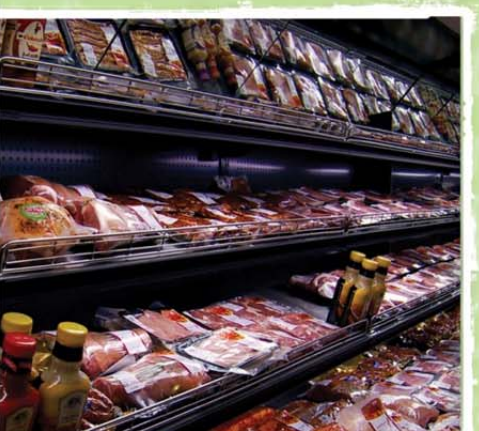

October 2013

Evaluating the South African Pork Value Chain

A report by BFAP

Bureau for Food and Agricultural Policy

BFAP

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A study of this nature would not have been possible without the participation and contribution of various role players across the pork value chain. A special word of thanks goes to all industry role players that completed the questionnaire regarding competitiveness. Further BFAP would like to extend its sincere appreciation to the following correspondents for taking the time to assist with this study:

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Executive summary

Following a period of extremely high feed costs, combined with stagnant producer prices for pork over the past few years, South African pork producers have found their profit margins under increasing pressure. At the same time, increased domestic consumption of pork is dependent on the supply of a high quality product, at affordable prices. Consideration of the entire value chain is therefore necessary in order to insure that the product reaches the final consumer in a cost effective manner, in order to grow demand. As a result, the South African Pork Producers Organisation (SAPPO) commissioned the Bureau for Food and Agricultural Policy (BFAP) to evaluate the performance of the pork value chain in South Africa.

The study critically evaluated the entire pork value chain in South Africa, from input supply through to end consumption. Different levels of the value chain were considered individually, evaluating the structure, conduct and performance of each level, as well as the key factors that enhance or constrain competitiveness. Structured questionnaires were used to evaluate the factors that enhance and constrain competitiveness at various levels of the value chain. Though factors influencing competitiveness differ at various levels of the value chain, some key factors were identified that constrain competitiveness across the entire chain. These factors included national infrastructure, the political climate, the costs and regulations related to labour, labour productivity and the cost of administered prices like fuel and electricity. Though the entire value chain was considered for the sake of completeness, greater emphasis was placed on the activities and margins post farm gate, as requested by SAPPO.

International meat consumption has increased steadily through the past decade thanks to increasing per capita income and a continued growth in urbanisation. South Africa is no exception, with meat consumption increasing significantly. The key difference however is that while pork is the protein of choice in the global market, it comprises only 7% of meat consumed in South Africa. Several economic, as well as non-economic factors were found to influence pork consumption. Consumer sentiments regarding quality, simplicity, health and convenience are key considerations, yet affordability will always remain an important consideration, particularly when consumers' spending power is limited. In the South African market, culture and religious sentiments also influence pork consumption.

At primary producer level, efficiency has increased significantly through investment in modern housing technologies, yet the cost of this technology, as well as the scale of production required to justify this capital investment provides a significant barrier to entry for new producers. At a cost of R50 000 per sow, construction of a new sow unit of 300 sows requires a capital investment in the order of R15 million. In addition to the cost of new housing facilities, the environmental requirements, particularly the cost and time associated with environmental impact studies provide further barriers to expansion. As a result, production increases through the past decade are attributed to gains in efficiency and carcass weight, with the national sow herd remaining relatively constant.

Long term expansion in order to meet growing demand will however be dependent on significant investment and expansion of sow numbers. The high level of concentration at abattoir level, where approximately 20 abattoirs slaughter 98% of South African pigs limits producers' bargaining power when prices are negotiated. The nature of production further does not allow producers to delay marketing of mature pigs, emphasising the fact that producers are price takers. Hence, management of production according to price cycles is key to producers' success.

Post farm gate, different business models are applied and the value chain essentially splits into a processing chain and a fresh meat chain, complicating the quantification of a generic value chain. In addition, products are no longer homogenous; the primary producer is paid a price per kilogram for the entire carcass, yet this price cannot be compared to the price of specific cuts at retail level. Processors and retailers have a significant mark up on certain cuts, yet others are sold significantly below cost. Different block tests were used in order to calculate whole carcass equivalent prices, which were then used to calculate a margin at different levels post farm gate. Naturally, margins were different for fresh and processed products. Retail margins on fresh products were significantly more than processed products due to the fact that value is added to fresh products at retail level, while the bulk of value added to processed products are at processor level. Considering the total picture, gross margins post farm gate seemed to weigh heavy towards retailers, however labour and overhead costs related to the large number of stores in operation must also be considered. The reality remains that a significant amount of value is added to convert the product from mature finished pigs to bacon and fresh meat cuts found on retailers' shelves.

Livestock farmers in general have been hard hit by significant increases in feed grain prices, yet typical cycles occur in agriculture and under more normal weather conditions, feed prices are expected to decline from 2014. Demand for pork is expected to increase in the long run, providing more favourable conditions for pork production. The South African pork industry has many strengths, such as access to top quality genetic material and superior health status. However low levels of government support and barriers to expansion are critical constraints. Investment in the South African pork value chain will be necessary if increased demand is to be met through local production rather than imports.

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Abbreviations and Acronyms

AFMA	Animal Feed Manufacturers Organisation
BFAP	Bureau for Food and Agricultural Policy
DAFF	Department of Agriculture, Forestry and Fisheries
EU	European Union
FAO	Food and Agricultural Organisation
LSM	Living Standard Measurement
SAAHA	South African Animal Health Association
SACU	Southern African Customs Union
SADC	Southern African Development Community
SAMIC	South African Meat Industry Company
SAPPO	South African Pork Producers Organisation
OECD	Organisation for Economic Cooperation and Development
RMAA	Red Meat Abattoir Association
USDA	United States Department of Agriculture

Compiled by:

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1. Introduction

In modern times, a quote by Adam Smith that "consumption is the sole end and purpose of all production" hold truer than ever before. In order to remain profitable and viable in the food industry, producers, marketers and retailers must understand and adapt to continually evolving consumer preferences over time. Following the slowdown in global economic growth after the financial crisis, combined with the increase in global food prices, the agricultural sector has been forced into an environment where it needs to meet ever increasing demands from the consumer, at affordable prices, while at the same time securing sustainable profits for continued investments and value chain improvements.

Different approaches have been utilised to capture the dynamics of changing consumer preferences and examine relationships between key stake holders that supply the end product to consumers. Supply chains have been described as all activities required to create, store and deliver a product from raw materials to end use. Demand chains are a reversal of supply chains, where production decisions are based on what consumers choose to buy. The value chain can be described as an interaction between the supply and demand chains. Kula, Downing and Field (2006) defines a value chain as a supply chain comprising various actors from input suppliers to producers, processors, importers and exporters engaged in the full range of activities required to bring a product from its conception to its end use by consumers. Value chains aim to create a system where consumer demand can be forecast accurately and satisfied quickly in an efficient, profitable and sustainable manner (Spies, 2011). Value chain activities can be contained in a single geographical area, or spread across multiple areas in the case of global value chains. In short, supply chains are production orientated and are commonly accepted as being old fashioned in terms of business and industry development. Demand chains on the other hand are consumer driven and are more advanced in that they serve changing consumer demands and preferences more efficiently. The value chain approach however considers both the supply and demand chain and is therefore less likely to neglect important links, ensuring efficiency, competitiveness and sustainability (Spies, 2011).

Following a period of extremely high feed costs, combined with stagnant producer prices for pork over the past few years, South African Pork producers have found their profit margins under increasing pressure. At the same time, increased domestic consumption of pork is dependent on the supply of a high quality product, at affordable prices. Consideration of the entire value chain is therefore necessary in order to insure that the product reaches the final consumer in a cost effective manner, in order to grow demand. As a result, the South African Pork Producers Organisation (SAPPO) commissioned the Bureau for Food and Agricultural Policy (BFAP) to evaluate the performance of the pork value chain in South Africa.

Unlike the global trend, where pork is the most consumed of all meat products, the South African pork industry is tiny compared to chicken and beef markets. If the South African pork industry is to grow and compete within the global context, it is necessary to understand and evaluate the value chain in its entirety. Factors affecting competitiveness at different stages of the value chain must also

be considered. If the value chain, as well as the environment in which it functions is better understood, stakeholders will be able to make better decisions in order to improve profitability at different levels. At the same time, efficient functioning of the entire value chain is critical in order to provide consumers with affordable end products and increase the share of pork in total meat consumption in South Africa. The key objectives of this study are:

- To provide an overview of key fundamentals in the South African pork industry
- To quantify the pork value chain, in order obtain an accurate picture of relative cost shares for each of the activities post farm gate
- To evaluate the performance of the value chain at different levels
- To trace movements in post farm gate margins over time
- To determine the factors within the macro, meso and micro environment that impact on the competitiveness of stake holders at various stages of the value chain
- To gain a better understanding of the drivers of pork consumption in South Africa

The relative size of the South African pork market within the global context means that trends in the South African pork market should be considered within this global context. Following this introduction, the study will therefore begin with a brief review of international pork markets, before providing a more detailed overview of the South African pork market. Following the market overview, the different levels within the South African pork value chain will be quantified in section 4, before pork consumption in South Africa is evaluated in section 5, before conclusions are drawn in section 6.

2. Overview of the international pork market

2.1 International consumption trends

The past decade has been characterised by a growing world population, with an ever increasing per capita income. Meat demand in developing countries continues to expand, as higher incomes and increased urbanisation drive changes in food consumption patterns. Consumption of meat products has risen substantially in developing countries, particularly in China and other fast growing Asian economies. Pork remains the protein of choice, comprising an average of 38% of total meat consumed worldwide from 2008 to 2010 (OECD, 2011). By 2020, the OECD expects this contribution to decrease to 37%, with poultry consumption growing faster than pork consumption in the coming decade. Despite the expected decline in market share relative to poultry, the OECD still expects pork consumption to grow by 19.84% over the next decade. In contrast the projected growth rate for poultry consumption is 28.73% (OECD, 2011). Poultry therefor represent a significant competitor for pork in traditional markets. The demand pull effect will also impact on the allocation of investments, resources and may even influence the development of meat value chains globally.

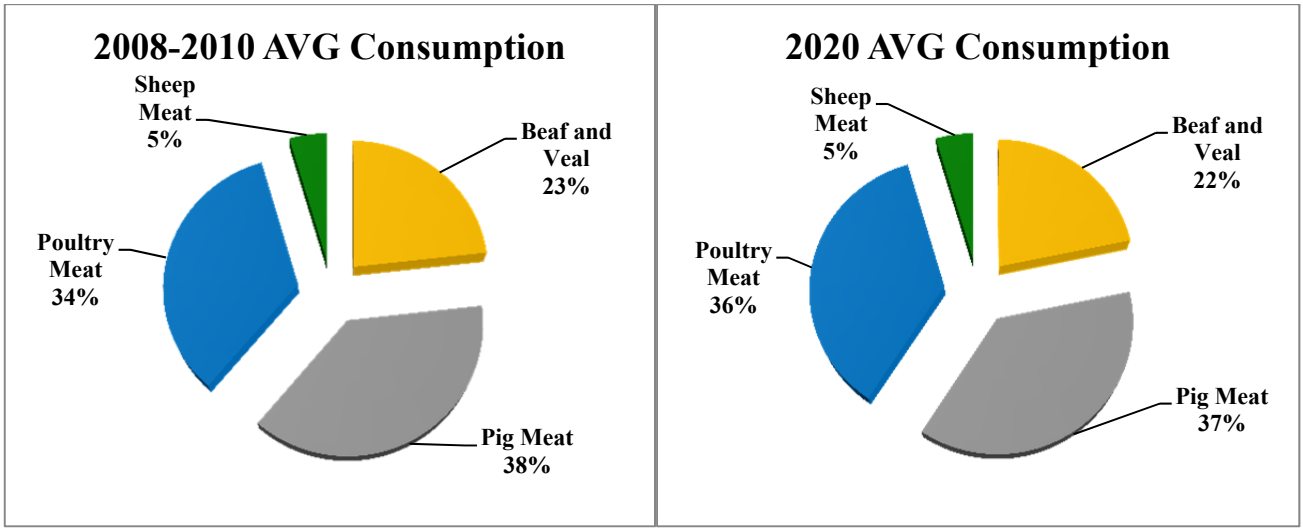

Figure 1: International meat consumption
Source: OECD, 2011

World pork consumption through the past decade has been characterised by steady growth from just over 84 million tons in 2000 to over 104 million tons expected in 2013 (USDA, 2013). World consumption is dominated by China, who consumed just over 50% of the world's pork in 2012, followed by the European Union (EU) and Russia. Pork consumption in China is mainly derived by high population numbers rather than high per capita in-take of pork (for example, per capita pork consumption is higher in the EU (Louw, Schoeman & Geyser, 2011). Increases in per capita pork consumption in China can therefore have significant upward pressure on global pork consumption. Per Capita consumption of pork in the major consumption countries is illustrated in Table 1.

Table 1: Per capita consumption of pork in 2009

Country / Region	Pork consumption per capita
Brazil	12.5kg
China midlands	34.6kg
European Union Average	42.6kg
Hong Kong	69.7kg
Russia	21.9kg
South Africa	3.77kg
USA	28.8kg

Source: Louw et al., 2011

Total global pork consumption, as well as the consumption shares of the five biggest pork consuming countries is illustrated in Figure 2.

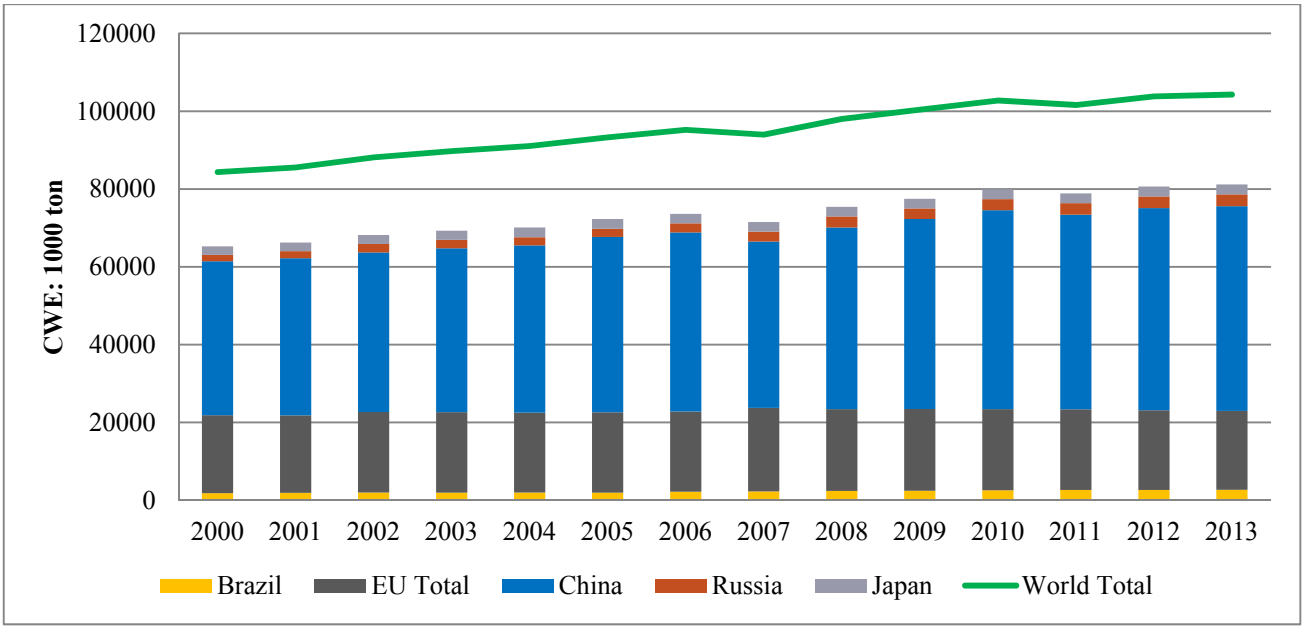

Figure 2: World Pork consumption
Source: USDA, 2013

2.2 International production trends

In order to supply the growing demand for pork products, world production has increased steadily over the past decade. The increase in pork production can be attributed to better genetics and improved production practices, rather than increased sow numbers, as an increase in sow numbers of 17% from 1980 to 2012 has been accompanied by an increase of 114% in pork production over the same period. Environmental concerns, as well as challenges related to waste management in developed countries such as the EU has resulted in production growth being much greater in developing countries like Brazil, Russia and China. Over the past decade, pork production has increased by 18.5% worldwide, with the greatest growth being recorded in Vietnam (65.4%), Russia (49.6%), Brazil (27.1%) and China (24.7%). During the same period, pork production in the EU has grown by only 5%. Despite rapid growth in Vietnam and Russia, the most important pork producing countries remain China, the EU, USA and Brazil, accounting for more than 80% of global pork production between them.

Figure 3 shows the trend in world pork production over the past decade, as well as the production share of China, EU and USA.

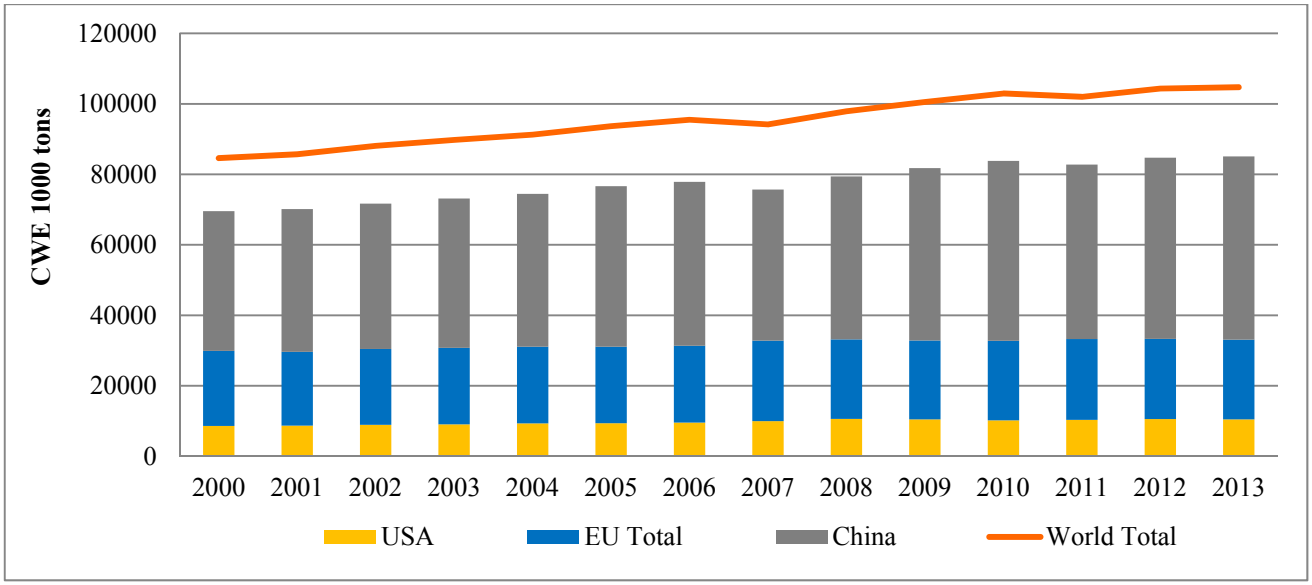

Figure 3: World pork production
Source: USDA, 2013

New welfare regulations effective from 1 January 2013 combined with environmental challenges and ever increasing feed costs has led to production forecasts for the EU being lowered. At the same time however, developing countries like China, Russia and Brazil are expected to increase pork production, resulting in the FAO estimating an increase of 19.77% (27.71% in non OECD countries, compared to 6.37% in OECD countries) in world pork production over the next decade. The FAO-OECD outlook for world meat production to 2020 is illustrated in Figure 4.

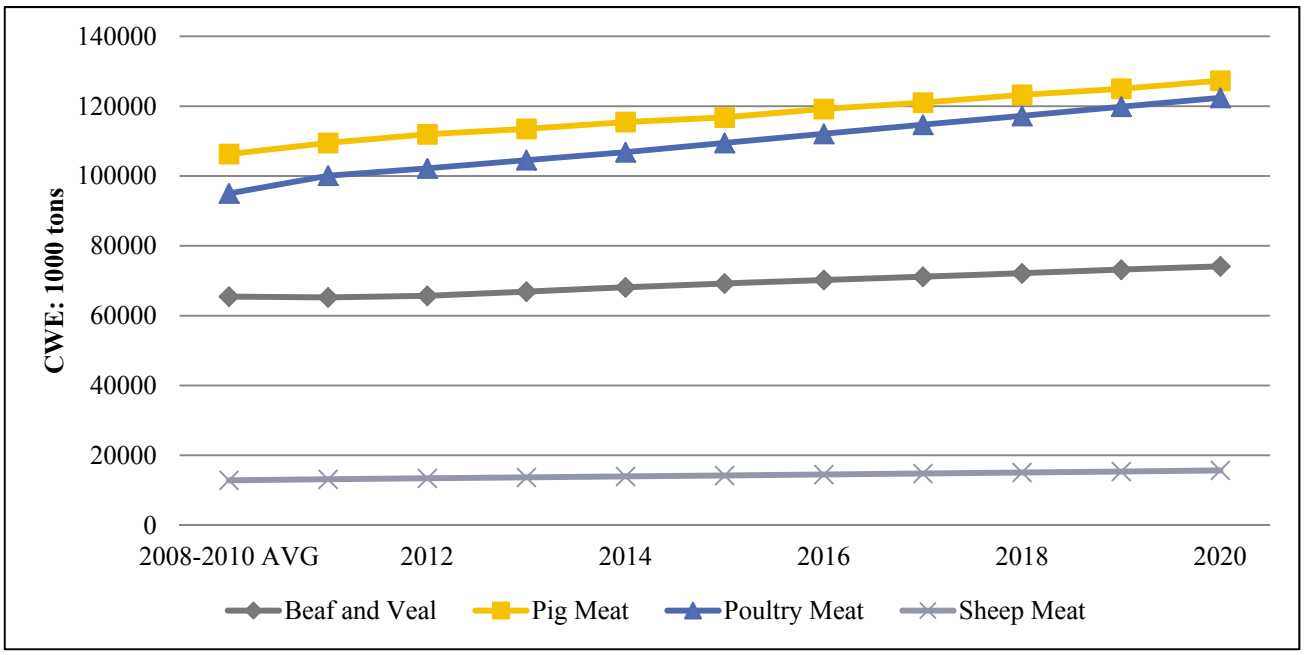

Figure 4: World meat production
Source: OECD, 2011

2.3 International trade in pork products

From section 2.1, global demand for pork is clearly growing, yet further expansion of production in many developed countries is limited by environmental concerns, as well as the cost of complying with welfare regulations. At the same time, a comparative advantage in producing pork products, due to more competitive feed prices and/or greater efficiency in production, allows the main exporting countries to produce pork at a lower cost. Spiralling feed grain prices further increases this competitive advantage, ever increasing the importance of international trade in the global market. The most significant exporters of pork products in 2012 were the USA, the EU, Brazil and Canada (Figure 5).

Figure 5: Major pork exporting countries
Source: Trademap, 2013

Apart from the cost implication of more competitive production in net exporting countries, the demand for prime cuts, processing cuts and fifth quarter products differs between regions, due to differences in religion, tradition, culture and wealth. Rising affluence in developing countries like China, where consumable fifth quarter products are in high demand provides a lucrative market for parts of the carcass that are not traditionally consumed in Western economies, where the demand for prime cuts and further processed products is stronger. These differences in regional demand for specific parts of the carcass offers opportunities to increase the total carcass value, further increasing the importance of international trade in pork products. The role of trade in balancing global demand is clearly illustrated by global trade patterns. Fresh and frozen pork cuts represents 66% of pork traded globally, while shoulders and ham represents a further 22%. Full and half carcasses on the other hand account for only 12% of pork traded globally. An evaluation of the main importers (Figure 6) and exporters (Figure 5) globally, illustrates the role of trade in balancing demand for different parts of the carcass, as regions like North America and Asia are significant contributors to both imports and exports. China, for example, imported pork cuts to the value of more than 600 million US dollars in 2012 at an average price of 1700 US dollars per ton, while simultaneously

exporting pork cuts to the value of 200 million US dollars at an average price of 4400 US dollars per ton. Differences in demand allows for the import of certain cuts at a much lower cost than the price obtained for exported cuts that are in greater demand elsewhere.

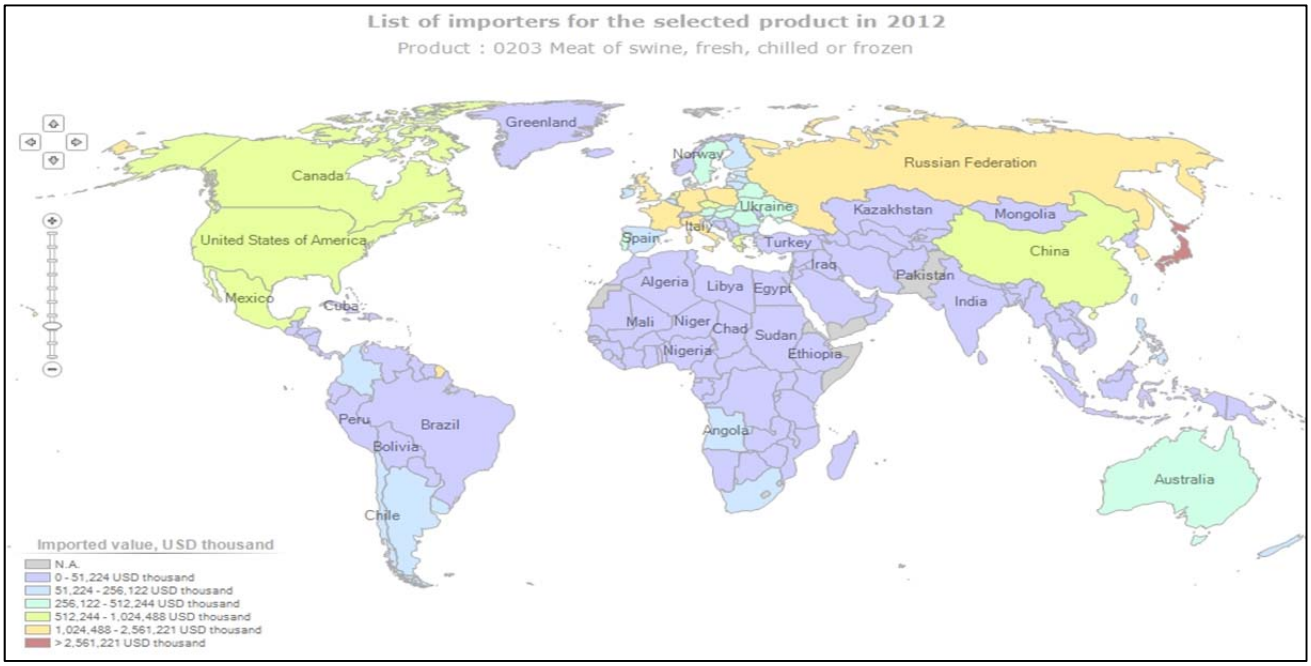

Figure 6: Major pork importing regions
Source: Trademap, 2013

The greatest import demand remains from Japan, Russia and EU member states like Germany, France and Poland. China's status as net importer of pork products has also become increasingly important since 2008 (Figure 7), as per capita pork consumption has increased.

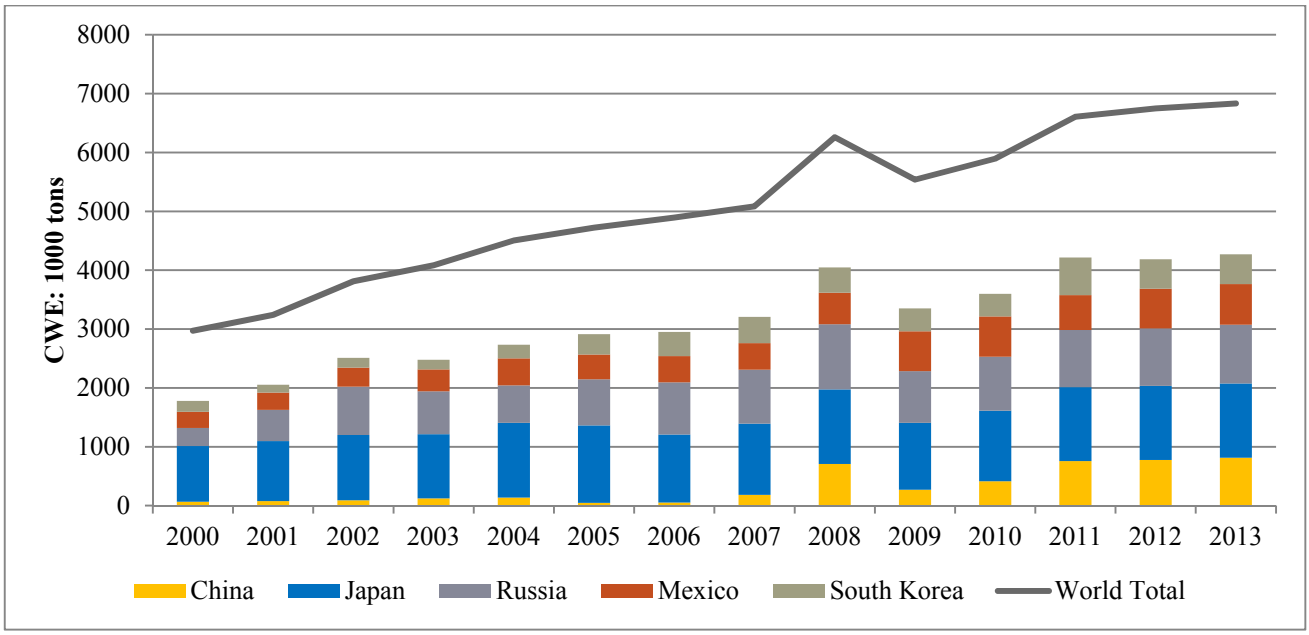

Figure 7: World imports of pork products
Source: USDA, 2013

The significantly increased importance of international trade over the past decade is illustrated by an increase in global pork exports of 136% from 2000 to 2013. The most significant growth in exports has been mainly in North America (179%) and the EU (178%), as illustrated by Figure 8.

