported in 1999, in US$ thousand	Quantity exported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world exports, %
Spain	1,792	754	Tons	6	11	0.29
Italy	1,771	498	Tons	-10	-10	0.29
Netherlands	1,519	256	Tons	33	27	0.25
France	1,490	453	Tons	-19	-1	0.24
Canada	1,409	218	Tons	15	15	0.23
Iceland	1,065	243	Tons	-7	-14	0.17

Note: Only countries with an export value of more than US$10 000 000 or more than 1000 tons are included.

Na   - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

Appendix B:
World imports of different red meat products

Table B.1: Imports of products 020110 (Bovine carcasses and half carcasses, fresh or chilled)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	1,002,113	369,480	Tons	-6	0	100
Italy	456,160	115,460	Tons	1	5	45.52
France	140,683	49,855	Tons	-13	-7	14.04
Netherlands	98,945	48,440	Tons	-8	5	9.87
Portugal	94,632	29,945	Tons	6	12	9.44
Greece	41,857	63,064	Tons	-8	33	4.18
Germany	38,382	10,389	Tons	-30	-27	3.83
United States of America	27,226	6,881	Tons	12	8	2.72
Belgium	18,860	5,939	Tons	11	20	1.88
United Kingdom	15,549	6,397	Tons	24	29	1.55
Austria	11,870	3,551	Tons	1	9	1.18
Spain	11,793	2,471	Tons	-24	-23	1.18
Mexico	11,222	6,457	Tons	109	110	1.12
Brazil	7,075	6,260	Tons	-37	-40	0.71
El Salvador	3,637	1,961	Tons	-27	-41	0.36
Algeria	3,629	1,999	Tons	Na	Na	0.36
Chile	2,921	1,983	Tons	108	113	0.29
Tunisia	2,288	1,393	Tons	-14	-9	0.23
Argentina	2,247	1,647	Tons	661	602	0.22

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons
         are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.2: Imports of products 020120 (Bovine cuts bone in, fresh or chilled)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	2,366,702	776,640	Tons	-7	-3	100
Italy	796,616	200,504	Tons	-2	1	33.66
France	434,553	156,651	Tons	-14	-8	18.36
Greece	228,236	74,980	Tons	-6	-1	9.64
United States of America	207,885	86,736	Tons	-1	-6	8.78
Denmark	120,467	38,233	Tons	2	8	5.09
Spain	108,320	18,402	Tons	0	1	4.58

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Table B.2: Continues

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
Netherlands	86,470	30,706	Tons	2	12	3.65
Germany	85,798	30,099	Tons	-21	-19	3.63
Portugal	59,156	17,868	Tons	-14	-10	2.50
United Kingdom	59,062	26,067	Tons	-6	19	2.50
Mexico	38,978	27,098	Tons	48	58	1.65
Belgium	17,799	5,451	Tons	-16	-11	0.75
Brazil	16,835	14,670	Tons	-3	-4	0.71
Canada	15,799	4,392	Tons	-8	-6	0.67
Macedonia	10,695	5,994	Tons	24	25	0.45
Austria	9,959	3,321	Tons	-5	2	0.42
Switzerland	9,090	1,310	Tons	23	20	0.38
Japan	9,078	2,015	Tons	-24	-21	0.38
Russian Federation	7,865	9,123	Tons	-13	-27	0.33
Argentina	7,583	5,840	Tons	34	26	0.32
Andorra	4,783	1,374	Tons	-1	0	0.20
Finland	2,986	1,743	Tons	-9	14	0.13
Czech Republic	2,858	2,832	Tons	19	15	0.12
Sweden	2,714	928	Tons	-27	-27	0.11
Croatia	2,582	948	Tons	-12	-16	0.11
Bosnia and Herzegovina	1,597	1,163	Tons	-20	-14	0.07

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.

Na - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.3: Imports of products 020130 (Bovine cuts boneless, fresh or chilled)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	5,346,718	1,365,689	Tons	2	10	100
Japan	1,604,539	331,965	Tons	-8	-2	30.01
United States of America	755,327	244,376	Tons	46	40	14.13
Mexico	486,695	202,353	Tons	64	68	9.10
Germany	440,816	81,119	Tons	-8	-3	8.24
United Kingdom	311,83 2	65,456	Tons	1	6	5.83
France	307,441	63,293	Tons	-6	-2	5.75
Canada	212,522	67,405	Tons	-7	-6	3.97
Netherlands	194,984	45,468	Tons	4	14	3.65
Italy	159,685	27,542	Tons	6	10	2.99
Spain	144,498	33,478	Tons	19	33	2.70
Chile	126,888	56,737	Tons	12	15	2.37

Table B.3: Continues

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
Denmark	87,255	18,720	Tons	-2	2	1.63
Sweden	77,764	19,289	Tons	11	27	1.45
Belgium	74,702	13,288	Tons	4	9	1.40
Austria	35,799	4,900	Tons	8	11	0.67
Switzerland	33,745	3,257	Tons	0	0	0.63
Greece	32,716	12,966	Tons	2	14	0.61
Portugal	30,903	6,407	Tons	6	11	0.58
Brazil	26,412	6,826	Tons	9	11	0.49
Taiwan	23,546	6,193	Tons	13	21	0.44
Hong Kong	17,681	2,447	Tons	-2	6	0.33
Finland	15,416	4,394	Tons	2	18	0.29
El Salvador	15,331	4,973	Tons	19	-1	0.29
Saudi Arabia	14,996	6,807	Tons	-9	2	0.28
Lebanon	14,678	5,086	Tons	9	9	0.27
Singapore	12,487	1,888	Tons	-3	3	0.23
French Polynesia	8,570	2,189	Tons	1	12	0.16
United Arab Emirates	7,783	2,869	Tons	5	8	0.15
Dominican Republic	7,318	2,130	Tons	68	165	0.14
Korea	6,845	1,836	Tons	128	249	0.13
Argentina	4,346	1,812	Tons	59	61	0.08
Bermuda	3,952	613	Tons	3	5	0.07
Australia	3,923	1,104	Tons	-23	-22	0.07

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.