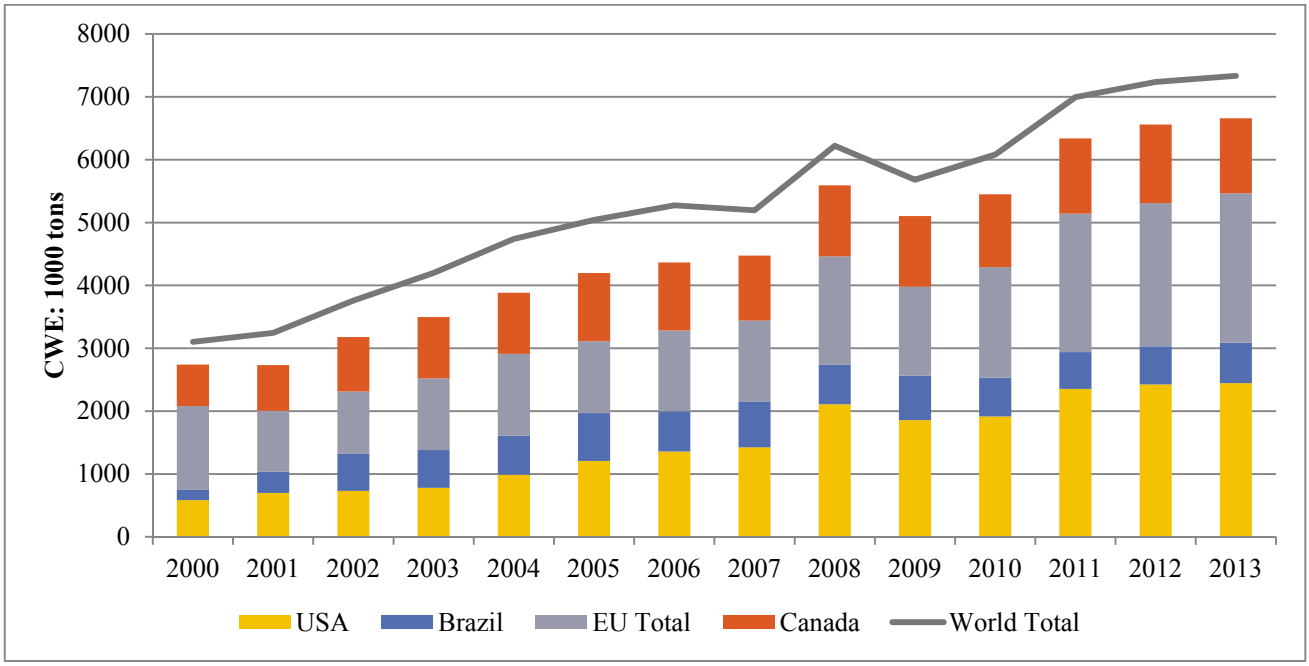

Figure 8: World exports of pork products
Source: USDA, 2013

2.4 International price trends

International pork prices have been relatively volatile over the past decade, with different trends visible in different markets. USA and Canadian prices tend to follow each other relatively closely, mainly due to the integrated nature of the two markets, while Brazil and EU prices have different external drivers. North American prices decreased in 2012, following increased production as a result of both increased breeding numbers in 2011 and higher sow slaughters due to significant feed price increases in 2012. EU prices however increased following tight supply due to high implementation costs of new welfare regulations. According to the OECD outlook, pork prices around the world have shifted to a higher level after 2012/13, due to a rise in feed grain prices, combined with steadily increasing demand for pork and a supply response often limited by external factors.

While prices in the EU, USA and Canada are expected to stabilize in a typically cyclical pattern at this higher level from 2013 onward, Brazilian prices are expected to increase steadily throughout the next decade. Relatively low feed costs give Brazil a comparative advantage in pork production when compared to EU countries and considering the fact that Brazil has much greater room for expansion, Brazilian exports will have a substantial role to play in supplying ever increasing demand from developing economies over the next decade. Figure 9 depicts changes in international prices over the past decade, while also providing an outlook for international prices to 2022. Due to currency differences, prices are expressed as an index, illustrating price changes, rather than absolute levels.

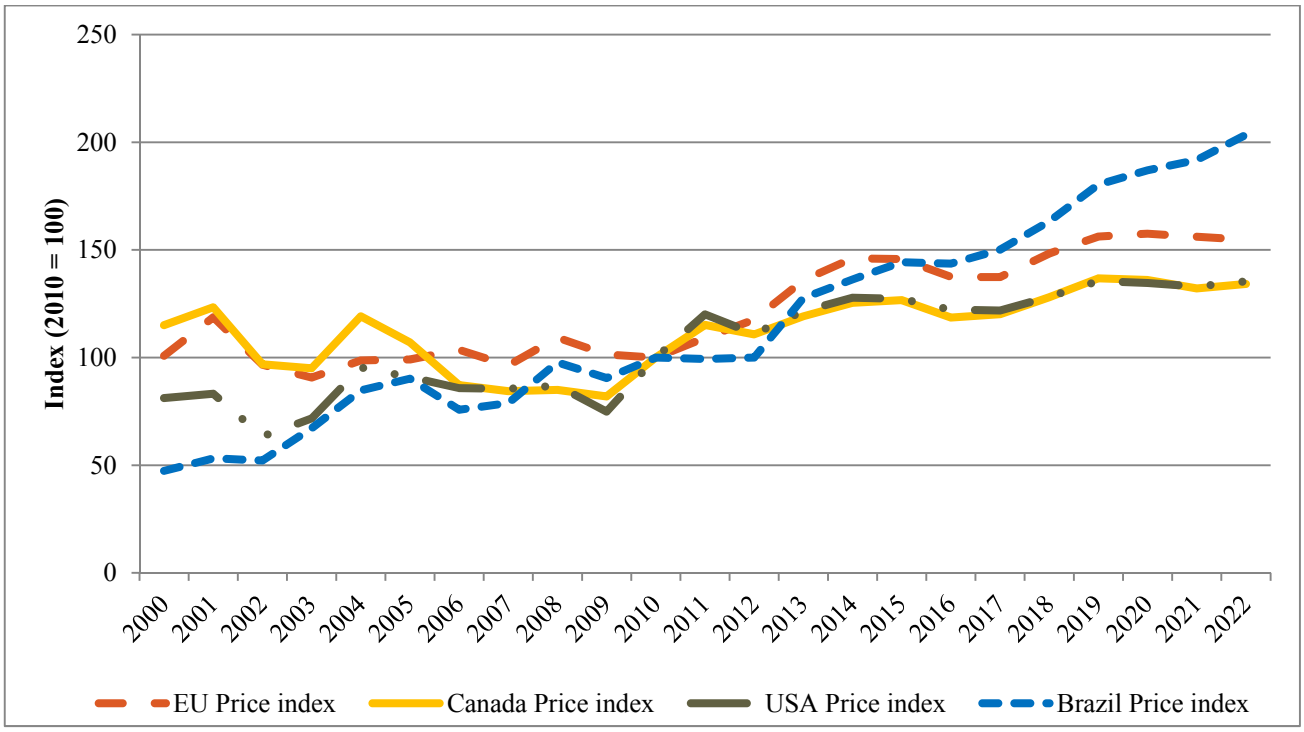

Figure 9: International price trends (index)
Source: OECD, 2013

3. Overview of the South African pork market

3.1 Consumption trends in South Africa

Significant increases in the per capita income of South African consumers over the past decade has led to improved living standards and increased spending power. When considered within the living standard measurement (LSM) classification, a large number of consumers have been shifted from LSM group 1, 2 and 3 to LSM group 4, 5 and 6 (Figure 10). As a result of this class mobility, consumption patterns have changed, illustrated by steady growth in meat consumption through the past decade, following a similar trend to other emerging economies.

The increased per capita income of increasingly urbanised consumers has led to increased per capita consumption of pork, while greater population numbers further increased total pork consumption. The observed class mobility is expected to continue through the coming decade (though at a decreased rate), pointing to further increases in the per capita consumption of pork. Apart from increased consumption per capita, South African population numbers are also expected to increase through the coming decade, further increasing total pork consumption. The rate of population growth is however decreasing compared to the past decade. Growth in meat consumption through the past decade, as well as projected growth in meat consumption for the coming decade under the assumptions of the 2013 BFAP baseline report is shown in Figure 11. Meat consumption growth through the decade between 2002 and 2012 was dominated by chicken, increasing at an annual average of 8%, followed by pork increasing at an annual average of 5.3%.

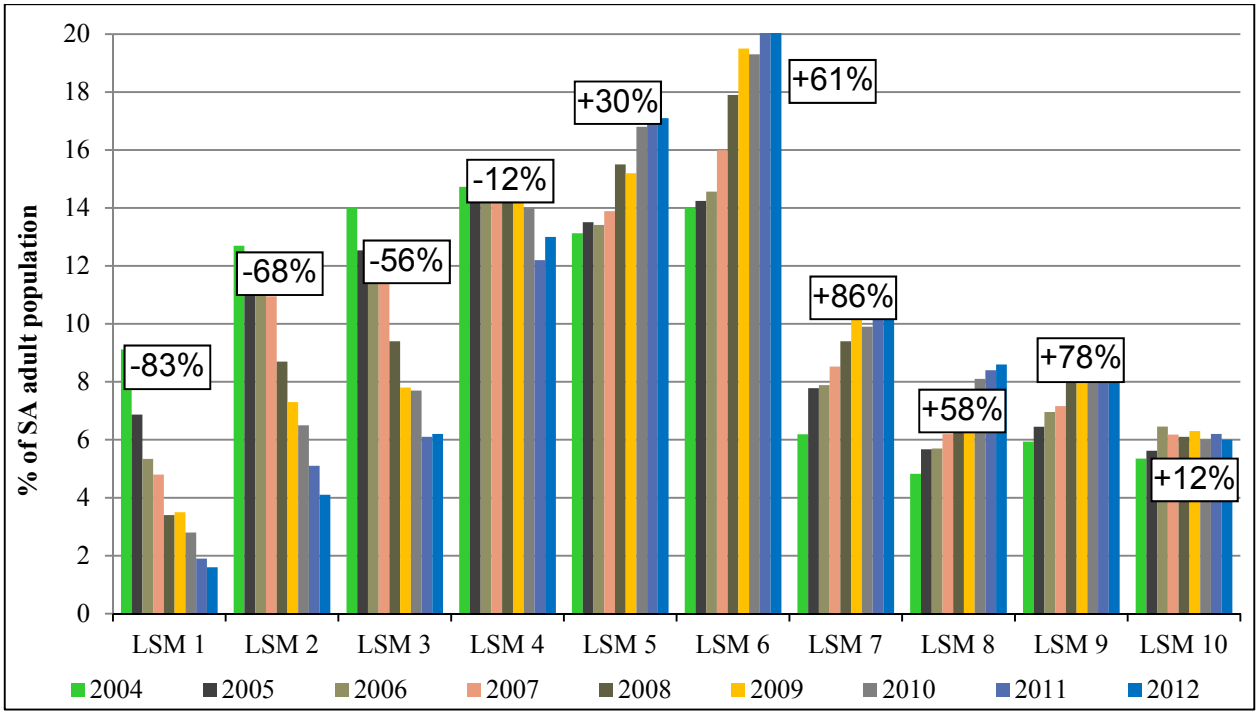

Figure 10: Class mobility of South African consumers
Source: SAARF AMPS data, 2004-2012

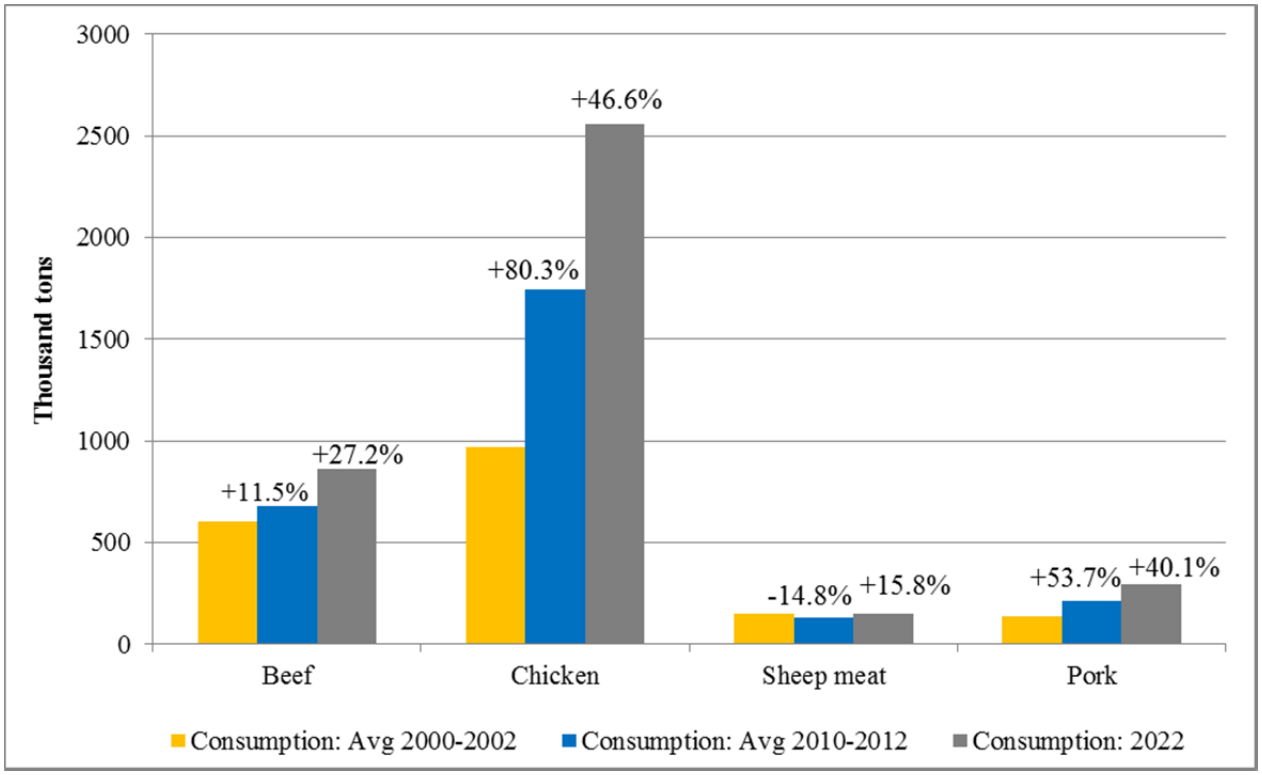

Figure 11: Meat consumption growth in South Africa
Source: BFAP, 2013

The price of various meat alternatives is a crucial factor that influences the consumers' decision regarding meat consumption. From a pricing perspective, the greatest competitor to pork consumption is chicken, which has been the cheapest source of animal protein since 2007. For this reason, chicken consumption is expected to grow faster than any other protein in the coming decade, as indicated in Figure 11. While chicken consumption is expected to increase by 46% from 2012 to 2022, pork consumption is expected to increase by 41% in the same period. This value is greater in percentage terms than beef, which is expected to increase by 27% over the same period, but pork is growing from a small base and hence the absolute growth in beef consumption is much greater than pork. Beef consumption is expected to increase by 184 thousand tons, compared to expected consumption growth of 21 thousand tons for sheep and 86 thousand tons for pork. Chicken consumption is projected to increase by 813 thousand tons through the same period.

Consideration of growth in per capita consumption paints a similar picture, with chicken consumption growing at an annual average of 6.3% through the past decade, followed by pork consumption growth of 3.9%. This serves to illustrate that the growth in consumption can be attributed to factors such as increased income, changing preferences and not purely to growth in population numbers. Though the importance of prices in influencing consumers cannot be underestimated, pork consumption in particular is influenced by many other factors that will be discussed in section 5.

3.2 Production trends in South Africa

The Department of Agriculture, Forestry and Fisheries (DAFF) indicates that animal production contributes approximately 50% to the gross value of South African agricultural production, yet the contribution of the pork industry to total animal production is only 4.4%. From a global perspective, the South African pork industry contributes only 0.18% of total pork produced worldwide, rendering it an insignificant player in world markets while at the same time making it vulnerable to changes in global pork markets.

Pork production increased by an annual average of 4.5% over the past decade, second only to broiler production which grew at an annual average of 6%. Following with the international trend, production increases can be ascribed to higher slaughter weights, more so than greater slaughter numbers. While the number of pigs slaughtered increased by 23.6% from 2000 to 2012, pork production increased by 69.3% in the same period, providing a clear indication that the average slaughter weight has increased significantly through this period.

SAPPO (2013) estimates that there are currently around 103 000 sows and 7000 boars in South Africa, managed by approximately 240 individual pork producers. Provincial sow numbers suggest that the majority of production takes place in the North West province, KwaZulu-Natal and the Western Cape. Despite this, 43% of pigs slaughtered in 2012 were slaughtered in Gauteng, with 15% in KwaZulu-Natal and 13% in the Western Cape (Figure 12).

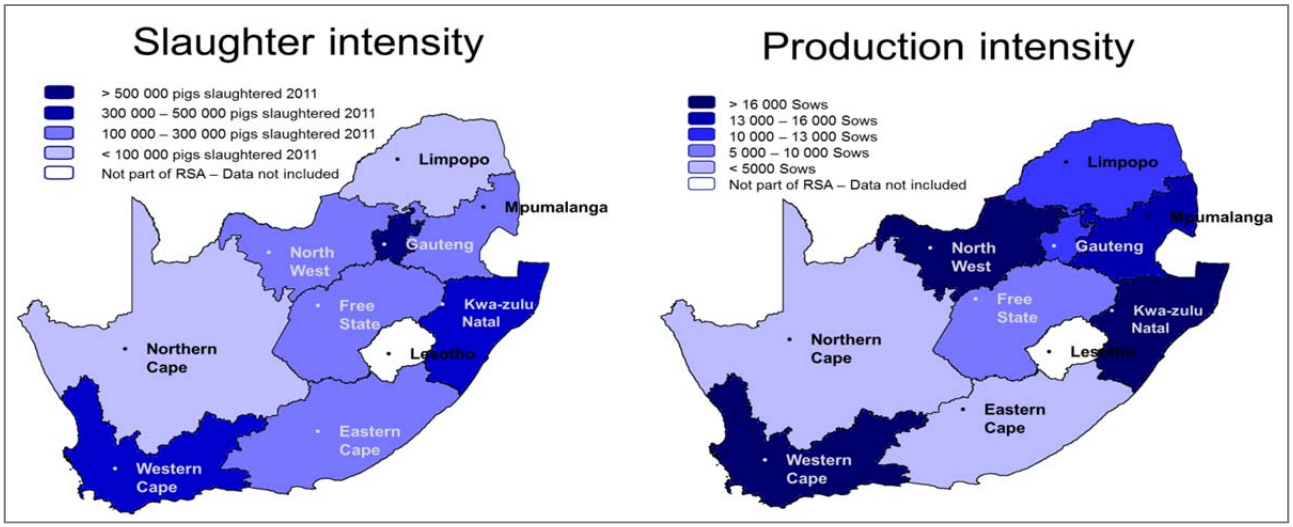

Figure 12: Provincial distribution of slaughters and sow numbers
Source: Compiled using data from the South African levy administrator and SAPPO, 2012

Following the impressive projected growth in pork consumption in the coming decade, pork production has the potential to increase accordingly. While pork production increased by 47.5% in the past decade, limited increases in sow numbers through the same period indicate that increased production was a result of improved efficiency and higher slaughter weights, rather than significant expansion of the sow herd. As indefinite expansion of carcass weights is not feasible, further increases in production through the coming decade would have to be as a result of increased sow numbers and/or further improvements in production efficiency. Significant investment would therefore be required from domestic producers if increased consumption is to be met by domestic production rather than imports through the coming decade. The outlook for pork production, as well as domestic consumption and resultant imports are illustrated in Figure 13. Realisation of this production outlook will however be dependent on sufficient planning and investment into expanding the domestic sow herd.

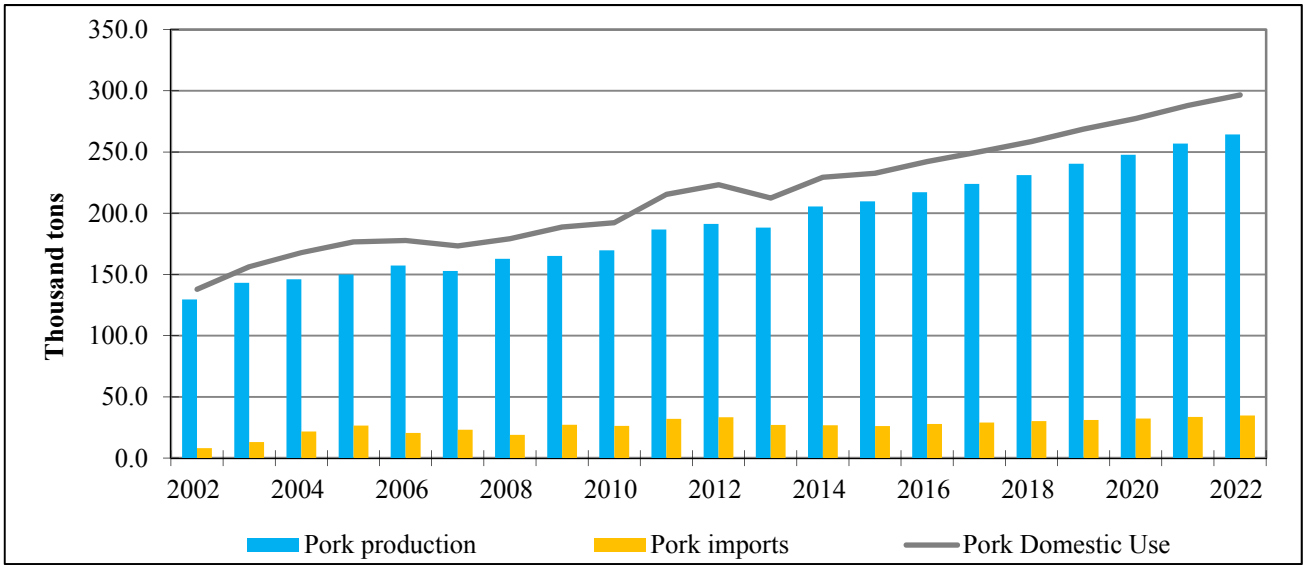

Figure 13: Pork production, consumption and imports 2002-2022
Source: BFAP, 2013

3.3 South Africa's international trade patterns

3.3.1 Pork imports to South Africa

South Africa has been a net importer of pork products since the early 1990's, with pork imports increasing steadily from almost 14 thousand tons in 1994 to 33 thousand tons in 2012. Despite its history as a net importer of pork products, the past decade has revealed an increasingly upward trend, a fact that should be of concern to the domestic industry. While imports comprised only 6% of domestic consumption in 2002, imported products accounted for 15% of domestic consumption in 2012. Figure 14 illustrates that while domestic consumption increased significantly through the past decade, this increased demand has largely been met by growth in imported products. Despite providing only 15% of domestic consumption in South Africa in 2012, imports are an important component to the South African pork market. Imports have a fundamental role in balancing the pork market in South Africa, due to the fact that South Africans have a stronger preference for ribs than for any other part of the pig carcass.

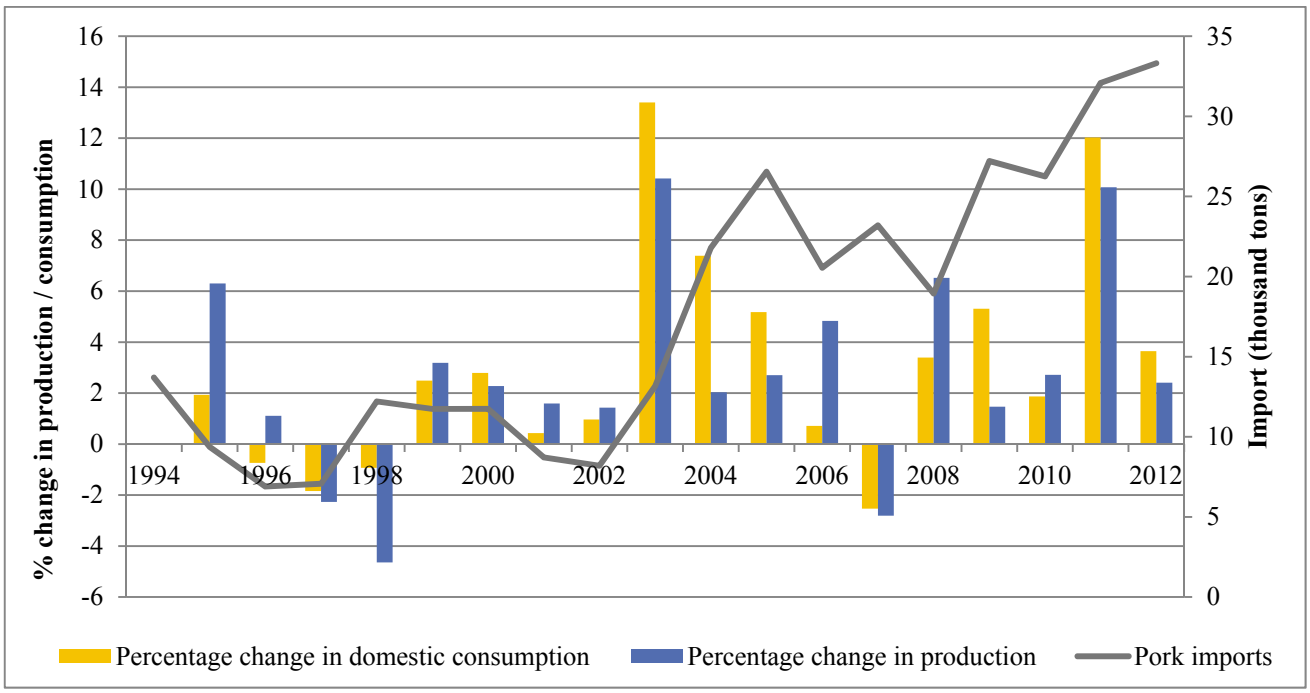

Figure 14: Pork imports into South Africa
Source: BFAP, 2013

Though it can be argued that imports, particularly from countries where feed costs are lower than in South Africa, pushes the domestic price down, consideration of the products imported into South Africa illustrates the role of imports in balancing the domestic market. South African pork imports, disaggregated by tariff classification are illustrated in Figure 15. The fact that almost no carcasses are imported is an indication that the deficit in the South African market is for specific cuts, rather than the entire pig carcasses. Pork imported to South Africa is predominantly ribs, followed by other frozen cuts, illustrating South African consumers' preference for ribs.

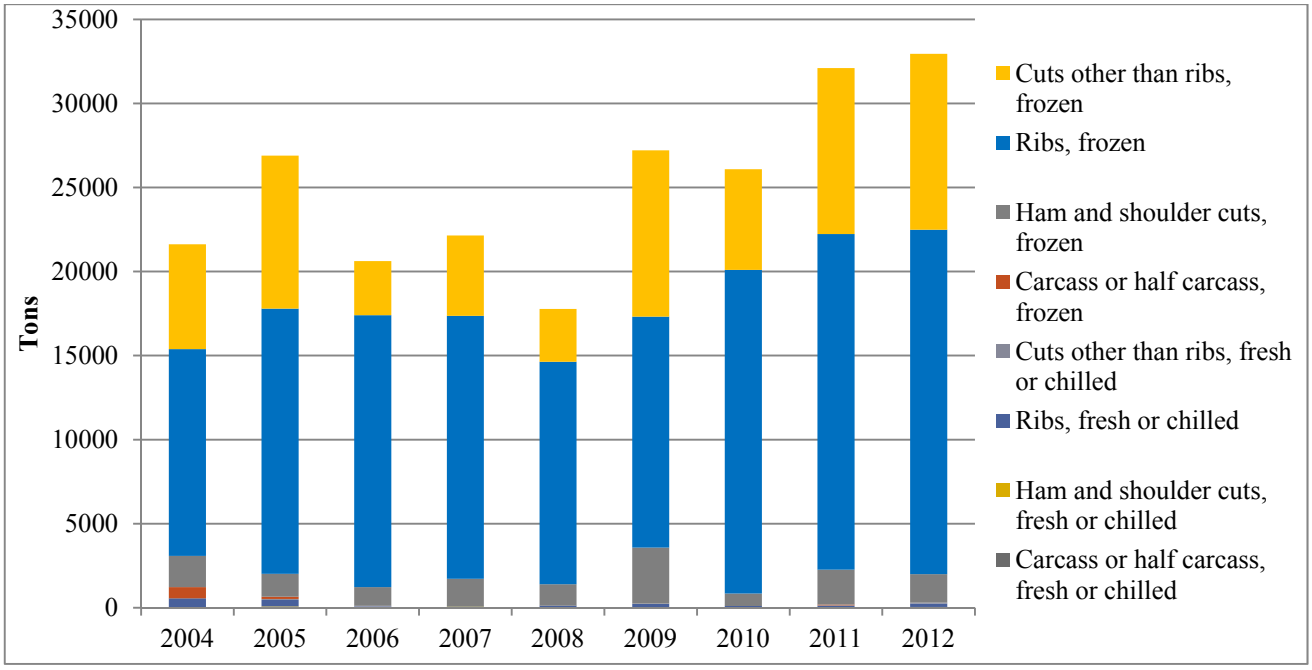

Figure 15: South African pork imports by tariff classification
Source: Compiled from Trademap, 2013

Further consideration of pork imports on a monthly basis, as illustrated in Figure 16, indicates that products are imported in a cyclical trend, with imports typically greater in March and April, while decreasing in August and September. This further indicates that imports are required during specific times of the year in order to supplement the deficit in domestic production. Without access to imports in order to balance the market, the pork price could show significantly greater volatility.