Na   - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

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Table B.4:   Imports of products 020210 (Bovine carcasses and half carcasses, frozen)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	199,633	163,094	Tons	-14	-10	100
Russian Federation	153,837	139,406	Tons	-21	-14	85.48
Netherlands	16,244	8,538	Tons	12	24	5.24
Portugal	10,202	3,219	Tons	40	53	1.97
Egypt	6,783	4,087	Tons	122	127	2.51
Uzbekistan	2,819	3,042	Tons	Na	Na	1.87
Italy	1,866	449	Tons	-6	-5	0.28
France	1,497	676	Tons	19	31	0.41

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.5: Imports of products 020230 (Bovine cuts boneless, frozen)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	4,494,507	2,182,725	Tons	-2	2	100
United States of America	1,031,987	541,944	Tons	5	6	22.96
Japan	810,638	338,057	Tons	-5	5	18.04
Russian Federation	228,727	198,142	Tons	-1	8	5.09
Korea	220,894	83,166	Tons	-10	-4	4.91
Egypt	215,332	132,922	Tons	6	4	4.79
Canada	186,221	104,925	Tons	1	5	4.14
Taiwan	140,707	55,548	Tons	-2	4	3.13
Italy	117,541	37,092	Tons	5	12	2.62
Israel	112,563	48,798	Tons	4	-1	2.50
Hong Kong	101,131	37,269	Tons	-1	3	2.25
Spain	99,118	26,527	Tons	-2	2	2.21
Germany	97,067	29,499	Tons	-14	-8	2.16
United Kingdom	93,349	41,191	Tons	-17	-10	2.08
Malaysia	80,182	66,092	Tons	-4	3	1.78
Netherlands	63,583	16,347	Tons	-11	-10	1.41
Iran	60,168	25,272	Tons	Na	Na	1.34
France	59,934	21,527	Tons	-1	6	1.33
Philippines	46,794	40,132	Tons	4	11	1.04
Mexico	46,094	29,623	Tons	20	33	1.03
Greece	42,797	23,580	Tons	-15	-1	0.95
Sweden	42,288	10,886	Tons	0	12	0.94
Saudi Arabia	39,361	7,100	Tons	-8	-33	0.88

Table B.5: Continues

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
Portugal	32,642	8,200	Tons	12	21	0.73
Algeria	30,955	16,005	Tons	-3	-5	0.69
Belgium	30,737	8,609	Tons	6	7	0.68
Chile	30,407	20,787	Tons	-4	0	0.68
Singapore	28,279	12,096	Tons	-10	-2	0.63
Indonesia	26,692	14,705	Tons	-22	-22	0.59
Denmark	23,019	5,707	Tons	8	13	0.51
Brazil	20,228	7,529	Tons	-29	-35	0.45
Malta	19,625	6,919	Tons	3	3	0.44
United Arab Emirates	14,838	5,160	Tons	-3	-8	0.33
Bulgaria	12,014	10,596	Tons	0	5	0.27
Switzerland	11,921	3,231	Tons	-3	-2	0.27
Cyprus	11,703	1,852	Tons	1	1	0.26
Finland	10,626	2,983	Tons	9	18	0.24
Oman	9,482	5,553	Tons	-12	-17	0.21
SACU	8,913	14,439	Tons	-37	-30	0.20
Bosnia and Herzegovina	8,688	5,376	Tons	7	10	0.19
Austria	8,630	2,810	Tons	-17	-17	0.19
Norway	8,540	2,230	Tons	12	20	0.19
Armenia	8,024	7,715	Tons	Na	Na	0.18
Ireland	7,927	3,754	Tons	-8	-5	0.18
Angola	7,911	4,112	Tons	8	11	0.18
French Polynesia	7,793	3,853	Tons	-1	5	0.17
Kuwait	7,448	3,644	Tons	4	0	0.17
Mauritius	7,423	4,832	Tons	-13	-13	0.17
Dominican Republic	7,026	4,085	Tons	274	365	0.16
Trinidad and Tobago	6,860	Na	Na	17	Na	0.15
Croatia	6,551	3,853	Tons	-13	-7	0.15
China	5,383	3,851	Tons	13	9	0.12
Ghana	5,046	4,172	Tons	Na	Na	0.11
Lebanon	5,000	1,944	Tons	-8	-15	0.11
Jordan	4,910	2,991	Tons	49	54	0.11
Argentina	4,788	2,539	Tons	40	43	0.11
Bahrain	4,632	1,641	Tons	10	8	0.10
Romania	4,357	2,232	Tons	16	17	0.10
New Zealand	4,144	2,178	Tons	-19	-19	0.09
Guatemala	3,960	2,463	Tons	124	135	0.09
Peru	3,950	2,010	Tons	-10	-8	0.09
Netherlands Antilles	3,894	1,627	Tons	29	42	0.09
Venezuela	3,793	2,144	Tons	56	54	0.08
Barbados	3,779	1,388	Tons	Na	Na	0.08

Table B.5: Continues

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
El Salvador	3,743	1,470	Tons	191	158	0.08
Area Nes	3,719	1,468	Tons	-21	-13	0.08
Macedonia	3,496	2,318	Tons	44	55	0.08
Greenland	3,406	563	Tons	4	6	0.08
Cuba	3,288	1,228	Tons	70	116	0.07
Papua New Guinea	3,263	3,338	Tons	-30	-26	0.07
Comoros	3,127	2,354	Tons	-2	-6	0.07
Bahamas	2,859	1,055	Tons	11	32	0.06
Tunisia	2,808	1,013	Tons	-9	-10	0.06
Slovakia	2,804	1,888	Tons	-7	0	0.06
Thailand	2,790	1,276	Tons	2	5	0.06
Gabon	2,457	2,073	Tons	-21	-21	0.05

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.6:   Imports of product 020311 (Swine carcasses and half carcasses, fresh or chilled)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	893,821	733,686	Tons	-11	4	100
Germany	357,750	302,440	Tons	-16	-1	40.02
Italy	159,220	105,165	Tons	-10	3	17.81
Greece	125,840	133,025	Tons	-6	17	14.08
Singapore	36,038	15,108	Tons	Na	Na	4.03
Mexico	34,232	30,217	Tons	74	85	3.83
Portugal	27,719	20,723	Tons	-7	6	3.10
Austria	26,841	20,569	Tons	-12	4	3.00
United States of America	19,339	11,206	Tons	-1	1	2.16
France	15,057	13,971	Tons	-25	-9	1.68
Belgium	12,322	12,199	Tons	26	55	1.38
Switzerland	10,012	7,355	Tons	15	34	1.12
Romania	9,755	7,582	Tons	273	266	1.09
Russian Federation	9,614	12,028	Tons	-20	-15	1.08
United Kingdom	7,447	6,594	Tons	-18	-2	0.83
Slovenia	5,940	5,346	Tons	-17	-5	0.66
Slovakia	4,903	5,126	Tons	119	143	0.55
Netherlands	4,326	3,817	Tons	-18	-5	0.48
Estonia	4,111	3,212	Tons	70	Na	0.46
Sweden	3,719	2,015	Tons	-1	8	0.42

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Table B.6: Continues

Ireland	3,154	1,417	Tons	21	30	0.35
Czech Republic	2,376	2,919	Tons	133	147	0.27
Poland	1,795	2,233	Tons	Na	Na	0.20
Lithuania	1,747	1,194	Tons	271	292	0.20
Macedonia	1,504	1,168	Tons	70	96	0.17

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.

Na - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.7: Imports of product 020312 (Hams, shoulders and cuts thereof, of swine bone in, fresh or chilled)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	1,650,859	1,097,217	Tons	-3	9	100
Italy	738,756	481,609	Tons	-4	8	44.75
France	242,586	151,149	Tons	-7	6	14.69
Germany	206,802	149,732	Tons	-9	3	12.53
United Kingdom	124,290	72,114	Tons	12	22	7.53
USA	81,521	61,099	Tons	-5	3	4.94
Spain	56,053	31,949	Tons	32	40	3.40
Mexico	42,555	54,283	Tons	76	92	2.58
Austria	31,362	15,227	Tons	16	20	1.90
Portugal	30,330	20,901	Tons	5	21	1.84
Belgium	23,573	14,149	Tons	-1	5	1.43
Sweden	14,282	4,924	Tons	23	30	0.87
Greece	10,713	9,708	Tons	-1	18	0.65
Poland	8,640	6,868	Tons	-22	-12	0.52
Ireland	5,568	2,211	Tons	5	11	0.34
Finland	5,402	2,529	Tons	17	34	0.33
Canada	5,310	3,926	Tons	34	45	0.32
Slovenia	5,075	2,707	Tons	-6	2	0.31
Netherlands	4,998	3,753	Tons	-23	-9	0.30
Croatia	1,686	1,004	Tons	-13	-9	0.10
Lithuania	1,390	819	Tons			0.08
Denmark	1,312	472	Tons	66	64	0.08
Taiwan	1,247	951	Tons			0.08

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.

Na - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.8: Imports of product 020319 (Swine cuts, fresh or chilled, nes)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	2,350,140	984,220	Tons	-7	5	100
Japan	828,868	171,724	Tons	-10	-1	35.27
Germany	449,221	218,847	Tons	-12	-1	19.11
USA	210,761	116,325	Tons	4	14	8.97
France	159,824	101,204	Tons	-6	8	6.80
United Kingdom	123,924	57,177	Tons	-7	3	5.27
Italy	99,122	49,813	Tons	-7	4	4.22
Netherlands	75,317	50,397	Tons	1	19	3.20
Sweden	53,607	11,414	Tons	3	14	2.28
Austria	45,716	22,208	Tons	4	14	1.95
Belgium	40,520	25,331	Tons	-16	-3	1.72
Greece	35,957	29,317	Tons	-1	20	1.53
Portugal	30,063	18,813	Tons	13	28	1.28
Canada	29,881	16,680	Tons	12	9	1.27
Denmark	24,742	13,762	Tons	5	24	1.05
Finland	20,624	6,494	Tons	-1	8	0.88
Mexico	20,382	15,581	Tons	38	32	0.87
Poland	19,521	14,762	Tons	18	29	0.83
Ireland	16,659	5,049	Tons	42	36	0.71
Switzerland	11,088	3,073	Tons	107	123	0.47
Czech Republic	7,383	6,932	Tons	32	37	0.31
Hong Kong	6,501	2,096	Tons	244	219	0.28
Spain	6,249	3,231	Tons	-23	-7	0.27
Hungary	5,089	5,804	Tons	-20	-9	0.22
Slovakia	2,877	3,095	Tons	66	75	0.12
Korea	2,701	851	Tons	105	114	0.11
Bosnia and Herzegovina	2,640	1,355	Tons	77	86	0.11
Argentina	1,861	938	Tons	39	62	0.08
Slovenia	1,770	967	Tons	-19	-13	0.08
Russian Federation	1,383	1,394	Tons	-46	-47	0.06
Andorra	1,299	581	Tons	-19	-10	0.06
Singapore	1,066	297	Tons	56	180	0.05

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.