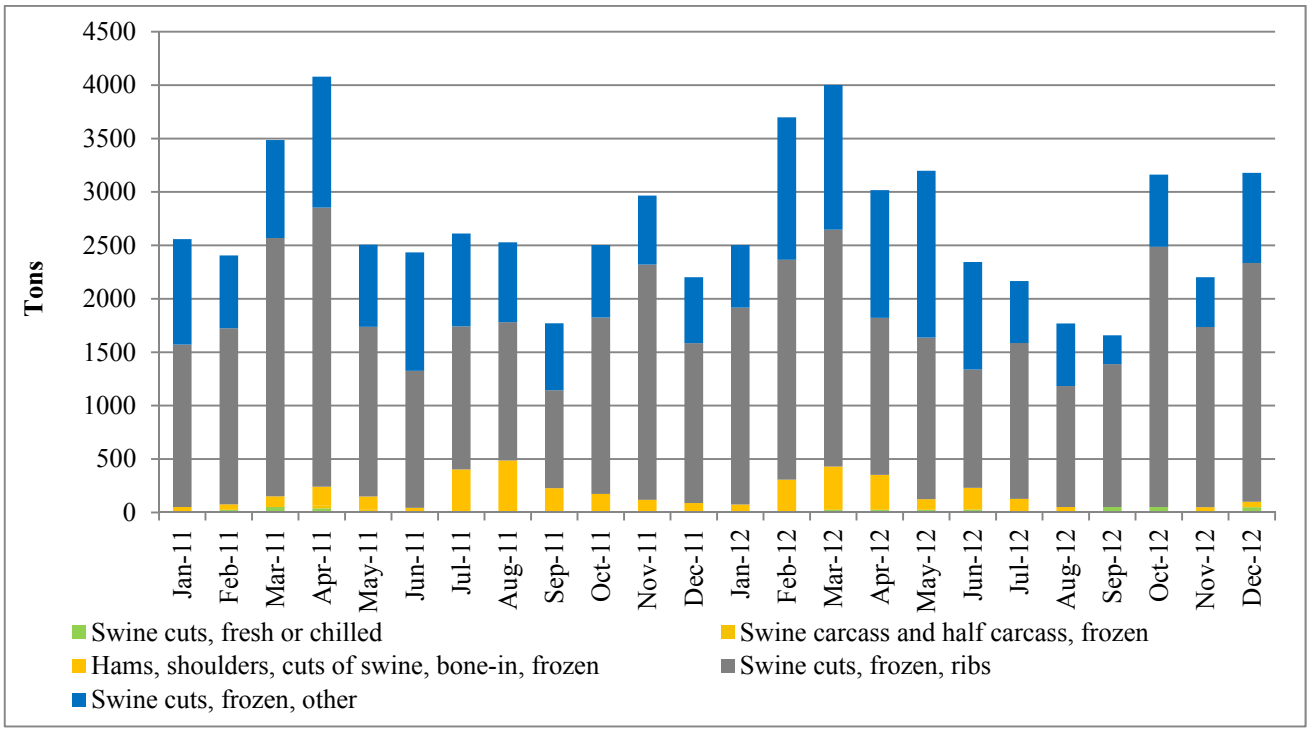

Figure 16: Monthly imports into South Africa
Source: Compiled from Trademap, 2013

While international competition has forced South African producers to produce pork more efficiently, it is important to ensure that South African producers are not subjected to unfair competition from abroad, negatively affecting the sustainability of the South African industry. South African producers are protected by a tariff of 15% or R1.30/kg (whichever amount is greater), yet ribs are imported duty free and as ribs comprise more than 50% of the pork imported to South Africa, the imposed tariffs are applied to less than half of the pork entering the country. Important to note however is that imports originating from within the SADC and SACU areas are duty free (SARS, 2013).

The bulk of the pork entering South Africa originates from the EU, with Germany, France and Spain being the countries of origin for 83% of the ribs imported to South Africa in 2012 (see Figure 17). The EU has a strong history of supporting and subsidising its farmers, particularly with regards to export subsidies and Louw *et al*. (2011) highlighted the concern that subsidised imports will have an unfair advantage in relation to domestically produced pork.

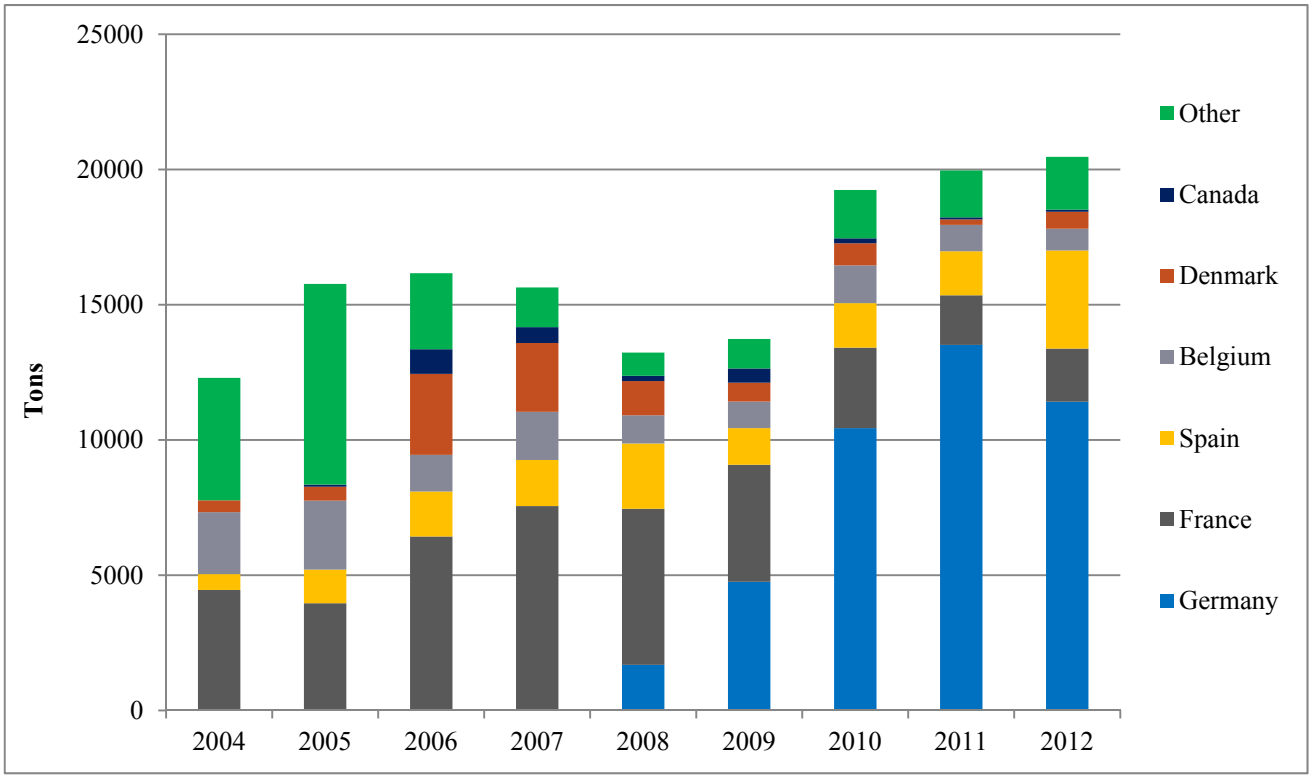

Figure 17: South African imports of ribs, disaggregated by country of origin
Source: Compiled from Trademap, 2013

Though the cost of imports will always be a consideration due to the competition that imported pork provides for domestically produced pork, the benefit of being able to import only specific cuts, without having to sell the rest of the carcass means that a certain amount of pork will be imported into South Africa in order to balance demand, regardless of the relative price of imported pork compared to domestically produced pork. Unless demand patterns for different parts of the carcass change fundamentally, South Africa looks set to remain a net importer of pork for the foreseeable future.

3.3.2 Pork exports from South Africa

Exports have averaged less than 1% of domestic use over the past decade and as such are not a significant factor in the South African pork market. The main destinations for South African pork exports are to African countries like Zimbabwe, Mozambique and Angola. South African pork exports, disaggregated by tariff classification are illustrated in Figure 18.

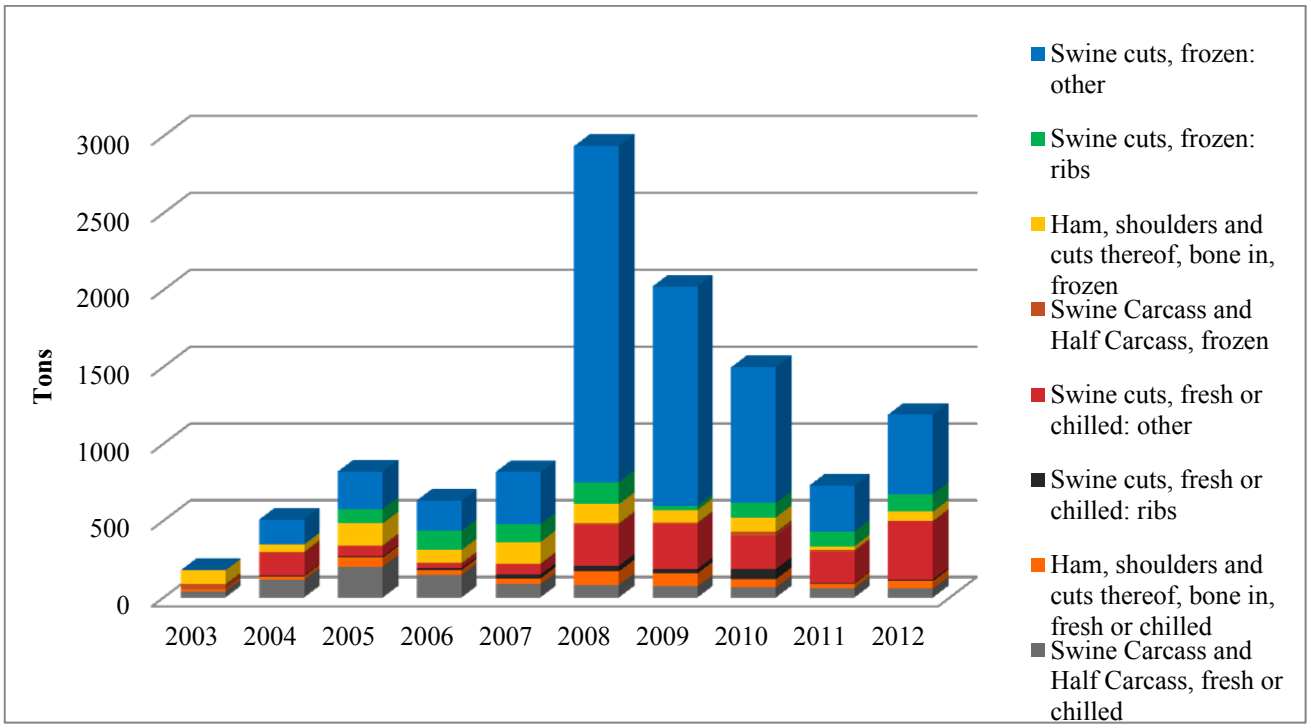

Figure 18: Pork exports from South Africa
Source: Compiled from Trademap, 2013

3.4 Price trends in South Africa

Due to its small contribution to world pork markets, as well as South Africa's status as a net importer of pork products, the South African pork price is vulnerable to shifts in international markets. Volatility in the exchange rate further increases the volatility in the world price that transmits to the South African market. The correlation between the domestic pork price and the price of different imported pork cuts is evident from Figure 19.

Its relative size compared to the other meat markets in South Africa further makes the pork price vulnerable to shifts in other markets like beef and chicken. Though chicken is the most important meat market in South Africa based on sheer volume traded, the traditional preference that South African consumers have for red meat, means that beef is often considered the market leader as far as prices are concerned. In other words, when the price is right, South African consumers prefer beef. This preference makes beef an important substitute for pork, as decreases in the beef price might induce a shift from consumers away from pork, regardless of whether the pork price changes.

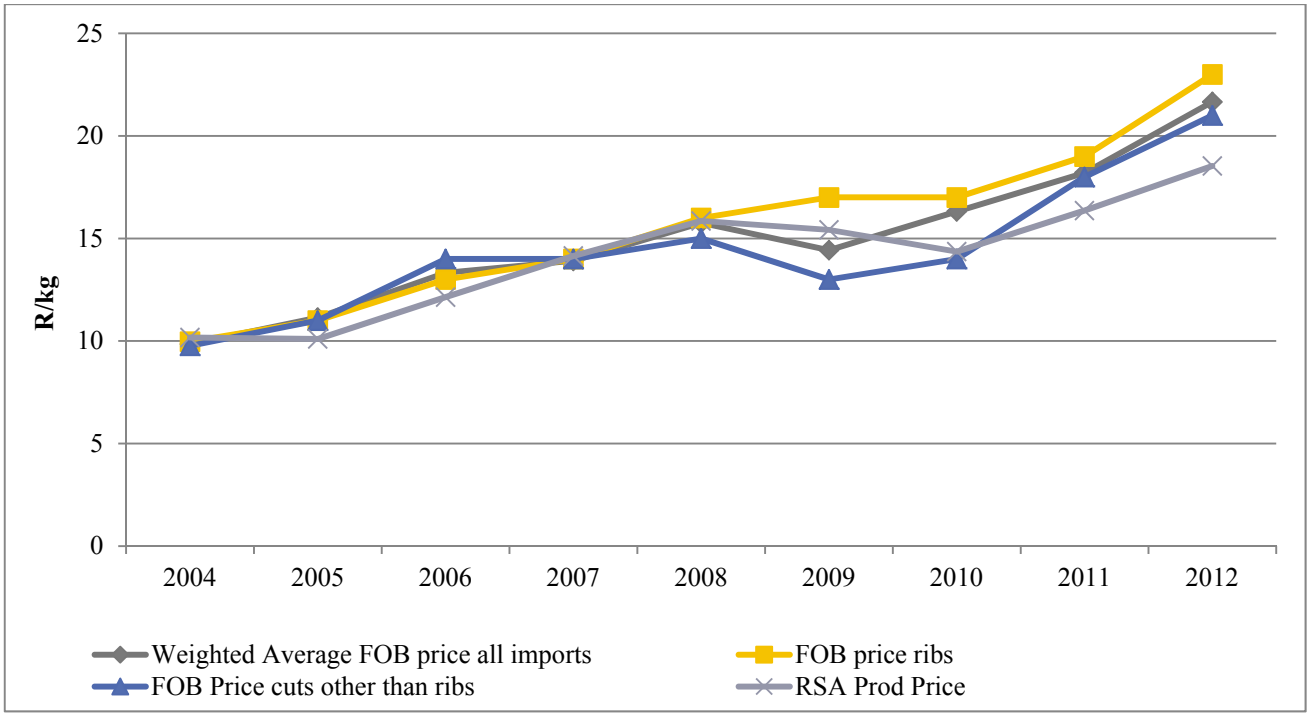

Figure 19: Price comparison of domestic and imported pork
Source: Compiled from Trademap, 2013

At the same time, the relatively cheaper price of chicken makes it popular to the lower income consumer and given the fact that pork is only marginally more expensive than chicken, chicken can be considered the closest substitute for pork from a price perspective. Domestic producer price trends are illustrated in Figure 20. Prices are expressed in constant 2000 terms in order to remove the effect of general inflation.

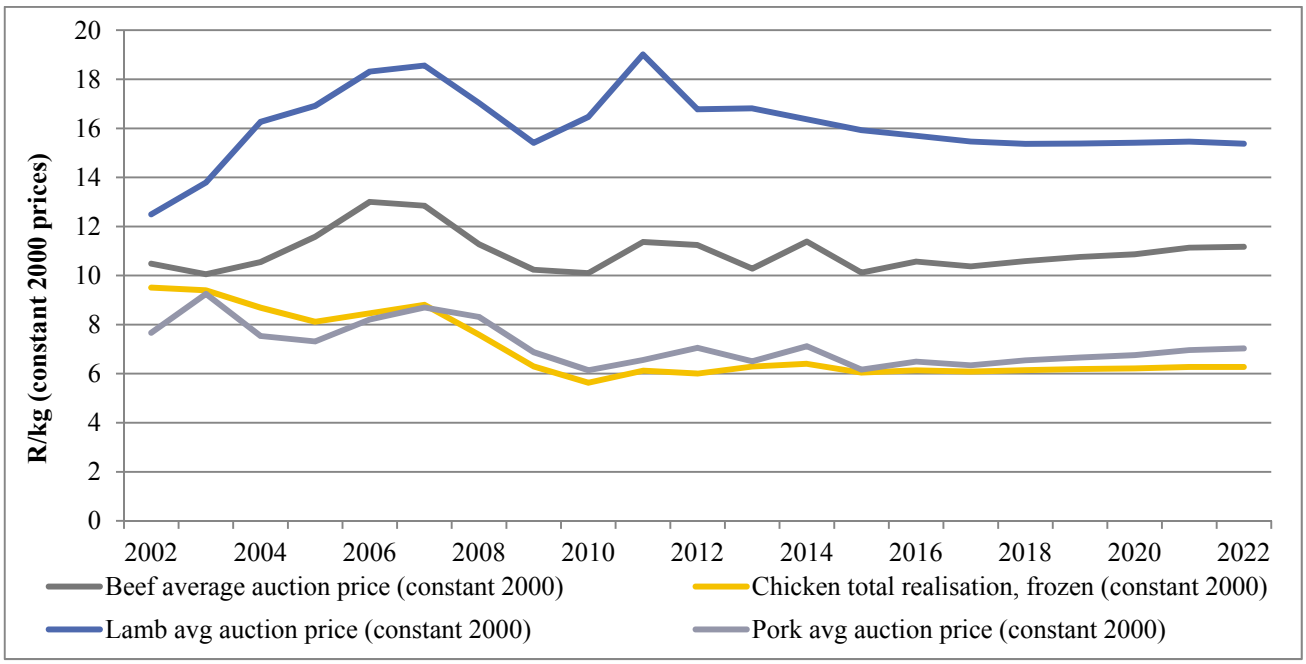

Figure 20: Meat producer prices in constant 2000 terms
Source: BFAP, 2013

Despite the fact that the producer price for chicken and pork trades at similar levels, the ultimate consumption decision is made at retail level. As a result, recent trends in retail prices of different meats are illustrated in Figure 21. At retail level, different cuts can compete, even though producer prices are further apart. In Figure 21 this is clearly illustrated, by the similarity in price between the average beef price for brisket, chuck and mince. The fact that significantly more value is added to pork before it is sold at retail level further means that when retail prices are considered, the difference in the price of pork compared to chicken is much greater.

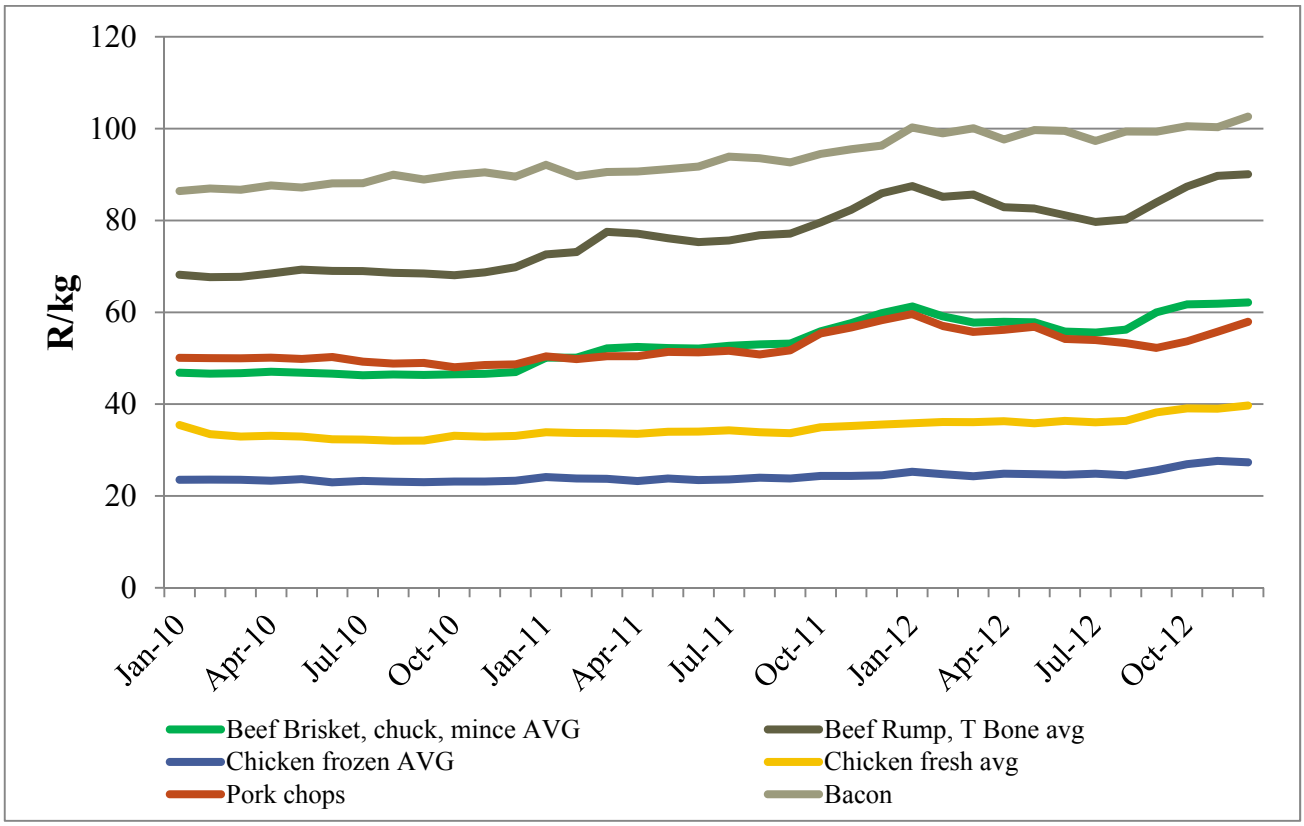

Figure 21: Retail price for different meat cuts
Source: Stats SA, 2013

At producer level, the price of pork is closely correlated to the price of feed. As an intensive industry where feed costs comprise up to 70% of input costs, the price of feed is an important factor when prices are negotiated. The correlation between feed costs and pork producer prices is illustrated in Figure 22. Domestic supply and demand naturally influence the price, with a domestic surplus (deficit) leading to a lower (higher) price. At the same time, the level of the import parity price, particularly from Germany as the origin of South African imports is another important factor to consider. When the domestic price increases above import parity, substitution will occur away from domestically produced products. Figure 22 also provides an outlook for the price of both pork and feed.

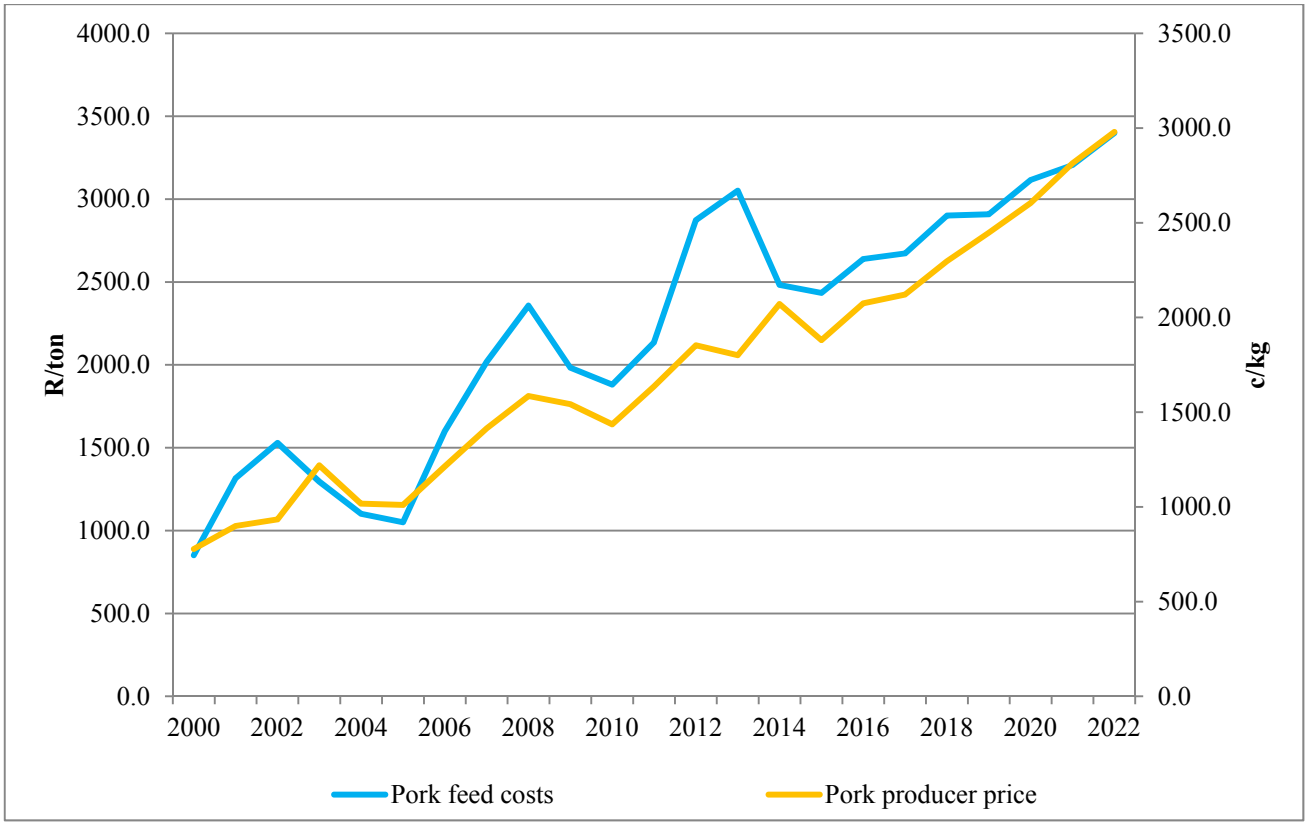

Figure 22: Pork producer price vs pork feed costs
Source: BFAP, 2013

4. Quantification of the South African pork value chain

The South African pork supply chain is complex in structure. Varying levels of vertical integration by different companies, across different stages of the supply chain make the identification of a generic supply chain that represents the entire industry extremely difficult. Figure 23 however provides a brief illustration describing the various levels that can be found in the chain. It should be noted however that in many instances, a single firm operates in more than one level, with the adoption of vertically integrated structures aiding in decreasing the cost of supplying the final product to the market.

Pork in South Africa is marketed through two distinct chains supplying either fresh pork or processed pork products into the market. Different classes of pork carcasses are used for different markets, with smaller and leaner porkers preferred in the fresh meat market, while heavier baconers are supplied to the processing market. Figure 23 presents a generic picture of the pork value chain, yet in essence there are significant differences between the fresh meat and processed meat chains. These differences will however be highlighted when the different links in the supply chain are evaluated.

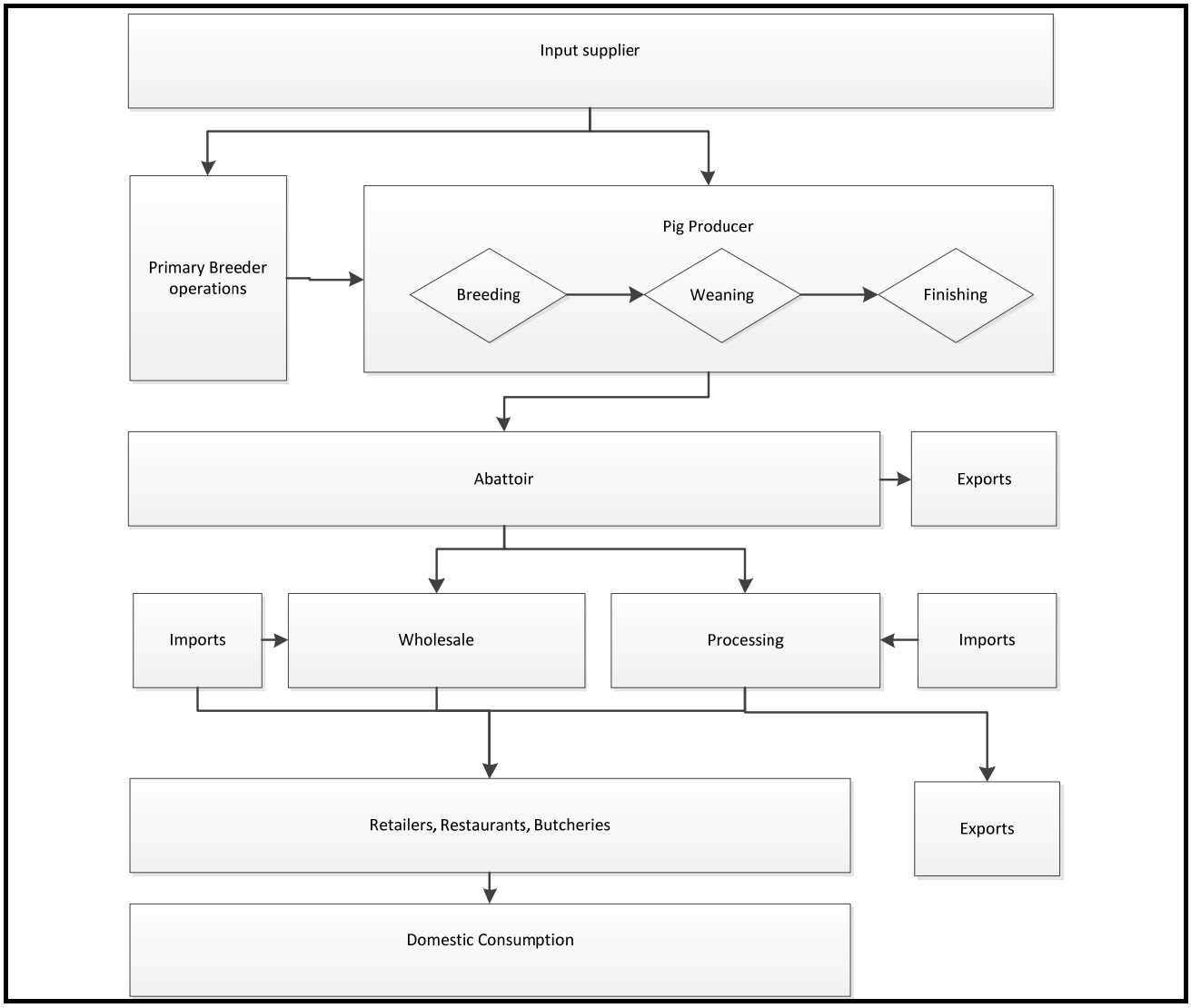

Figure 23: Diagrammatic representation of the pork value chain in South Africa
Source: Author compilation, 2013

4.1 Input Supply

Despite the small size of the pork industry relative to other animal production sectors in South Africa, the pork industry consumed 10% of all feed produced in South Africa in 2012 (AFMA, 2012). Total feed consumption by the pork industry amounted to 1.11 million tons in 2012, of which only 30.94% was produced by AFMA members. This indicates that a large percentage of producers mix their own feed, a fact substantiated by Louw *et al*. (2011), who indicated that almost 75% of South African pork producers mix their own feed. Louw *et al.* (2011) further indicates that animal feed sales are concentrated in the Western Cape and KwaZulu-Natal, both areas where key raw materials used are not as readily available.

Apart from consuming in excess of 1 million tons of feed in 2012, the importance of feed prices to the pork producer is further emphasised by the fact that feed costs account for between 70% and 80% of producers' variable production costs on the farm. The intensive nature of pork production systems therefore renders feed the most important input from a producer's perspective. The typical pork

producer in South Africa mixes his own feed in a modern mixing plant on the farm, ensuring cost effective procurement of raw materials as well as sound diet formulation that optimises feed conversion ratios at various stages of the production cycle (Kirsten, Visser & Blignaut, 2007; Louw *et al*., 2011). The inclusion rates of key raw materials in pig feed rations as described by Visser (2004), as well as Louw *et al*. (2011) are illustrated in Table 2.

Table 2: Inclusion rates of raw materials in pig feed

Raw Material	**Visser inclusion rate (2004)**	**Louw *et al*. inclusion rate (2011)**
Grain (Maize, wheat and sorghum)	65%	60% - 70%
Bran	16%	5% - 10%
Fishmeal	7%	15% - 25%
Oilcakes	8%	
Salt	1%	5% - 10%
Premixes	2%	
Synthetic lysine and macro minerals	1%	

Source: Louw *et al*., 2011 & Visser, 2004

From Table 2 it is clear that the most important raw material from a pig feeding perspective is maize and other feed grains, the main energy source in the ration. Under normal weather conditions, South Africa tends to be a net exporter of yellow maize, leading to yellow maize prices trading at export parity levels. This insures ample supply of maize at prices that are generally competitive on the international stage. When poor weather conditions lead to reduced production however, the price moves to import parity levels and the effect of exchange rate volatility becomes more significant. South Africa has however been a net exporter of yellow maize since 2008 as the area under yellow maize has increased due to reduced white maize consumption resulting from improved consumer income.