Na - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.9: **Imports of product 020321 (Swine carcasses and half carcasses, frozen)**

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	243,920	251,064	Tons	-5	8	100
Russian Federation	172,987	199,143	Tons	-9	9	70.92
Hong Kong	18,917	9,867	Tons	21	29	7.76
United Kingdom	7,522	3,593	Tons	-7	7	3.08
Belarus	5,084	4,285	Tons	Na	Na	2.08
Sweden	3,617	1,374	Tons	248	317	1.48
Romania	3,514	2,669	Tons	68	65	1.44
Singapore	2,917	1,468	Tons	-14	-8	1.20
Korea	2,411	1,649	Tons	Na	Na	0.99
Ukraine	2,364	3,865	Tons	16	35	0.97
Latvia	1,882	2,779	Tons	-7	3	0.77
Portugal	1,825	1,163	Tons	7	18	0.75
Philippines	1,708	1,848	Tons	Na	Na	0.70
Taiwan	1,488	1,091	Tons	21	29	0.61
Germany	1,348	538	Tons	32	26	0.55
Spain	1,342	1,112	Tons	-6	-1	0.55
Greece	1,314	482	Tons	11	16	0.54
Norway	1,290	1,150	Tons	666	908	0.53
Estonia	1,260	1,394	Tons	-12	Na	0.52
Italy	1,188	801	Tons	-16	-7	0.49
Poland	1,052	1,244	Tons	Na	Na	0.43

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.
Na - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.10: **Imports of product 020322 (Hams, shoulders and cuts thereof, of swine, bone in, frozen)**

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	286,553	254,687	Tons	4	20	100
Russian Federation	62,778	67,133	Tons	27	35	21.91
Spain	45,602	34,173	Tons	26	39	15.91
Italy	22,280	13,487	Tons	-19	-10	7.78
France	20,651	11,244	Tons	-13	-3	7.21
China	19,583	48,106	Tons	210	290	6.83
USA	18,454	7,977	Tons	7	9	6.44
Taiwan	12,147	7,731	Tons	81	103	4.24
Portugal	8,443	5,592	Tons	-10	3	2.95
Hong Kong	8,088	8,945	Tons	-12	5	2.82
Germany	7,837	5,383	Tons	-11	3	2.73
Mexico	6,003	7,462	Tons	25	32	2.09

Table B.10: Continues

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
United Kingdom	5,267	2,766	Tons	-3	-20	1.84
Poland	3,666	2,711	Tons	11	18	1.28
Finland	3,630	1,514	Tons	37	57	1.27
Panama	3,428	2,466	Tons	283	326	1.20
New Zealand	3,212	1,875	Tons	21	38	1.12
Belgium	2,770	1,440	Tons	19	25	0.97
Netherlands	2,723	2,335	Tons	-5	20	0.95
Austria	2,235	1,410	Tons	40	54	0.78
Japan	2,226	466	Tons	-17	-10	0.78
Ireland	2,035	893	Tons	20	28	0.71
Cuba	1,765	1,267	Tons	2	17	0.62
Trinidad	1,460	0	No quantity	17		0.51
Philippines	1,414	1,540	Tons	11	33	0.49
Canada	1,223	724	Tons	17	22	0.43
Denmark	1,013	1,270	Tons	12	17	0.35

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.11: Imports of product 020329 (Swine cuts, frozen nes)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	3,876,824	1,627,452	Tons	-7	6	100
Japan	2,031,092	427,513	Tons	-10	-2	52.39
Korea, Rep. of Korea	212,615	121,601	Tons	14	32	5.48
Germany	196,159	101,654	Tons	-15	-4	5.06
USA	180,608	69,625	Tons	4	6	4.66
Russian Federation	160,306	164,021	Tons	-3	13	4.13
Hong Kong (SARC)	144,293	112,385	Tons	13	23	3.72
Italy	103,950	57,710	Tons	-17	-6	2.68
France	78,685	51,295	Tons	-15	-2	2.03
United Kingdom	70,386	59,986	Tons	-11	5	1.82
Argentina	58,605	34,349	Tons	10	25	1.51
Canada	47,384	17,450	Tons	25	31	1.22
Australia	43,828	22,112	Tons	32	44	1.13
Spain	37,998	16,777	Tons	-12	-3	0.98
Greece	33,901	18,252	Tons	-10	-4	0.87
Taiwan	33,660	31,139	Tons	48	58	0.87
Denmark	32,904	18,485	Tons	1	16	0.85

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.12: Imports of product 020410 (Lamb carcasses and half carcasses, fresh or chilled)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	552,984	191,523	Tons	-5	0	100
France	365,696	116,122	Tons	-5	-1	66.13
Italy	42,079	10,715	Tons	-3	2	7.61
Belgium	36,773	10,159	Tons	-4	-1	6.65
Greece	24,116	22,835	Tons	16	50	4.36
Germany	13,469	4,234	Tons	-16	-12	2.44
Portugal	12,884	4,077	Tons	-6	2	2.33
Spain	12,569	3,827	Tons	-19	-16	2.27
Saudi Arabia	8,797	2,706	Tons	9	4	1.59
United Arab Emirates	6,992	3,424	Tons	-4	-1	1.26
United Kingdom	6,277	5,630	Tons	-15	-9	1.14
USA	5,782	2,008	Tons	69	78	1.05
Switzerland	3,137	749	Tons	-19	-17	0.57
Argentina	1,839	1,242	Tons	2	6	0.33
Croatia	1,742	415	Tons	-19	-21	0.32
Netherlands	1,679	468	Tons	-3	2	0.30
Austria	1,046	272	Tons	-34	-33	0.19
Andorra	1,018	213	Tons	9	13	0.18

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.

Na - not available

Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.13: Imports of product 020422 (Sheep cuts, bone in, fresh or chilled)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	291,077	58,203	Tons	10	13	100
USA	77,183	12,250	Tons	31	34	26.52
France	43,707	11,163	Tons	2	10	15.02
United Kingdom	36,853	7,664	Tons	9	7	12.66
Belgium	33,838	5,625	Tons	9	22	11.63
Switzerland	15,641	1,700	Tons	4	4	5.37
Germany	14,997	2,317	Tons	-3	2	5.15
Canada	14,401	3,710	Tons	5	7	4.95
Japan	8,675	826	Tons	0	4	2.98
Italy	8,042	1,228	Tons	7	9	2.76
Netherlands	7,617	747	Tons	10	4	2.62
Denmark	5,581	713	Tons	149	118	1.92
Austria	4,587	353	Tons	30	23	1.58
Saudi Arabia	4,257	1,924	Tons	10	8	1.46
Hong Kong	1,832	195	Tons	15	11	0.63

Table B.13: Continues

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
United Arab Emirates	1,731	946	Tons	23	28	0.59
Taiwan	1,521	1,216	Tons	16	10	0.52
Singapore	1,488	395	Tons	12	28	0.51

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.14: Imports of product 020441 (Sheep carcasses and half carcasses, frozen)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	41,216	41,163	Tons	-9	-4	100
Mexico	9,226	10,738	Tons	5	17	22.38
Korea	3,883	4,434	Tons	-19	-17	9.42
Malaysia	3,875	3,407	Tons	-4	0	9.40
Oman	2,962	1,885	Tons	-3	5	7.19
Taiwan	2,872	3,649	Tons	-5	-3	6.97
Singapore	2,625	2,297	Tons	1	7	6.37
Portugal	1,884	770	Tons	17	22	4.57
Russian Federation	1,441	1,522	Tons	-25	-28	3.50
Saudi Arabia	1,395	1,557	Tons	1	3	3.38
Jamaica	1,153	1,525	Tons	-12	-8	2.80
USA	1,007	740	Tons	-34	-33	2.44

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Table B.15: Imports of product 020442 (Sheep cuts, bone in, frozen)

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
World estimation	652,000	328,226	Tons	2	7	100
United Kingdom	164,786	57,021	Tons	0	4	25.27
USA	77,481	23,492	Tons	12	11	11.88
Germany	56,181	15,821	Tons	-4	-2	8.62
France	52,275	17,105	Tons	-1	5	8.02
Belgium	28,057	5,962	Tons	5	3	4.30
Mexico	21,663	23,141	Tons	24	32	3.32
Papua New Guinea	19,062	26,688	Tons	-10	-6	2.92
Saudi Arabia	17,465	15,719	Tons	13	18	2.68

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Table B.15: Continues

Importers	Value imported in 1999, in US$ thousand	Quantity imported in 1999	Quantity unit	Annual growth in value 1995-1999, %	Annual growth in quantity 1995-1999, %	Share in world imports, %
Canada	15,947	6,232	Tons	6	4	2.45
SACU	14,958	35,106	Tons	23	53	2.29
Spain	14,713	4,721	Tons	1	4	2.26
Japan	13,166	6,518	Tons	-9	-4	2.02
Italy	13,059	4,519	Tons	0	3	2.00
Greece	9,403	4,443	Tons	9	16	1.44
Netherlands	9,165	2,033	Tons	-3	-6	1.41
Fiji	8,911	10,020	Tons	0	4	1.37
Jordan	7,925	6,359	Tons	-1	1	1.22
Taiwan	7,839	4,200	Tons	32	46	1.20

Note: Only countries with an import value of more than US$10 000 000 or more than 1000 tons are included.
Na   - not available
Source: ITC calculations based on COMTRADE statistics, 2000.

Appendix C: Trade in selected red meat products by SACU

Table C.1: Imports of product 020220 (Bovine cuts bone in, frozen)*

Exporters	Imported value 1999 in US$ thousand	Share in SACU's imports, %	Imported quantity 1999	Quantity unit	Unit value	Import trend in value 1995-1999, %, p.a.	Import trend in quantity 1995-1999, %, p.a.	Ranking of partner countries in world exports	Share of partner countries in world exports, %	Total export growth in value of partner countries 1995-99, %, p.a.
Uruguay	709	63	1,187	Tons	0.6	na	na	10	2	22
Australia	366	33	642	Tons	0.6	-15	-3	4	10	2
Zimbabwe	37	3	28	Tons	1.3	nr	nr	49	nr	nr

Na   - not available
Nr   - not reported
*   - SACU ranks 30th in world imports of this product
Source: ITC calculations based on COMTRADE statistics, 2000.

Table C.2: Imports of product 020230 (Bovine cuts boneless, frozen)*

Exporters	Imported value 1999 in US$ thousand	Share in SACU's imports, %	Imported quantity 1999	Quantity unit	Unit value	Import trend in value 1995-1999, %, p.a.	Import trend in quantity 1995-1999, %, p.a.	Ranking of partner countries in world exports	Share of partner countries in world exports, %**	Total export growth in value of partner countries 1995-99, %, p.a.
Ireland	5,014	56.25	9,373	Tons	0.5	-30	-17	4	9	-4
Zimbabwe	1,724	19.34	1,159	Tons	1.5	87	105	27	0	-22
Belgium	1,348	15.12	2,760	Tons	0.5	-12	0	16	1	-20
Australia	299	3.35	465	Tons	0.6	-6	12	1	23	6
Argentina	216	2.42	221	Tons	1.0	-65	-67	7	4	-15
Uruguay	122	1.37	140	Tons	0.9	26	46	6	4	8
United Kingdom	78	0.88	150	Tons	0.5	-82	-80	31	0	-60
Iran	72	0.81	98	Tons	0.7	-47	-40	67	0	Na
Denmark	28	0.31	48	Tons	0.6			15	1	-10
Germany	10	0.11	24	Tons	0.4	-57	-41	9	3	-7

NA   – not available
*   - SACU ranks 38th in world imports in this product
**   - rounded
Source: ITC calculations based on COMTRADE statistics, 2000.