Following consecutive years of poor weather conditions in key production regions in the USA, maize prices around the world reached record levels in 2013. The price is expected to decline in 2014 and 2015, with initial production estimates in the USA improving significantly. The domestic maize price in South Africa is expected to follow this trend, providing relief for livestock producers. South Africa is projected to remain a net exporter of yellow maize over the next decade, as indicated in Figure 24.

While South Africa tends to be self-sufficient in the supply of energy sources like maize, the raw materials used as protein source comprise 15-25% of the feed mixture and tend to be imported. Despite being a net exporter of soya beans, the limitations in South Africa's crushing capacity results in net imports of oilcake, the protein source most commonly used in animal feeds. The result is price formation based on import parity prices, leading to oilcake prices that are volatile due to exchange rate fluctuations and generally more expensive than in South America. The alternative is fishmeal, which is also imported and therefore subjected to the same volatility in exchange rates.

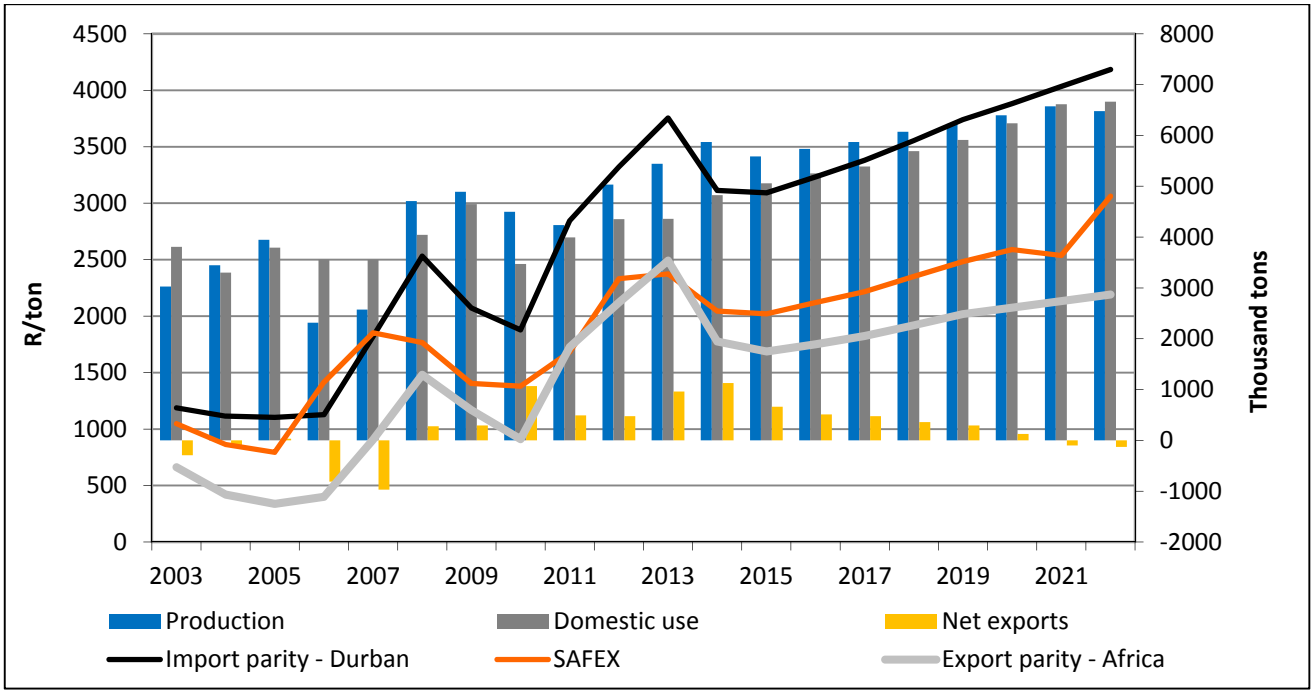

Figure 24: South African yellow maize production, consumption and prices
Source: BFAP, 2013

Apart from the high cost, producers have expressed concerns as to the quality of domestically produced oilcake, as well as the quality and availability of fishmeal. Though crushing capacity is being increased at a considerable rate, South Africa is expected to remain a net importer of soya oilcake for the next decade, as illustrated in Figure 25. The result is that pricing of domestically produced soya oilcake will be based on import parity prices for the foreseeable future.

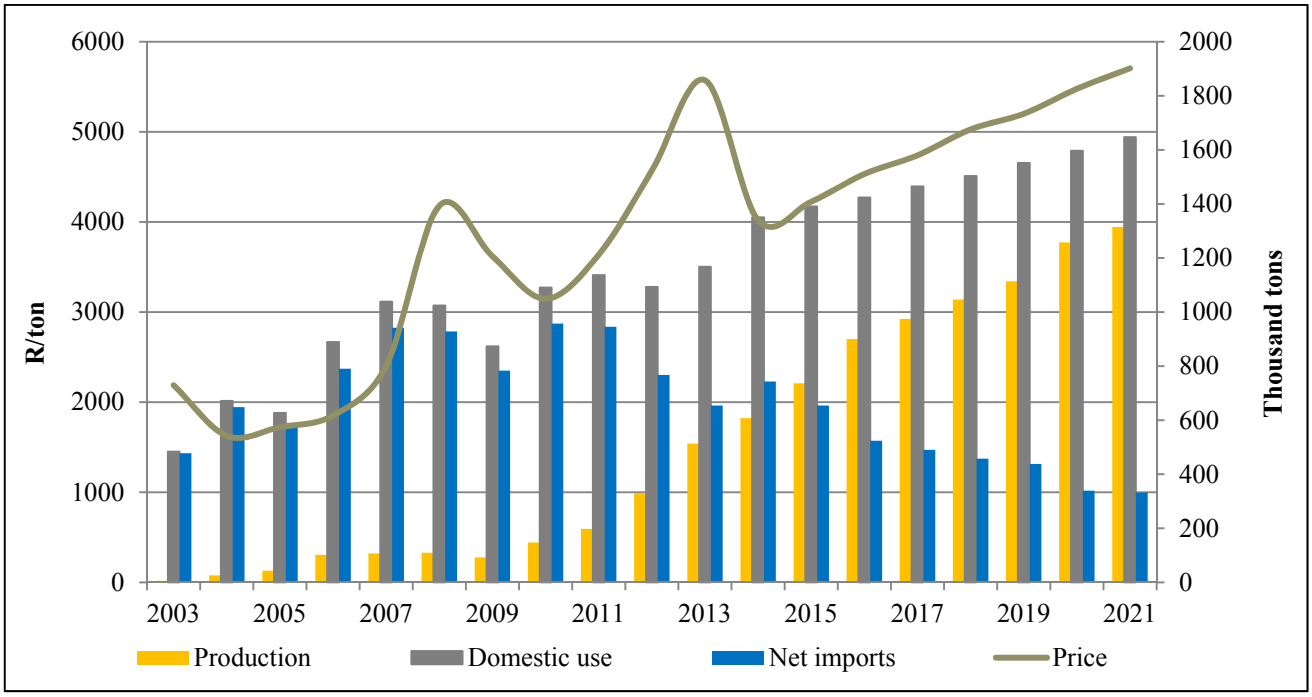

Figure 25: Soybean cake production, consumption and trade in South Africa
Source: BFAP, 2013

Following record highs in 2013 as a result of increased demand worldwide, combined with extremely dry conditions in the USA, the price of soya cake is expected to decline in 2014, before increasing steadily in nominal terms over the next decade. This trend follows the trend in international soybean cake prices, yet the difference in soybean cake prices in South Africa and Brazil, both expressed in US dollar terms are clearly illustrated in Figure 26.

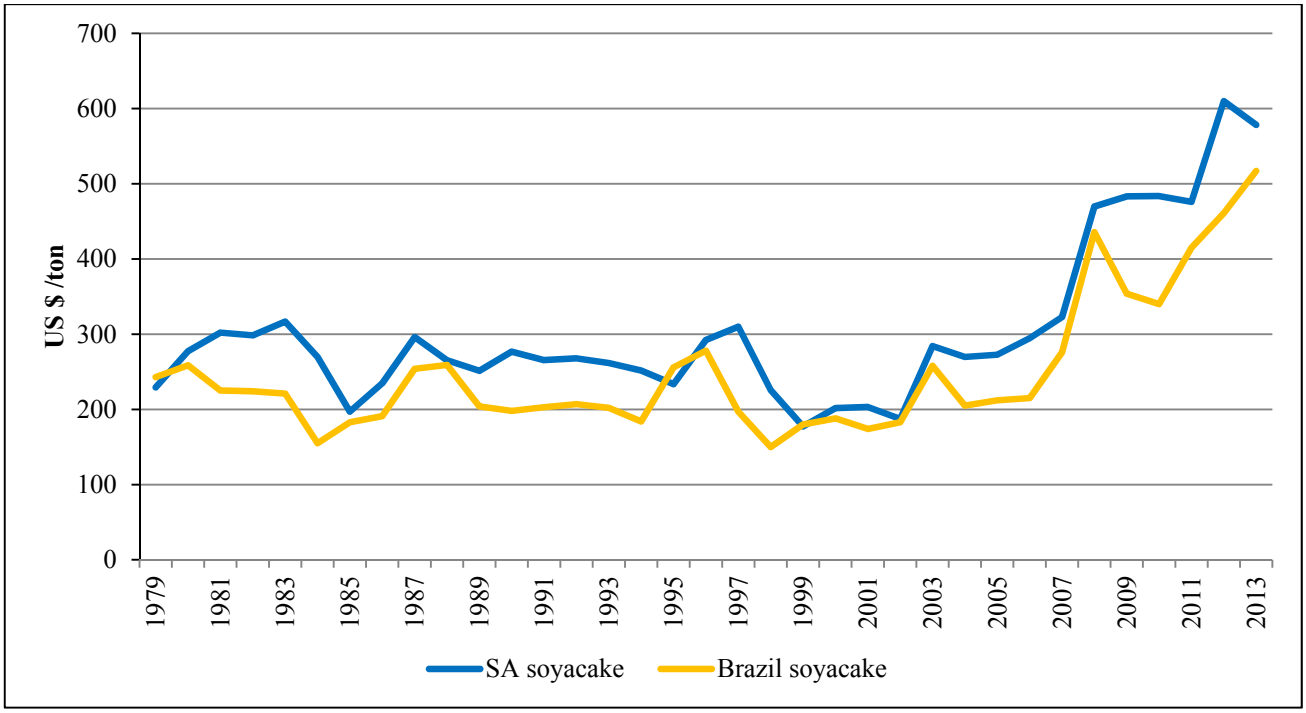

Figure 26: Soya cake prices in SA and Brazil
Source: BFAP, 2013

Feed price volatility is a particularly sensitive issue to pork producers, as producers tend to source raw materials in the spot market (Louw *et al*., 2011). Smaller producers do not possess the cash flow to secure raw materials well in advance and resultantly are subjected to huge risks regarding volatility in raw material prices. Uncertainty regarding a market for the pigs produced further discourages producers from procuring raw feed materials in advance. Louw *et al.* (2011) indicates that larger producers that have the support of contractual arrangements to sell their pigs also engage into contractual arrangements in order to procure raw feed grains and reduce the risk of price volatility.

Though feed comprises the bulk of pork producer costs, veterinary services and the supply of pharmaceutical products is a second important input to consider. Manufactures and suppliers of veterinary medicine are represented by the South African Animal Health Association (SAAHA). Kirsten et al indicate that current membership to SAAHA include 17 companies, 11 animal health related national associations and institutions as well as two national government departments. Apart from the supply of medical products, the availability of veterinary support is another key issue for pork producers. Louw *et al*. (2011) indicated that poor veterinary support in rural areas was a key area of concern to South African producers.

4.2 Primary breeder operations

Good quality genetic material is crucial to the success of the pork value chain. Pigs with good genes and favourable feed conversion ratios are more cost effective to raise and desirable characteristics lead to better prices. Louw *et al*. (2011) indicates that South Africa's gene pool is strong and that good quality genetic material is available to South African producers.

The South African breeding industry is highly concentrated, with 2 breeding companies controlling 75% of the market, with TOPIGS SA currently holding an approximately 30% share and KANHYM/PIC currently holding an approximately 45% share (Kirsten *et al*., 2007). Twelve stud breeders supply the remaining 25% of the market. The breeding sector uses ±4015 sows and 692 boars. The main breeds currently being used in South Africa, as well as the estimated percentages of the herd composition is shown in Table 3.

Table 3: Pig breeds currently being used in South Africa

Breed	Percentage contribution to national herd
Large white	60%
SA Landrace	30%
Duroc	5.5%
Other (Pietrain, Chester White, Kolbroek)	4.5%

Source: Kirsten *et al*., 2007

South Africa's top 2 breeding companies have strong affiliations to internationally successful breeding companies like PIC and TOPIGS, ensuring the availability of top genetics to South African producers. Genetic quality can be regarded as a strength of the South African pork industry.

4.3 Primary Production

Pork production in South Africa is a relatively small industry, with a commercial sow herd of approximately 103 000 sows being managed by around 240 commercial producers. Louw *et al*. (2011) indicates that in order to be economically viable, a commercial pork producer must house at least 300 sows. While the size distribution and the accompanying economies of scale benefits of typical pork producers differ considerably, the majority of producers operate farrow to finish units, with breeding, weaning and finishing operations all being undertaken by the same producer. This is in contrast to producers in the EU, where piglet production and finishing are typically not undertaken by the same producer. Producers often specialize in a single aspect of production, disaggregating the supply chain to an extent. While this system allows for greater specialisation in production, the farrow to finish system employed in South Africa has the benefit that piglets enter the finishing barn at cost price, rather than market price, decreasing the cost of production for the finishing unit. In addition to maintaining the entire farrow to finish unit, around 70% of South African pork producers mix their own feed rations, ensuring optimum feed conversion at the various stages of growth on the farm.

Production takes place in specialised housing with advanced climate control features, allowing the producer to optimize growing conditions through the manipulation of temperature and light conditions. The cost of specialised housing is immense however, with the capital outlay for a new pork farm estimated between R25 000 and R40 000 per sow (Louw *et al*., 2011), while interviews suggested that this figure could be as high as R60 000 per sow in 2013, resulting in large barriers to entry for new producers wishing to enter the market. Construction of a 300 sow unit would therefore require a capital investment of R15 million at R50 000 per sow. At the same time, the high level of asset specificity associated with the investment in modern housing facilities creates a significant barrier to exist the industry. The specialised nature of production units means that the unit cannot readily be converted to another use, effectively meaning that once the investment has been made, the producer does not have an alternative to producing pigs, regardless of market conditions. The result is that in the short run, production is expected to be relatively inelastic to changes in prices. The large cost associated with modern housing facilities has resulted in many producers being unwilling or unable to invest in modern, state of the art facilities, resulting in great variation in technical efficiency indicators such as feed conversion ratio, mortality rates and the number of weaners produced per sow per year.

The capital investment required to produce efficiently is however not the only barrier to entry or expansion faced by South African pork producers. The length of time required to enter or exit the industry poses a barrier to entry in itself. In addition to already significant capital investments required, the time from breeding to sale of the first mature, finished pigs requires significant cash flow reserves in order to carry the costs of production before the first income is generated. In addition, law requires that environmental impact studies be conducted before new production units can be erected and apart from the cost involved, the time needed for the impact studies to be completed and approved by government acts as a significant barrier to entry as well as expansion.

Despite the fact that the industry is relatively small with only around 240 commercial producers, the number of primary producers far outstrips the number of abattoirs, resulting in the farmer being an absolute price taker. The cost of transport, as well as the effect of travelling large distances on the health and weight of mature pigs results in the fact that many producers have only a small number of abattoirs that they can realistically deliver to. The intensive nature of the production system further means that mature pigs have to be sold when they reach marketing age, as the entry of new weanlings into the finishing unit requires the exit of mature pigs. The cost of feeding the pig for an additional time period is immense and as such the farmer has no alternative but to deliver to his chosen abattoir at the time dictated by the production system. Less intensive production systems associated with other livestock enterprises allow the producer significantly more freedom in choosing the marketing time based on weight as well as favourable market conditions. The inability to postpone marketing based on favourable prices means that the farmer essentially has no alternative and must accept the price offered to him by the abattoir. Prices follow a typical cyclical pattern however and are typically higher in the second half of the year, as a result of greater demand in the summer months, with demand and resultant prices reaching a peak over Christmas time. After the Christmas holiday, demand typically reduces significantly and prices follow. Producers that are able to manage the production cycle in order to increase supply over periods of greater demand will improve their position.

Primary pork producers in South Africa have taken several measures to reduce the cost of production, such as mixing their own feed, yet several factors beyond the control of the primary producer have a significant impact on production costs. Undoubtedly the greatest cost to the primary producer is feed. The intensive nature of production and large associated quantities of feed consumed per pig renders feed cost to be almost 70% of the production costs at farm level. Unlike the broiler industry, where key input costs are subtracted from the price paid to the producer at the end of the cycle, the pork producer must manage his cash flow very efficiently, as inputs must be paid for when used, while income is only received at a much later stage. Top management of the herd allows for improved cash flow, with a set number of pigs marketed weekly. Grower pigs are fed for approximately 145 days in order to reach a live slaughter weight of approximately 100kg. The spike in feed grain prices in 2012 following the drought in the USA has therefore been particularly hard on pig producers. Though the cost of feed is no doubt the most important and sensitive issue regarding the primary producer, other variable costs that have a significant effect on profitability are fuel, electricity, wages and cleaning materials. Strict biosecurity practices in order to prevent the outbreak of disease are another costly component of pork production. Negligence on this matter can have disastrous consequences however, due to the intensive nature of production and the large number of pigs confined to a specific area.

Modern housing facilities require large quantities of water for waste management, while electricity usage is high due to advanced environmental control within the housing facilities. Significant increases in the administered cost of electricity in the past five years, combined with increased costs of raw feed materials and more recently increases in the minimum wage rate has placed significant pressure on the profit margins of primary producers. The prices received, as well as the share of important variable cost components of the primary producer is summarised in Table 4. Only variable costs are included in the table, with fixed costs being a significant component, especially if the producer has chosen to invest in modern housing facilities that are technically efficient, but very costly. As producers typically use their own fleet and are responsible for the transport of pigs to the abattoir, significant increases in fuel prices in recent times has also been costly

Louw *et al*. (2011) indicate that acceptable net profit margins for South African pork producers are between 10%-15%, with returns greater than 15% considered exceptional. Returns below 10% were however considered too risky. The capital investment required and associated risk levels are exceptionally high and a significant return is therefore required. With feed costs increasing by 60% from 2010 to 2012 and pork prices increasing by only 29% over the same period, few pork producers have been able to show positive margins. Apart from profitability of producers, other performance indicators used in the sector are dressing percentages, mortality rates (mortality rates of below 4 are targeted), piglets born per sow per year (27 is targeted), litters per sow per year (2.3 is targeted) and feed conversion ratios. Feed conversion ratios differ considerably across producers based on the quality and composition of feed, genetic quality of the pigs as well as sound management practices.

Table 4: Prices and cost structure of primary producers

Farm Level	Avg Carcass kg	51	80
		Porker	Baconer
Producer Price on hook	R/kg	R18.30	R17.58
	R/Carcass	R1 006.50	R1 406.40
Less:			
Levies (c/kg)	8.75c/kg	R0.0875	R0.0875
Farmer actual price received	R/kg	R18.21	R17.49
	R/Carcass	R1 001.55	R1 399.20
Cost Components	**Share in variable cost**		
Feed and Medicine	70%		
Labour	10%		
Fuel and Electricity	4%		
Admin	3%		
Veterinary Costs	3%		
Artificial Insemination Costs	2%		
Marketing and transport	2%		
Bedding and Cleaning Material	1%		
Other	5%		

Source: Confidentially surveyed

Access to internationally competitive genetic material, combined with modern housing facilities allows primary pig producers to compete well with international counterparts on a technical scale, yet the cost of key inputs like feed in South Africa are considerably more than those faced by South American producers. The pressure of ever increasing input costs combined with little increase in the pork producer price has meant that only large scale producers with significant economies of scale benefits have invested in modern facilities. The improved efficiency associated with these facilities has given the producers that use them an additional advantage over those that have not been willing or able to make the investment.

An important consideration when describing pig production in South Africa is the size of the informal market. The size of the informal market is difficult to estimate, due to the fact that much of it is subsistence based, while statistics on informal trade are not readily available. The outbreak of African swine fever in 2006 wiped out the majority of the informal herd in the Eastern Cape however and at is estimated that the informal production herd currently consists of around 40 000 sows (SAPPO, 2013). The effect of African swine fever on the informal herd in 2006 illustrates the importance of maintaining South Africa's favourable disease status. South Africa is one of only six countries around the world that is free of PRRS and strict SPS regulations are necessary in order to ensure that this status is maintained.

4.3.1 Factors affecting competitiveness at primary producer level

Factors that affect the competitiveness of primary producers can be separated into the macro environment, the meso environment and the micro environment. The macro environment refers to regulatory and administrative issues, global and domestic economic trends, as well as chance factors like the exchange rate and the political environment. The micro environment relates to issues that can be managed by primary producers within the business environment, whereas the meso environment refers to the supporting functions and services within the value chain.

The results of a survey, conducted to determine the factors that enhance or constrain the competitiveness of primary pork producers in South Africa are illustrated in Figures 27 – 29. Smaller values are associated with factors that constrain the competitiveness of primary producers, while large numbers are associated with factors that enhance the competitiveness of primary producers.

Within the macro environment (Figure 27), the most important factors identified by producers that constrain their competitiveness are the national infrastructure, consumer buying power and high input cost levels. Interest rate levels were identified by producers as an important factor within the macro environment that enhances their competitiveness. Within the meso environment (Figure 28), important factors that constrain the competitiveness of primary producers are the levels of government support, research and development, as well as training and skills development. Factors that enhance the competitiveness of primary producers within the meso environment are biosecurity management, quality assurance programs and technology levels. Pricing strategies, labour productivity and the cost and consistency of electricity supply were key factors identified as constraining competitiveness within the micro environment (Figure 29), while the quality of inputs was a significant factor enhancing competitiveness within the micro environment.

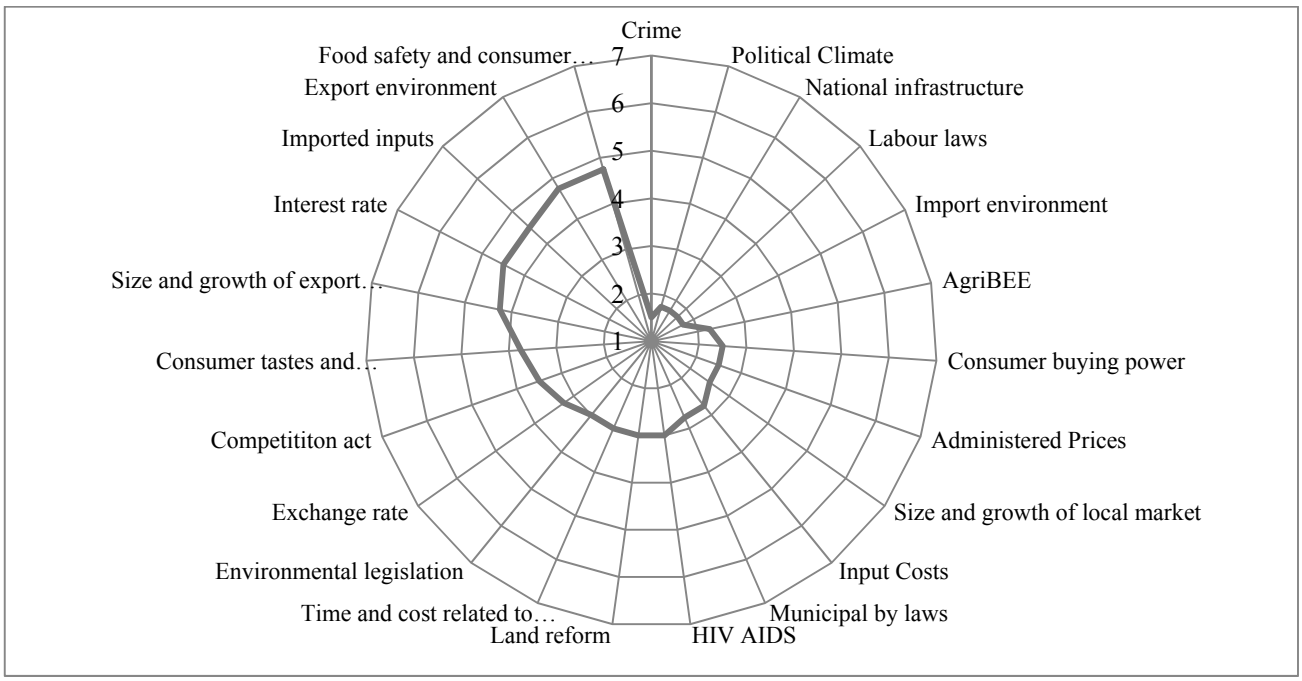

Figure 27: Macro environment impacting on primary producers
Source: Confidentially surveyed

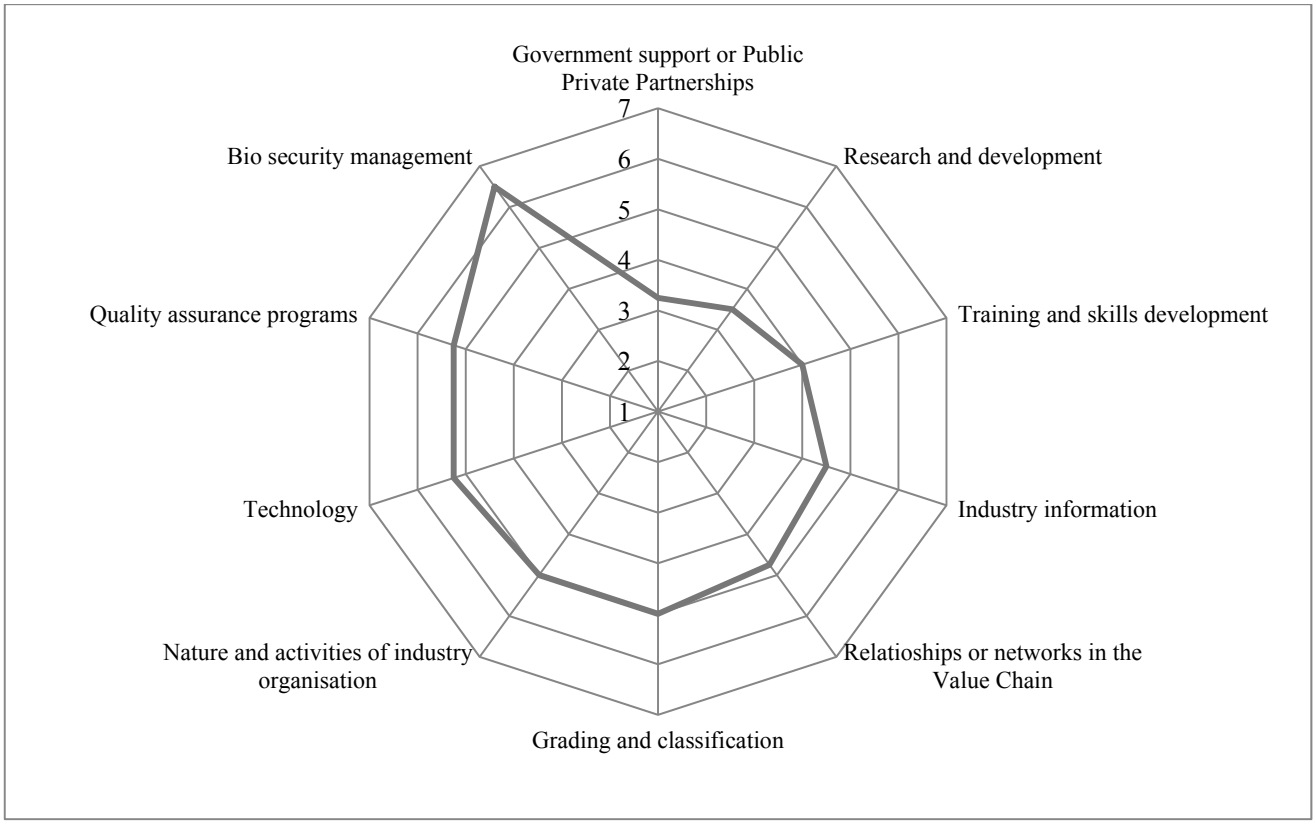

Figure 28: Meso environment impacting on primary producers
Source: Confidentially surveyed

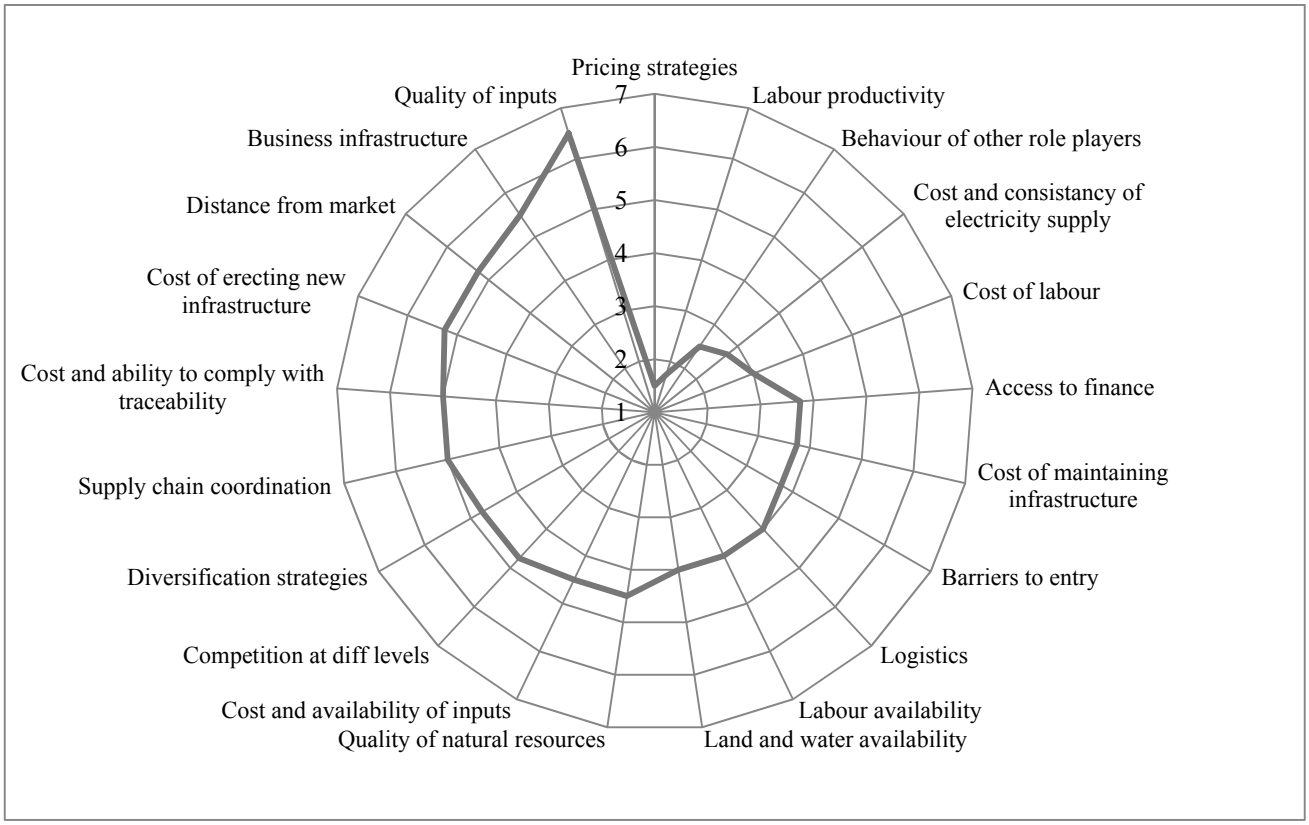

Figure 29: Micro environment impacting on primary producers
Source: Confidentially surveyed

4.4 Abattoir level

Abattoirs provide one of the most important links within the pork value chain, converting live animals into meat. In South Africa, abattoirs that are in the business of slaughtering pigs tend to be specialised for this purpose. While a total of 485 abattoirs exist in South Africa (RMAA, 2010), only 150 of these slaughter pigs, while less than 20 of these abattoirs slaughter 98% of the pigs in South Africa (Louw *et al.*, 2011). Kirsten *et al.* (2007) further indicates that the 10 largest abattoirs slaughter 80% of South Africa's pigs. The principle barrier to entry for new abattoirs is the significant capital investment required in order to operate an abattoir. Markets require a high standard of hygiene as well as traceability and abattoirs in South Africa are required to comply with the standards set out in the Meat Safety Act of 2000. Export markets are more stringent in their requirements however and currently only 5 of the pork abattoirs in South Africa comply with international standards and regulations in order to be accredited for exports (Louw *et al.*, 2011; Kirsten et al., 2007).