Table C.3: Imports of product 020329 (Swine cuts. Frozen nes)*

Exporters	Imported value 1999 in US$ thousand	Share in SACU's imports, %	Imported quantity 1999	Quantity unit	Unit value	Import trend in value 1995-1999, %, p.a.	Import trend in quantity 1995-1999, %, p.a.	Ranking of partner countries in world exports	Share of partner countries in world exports, %**	Total export growth in value of partner countries 1995-99, %, p.a.
France	5,999	53.31	5,386	Tons	1.1	13	64	2	8	5
Hungary	1,582	14.06	1,485	Tons	1.1	-16	13	12	3	-3
Belgium	1,344	11.94	1,832	Tons	0.7	-2	52	8	3	-15
United Kingdom	1,104	9.81	1,481	Tons	0.7	-22	13	13	3	-10
Brazil	434	3.86	322	Tons	1.3	Na	Na	9	3	9
Spain	357	3.17	325	Tons	1.1	Na	Na	10	3	15
Canada	123	1.09	265	Tons	0.5	-57	-11	3	8	-1
Zimbabwe	111	0.99	62	Tons	1.8	-28	-27	37	0	-12
Ireland	91	0.81	141	Tons	0.6	34	111	14	2	-11
United States of America	42	0.37	48	Tons	0.9	-28	19	4	8	7
Germany	22	0.20	24	Tons	0.9	Na	Na	7	4	12
Austria	17	0.15	13	Tons	1.3	Na	Na	18	1	37
Australia	16	0.14	17	Tons	0.9	Na	Na	17	1	15
Niger	11	0.10	25	Tons	0.4	Na	Na	58	0	Na

NA   – not available
*   - SACU ranks 30th in world imports in this product
**   - rounded
Source: ITC calculations based on COMTRADE statistics, 2000.

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Table C.4: Imports of product 020442 (Sheep cuts, bone in, frozen)*

Exporters	Imported value 1999 in US$ thousand	Share in SACU's imports, %	Imported quantity 1999	Quantity unit	Unit value	Import trend in value 1995-1999, %, p.a.	Import trend in quantity 1995-1999, %, p.a.	Ranking of partner countries in world exports	Share of partner countries in world exports, %**	Total export growth in value of partner countries 1995-99, %, p.a.
Australia	13,491	90.19	31,702	Tons	0.4	20	51	2	23	7
New Zealand	1,352	9.04	3,118	Tons	0.4	83	129	1	67	0
United Kingdom	45	0.30	127	Tons	0.4	Na	Na	5	1	-5
Ireland	35	0.24	68	Tons	0.5	Na	Na	10	0	36

NA   – not available
*   - SACU ranks 10th in world imports in this product
**   - rounded
Source: ITC calculations based on COMTRADE statistics, 2000.

Table C.5: Exports of product 020220 (Bovine cuts bone in, frozen)*

Importers	Exported value 1999 in US$ thousand	Share in SACU's exports, %	Exported quantity 1999	Quantity unit	Unit value	Export trend in value 1995-1999, %, p.a.	Export trend in quantity 1995-1999, %, p.a.	Ranking of partner countries in world imports	Share of partner countries in world imports, %*	Total import growth in value of partner countries 1995-99, %, p.a.
Mozambique	858	12.55	582	Tons	1.5	77	Na	35	0	77
Angola	455	6.66	160	Tons	2.8	42	Na	41	0	13
Portugal	374	5.47	71	Tons	5.3	Na	Na	20	0	3
Italy	298	4.36	53	Tons	5.6	Na	Na	4	4	79
Belgium	247	3.61	47	Tons	5.3	21	Na	24	0	22
Gabon	188	2.76	62	Tons	3.0	Na	Na	43	0	-2
France	122	1.78	16	Tons	7.6	Na	Na	19	1	-12
Hong Kong (SARC)	89	1.30	29	Tons	3.1	124	Na	6	3	-3
Seychelles	87	1.27	23	Tons	3.8	39	Na	68	0	52
Congo	85	1.24	26	Tons	3.3	39	Na	85	0	18
Malaysia	79	1.16	16	Tons	4.9	122	Na	15	1	-12
Côte d'Ivoire	61	0.89	16	Tons	3.8	99	Na	64	0	12
Tanzania	60	0.88	16	Tons	3.8	50	Na	128	0	

Table C.5: Continues

Importers	Exported value 1999 in US$ thousand	Share in SACU's exports, %	Exported quantity 1999	Quantity unit	Unit value	Export trend in value 1995-1999, %, p.a.	Export trend in quantity 1995-1999, %, p.a.	Ranking of partner countries in world imports	Share of partner countries in world imports, %*	Total import growth in value of partner countries 1995-99, %, p.a.
Mauritius	56	0.82	22	Tons	2.5	Na	Na	97	0	-45
Germany	49	0.72	9	Tons	5.4	Na	Na	10	2	20
Netherlands	49	0.72	7	Tons	7.0	Na	Na	37	0	-30
Democratic Republic of the Congo	41	0.60	13	Tons	3.2	76	Na	93	0	76
Ghana	23	0.34	4	Tons	5.8	16	Na	69	0	
Japan	22	0.32	3	Tons	7.3	Na	Na	3	4	-13
Singapore	18	0.26	3	Tons	6.0	63	Na	23	0	-18

NA – not available
* - SACU ranks 13th in world exports in this product
** - rounded
Source: ITC calculations based on COMTRADE statistics, 2000.

Table C.6: Exports of product 020230 (Bovine cuts boneless, frozen)*

Importers	Exported value 1999 in US$ thousand	Share in SACU's exports, %	Exported quantity 1999	Quantity unit	Unit value	Export trend in value 1995-1999, %, p.a.	Export trend in quantity 1995-1999, %, p.a.	Ranking of partner countries in world imports	Share of partner countries in world imports, %**	Total import growth in value of partner countries 1995-99, %, p.a.
Kuwait	469	27.27	144	Tons	3.3	Na	Na	46	0	4
Mozambique	324	18.84	208	Tons	1.6	-44	Na	119	0	-44
Comoros	195	11.34	71	Tons	2.7	47	Na	70	0	-2
Libyan Arab Jamahiriya	164	9.53	59	Tons	2.8	Na	Na	94	0	-37
Angola	142	8.26	53	Tons	2.7	-7	Na	44	0	8
United Arab Emirates	96	5.58	26	Tons	3.7	Na	Na	32	0	-3
Germany	67	3.90	12	Tons	5.6	-78	Na	12	2	-14
Belgium	64	3.72	17	Tons	3.8	-58	Na	25	1	6

Table C.6: Continues

Importers	Exported value 1999 in US$ thousand	Share in SACU's exports, %	Exported quantity 1999	Quantity unit	Unit value	Export trend in value 1995-1999, %, p.a.	Export trend in quantity 1995-1999, %, p.a.	Ranking of partner countries in world imports	Share of partner countries in world imports, %**	Total import growth in value of partner countries 1995-99, %, p.a.
Nigeria	58	3.37	7	Tons	8.3	Na	Na	146	0	172
Netherlands	44	2.56	22	Tons	2.0	Na	Na	15	1	-11
United Kingdom	26	1.51	40	Tons	0.7	Na	Na	13	2	-17
Norway	19	1.10	55	Tons	0.3	-62	Na	41	0	12
France	12	0.70	33	Tons	0.4	Na	Na	17	1	-1
Democratic Republic of the Congo	11	0.64	32	Tons	0.3	6	Na	105	0	-42

NA　　– not available
*　　- SACU ranks 36th in world exports in this product
**　　- rounded
Source: ITC calculations based on COMTRADE statistics, 2000.

Table C.7: Exports of product 020329 (Swine cuts, frozen nes)*

Importers	Exported value 1999 in US$ thousand	Share in SACU's exports, %	Exported quantity 1999	Quantity unit	Unit value	Export trend in value 1995-1999, %, p.a.	Export trend in quantity 1995-1999, %, p.a.	Ranking of partner countries in world imports	Share of partner countries in world imports, %**	Total import growth in value of partner countries 1995-99, %, p.a.
Singapore	978	66.00	660	Tons	1.5	-19	Na	22	1	12
New Zealand	215	14.52	120	Tons	1.8	64	Na	24	0	19
Hong Kong (SARC)	141	9.52	97	Tons	1.5	-28	Na	6	4	13
Angola	86	5.81	32	Tons	2.7	-1	Na	53	0	38
Mozambique	22	1.49	11	Tons	2.0	38	Na	137	0	38
Mauritius	11	0.74	3	Tons	3.7	48	Na	94	0	59

NA　　– not available
*　　- SACU ranks 25th in world exports in this product
Source: ITC calculations based on COMTRADE statistics, 2000.

Appendix D
Comparison of trade statistics reported by the ITC and the Department of Customs and Excise

Import and exports statistics reported in Chapter 3 were sourced from the ITC, who base their import and export statistics on the COMTRADE database. SACU did not report trade statistics to the COMTRADE database until 1999. In other words, the trade statistics reported for SACU were obtained from the exporting or importing country that does report to the COMTRADE database. Hence, it may be possible that certain exports or imports are not accounted for by the ITC.

Tables D.1 to D.4 compare trade data for 1998 by the ITC and the Department of Customs and Excise in South Africa for selected bovine meat products imported and exported by SACU in order to point out the discrepancies in data between the two sources. It is believed that the same discrepancies will hold for the other products.

Table D.1 compares import statistics for bovine cuts (boneless, fresh or chilled; HS code 020130). According to the ITC, Ireland, Australia and the Netherlands reported that they exported this product to SACU. Conversely, C&E statistics suggest that only the Netherlands exported this product to SACU. Zimbabwe is also reported to have exported this product to SACU, but is not captured by the ITC since Zimbabwe does not formally report trade statistics to the COMTRADE database. Due to these discrepancies one would expect the total imports reported by the two sources to differ, but not to the magnitude presented in Table D.1. Also noteworthy is the large difference in the unit value of imports of the Netherlands reported by the ITC and the C&E, respectively.

Table D.1: Comparison of import statistics reported by ITC and the Department of Customs and Excise on bovine cuts (boneless, fresh or chilled; HS code 020130)

Exporters to SACU	ITC statistics		Customs and Excise (C&E) statistics		Unit value (ITC) (R/kg)	Unit value (C&E) (R/kg)
	Imported value 1998 in Rand (000)	Imported quantity 1998 (ton)	Imported value 1998 in Rand (000)	Imported quantity 1998 (ton)		
Total	4839	622	2200	222	7.78	9.90
Ireland	3971	514	Nr	Nr	7.72	Nr
Australia	614	104	Nr	Nr	5.90	Nr
Netherlands	254	4	208	4.51	63.60	46.01
Zimbabwe	Nr	Nr	1993	217.7	Nr	9.15

NR – Not recorded
Source: ITC, 2000; NDA, 2000.

Table D.2 compares the export statistics of bovine cuts (boneless, fresh or chilled; HS code 020130). According to the ITC total exports of this product amounted to 13 932 tons, but the C&E quotes a figure of 6 285 tons to the same destinations, except for Hong Kong for which no data is reported by the C&E. Taking into account the additional 13 countries to which this product was exported to according to the C&E, the quantity exported is still 4 553 tons less that the amount reported by the ITC (Total exports to all destinations amounted to 9379 tons according to the C&E). The large discrepancies in terms of the value and quantity exported on a country basis should also be noted. Probably most significant are the large differences in the unit value of exports. The average unit value reported by the ITC is R32.37 per kg, whilst that of the C&E amounts to R8 per kg. Economic logic would suggest that the former is a much better portrayal of reality since exporters would rarely go through all the trouble of exporting a product at lower prices than they could realise on the domestic market given that South Africa is a net importer of bovine meat products. The small deviations in the unit values reported by the ITC augments this line of thinking.