Abattoirs are graded as low throughput or high throughput, based on their lairage and chiller capacity as set out in the Meat Safety Act. The grading determines the number of units that an abattoir may slaughter in a day, with one unit amounting to 1 cattle, 6 sheep, 5 pigs, 4 ostriches or 2 horses. The provincial distribution of pork abattoirs, as well as the number of pigs slaughtered per province in 2012 is indicated in Figure 30.

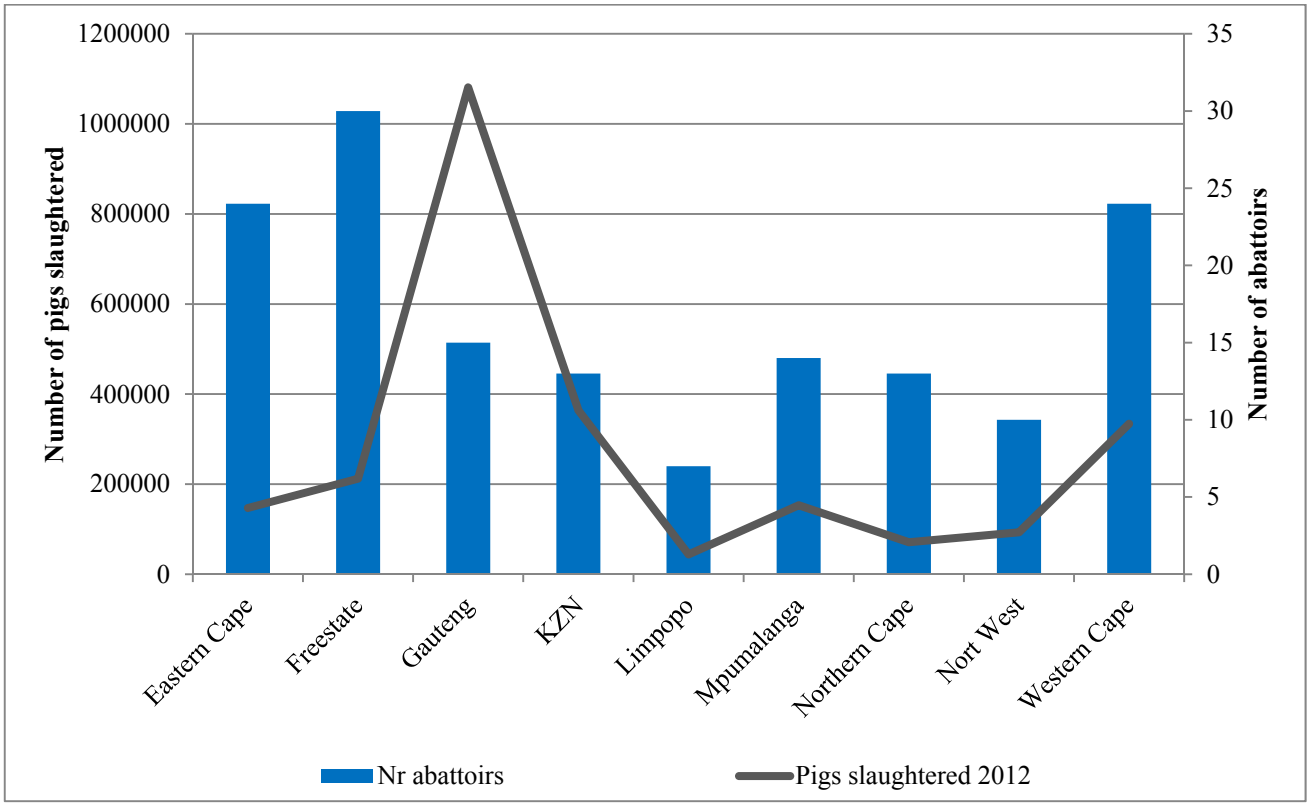

Figure 30: Provincial distribution of abattoirs and pig slaughters
Source: Compiled from Levy administrator statistics and Louw et al., 2011

After slaughter, pigs are classified by the abattoir based on quality characteristics as indicated by the PORCUS classification system presented by the South African Meat Industry Company (SAMIC). The PORCUS classification system is based on the relation meat to fat on the carcass, as measured between the second and third last rib, 45mm from the carcass midline. Apart from the PORCUS rating, the carcass is classified further by conformation. If damaged, the carcass will be assigned an additional damage rating. The PORCUS classification system is summarised in Tables 5 and 6 below. The price paid to the farmer is dependent on the grading as per the PORCUS system.

Table 5: PORCUS classification system

% Meat	mm**	Class
≥ 70	≤ 12	P
68 – 69	13 - 17	O
66 – 67	18 – 22	R
64 – 65	23 – 27	C
62 – 63	28 – 32	U
≤ 61	> 32	S
No specifications in respect of % meat apply in the case of Rough, Sucking pig (≤ 20kg) and sausage pig (≥ 100.1kg). ** In case of Intrascope		

Source: SAMIC, 2013

Table 6: Pork conformation and damage grading

Conformation	Class		Damage	Class
Very flat	1			
Flat	2		Slight	1
Medium	3		Moderate	2
Round	4		Severe	3
Very Round	5			

Source: SAMIC, 2013

Pork carcasses are allocated to different markets based on weight. Lighter pigs are classed as porkers (50kg – 65kg), while heavier pigs are classed as baconers (66kg-83kg). The South African pork market comprises approximately 70% baconers, sold mainly for the processed market (though some lighter baconers are sold to the fresh meat market) and 30% porkers produced solely for the fresh meat market. The average slaughter mass in South Africa is 78kg (Kirsten *et al.*, 2007). This average slaughter mass is below that of key pork production countries like the USA, where the average slaughter mass is 87kg. The demand for heavier pigs is increasing however, with the average slaughter weight increasing significantly in the last 10 years. The changes in slaughter weights are indicated in Figure 31, with production increasing sharply since 2001, despite a declining trend in pig numbers over the same period. Of the total number of pigs slaughtered in South Africa, 55% are processed, while 45% are sold fresh. The processing sector therefore has a significant influence on the industry as a whole.

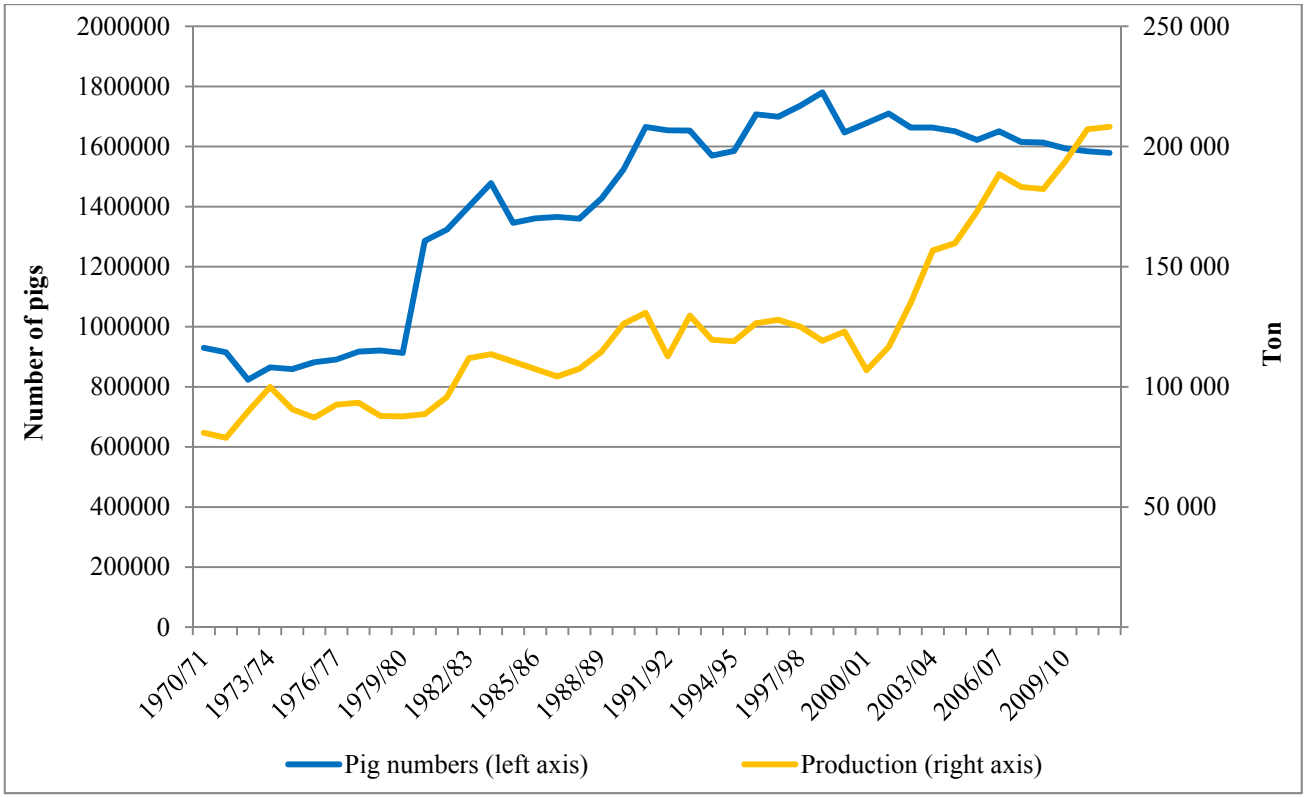

Figure 31: Pig numbers vs pork production
Source: DAFF, 2013

4.4.1 Price formation at abattoir level

Different business models exist for abattoirs around South Africa. At the one end of the spectrum, pure service abattoirs provide a slaughter service to producers or agents, for which the abattoir is paid a fee, without ownership of the pig changing, while at the other end of the spectrum, abattoirs buy the pigs from the producer, before undertaking the entire slaughter and processing of the meat before selling directly to retail level or even to consumers. Naturally, there are various other models in the middle of the spectrum. Several abattoirs sell whole carcasses at wholesale level, undertaking only the slaughtering process, while others cut the carcass into primal parts, selling specific primal cuts of separately at wholesale level. Regardless of the chosen business model however, a key factor for the abattoir is the assurance of throughput. Margins per pig are small, while fixed costs are significant, resulting in the throughput rate being one of the crucial factors to an abattoirs success. As a result, various levels of vertical integration has taken place, with some abattoirs being owned by a business that also produces pigs, while some abattoirs are owned by processing companies. Alternatively, some abattoirs are supplied solely or in part by producers that are also shareholders in the abattoir. By providing the producer with an interest in the success of the abattoir, this model ensures that producers provide the abattoir with a constant supply of pigs of the desired quality characteristics.

Abattoirs that are not vertically integrated downward to production level take measures in order to secure a high throughput rate. These measures range from contracting farmers to supply a set number of pigs on a weekly basis, at a price generated by a formula that is based on production cost, to quota

agreements, where producers are contracted to deliver a set number of pigs per week at a market related price, to gentleman's agreements as to the number of pigs that specific producers will supply, also at a market related price. Most producers deliver to the same abattoirs on a continuous basis however.

A key concern to producers is the lack of transparency and information regarding price determination at abattoir level. With high concentration levels present at abattoir level, the number of sellers far outnumbers the number of potential buyers, particularly since most producers are further limited in their choice of abattoir by logistical issues, such as distance from the abattoir. With only a limited number of buyers and little information available to sellers regarding prices, the market related price paid by abattoirs is not always well understood by the producer. The market related price differs fundamentally from the contract price, further reducing producers trust in the price formation process. Added the fact that the nature of the farmers production system does not allow him the leverage to keep his pigs back and sell them at a later stage when the price is more favourable, it is clear that the primary producer is an absolute price taker in the process and has little bargaining power compared to the abattoir. This pricing system has led to friction and a dis-trust between producers and abattoirs, two key members of the value chain. Improved information on producer prices could improve this level of trust.

4.4.2 Performance of abattoirs in South Africa

The performance of abattoirs in South Africa is influenced by various factors. The industry is capital intensive and with small margins attainable per kilogram of meat, the success of the abattoir depends greatly on the abattoir's rate of throughput. Small margins per unit result in a large number of units necessary in order to justify the significant capital investment required, leading to economies of size benefits and the resultant high levels of concentration within the industry.

Kirsten *et al.* (2007) indicates that abattoirs are one of the key areas in the supply chain where South African performance is below that of European counterparts. Pre slaughter handling was often found to be below par, with the use of electrical stunning methods considered unacceptable (Kirsten *et al*., 2007). Some state of the art abattoirs do exist however, that comply with international regulations. These abattoirs utilize less stressful stunning methods. The consolidation of abattoir size is likely to improve performance, with large, export accredited abattoirs leading to more efficient practices. At the same time, a further reduction in numbers will increase the uneven concentration levels and possibly increase producer suspicion of uncompetitive conduct.

Prices at producer level, as paid by the abattoir are easily measured, as all prices relate to cold weights of a carcass that has been graded by a uniform system. As the meat exits the abattoir in many different forms, the price obtained by the abattoir is much harder to compare, as is the margin obtained. The margin obtained on the sale of primal cuts is however significantly larger than the margin obtained when selling an entire carcass, despite the additional costs involved. The costs obtained by the abattoir can therefore be split into slaughter costs, as well as additional costs for conversion to primal cuts. The most significant cost component to the abattoir is labour, contributing to 48% of total slaughter costs, followed by electricity and fixed overheads, at 35% of total slaughter

costs. Other costs incurred by the abattoir include hygiene management, protective clothing, knives, cutting blades and repairs. Furthermore, the abattoir is responsible for the cost of transport to the wholesaler or processor, within specified distances from the abattoir.

Apart from the costs involved in slaughter as well as conversion to primal parts, abattoirs receive an additional income from the fifth quarter. The four primal cuts comprise approximately 83% of the total carcass weight, resulting in significant income from the remaining parts of the carcass after primal cuts have been sold.

The prices paid and received, as well as the allocation of different cost factors and margins are illustrated in Figure 32. Prices are considered for March 2013.

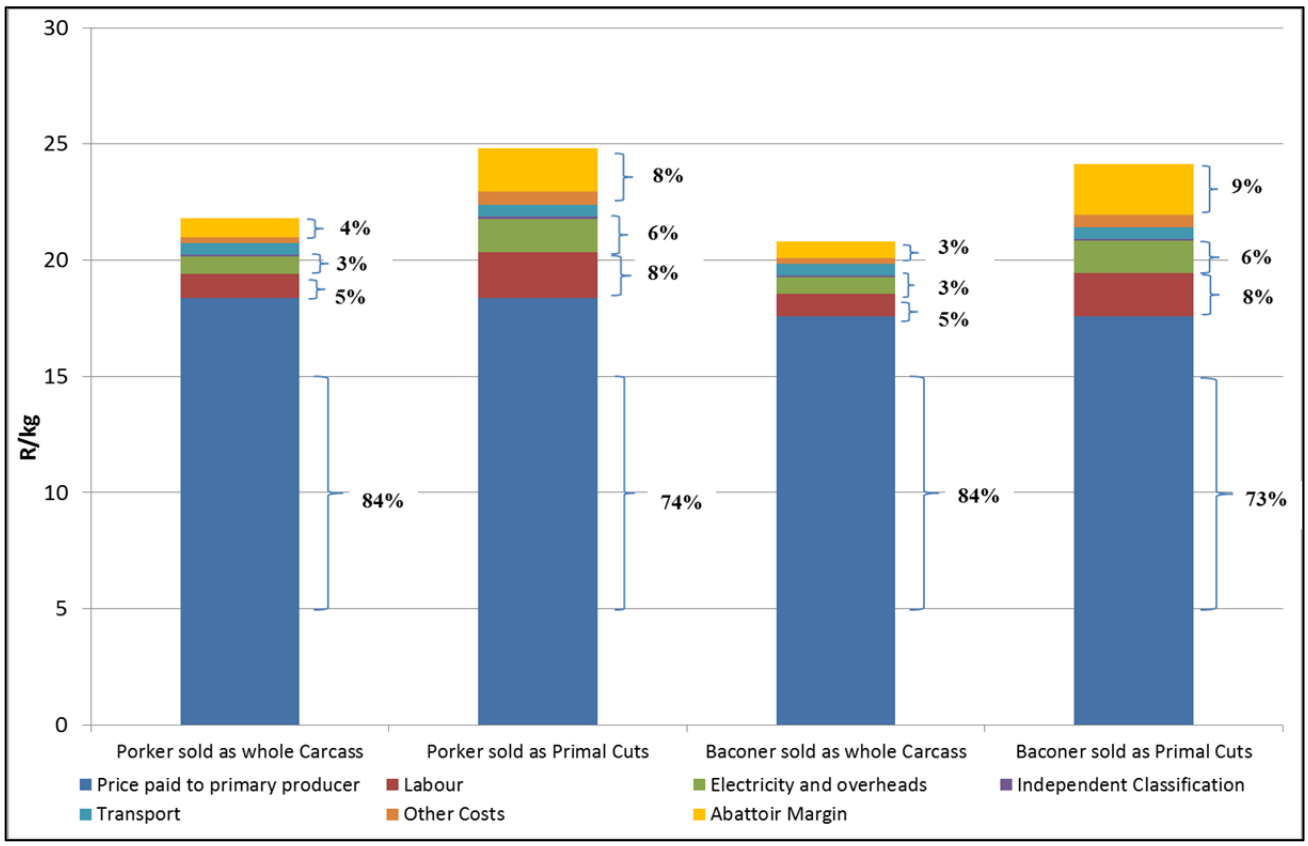

Figure 32: Margins and cost allocations at abattoir level
Source: Compiled from confidential interviews

Figure 32 clearly illustrates that the margin received at abattoir level is greater on a Baconer than on a Porker, while also illustrating that the margin increases significantly if additional value is added by converting the carcass to primal cuts before sale. Interviews with key abattoir indicated that abattoirs prefer to slaughter more Baconer pigs than Porker pigs, due to the fact that mechanization is simplified if the pigs are of uniform size and weight. The mechanization process has led to the fact that some abattoirs slaughter only Baconer pigs.

4.4.3 Factors affecting the competitiveness of abattoirs

As in section 4.3, the factors that affect the competitiveness of abattoirs are expressed within the macro, meso and micro environment. The macro environment refers to regulatory and administrative issues, global and domestic economic trends, as well as chance factors like the exchange rate and the political environment. The micro environment relates to issues that can be managed by abattoirs within the business environment, whereas the meso environment refers to the supporting functions and services within the value chain.

The most significant factors constraining competitiveness at macro level (Figure 33) are the import environment and the level input costs as well as administered prices like electricity and fuel. The level of the exchange rate, through its effect on the price of imports has an enhancing effect on the competitiveness of abattoirs.

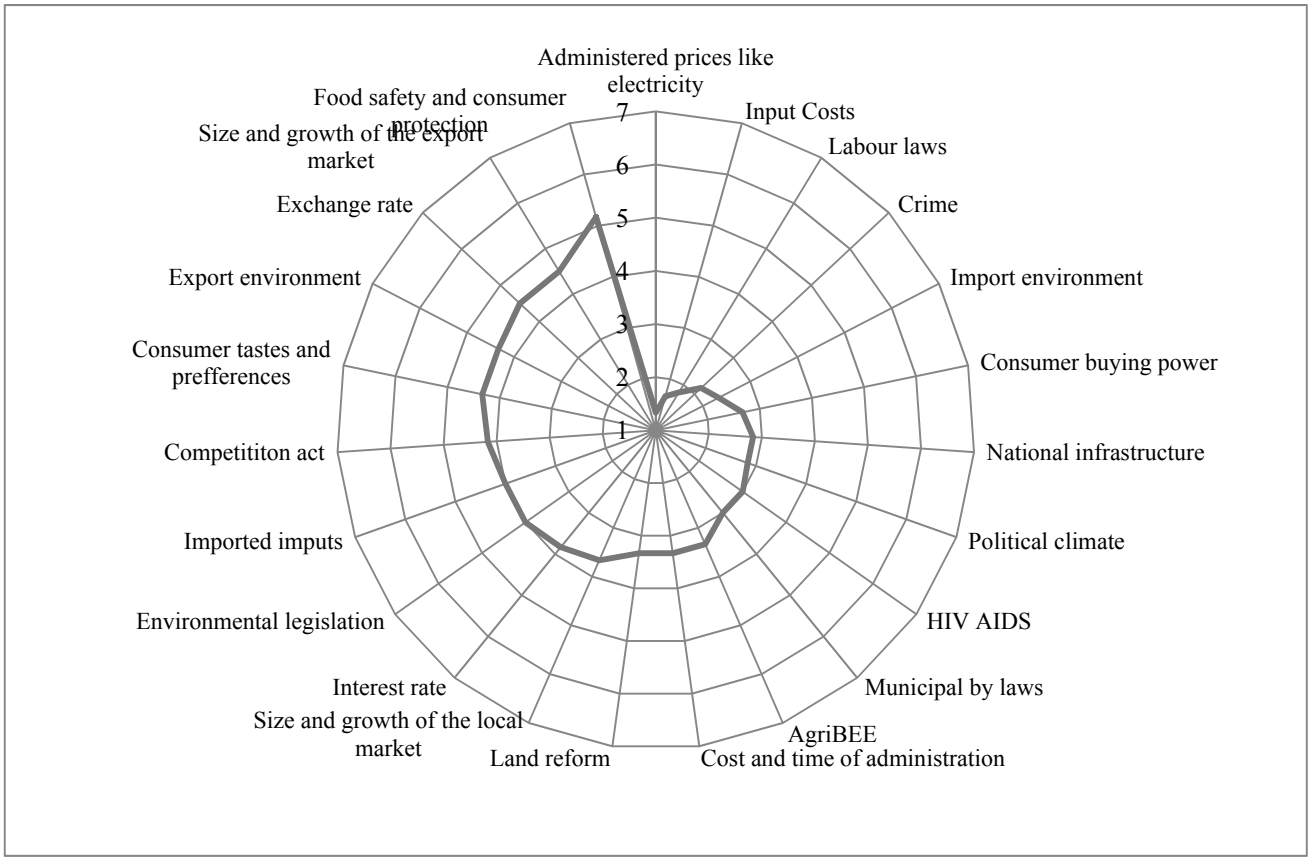

Figure 33: Macro environment impacting on abattoirs
Source: Confidentially surveyed

Within the micro environment, the quality of inputs is crucial to ensuring competitiveness. Diversification strategies, as well as the level of coordination within the supply chain are further regarded as factors that significantly enhance the competitiveness of abattoirs. The high costs of erecting infrastructure provide a barrier to new entrants, thereby enhancing the competitiveness of existing abattoirs.

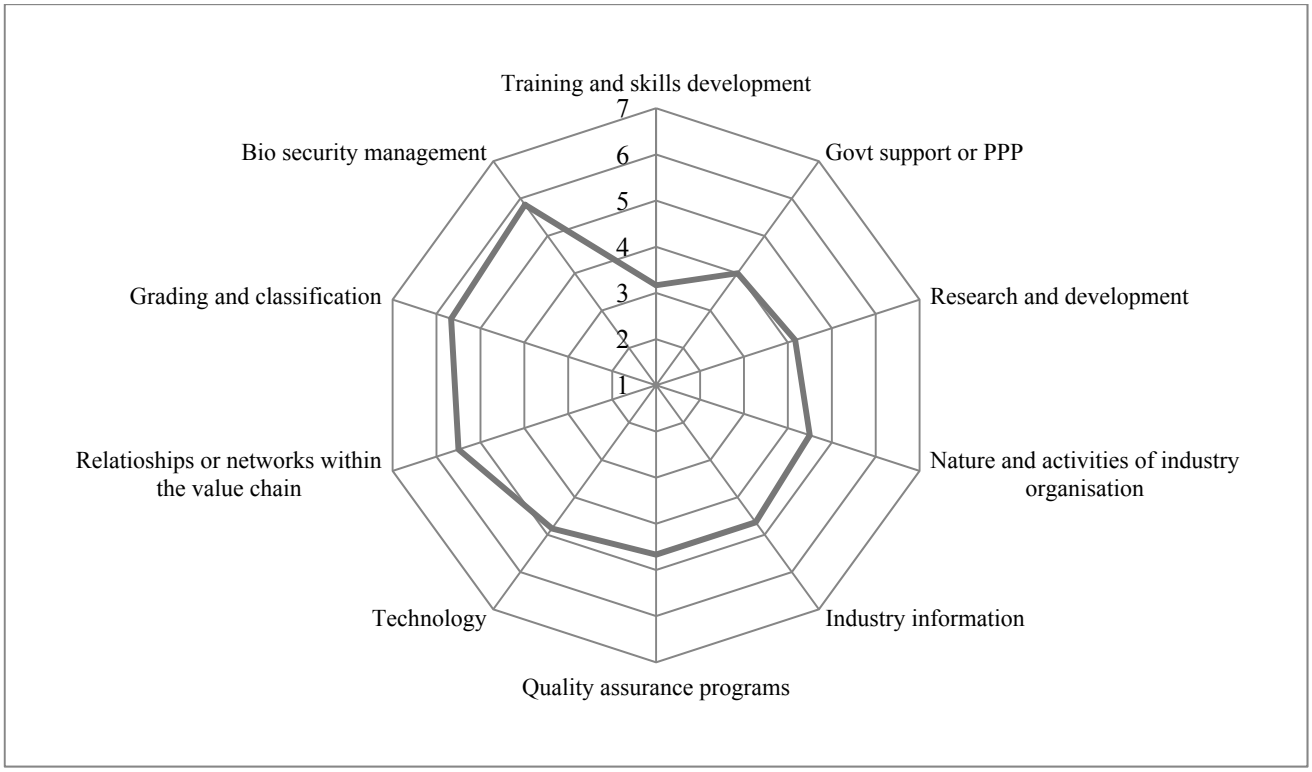

Figure 34: Meso environment impacting on abattoirs
Source: Confidentially surveyed

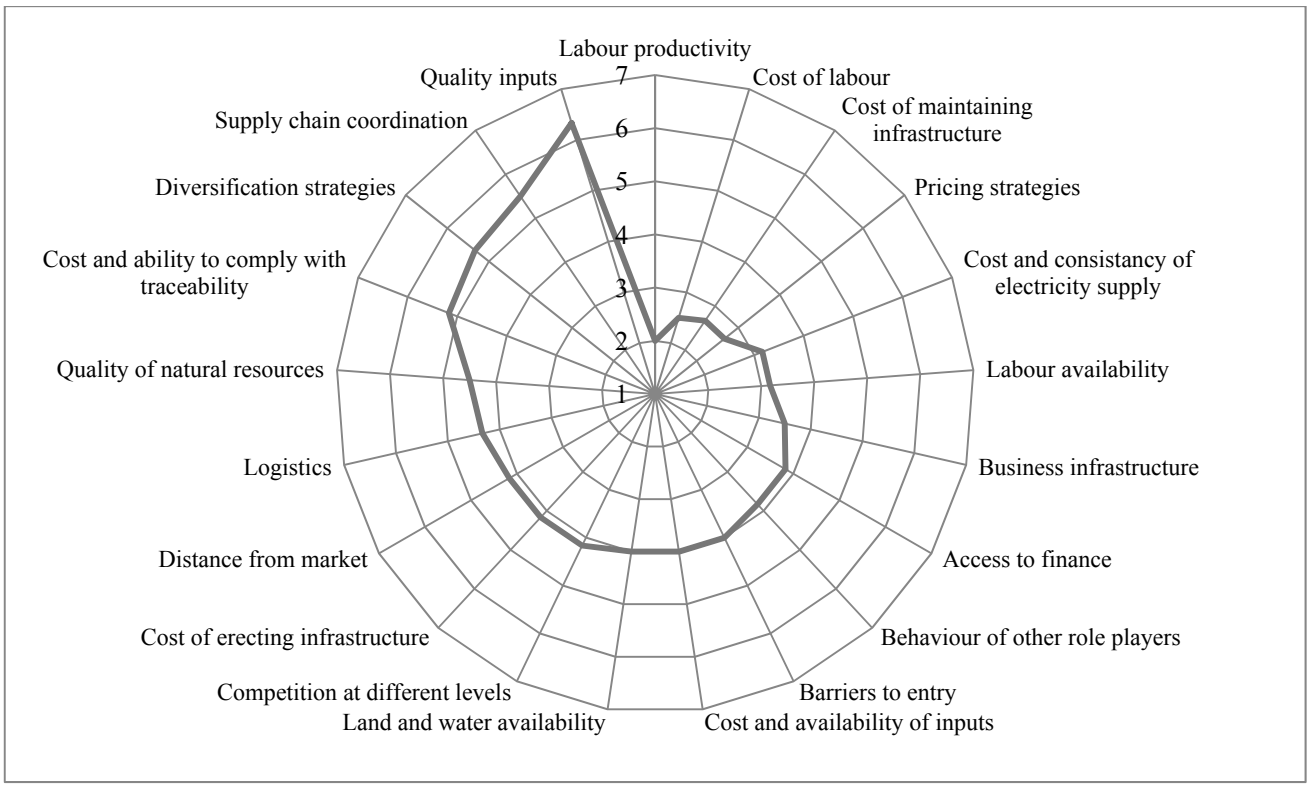

Figure 35: Micro environment impacting on abattoirs
Source: Confidentially surveyed

4.5 Processing

As mentioned, the South African pork industry has two distinct branches, with around 45% of pigs produced being sold for the fresh meat market and approximately 55% being sold for the processed market. When considering the further processing stage of the value chain then, a clear distinction must be made between the processor, who undertakes a substantial amount of value adding before selling the product on to the retail stage and the wholesaler, who is mainly a distributor. In some instances in the fresh meat chain, the wholesaler undertakes cutting and packing operations, but these are limited in number and more often than not, cutting and packing will also take place at abattoir level. This section focusses only on the 55% of meat sold through the processing chain.