Table D.2: Comparison of exports statistics reported by ITC and the Department of Customs and Excise on bovine cuts (boneless, fresh or chilled; HS code 020130)

Importers from SACU	ITC statistics		Customs and Excise (C&E) statistics		Unit value (ITC) (R/kg)	Unit Value (C&E) (R/kg)
	Exported value 1998 in Rand (000)	Exported quantity 1998 (ton)	Export value 1998 in Rand (000)	Exported quantity in 1998 (ton)		
Total	450943	13932	50288	6285	32.37	8.00
United Kingdom	320159	10026	17084	4155	31.93	4.11
Germany	54498	1633	3297	719	33.37	4.58
France	37952	1223	137	32	31.03	4.28
Norway	29093	847	29746	1377	34.35	21.60
Switzerland	9118	200	4	0.24	45.59	18.59
Hong Kong	82	2	Nr	Nr	41.48	Nr
Malaysia	38	1	17	0.51	38.71	34.46

Note – Only countries on which the ITC reports export statistics are included in the table for comparison purposes. C&E list an additional 13 countries to which SACU exported.
Source: ITC, 2000; NDA, 2000.

Table D.3 compares the imports of bovine cuts (boneless, frozen; HS code 020230). Although the differences in terms of the total imports of this product is not as large as those reported in Table D.1 discrepancies on the basis of individual country for countries reported by both the ITC and the C&E, are still considerable. Also, it should be noted that the unit value of imports of this products as reported by the ITC is higher than that reported by the C&E. This may be indicative of the common belief that importers make themselves guilty of under-invoicing of imports in order to lower their burden in terms of customs duties.

Table D.3: Comparison of import statistics reported by ITC and the Department of Customs and Excise on bovine cuts (boneless, frozen; HS code 020230)

Exporters	ITC statistics		Customs and excise (C&E) statistics		Unit value (ITC) (R/kg)	Unit value (C&E) (R/kg)
	Imported value 1998 in Rand (000)	Imported quantity 1998 (tons)	Imported value 1998 in Rand (000)	Imported quantity 1998 (tons)		
Total	99568	15195	53578	12951	6.55	4.14
Ireland	49687	7384	26909	7279	6.73	3.70
Australia	26444	4512	11495	2645	5.86	4.35
Belgium	9672	1565	9028	1941	6.18	4.65
New Zealand	4253	633	617	123	6.72	5.01
US	3578	372	Nr	Nr	9.62	Nr
Argentina	3196	393	699	185	8.13	3.78
Uruguay	1410	193	744	156	7.31	4.76
France	382	62	364	78	6.15	4.68
Norway	371	18	Nr	Nr	20.58	Nr
Portugal	315	24	Nr	Nr	13.13	Nr
Germany	133	12	57	23	11.06	2.49
Canada	111	25	92	24	4.42	3.88
Botswana	Nr	Nr	39	18	Nr	2.15
United Kingdom	Nr	Nr	76	15	Nr	5.23
India	Nr	Nr	22	6	Nr	3.63
Iran	Nr	Nr	506	125	Nr	4.06
Ukraine	Nr	Nr	56	15	Nr	3.68
Zimbabwe	Nr	Nr	2872	317	Nr	9.06

Source: ITC, 2000; NDA, 2000.

Table D.4 compares the exports of bovine cuts (boneless, frozen; HS code 020230). For all countries included, in other words also the 16 countries not reported in Table D.4, the C&E reports total exports at 8 662 tons. This is 2 465 tons lower than the exports reported by the ITC in Table D.4. Also notable is the large difference in the total value of export, as well as on an individual country basis. As was the case in Table D.2, the unit value of exports also shows large discrepancies. It is difficult to anticipate why exporters will export this product at a lower unit price than could be realised on the domestic market, especially if it is known that exports of this product is usually of exceptional quality.

Table D.4: **Comparison of exports statistics reported by ITC and the Department of Customs and Excise on bovine cuts (boneless, frozen; HS code 020230)**

Exporters	ITC statistics		Customs and excise (C&E) statistics		Unit value (ITC) (R/kg)	Unit value (C&E) (R/kg)
	Exported value 1998 in Rand thousand	Exported quantity 1998 (tons)	Exported value 1998 in Rand thousand	Exported quantity 1998 (tons)		
Total	170556	11127	31681	7882	15.33	4.02
Germany	48039	2963	4618	1891	16.21	2.44
Greece	38931	3095	5005	2349	12.58	2.13
United Kingdom	31394	2067	2977	1484	15.19	2.01
Norway	26577	1248	18533	2001	21.30	9.26
Netherlands	10059	737	393	148	13.65	2.65
Belgium	8372	617	151	5	13.57	26.24
France	7012	375	Nr	Nr	18.70	Nr
Hong Kong	171	25	1.8	0.05	6.86	34.17

Note – Only countries on which the ITC reports export statistics are included in the table for comparison purposes. C&E list an additional 16 countries to which SACU exported.
Source: ITC, 2000; NDA, 2000.

In the light of the above discussion it should be understandable why this study rather uses the ITC statistics to report on trade rather than the official Customs and Excise data. Koester and Loy (1996) also questioned the reliability of the information on trade provided by the Department of Customs and Excise in South Africa due to factors such as rent seeking by importers and exporters. It is, however, not suggested that the ITC statistics are entirely correct, but rather that it provides a more reliable picture of imports and exports for those countries that are reported jointly by the ITC and the C&E. It also places question marks over the C&E data reported for countries not covered by the ITC. This state of affairs is not satisfactory and should receive serious attention, especially if one considers that strategic marketing decisions based on wrong information in a globalised world could be catastrophic.