The processing industry in South Africa is highly concentrated, with the two largest role players being Enterprise Foods, a division of Tiger Brands Ltd, situated in Olifantsfontein and Eskort, situated in Heidelburg with an additional facility in Escourt in KwaZulu Natal. Louw *et al*. (2011) indicates that between them, Eskort and Enterprise process 80% of all pork processed in South Africa. Other processors are Bluff meats, Rica meats, Frey's meat, New Style Pork and Farmpure meats. Several smaller processors make up the balance. Significant concentration at processing level is a result of the immense capital investment required in order to enter the meat processing sector. The capital intensive nature of production, as well as the cost of processing equipment acts as significant barriers to entry for new processors. In addition, the equipment used for processing is mainly imported and hence the depreciation of the Rand in recent times increases the cost of equipment further.

Extensive overhead costs related to the processing facility further mean that high throughput is required in order to capitalize on economies of scale benefits. The size of the operation required in order to compete economically further limits the possibilities for entry into the sector. In other industries with similar characteristics regarding the optimal scale of production and capital intensive nature, significant vertical integration has occurred in order to ensure numbers through the processing facility. In the pork processing industry however, vertical integration has not been adopted as widely. While most processors are backward integrated to an abattoir, few processors have integrated further back to primary production. While some smaller processors have integrated the entire chain, the 2 largest processors have chosen different routes of securing throughput. Enterprise makes use of contracts in order to secure production, with a small group of farmers supplying the bulk of pigs to the abattoir. Within the contracts, producer prices are linked to a formula that includes the cost of production. Producers within this system are assured of a market for output, at a price determined in order to secure a margin. The result is that these contracted producers have been able to invest in modern technology and expand to a size that allows them to maximise efficiency. This coordination within the chain has additional benefits to the processor, who is able to secure supply of the most important input in his production process, while allowing for specialisation in the primary production process. The ownership and shareholder structure of Eskort negates the need for backward integration to primary producer level in that the shareholder of the company are primary producers themselves and are able to supply the abattoir with the pigs needed for optimal operation. Though Eskort is run as a separate enterprise from any of the primary producers, the supplier shareholder model is beneficial in that it gives the producer an interest in the

success of the processing company, which leads to the constant supply of good quality inputs from the primary producers to the abattoir. Both Eskort and Enterprise use a small number of suppliers that are assured of a market and therefore are able to produce at a large efficient scale. The small number of producers used is beneficial to the processing company by allowing greater control of quality in the most crucial input to his production process.

Some processors import a share of inputs, mainly as a form of balancing the market. Deficits from primary production are supplemented by imports in times when stocks are lower, while imports are also able to balance the market. Apart from the fact that South African consumer demand is higher for specific cuts like ribs, the demand for different pork cuts differ at various times of the year. As supply through the abattoir is of the entire carcass, importing a percentage of inputs allows the processor to supplement only the cuts that are in high demand at the time of purchase. The reliance on imports however means that exchange rate depreciation and volatility is a critical factor to the competitiveness of the processor, through the both the cost of equipment as well as the cost of pork as input. Imports further affect price formation in that the domestic price will not trade significantly above import parity in the long run. The result is that volatility in the exchange rate will affect the domestic price and therefore also the price of inputs to the processor.

4.5.1 Processor Costs and Margins

The most substantial cost of production to the pork processor is the cost of acquiring pork to be processed. Apart from the costs related to the acquisition of pigs however, processors are faced with additional costs necessary for the conversion of fresh pork meat into processed products. Of the conversion costs, the greatest component is labour, followed by service costs, which include rates, electricity and water. Further operating costs include packaging, cleaning, protective clothing and repairs.

Important to consider when calculating margins is that the equivalent selling price of the entire pig must be considered. When considering only the prime cuts that are processed to bacon and ham at processor level, the margin will be significantly overestimated if compared to the price received by the abattoir for the entire carcass. On the processor side, much of the carcass is not useful in the production of final products demanded by the consumer and is sold of very cheaply. In order to account for this, processors make use of a block test model, which aids in pricing of the cuts used in final production, by accounting for the fact that the rest of the carcass is sold for a price far below cost. By using the block test model, the processor insures that by the time the entire carcass is sold, the weighted average price received for the carcass is able to cover the costs incurred in processing, as well as a required margin. The percentage of carcass composition, as well as the price received as percentage of carcass cost of the parts not used for processing are summarised in Table 7. Though block test models are different across processors, the basic carcass composition is the same and the differences are marginal. The values indicated in this report are average values from different block test models.

Table 7: Low cost carcass composition

Cut	Percentage of carcass composition	Price received as percentage of cost of carcass
Head – no cheeks	5.5%	20%
Tails and trotters	3.5%	35%
Bones	11%	15%
Weighted average	**20%**	**19.88%**

Source: Confidentially surveyed

After removing the cuts summarised in Table 7, the remainder of the carcass can be used for processing purposes, yet of the remainder of the carcass must still be allocated to specific processed products. The pricing of the rest of the carcass is also dependant on the final use and is further allocated using the same block test model. The percentage of the carcass used for ribs and bacon, as well as the price as percentage of the carcass cost is summarised in Table 8. The price indicated is simply derived from the block test before any margins or conversion costs are added.

Table 8: High cost carcass composition

Product	Percentage of carcass composition	Price received as percentage of cost of carcass
Bacon	36%	185%
Ribs	3.5%	210%
Weighted average	**39.5%**	**187%**

Source: Confidentially surveyed

The remainder of the carcass consists of hocks, rinds, fats and various trimmings, parts generally used for processed ham and emulsified products like sausages. Parts of the carcass are also used in polonies, but the use of pork in polonies is supplemented with other protein sources that decrease the cost of the final product significantly.

When considering margins at processor level, a representative price for the entire carcass must be considered, based on the block tests described above. The prices, cost components and margins are summarised in Figure 36. As with the abattoir chain, gross margin in the context of this study is defined as the difference between the price received for the pork and the price paid for the pork, before considering any production costs. The net margin is defined as the gross margin less costs incurred in the production process. As processors procure whole carcasses and not prima cuts, the margins are only calculated for a Class BP Baconer whole carcass.

The retailer buys the final processed products for resale to the end consumer, but ownership of the product only changes when sold by the retailer. The result is that products that are damaged or expire in the retail store are sent back to the processor, who is obliged to refund the retailer for the returned products. Industry interviews indicated that returns from retail level could be up to 8% for processed pork products, indicating that a significant cost component for the processor can be attributed to returned products.

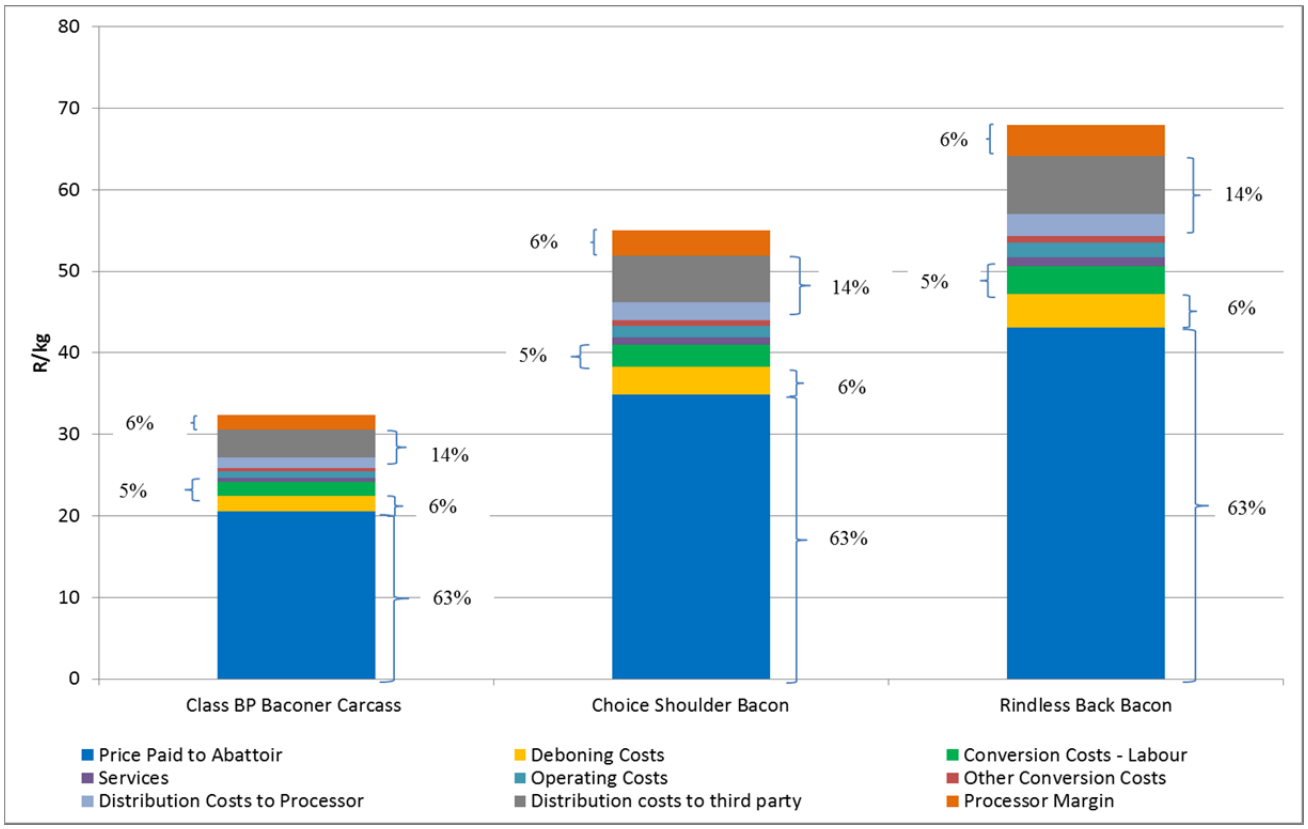

Figure 36: Margins and cost allocations at processor level
Source: Compiled from confidential interviews

4.5.2 Factors affecting processor competitiveness

As in previous section, factors affecting the competitiveness of processors are considered within the macro, meso and micro environment. The macro environment refers to regulatory and administrative issues, global and domestic economic trends, as well as chance factors like the exchange rate and the political environment. The micro environment relates to issues that can be managed by processors within the business environment, whereas the meso environment refers to the supporting functions and services within the value chain.

Within the macro environment (Figure 37), the level of administered prices like electricity and fuel is critical for the competitiveness of processors. Operating costs comprise almost 25% of the processors conversion costs, illustrating the importance of changes in administered prices. Food safety and consumer protection was the most significant factor within the macro environment enhancing processor competitiveness.

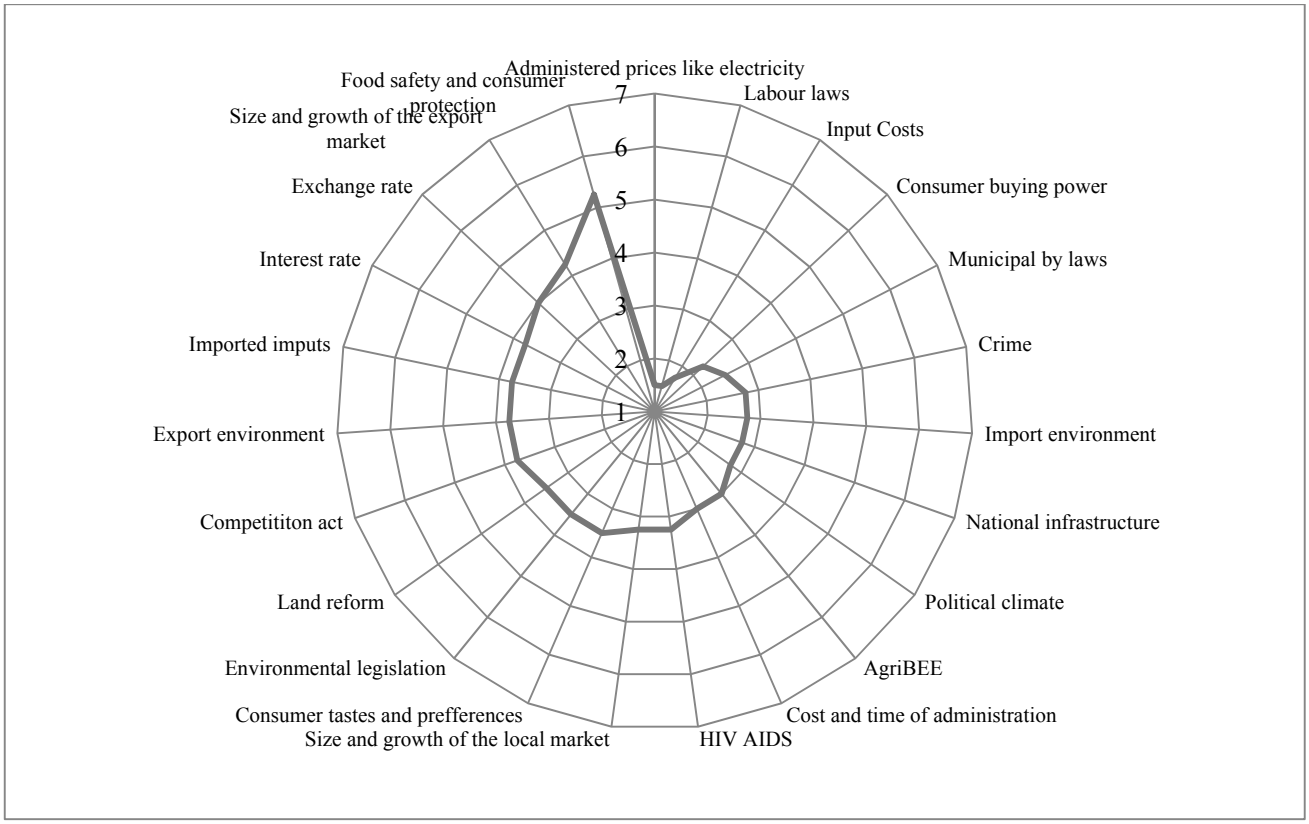

Figure 37: Macro environment impacting on Processors
Source: Confidentially surveyed

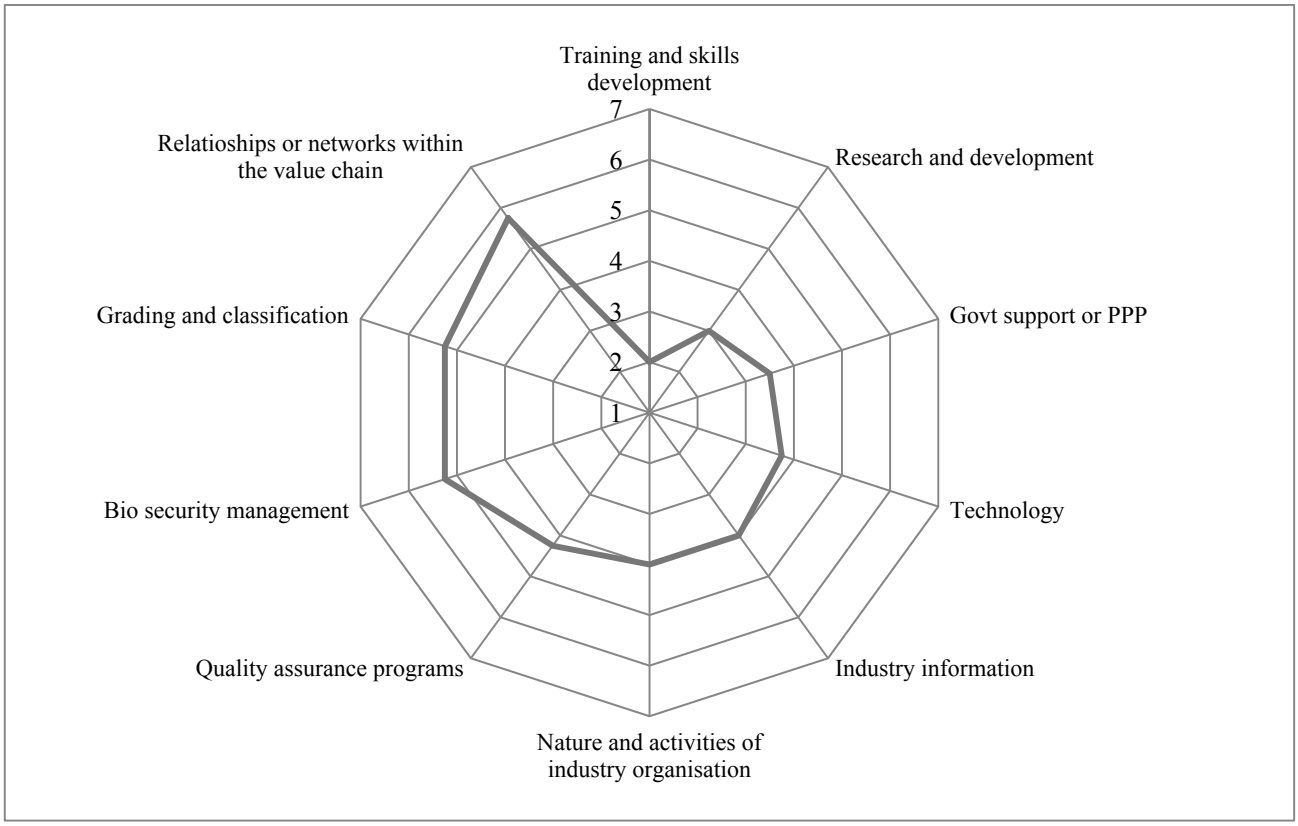

Figure 38: Meso environment impacting on Processors
Source: Confidentially surveyed

Within the meso environment (Figure 38), relationships and coordination of the value chain enhance processor competitiveness, ensuring high levels of throughput for processing plants that require significant capital investment to erect. Grading and classification further enhance the competitiveness of processors, ensuring the quality of inputs. The cost and productivity of labour are key factors within the micro environment (Figure 39) that constrain the competitiveness of processors. Further the cost and consistency of electricity supply is critical for processor competitiveness. The quality of inputs, as well as diversification strategies is the most important factors enhancing competitiveness within the micro environment.

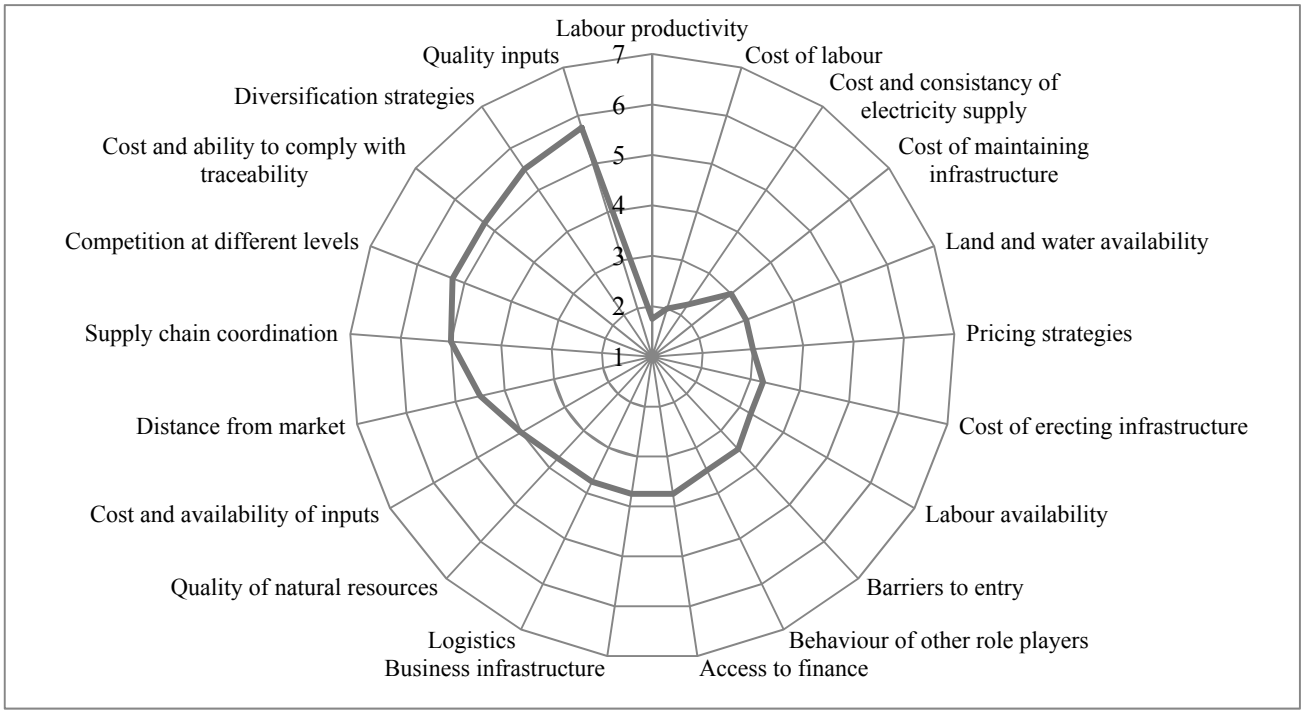

Figure 39: Micro environment impacting on Processors
Source: Confidentially surveyed

4.6 Distribution and Wholesale

Processor distribution to retail level is typically not undertaken by the processors themselves, but rather contracted to a third party distributor. Processors in South Africa use the services of companies like Clover and Vector logistics as distribution agents. The pork industry is small and when considering the limited numbers traded, compared to the large number of stores that must be serviced, the costs associated with distribution are too high to warrant the processor undertaking the distribution process. Third party distributors move more than just pork and when chicken, dairy and other chilled or frozen products are transported together, the distribution costs per unit decreases significantly. Primary transport to the distribution centre however remains the responsibility of the processor.

The distributor of processed pork products is paid a negotiated percentage for his services and does not take ownership of the product. As a result, when considering the value chain and margins across the processing chain, the expense related to distribution is allocated to the processor's costs.

Distribution costs for the processor are substantial however and are often greater than the conversion costs when considered as a share of the final product price.

In the fresh pork chain however, products are often sold from the abattoir to a wholesaler, who handles distribution, before being sold to the retail store. In the case of the fresh pork market, the product enters retail level in many different forms. A significant proportion of retailers operate an in store butchery, buying in whole carcasses from the wholesaler, before further cutting and packing operations are undertaken by the in-store butchery. In a country where both consumer preferences and buying power can differ substantially across different geographical areas, this system does not allow for strategic allocation of parts of the carcass to geographical areas where the demand for specific cuts may be higher.

Some retailers have started to follow a system of centralised cutting, packaging and distribution facilities. The function is generally not fulfilled by the retail chains themselves, but rather undertaken by independent companies. In other models, certain abattoirs have integrated cutting and packing operations into their business model, adding more value at abattoir level and thereby achieving a higher price. Cutting and packing operations at abattoir level range from distribution of meat as primal cuts, to further value adding and distribution of a product that is ready to enter the retail store and in some instances is sold directly to the end consumer. While the costs of distribution by a third party have been allocated to the processor within the processed pork chain, the wholesaler within the fresh pork chain takes ownership of the product and therefore has his own margins to manage. The greatest cost for the wholesaler is associated with distribution and will therefore be heavily impacted by the price of fuel. The gross margin at wholesale level is illustrated in Figure 40.

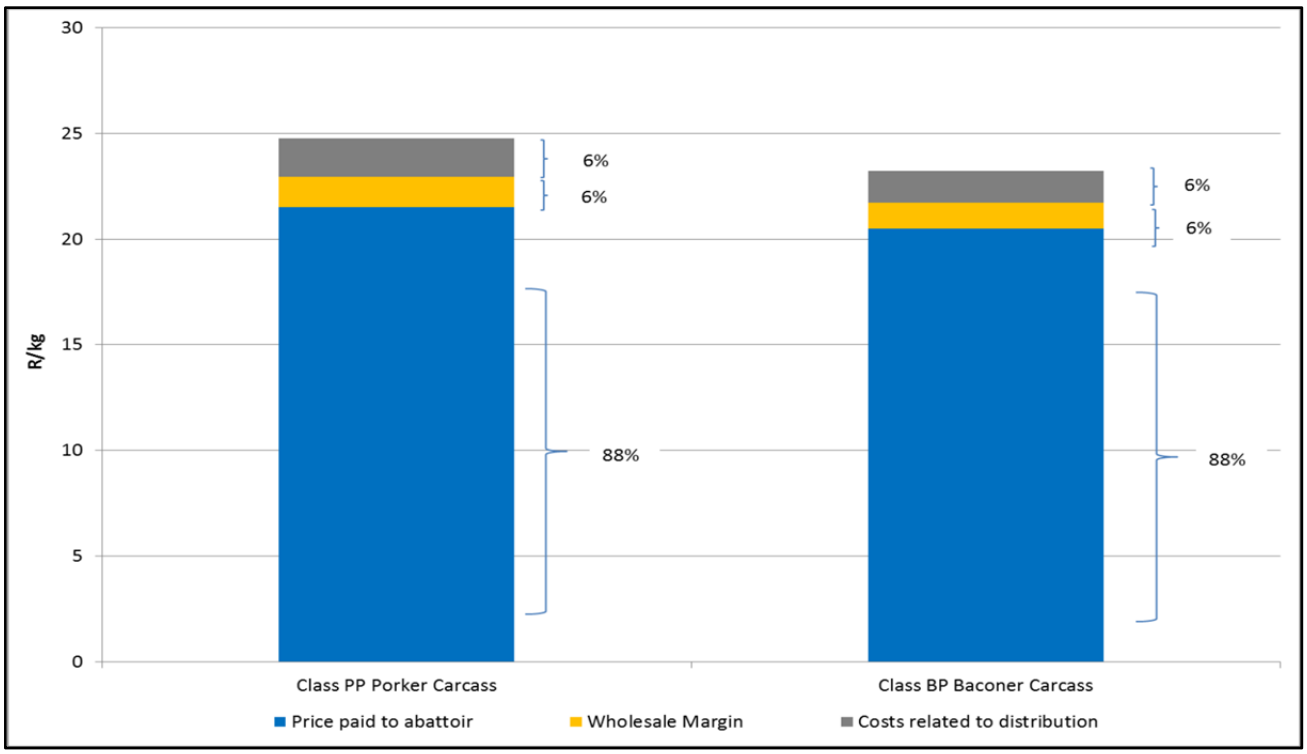

Figure 40: Margins at wholesale level
Source: Author compilation

4.6.1 Factors affecting competitiveness at wholesale and distribution level

As in previous sections, the factors that affect competitiveness at wholesale and distribution level were surveyed within the macro, meso and micro environment. The macro environment refers to regulatory and administrative issues, global and domestic economic trends, as well as chance factors like the exchange rate and the political environment. The micro environment relates to issues that can be managed by wholesalers within the business environment, whereas the meso environment refers to the supporting functions and services within the value chain.

Within the macro environment (Figure 41), the level of administered prices, particularly fuel is critical for competitiveness. At wholesale level, distribution is a key cost component and fuel price increases constrain competitiveness. Further the import environment constrains competitiveness, with imports providing competition at wholesale level and preventing the domestic price from increasing above import parity levels for extended periods. Through increasing the price of imported products that compete with domestic products, a weaker exchange rate enhances the competitiveness of wholesalers.

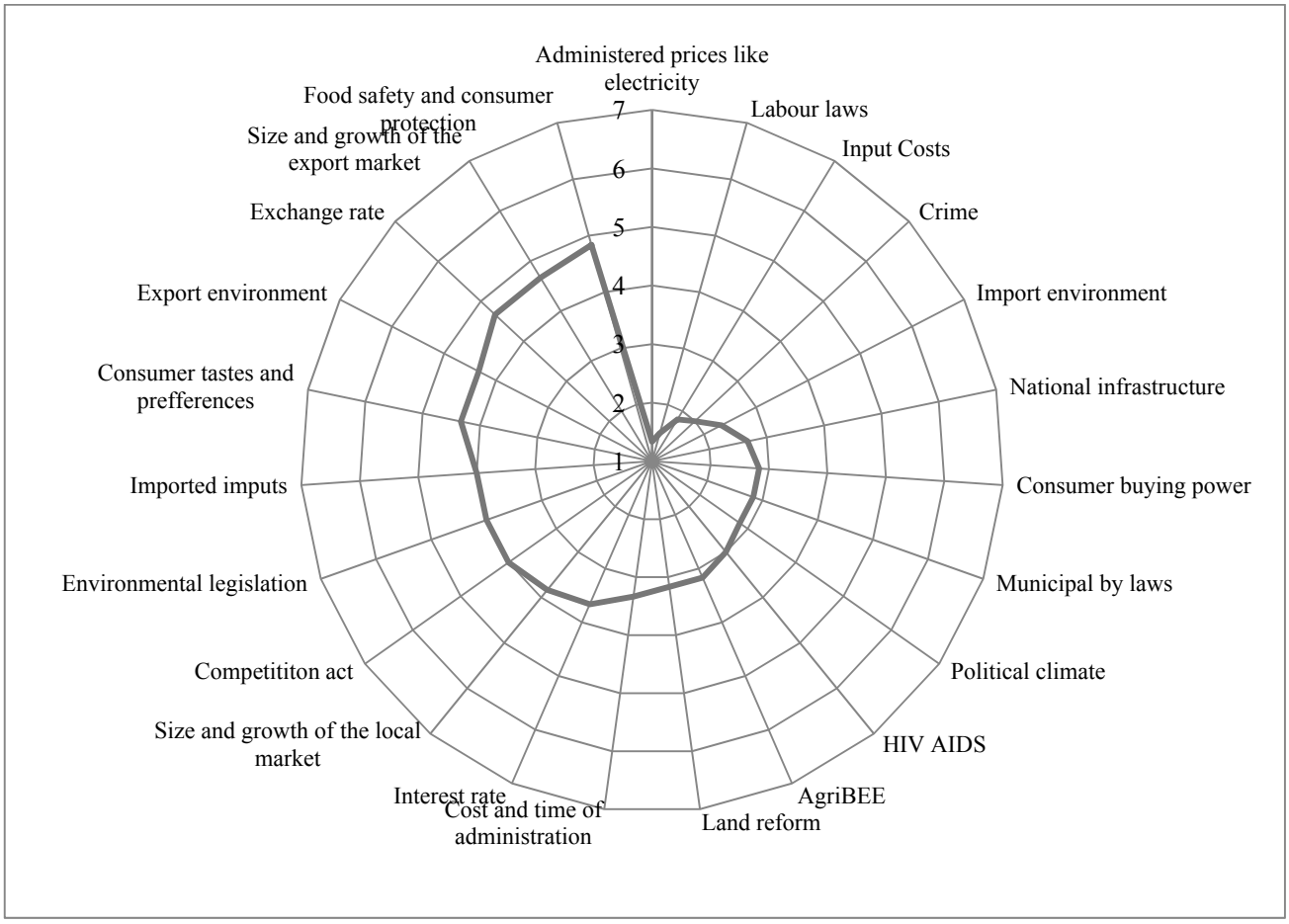

Figure 41: Macro environment impacting on Wholesalers
Source: Confidentially surveyed

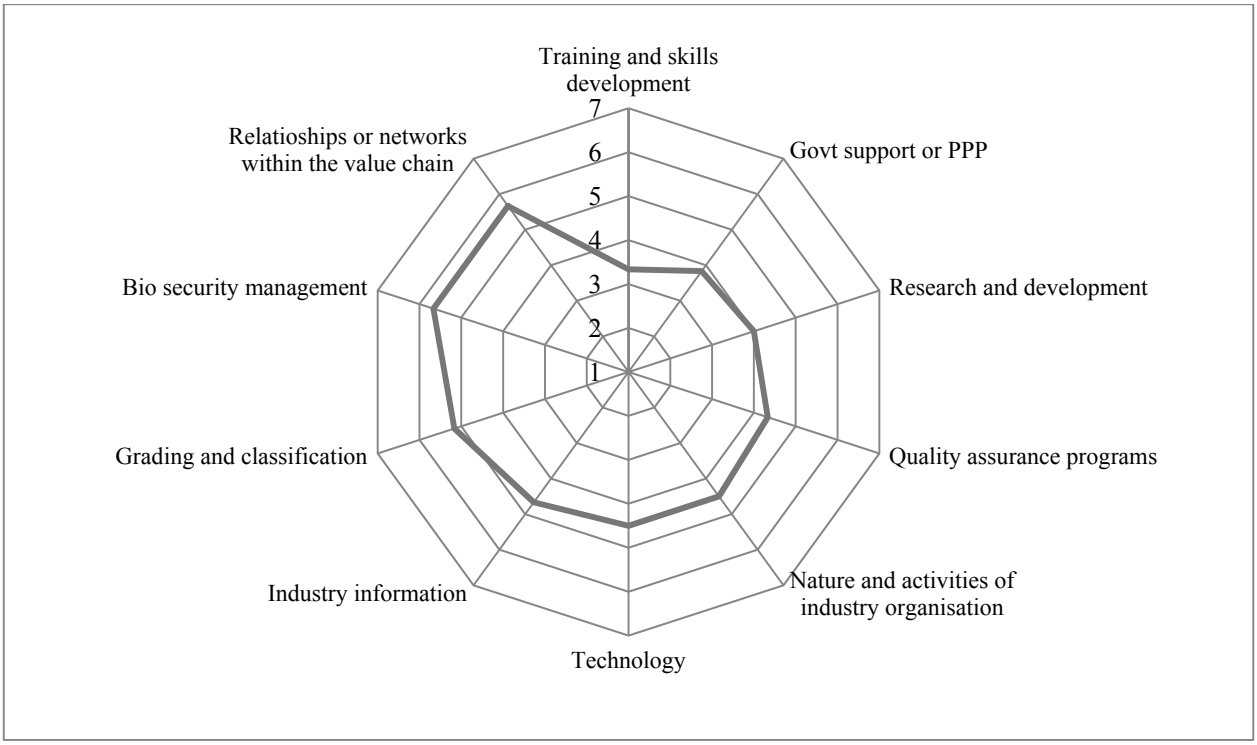

Figure 42: Meso environment impacting on Wholesalers
Source: Confidentially surveyed

Within the micro environment (Figure 43), the cost and productivity of labour are the most significant factors that constrain competitiveness, while the quality of inputs enhances the competitiveness of wholesalers significantly.

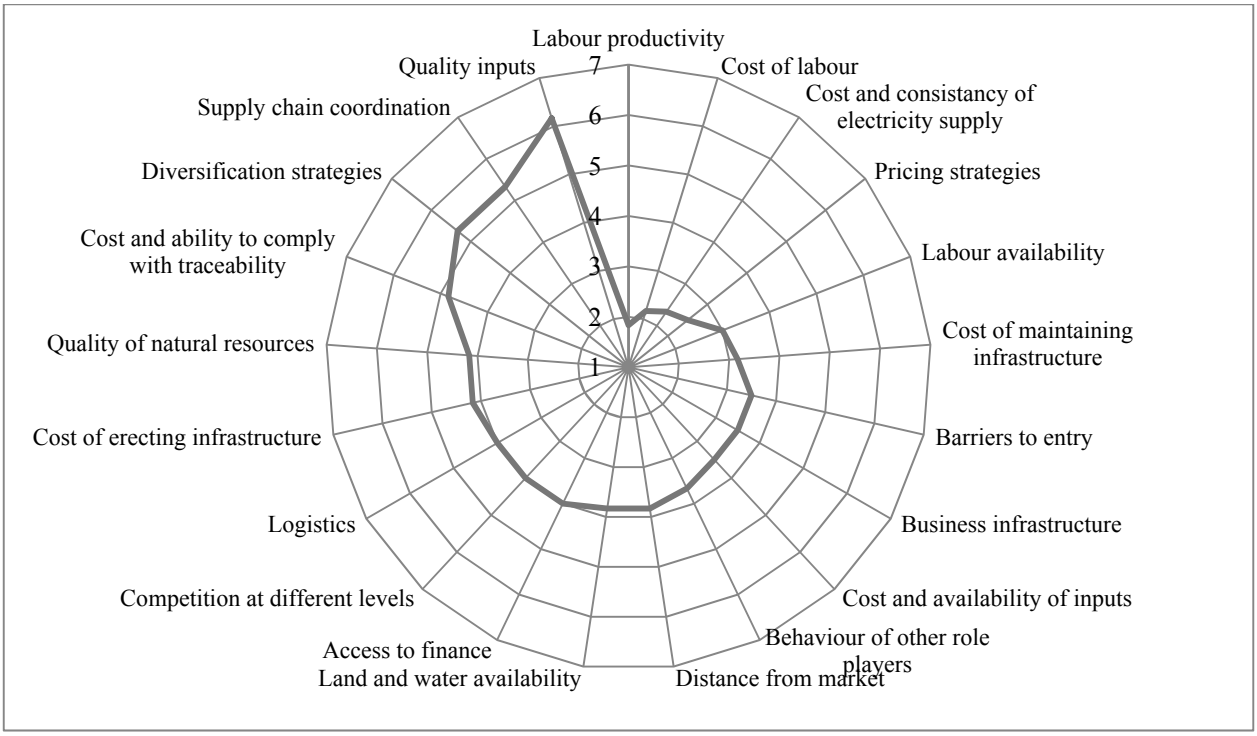

Figure 43: Micro environment impacting on Wholesalers
Source: Confidentially surveyed

4.7 Retail level

The retail sector in South Africa is dominated by large Supermarket chains such as Pick and Pay, Spar, Shoprite Checkers and Woolworths. The retail sector exhibits high levels of concentration, as 6% of the retail stores are responsible for 70% of food sales (AC Nielsen, 2006 in Kirsten *et al*., 2007). Apart from these retail chain stores, other channels through which products reach the final consumer are traditional butcheries, institutional buyers and the hospitality industry. Industry experts estimate that approximately 50% of fresh pork products produced in South Africa is marketed through an estimated 1500 to 2000 traditional butcheries, while the bulk of processed products are sold through supermarkets.

While all the large retail chains sell pork, the strategies used in the procurement and distribution process are very different. One of the large retailers use a third party packer that is responsible for procurement, processing, packaging and distribution of their pork products, which arrives in store pre packed and shelf ready. Others procure whole carcasses that are processed and packaged by an in store butchery. Both these systems have distinct advantages, with the use of in store butcheries creating the perceptions of freshness with the consumer, while a centralised packing and distribution system allows for strategic distributions of key products to geographical areas where demand for specific products is greater. At the same time, parts of the carcass that would be discarded in an in store butchery could possibly be used in the manufacture of further processed and emulsified products with the use of a central packing and distribution facility.

The use of a central packing and distribution unit simplifies branding, which is more difficult from an in store butchery. Many retailers have introduced their own branding system, with private labels under the retail stores own name, often allowing the final product to reach the consumer in a more cost effective manner. Retail procurement practices have changed over time however, with retailers tending to move away from the system of whole carcass procurement towards a system of procuring primal cuts that are processed in central locations, or even procuring final products that are ready to go on shelf.

Procurement of processed products is more similar across the different retail chains, yet the manner in which the risk of spoilage and damage is handled differs across chains. Some chain stores procure processed products to be sold in the store, yet ownership of the product does not change until sold by the retailer, effectively meaning that the risk of damage and on shelf expiry is borne by the processor. Should the product expire in store, it is returned to the processor, who must refund the retailer. Processors report that returns can be up to 8%, creating significant cost to the processor and inefficiencies in the value chain. Other retailers take the risk of damage and expiry, yet the margin is adjusted in order to do so. From an efficiency perspective however, a system where the risk rests with the retailer seems to be more advantageous, due to the fact that retailers may be prepared to sell products at reduced prices on approach of expiry rather than allowing expiry and disposing of the product. While the cost to the retailer may be greater, the cost to the entire value chain will be less.

Promotions in store are a significant part of a retailer's strategy to increase consumption of certain products, particularly pork that is not traditionally consumed by many South Africans. Apart from

the costs involved in marketing and advertising a product on promotion, the reduced selling price further means that the retailer's margin is significantly reduced. While efficient in promoting the sale of specific products, promotions could have the unintended disadvantage of increasing send backs. Retailers tend to stock more than one brand of product and if a particular brand is being promoted, sale of other brands of the same product could be reduced, leading to greater loss through returns. When under promotion, consumers may also be tempted to buy large amounts of products that can be frozen at home, reducing sales in the time following the promotion. At the same time, having a product on promotion could reduce the price to the extent that consumers that are not able to afford the product at normal prices are able to buy it, increasing the buyer base.

In order to calculate the retail margin, a similar approach must be followed to that used at processor level. While the retail margin on processed pork will be added on to the price of final products, the selling price of fresh pork at retail level is difficult to determine, due to the difference in the product procured and the product sold. Similar to the processor, large parts of the carcass sold as fresh meat will be disposed of, or sold at a price far below cost, leading to the use of a block test in order to price different cuts. The margin on ribs and chops for example seems very large, but the retailer must push the price of the expensive cuts up in order to cross subsidise the losses from the cheaper parts of the carcass. The use of a block test ensures that by the time the entire carcass has been sold, the "carcass equivalent price" as a weighted average of the price received for the different parts of the carcass is sufficient to cover the costs incurred by the retailer. Table 9 indicates the percentage carcass composition of key cuts that are typically expensive, as well as parts of the carcass that receives little return.

Table 9: Carcass composition and sales price as percentage of cost

Cut	Percentage of Carcass	Sales price as percentage of carcass cost (approximate)
Various chops	28%	128%
Spare Ribs and Rib Chops	7%	135%
Steak	7.5%	151%
Head	6%	28%
Trotters	3.5%	65%
Skins and trimmings	9%	64%
Bones and cutting loss	6%	0%

Source: Confidentially surveyed

Sufficient prices at retail level are not available in order to build up an entire carcass and as a result, assumptions must be made regarding the prices of the different cuts in relation to each other. These assumptions are based on the block test used for fresh meat. The calculated prices and margins are illustrated in Figure 44. Due to the large number of stores necessary in order to sell across the country, retailers have substantial expenses related to both labour and overheads. Cost allocations are based on shares allocated in company annual reports.

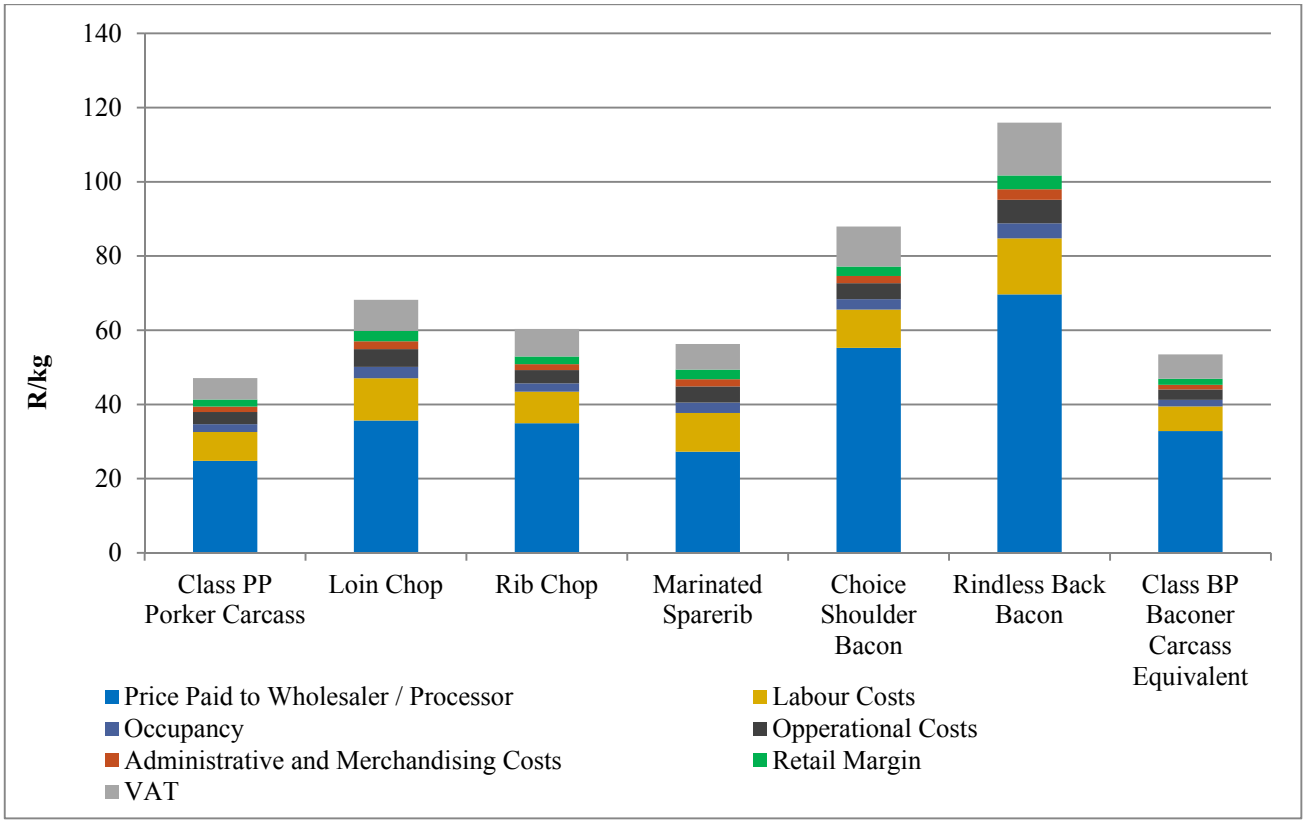

Figure 44: Margins and Cost allocation at retail level
Source: Compiled from confidential interviews and company reports

4.7.1 Factors affecting competitiveness at retail level

As in previous sections, the factors that affect competitiveness at retail level were surveyed within the macro, meso and micro environment. The macro environment refers to regulatory and administrative issues, global and domestic economic trends, as well as chance factors like the exchange rate and the political environment. The micro environment relates to issues that can be managed by retailers within the business environment, whereas the meso environment refers to the supporting functions and services within the value chain.

Within the macro environment (Figure 45), administered prices like electricity impact on overhead costs over a large number of stores and thereby constrains the competitiveness of retailers. Within the meso environment (Figure 46), the high level of biosecurity requirements enhances the competitiveness of retailers by ensuring a high quality inputs at micro level (Figure 47). Labour costs provides 47% of the gross margin at retail level, hence the productivity and cost of labour are the most significant factors within the micro environment constraining competitiveness at retail level.

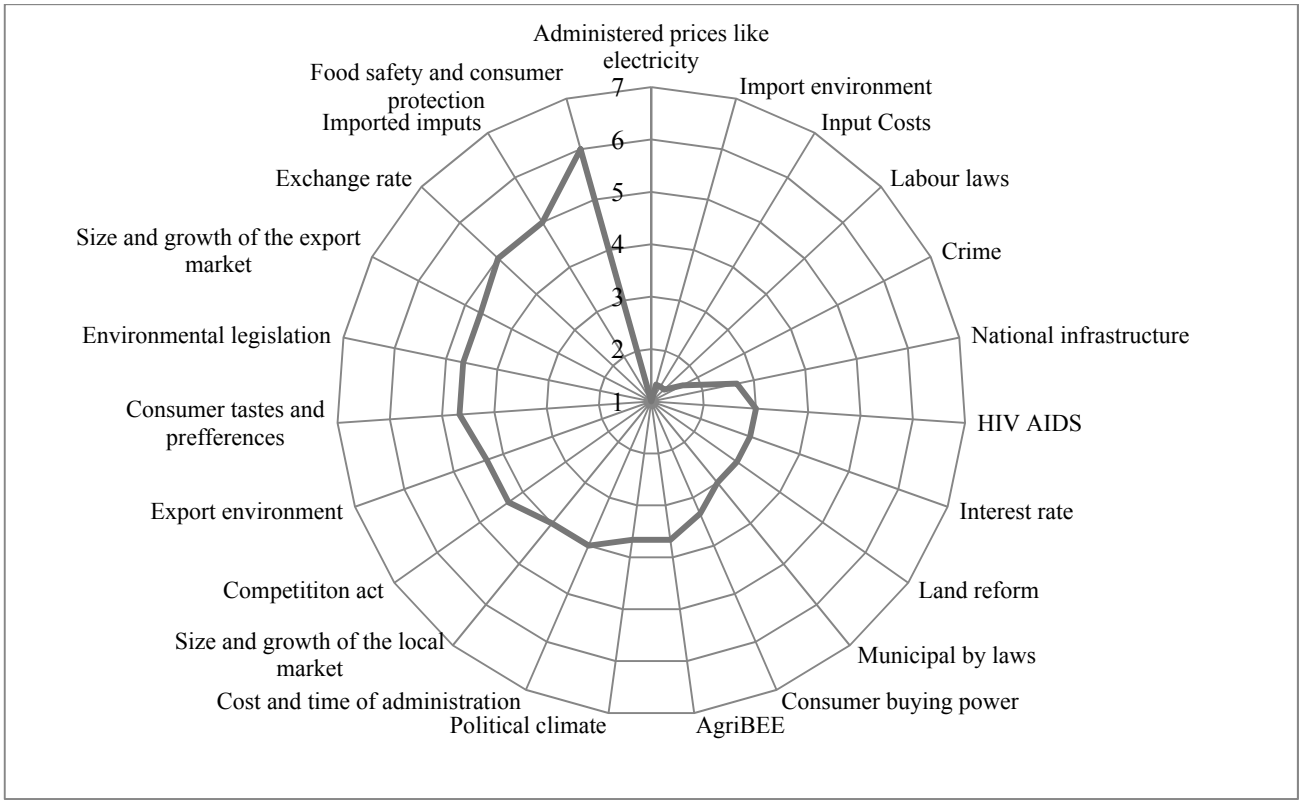

Figure 45: Macro environment impacting on Retailers
Source: Confidentially surveyed

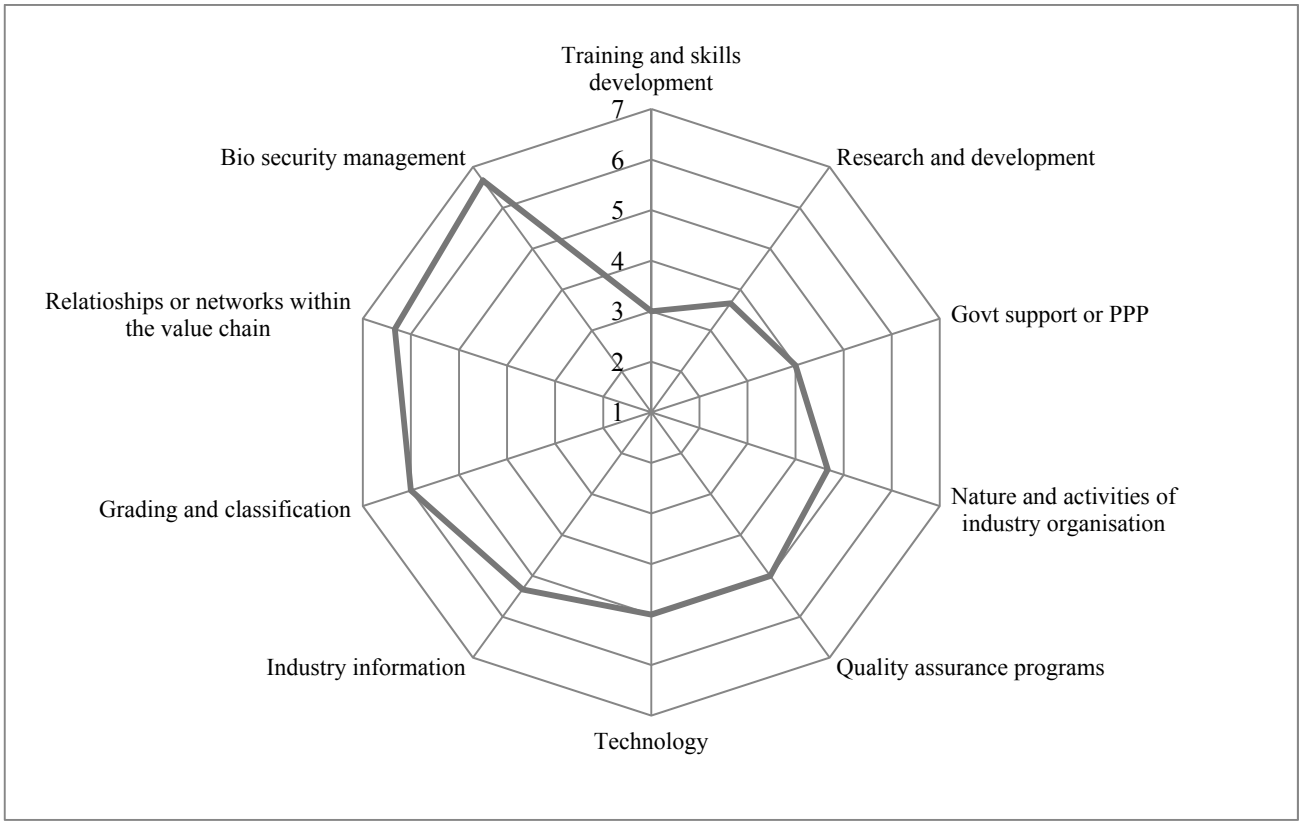

Figure 46: Meso environment impacting on Retailers
Source: Confidentially surveyed

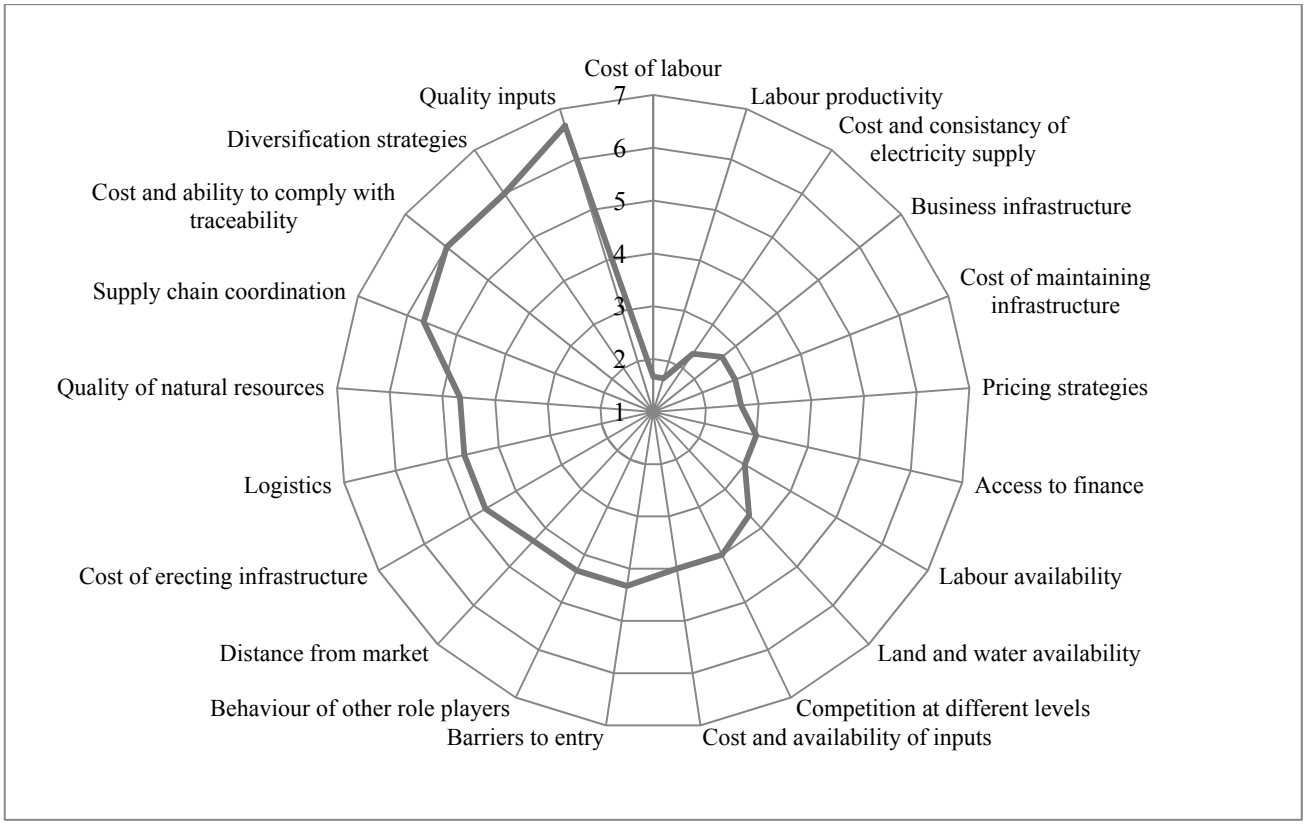

Figure 47: Micro environment impacting on Retailers
Source: Confidentially surveyed

4.8 Quantifying margins over time

From previous sections, the share of the margin added between producer and retail value has been allocated based on available prices for March 2013. The margins calculated, as well as the share of the price paid by the consumer allocated to each actor in the value chain is summarised in Table 10. From Table 10, the primary producer's share is greater for the fresh pork chain, where less value is added through the chain. The margin at retail level is greater on fresh products, due to the fact that the retailer adds more value to the fresh product through the butchering process. Within the processing chain, the bulk of value is added at processor level, reducing the margin at retail level.

Table 10: Prices received by the different participants in the pork value chain

Value chain participant	PP Porker	BP Baconer	Share of consumer price	
			PP Porker	BP Baconer
Primary producer (whole carcass)	R18.21/kg	R17.49/kg	44.96%	38.03%
Abattoir (whole carcass)	R21.79/kg	R20.81/kg	8.84%	7.22%
Wholesale (adjusted to whole carcass)	R24.78/kg	R32.40/kg	7.38%	25.20%
Retail (adjusted to whole carcass)	R40.50kg	R53.48/kg	38.81%	29.55%

Source: Calculations

Though the static snapshot provided is an important component in that it allocates shares of the final price paid to consumers to the different actors across the chain, more meaningful information regarding margins can be obtained by tracing the margins over time. The limited availability of data

limits this to a large extent, yet data was obtained illustrating the margin between producer and retail level for both the fresh meat and processed supply chains from 2008 to 2012. The margins in the fresh pork supply chain are illustrated in Figure 48. Though the price at retail level has shown significantly greater volatility than the price of Porkers at producer level, the margin from producer to retail price has remained relatively constant for the period under consideration.

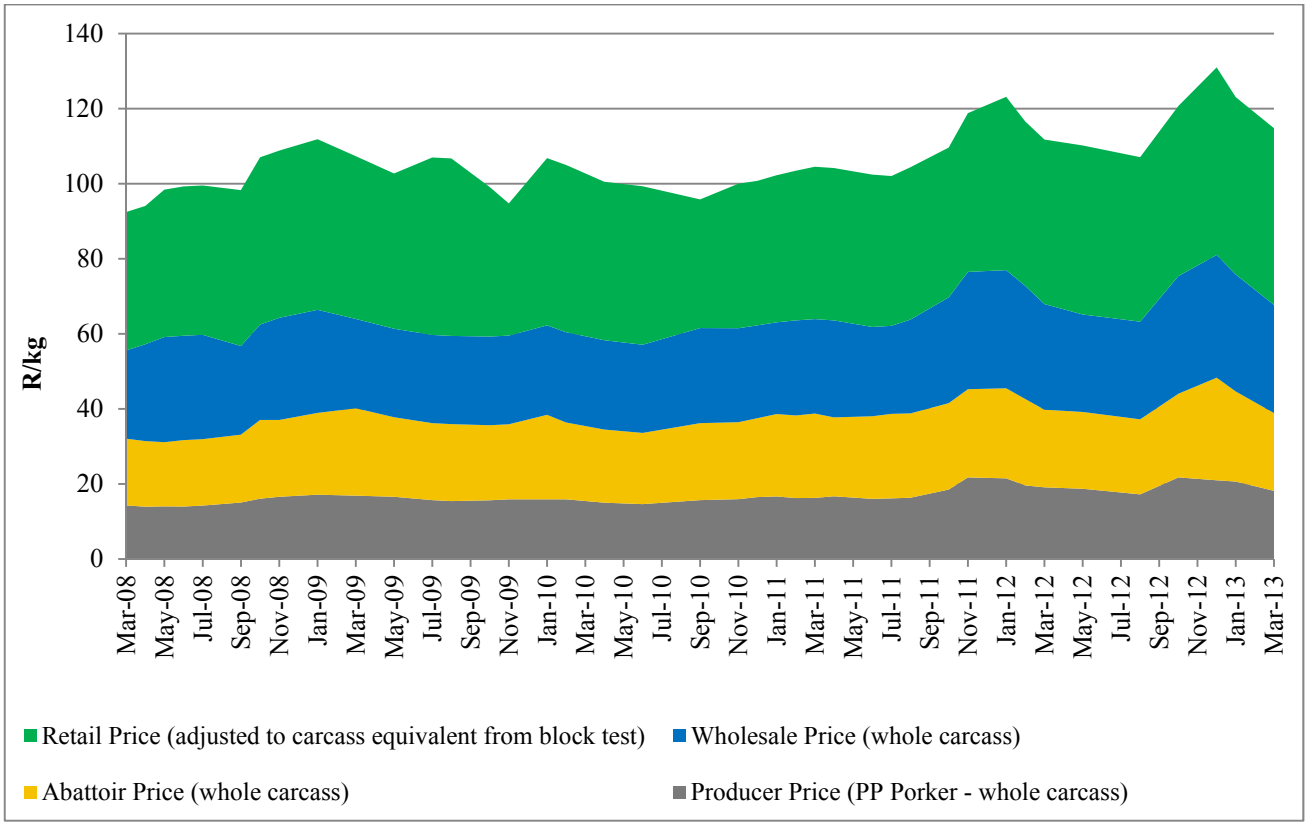

Figure 48: Fresh pork margins from 2008 to 2012
Source: Compiled from Stats SA and BFAP data, 2013

The margins in the processed pork value chain for the same period are illustrated in Figure 49. The difference in absolute value between the margins in the fresh and processed value chains is attributed to the additional value added within the processed pork supply chain. The wholesale prices for processed products are not published and are therefore not included in the time series. Though the wholesale prices were calculated from a confidential survey in for March 2013, an historic time series is not available. Consideration of the processed pork chain shows that margins have increased slightly over the four year period under consideration. In order to explain why margins have increased, the costs incurred across the value chain should be reconsidered.

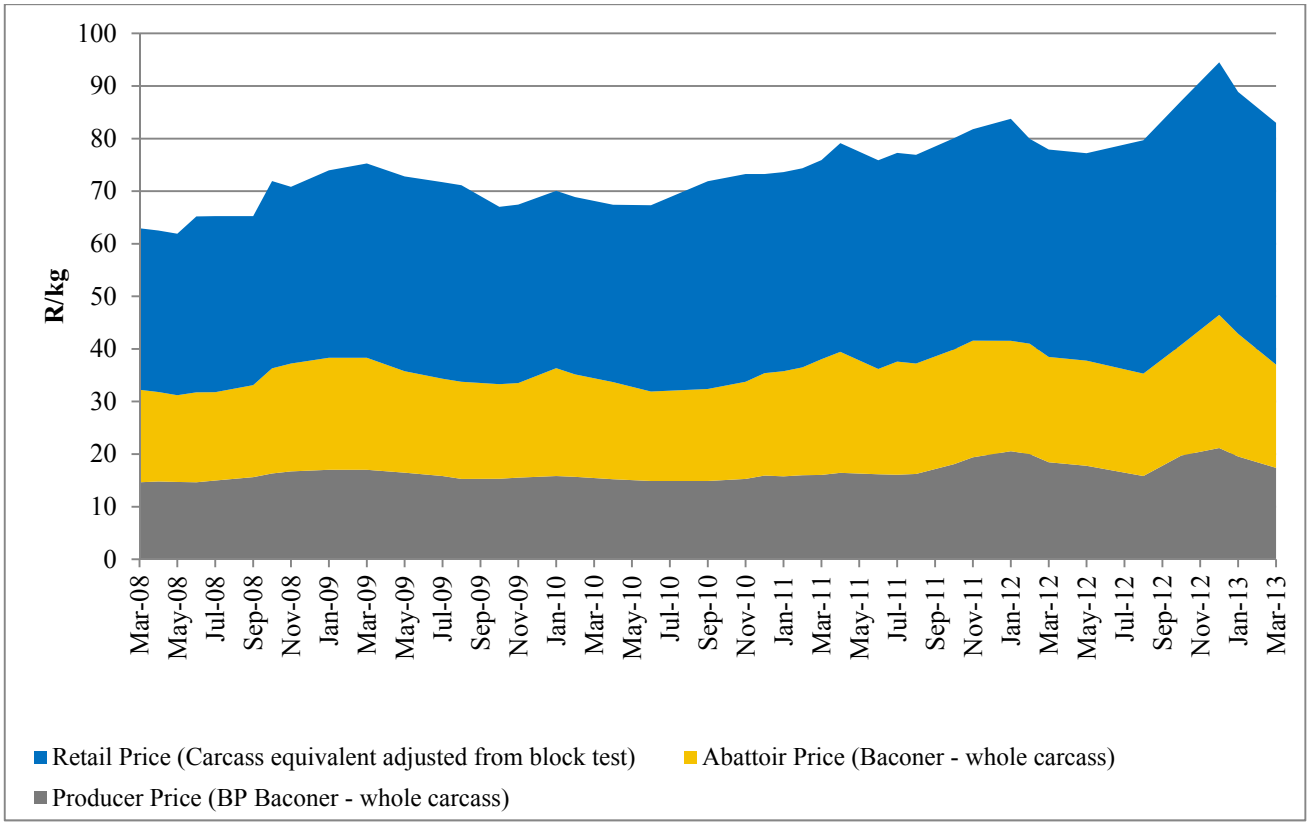

Figure 49: Processed pork margins from 2008 - 2012
Source: Compiled from Stats SA and BFAP data, 2013

The most significant contributors to the cost of various actors across the chain, as illustrated throughout section 4 were labour, electricity and overheads, as well as distribution. When the changes in these three key cost components are considered, the cost of value adding seems to have increased at a much greater rate than inflation. The increases in these key cost components for the past five years are summarised in Table 11. The wage rate increases in Table 11 is the average of all workers earning an hourly wage in South Africa.

Table 11: Increases in key cost components in the pork value chain

Component	2008	2009	2010	2011	2012
Electricity	5.9%	27.5%	31.3%	24.8%	28.8%
Wages	9.3%	9.8%	8.1%	8.3%	8.2%
Fuel	48%	-5.1%	4.1%	5.2%	16.1%
CPI	5.2%	10.3%	6.16%	5.4%	4.5%

Source: Compiled from Quantec database

4.9 SWOT Analysis

The competitiveness and performance of the South African pork value chain across all levels can be summarised in the form of a SWOT analysis, as illustrated in Table 12.

Table 12: SWOT Analysis of the South African pork industry

Strengths:	Weaknesses:
• Small, well organised and dynamic industry • Well organised producer organisation that lobbies on behalf of primary producers • Superior health status within the industry • Biosecurity management is strong • Access to advanced technology • Access to high quality inputs • Access to top quality international genetic material • Producer adaptation to difficult economic, trade and political environments • Efficient grading and classification system at abattoir level	• High costs of inputs and raw feed ingredients • Poor self sufficiency of protein in feed • Low levels of government support • High level of specific investment required to expand production presents a significant barrier to entry and exit • Time and cost related to environmental impact studies to expand production • Lack of price information to primary producers • Transparency of price formation • Out dated stunning methods at abattoirs • Lack of export accredited abattoirs • Religious convictions related to pork consumption • High levels of products returned from retail level • Cost and consistency of electricity supply
Opportunities:	**Threats:**
• Increasing the export market • Potential export markets for the parts of the carcass that are not traditionally consumed in South Africa, allowing greater domestic production of the parts that are preferred by South African consumers • Class mobility of South African consumers leading to increased meat consumption • Pork consumption per capita has increased significantly over the past decade, yet remains low compared to global norms and can therefore be increased significantly • Many consumers do not consume pork traditionally and can be introduced to the product • Greater coordination through the value chain will lead to increased investment at primary producer level • Increased soybean crushing capacity will lead to greater self-sufficiency in raw protein sources for feed	• Lack of state veterinary services • Lack of government support • Increased imports since 2002, particularly from countries that enjoy government support and the effect on domestic price levels • Decline in producer numbers • Cost of erecting and maintaining infrastructure • Import of cheaper protein sources like IQF chicken pieces and mechanically deboned meat • Negative perceptions regarding animal welfare • High levels of administered prices like electricity and fuel • Volatility in the exchange rate affecting bot the pork price and the price of raw feed materials

5. Pork Consumption in South Africa

South African meat consumption preferences are distinctly different from international trends, with poultry being the protein of choice, followed by beef, fish and only then pork. While 38% of meat consumed around the world in 2010 was pork, in South Africa, this figure was only 7%, as indicated by Figure 50. This consumption share is expected to increase over time however, as pork consumption is projected to grow at a rate second only to chicken over the next decade. While 12.4kg of pork was consumed per capita worldwide in 2011, this figure was significantly lower in South Africa at 4.3kg per capita. This section will focus on the reasons for these differences in preferences and the drivers behind pork consumption in South Africa.

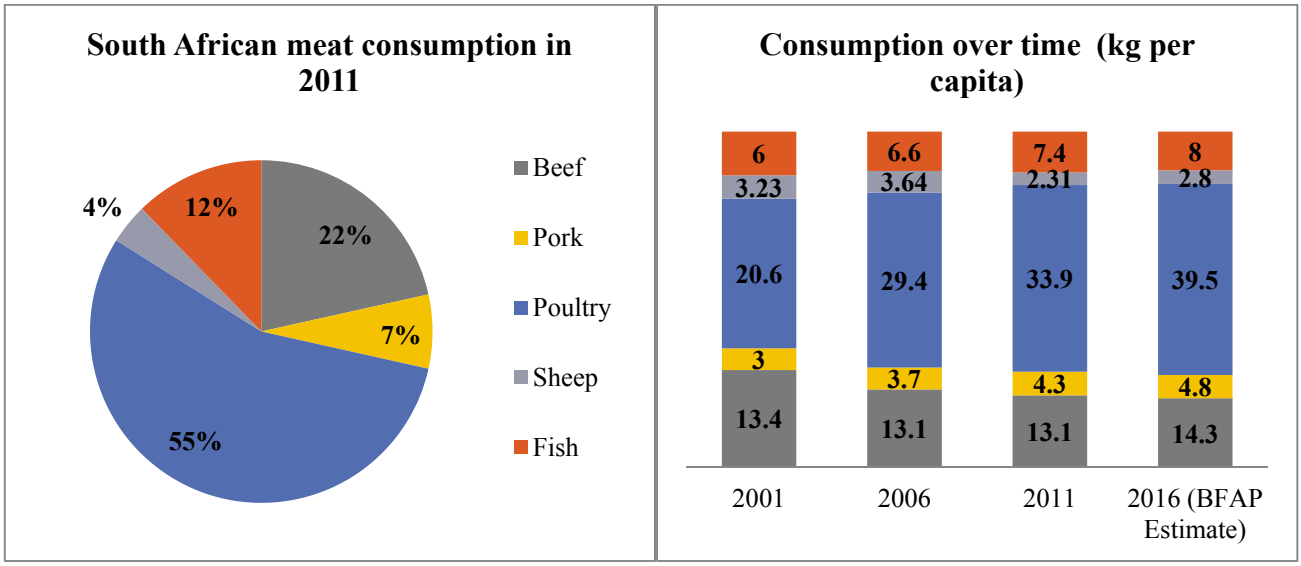

Figure 50: South African meat consumption preferences
Source: BFAP Data, 2013

5.1 Identifying South African pork consumers

South African consumers are often segmented using the SAARF LSM® (Living Standards Measure) approach. By this approach, consumers are grouped into 10 different LSM groups based on socio economic status, which includes but is not limited to household income. The LSM segmentation of South African consumers, along with the average income per LSM group is illustrated in Figure 51.

These LSM groups can further be used to define 3 lifestyle levels in South Africa.

- ***Marginalised consumers*** (LSM 1 to 4): 25% of adult population, with less than 10% contribution to income and expenditure;
- The ***emerging consumer group*** (LSM 5 to 7): 51% of adult population, with around a 40% contribution to income and expenditure;
- ***Established consumers*** (LSM 8 to 10): 24% of adult population, with more than 50% contribution to income and expenditure.

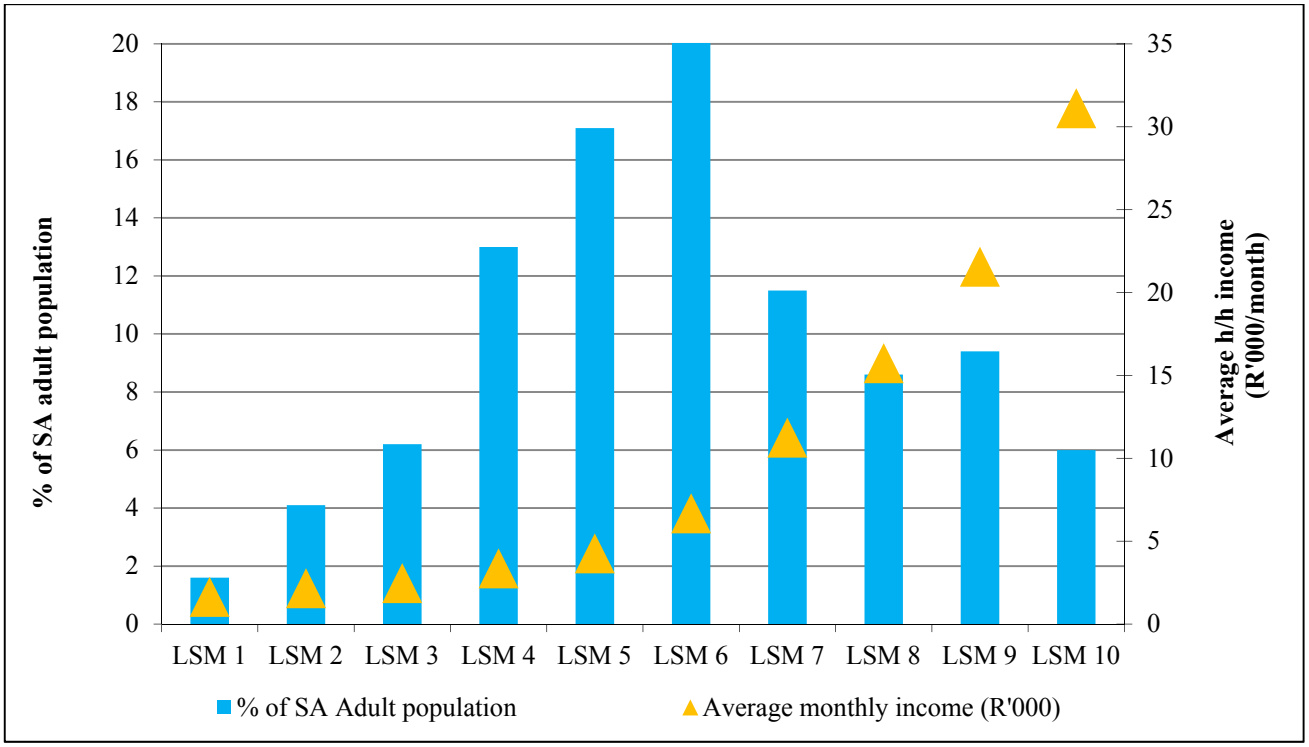

Figure 52: South African consumers by LSM group
Source: SAARF, 2013 & AMPS, 2012

Figure 53 suggests that 67% of pork consumed in South Africa is by established consumers, while only 10% is consumed by emerging consumers. This is an important statistic, as the price elasticity of demand is expected to be more elastic for emerging consumers that spend a greater portion of their income on food.

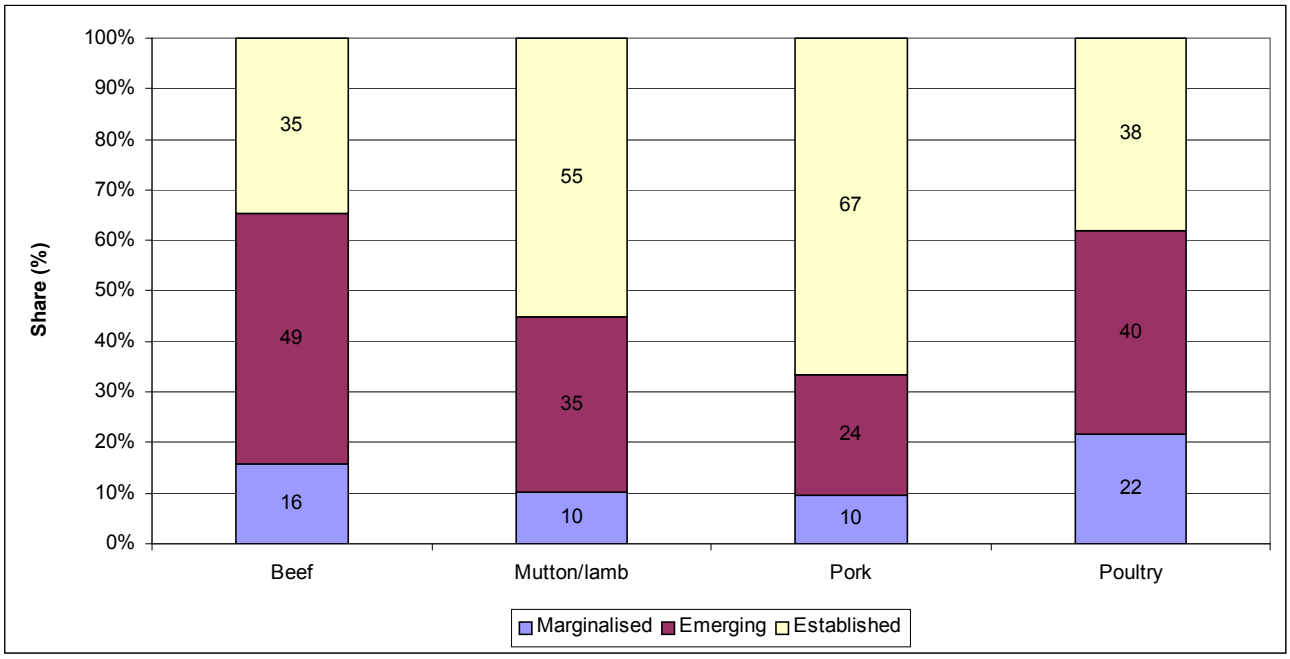

Figure 53: Meat consumption in South Africa disaggregated by consumer group
Source: BMR 2006 and BFAP 2008

Oyewumi and Jooste (2006) further suggest that consumers prefer value added pork products, as indicated in Table 13. The authors suggest that consumers prefer value added products, with all races indicating that a higher percentage of households consume value added pork than fresh pork, except for coloureds, where the decrease was marginal.

Table 13: Household preferences for pork products

Race	Fresh Meat	Value added product	Pre-packed pork foods
Blacks	48.4%	70%	46.2%
Whites	76.9%	78%	57.1%
Coloureds	53.8%	48%	35%
Asians	25%	37.5%	25%

Source: Oyawumi and Jooste (2006)

5.2 Drivers of pork consumption

The demand for pork in South Africa was modelled by Nieuwoudt (1998), who used the model to project pork consumption in South Africa from 2000 to 2022. Niewoudt's projection of pork demand was dependant on assumptions made regarding population growth, urbanisation, income per capita growth and income elasticities estimated using historic data. Important to note from Niewoudt's study was the significant differences found in consumption patterns amongst population groups. These differences were attributed to differences in living standards, as well as taste preferences. Due to the expectation that living standards among different population groups would become more equal over time, final demand was projected for an aggregated population. Niewoudt (1998) concluded that the main factors that would drive demand for livestock products into the future are population growth, income elasticities, economic growth and urbanisation. The fact that the estimate generated by Niewoudt for pork consumption in 2010 was only 5% more than the actual consumption of pork in 2010 would suggest that the drivers isolated by Niewoudt were accurate. A crucial finding from the study then is that the income elasticity of demand for pork products was found to significantly lower than for other meat products, suggesting that the demand for pork is inelastic to changes in income and can therefore be considered to be influenced by other factors as well.

Subsequent literature differentiates between economic and non-economic factors that drive pork consumption. Economic factors that influence consumers include the price of pork, the price of substitutes for pork and increased income of consumers. Taljaard, Jooste and Asfaha (2007) identified non-economic factors as issues pertaining to health and safety, convenience, quality, animal welfare and the environment. In an econometric analysis, Taljaard *et al*. (2007) found that demand is determined by five main factors namely, consumers' disposable incomes, the price of pork, the price of other related meat products, changes in the size and structure of the population as well as tastes and preferences of the consumer. While he did not test the influence of these individual factors included in tastes and preferences, the econometric analysis concluded that non-economic factors are increasingly important in the consumption decision of consumers and must therefore be considered by producers. While prices and income had a significant effect on the consumption

decision, that effect was found to be decreasing over time. Understanding the tastes and preferences of consumers is therefore an important consideration.

5.2.1 Economic factors that influence meat demand:

The most important economic factors that influence the consumer's decision on pork consumption are income per capita, price of pork in relation to other meat products as well as changes in the size and structure of the population. Over the past decade, per capita income in South Africa has increased steadily (South African Reserve Bank, 2013). At the same time, the population has grown, as well as becoming increasingly urbanised. An increasingly urban, growing population with ever increasing purchasing power points to rapid growth in meat consumption, a phenomenon confirmed by Figure 11 in section 3.1, which indicates that meat consumption has grown tremendously over the past decade and is expected to grow even more over the coming decade.

The decision of concern to pork producers however is not only whether more meat is consumed, but whether the consumption of pork in relation to other meat products will increase. Important in this decision is the price of pork in relation to other meat products. These prices over the past 15 years, as well as the outlook to 2021 are illustrated in Figure 20 in section 3.4. Prices are indicated in constant 2000 terms.

Despite being a relatively low cost option, Figure 53 indicates that the majority of pork is consumed in South Africa is by established consumers, while Table 13 indicates that consumers prefer value added pork. This would further confirm that the pork consumption decision is based on more than just economic factors like prices and income. The preference for processed pork products further means that a significant amount of value is added before reaching the consumer and while pork may be a relatively cheap option at producer price level, the prices paid by consumers for products like bacon and ham is significantly more expensive.

5.2.2 Non-economic factors that influence meat demand

The influence of non-economic factors on pork consumption preferences was initially considered by Duffy (1999) and Huston (2000), with both authors concluding that economic factors alone does not explain the significant changes and differences in meat demand patterns. Taljaard *et al*. (2006) analysed meat consumption trends in South Africa, with specific emphasis on quantifying the non-economic factors that influences these demand pattern, stating that consumers worldwide are becoming more demanding. Apart from affordability, consumers consider other factors like food safety, health, environmental and animal welfare concerns as well as convenience. Taljaard *et al.* (2006) suggest that the factors that influence consumer demand for processed beef, pork and lamb can be summarised as:

- Novelty (new and different, modernized and value added)
- Quality (taste, tenderness, physical attractiveness)
- Simplicity (quick, fast, uncomplicated)

- Convenience (easy to prepare and serve)
- Health and Safety
- Consistency (similarity in appearance and eating experience)

The comparison between different meats in terms of these factors is therefore also important considerations. Modern consumers prefer healthy meat, with a preference for lean cuts and low fat products. At the same time, rushed lifestyles make convenience prime. Taljaard *et al*. (2006) concluded that the contribution of non-economic factors to explaining pork demand in South Africa is as high as 70%, compared to a 30% contribution from price and income factors. This is consistent with the findings of Niewoudt (1998) that the income elasticity for pork consumption is low. Taljaard *et al*. (2006) further concluded that the effect of non-economic factors is increasing over time.

5.3 Generic pork marketing in South Africa

In recognition of the fact that South Africans are not traditional pork consumer, as well as the fact that the religious convictions of a large part of the South African population does not allow pork consumption, SAPPO embarked on an advertising and marketing campaign, with little impact on the industry as a whole (Lubnow, 2007). Industry views were found to be conflicting regarding SAPPO's marketing campaign. While some industry specialists felt that the campaign had been very successful in influencing pork consumption, others feel that, given the limited budget, the campaign should be more targeted to specific audiences that are identified as possible pork consumers.

The challenges for the marketing campaign is that the South African consumer has a traditional preference for beef, as well as the fact that chicken is more affordable, while many would argue that chicken is also healthier. The religious barrier is another difficulty that needs to be overcome, yet the ability of an advertising campaign to change religious views regarding pork consumption has been questioned within the industry. While the increases in pork consumption through the last decade could well be, at least in part, a result of the SAPPO marketing campaign, the fact that pork consumption has increased by 50% over the past decade, compared to an 80% increase in chicken consumption suggests that there might be more room for improvement. The majority of pork consumed is still by established consumers, which suggests that a significant portion of emerging consumers could still increase pork consumption significantly.

6. Summary and Conclusions

When considering a value chain, it is often found that each participant within the value chain feels that the participant following him has a much greater margin. At the same time, consumers constantly demand that the product be delivered at a lower price. The fact remains that significant value is added in order to take the product from the mature finished pig leaving the farm to producing a pork chop or bacon cut. A greater understanding of how the value chain operates, as well as the associated costs of different participants in the value chain, can go a long way towards increasing the level of trust throughout the value chain, aiding in the efficient delivery of the end

products demanded at consumer level. A greater understanding of pork consumption preferences in South Africa is also critical in order to supply the products preferred by the end consumer in a cost efficient manner.

Despite recent downturns in economic growth around the world, meat consumption trends have been predominantly upward and are expected to continue increasing. South Africa is no exception, with increased spending power and growing urbanisation fuelling dramatic increases in meat consumption over the past decade. The difference in South Africa is that pork is not the protein source that dominates consumption, but instead is a very small part, with chicken being the protein of choice. Though many economic and non-economic factors can be attributed to the difference in consumption preferences, greater efficiency in the value chain would lead to the supply of a cheaper end product, which would arguably increase consumption. The study evaluated the South African pork value chain in its entirety, in order to gain a better understanding of margins across the value chain, as well as the factors that influence the competitiveness of the pork value chain at different levels.

Fundamentally, consumption of pork in South Africa has increased over time, with pork consumption growing at a rate second only to chicken in percentage terms over the past decade. The growth has been from a small base however and considering only the percentage growth can be misleading. In absolute terms, both chicken and beef consumption growth has exceeded growth in pork consumption. Despite offering one of the cheaper sources of protein, more than 65% of pork consumed in South Africa is by established consumers in LSM groups 8 – 10, with only 10% being consumed by low income consumers. Apart from price and income levels, several non-economic factors influence pork consumption. Religious factors remain a significant influence that affects pork consumption levels, with a significant portion of the South African population not consuming any pork due to religious sentiments. Further, consumer sentiments regarding quality, simplicity, convenience and health are important factors that drive pork consumption. Traditionally, South African consumers have a strong preference for beef, while chicken remains a cheaper and arguably more convenient option than pork, hence the small share in total protein consumption, yet it remains up to the South African pork industry to influence these traditional demand patterns and produce products that can compete on the front of simplicity and convenience. Strong consumption growth over the past decade indicates that some success has been achieved in this regard, however identification and targeting of specific consumer groups with generic marketing campaigns, as well as the production of products that consider the consumers preference for quality as well as convenience remains a critical factors if the positive influence on pork consumption is to be increased.

Upon evaluation of the different levels of the South African pork value chain, it was evident that primary pork producers find themselves in difficult circumstances. The pork price has been pressurised by imports entering South Africa at very competitive prices, while feed costs have reached record levels following poor weather conditions in the USA. As the majority of producers mix feed on the farm, the cost and volatility in raw material prices has placed extreme pressure on production costs. In addition, the volatility in the exchange rate has transmitted through to producers due to the reliance on imported protein sources like soya cake and fishmeal substitutes. Supply increases in order to meet rising demand have been mainly as a result of increased carcass weight

and greater efficiency, rather than increase sow numbers. Improving efficiency is no doubt a positive sign, however significant increases in production in the future will be dependent on greater investment and expansion of the sow herd, as carcass weights and production efficiency is limited in the extent to which it can increase production. The technical efficiency of primary producers is characterised by extreme variability, based on the level of technology being used at farm level. Though state of the art housing facilities are available to South African producers, the cost of capital investment required in order to upgrade to these facilities is immense. The lack of certainty regarding a market for the final product, as well as the perceived lack of transparency in price formation at abattoir level has not provided producers with the security in the market that is necessary in order to encourage large scale capital investment. Greater coordination mechanisms through the supply chain will encourage the required investment, improving efficiency at primary producer level. This is evident in the use of contracts to grow pigs for large processors, yet the opportunities to produce on contract are limited.

While South Africa has some state of the art abattoirs in operation, the limited number of abattoirs accredited for exports limits other available marketing opportunities when products are not sold for domestic consumption. Exploration of possible alternative markets for South African products could be fruitful in this regard. Improved stunning methods and investment in improved technology would increase abattoir efficiency, while greater export accreditation could be achieved. Market concentration is high at abattoir level, with only 20 abattoirs slaughtering more than 95% of South African pigs. The market concentration faced by the primary producer is often increased due to logistical reasons and the limited number of abattoirs that can realistically be delivered to due to transport requirements. The lack of trust regarding the transparency of price formation at abattoir level does not encourage efficient practice within the value chain. Greater access to price information would improve trust at this point.

Though margins at retail and processing level seem large on initial inspection, calculation of the price achieved based on the entire carcass instead of typically expensive cuts often seen at retail level proves to decrease these margins significantly. While margins seem to weigh heavy towards the retail end of the value chain, the significant overhead cost associated with the number of stores operated at retail level lead to the requirement of significant operating margins in order to cover these costs. The profit margins reported by listed retail companies are not exorbitant.

Considering margins over time, the processing margin in particular has shown a widening through the past five years, yet the effect of significant increases in value chain costs must be considered before conclusions are drawn. The most significant costs identified throughout the value chain post farm gate are distribution costs, labour costs and electricity and overhead costs. Considering the significant increases in the cost of both fuel and electricity over the past five years, the increased cost of processing pork products is not unexpected.

Distribution costs throughout the chain are significant, not only due to the cost of fuel, but also due to distances travelled. From primary production level, transport to abattoirs provide significant costs to the farmer, especially considering the mismatch in provincial sow numbers as well as provincial slaughtering statistics. This mismatch indicates that farmers often travel large distances to the

abattoir, increasing transport costs. At the same time, meat processed in Gauteng and KwaZulu Natal is distributed nationwide, further increasing distribution costs.

Various factors affect the competitiveness of role players at different stages of the pork value chain, yet certain factors were identified that constrain competitiveness across the entire value chain. These factors included national infrastructure, the political climate, the costs and regulations related to labour, labour productivity and the cost of administered prices like fuel and electricity. The constraining effect of the cost and availability of labour would point to the fact that greater mechanisation is required, yet the cost related to new buildings and mechanisation, as well as the environmental requirements that must be met for new facilities to be constructed limits this option.

In conclusion, demand for pork products is expected to grow in the long run and more normal weather conditions should result in decreased feed costs, providing improved conditions for pork production over the next few years. If increased demand is to be met by domestic production rather than imports however, significant investment will be required across the value chain in order to provide possible export opportunities for parts of the carcass that are less popular in South Africa, as well as the expansion of primary production. Greater coordination, providing surety of a market as well as transparency regarding price formation will have a significant role in ensuring that the required investment occurs at primary producer level.

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