

Evaluating the South African pork value chain¹

By

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INTRODUCTION

In modern times, a quote by Adam Smith that “consumption is the sole end and purpose of all production” holds 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.

Unlike the global trend, where pork is the most consumed of all meat products, the South African pork industry is small compared to chicken and beef markets. Following a period of extremely high feed costs, as well as 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. A competitive, efficient value chain is critical in ensuring that the product reaches the final consumer in a cost effective manner, in order to grow demand.

If the South African pork industry is to grow and compete within the global context, a comprehensive evaluation of the value chain, as well as the factors that affect competitiveness within the different levels of the value chain is required. Against this backdrop, the purpose of this research is to evaluate the performance of the South African pork value chain whilst also identifying the factors that influence performance and competitiveness at different levels of the South African pork value chain. Quantification of relative cost shares within the chain will provide an understanding of the possible effect of changes in key cost factors across different stages of the value chain. Given the small size of the South African pork market within the global context, the South African pork value chain must be considered against the backdrop of global trends.

The study has the following objectives:

- To provide a detailed overview of key fundamentals in the South African pork industry
- To quantify the South African 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 evaluate the drivers of pork consumption in South Africa

An improved understanding of the value chain, as well as the environment in which it functions will provide stakeholders with information to underpin decision making, leading to sustainable profits and continued investment at different levels of the value chain. 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.

APPROACH AND METHODOLOGY

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).

Literature describes various methods that have been used to conduct value chain analysis, both domestically and globally. Porter (1985) describes value chain analysis as an evaluation of the activities performed by an organization and further links these activities to the organizations competitive position. As the basis from which value chain analysis evolved, sub-sector analysis provides a framework for the evaluation of performance within a specific subsector by analysing the functioning and performance of each actor in the chain. Four important elements related to subsector analysis, as identified by Lusby and Panlibuton (2004), include the understanding markets and market trends, understanding relationships between market participants, identifying constraints and opportunities and mapping the inter-relationships within the sector graphically. Holtzman (2002) further identifies the understanding of commodity characteristics and consumption patterns as key elements of value chain evaluation, due to the effect of product demand in driving the supply response system. Holtzman (2002) further identifies structure, conduct and performance as key factors to be evaluated at different levels of the value chain. Kula, Downing and Field (2006) identifies sub-sector analysis as the basis from which value chain analysis evolved whilst identifying four key points that differentiate the two. These points include inter-firm cooperation as the key to competitiveness, power relationships and the improvement in collective efficiency achieved by improved relationships between buyer and seller, economies of scale and innovation as essential in sustained competitiveness. Value Chain Analysis therefore expands on the foundation created by sub-sector analysis and links it to competitiveness. Porter (1985) identifies five competitive forces interacting within a given industry: the intensity of rivalry among existing competitors; the barriers to entry for new competitors; the threat of substitute products and services; the bargaining power of suppliers; and the bargaining power of buyers.

Utilizing the value chain approach, this study relates to explanatory research, with the function of improving information and understanding, rather than testing a hypothesis. The study unpacks the entire pork value chain in South Africa, through structured interviews with

focus groups and key stakeholders at different levels of the value chain. The structure, conduct and performance of each level of the value chain is evaluated, while margins and cost shares are identified and quantified for all activities post farm gate. Relationships and coordination levels between value chain participants provides an important aspect of the evaluation.

Although the study does not include a full, statistically relevant survey, the small size and concentrated nature of the industry limits the sample size and as a result, focus group discussions with key stakeholders at different stages of the value chain provide more detailed information. Factors that influence competitiveness within the macro, meso and micro environment are evaluated through a questionnaire circulated to stakeholders throughout the value chain. 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. Flowing from its importance in driving the supply response (Holtzman, 2002), pork consumption patterns and the drivers of pork consumption are evaluated based on an extensive literature review and secondary data.

OVERVIEW OF THE SOUTH AFRICAN PORK MARKET

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 through the past decade. In contrast to global trends, the share of pork in total meat consumption in South Africa is small, with chicken being the protein of choice. Despite pork consumption growth of 5.3% per annum through the past decade, which was second only to chicken (8% per annum), pork still accounted for only 7% of total meat consumption in 2011. Projected growth of 4% per annum through the next decade (Figure 1) will see pork increase its share in total meat consumption only marginally to 8% by 2022.

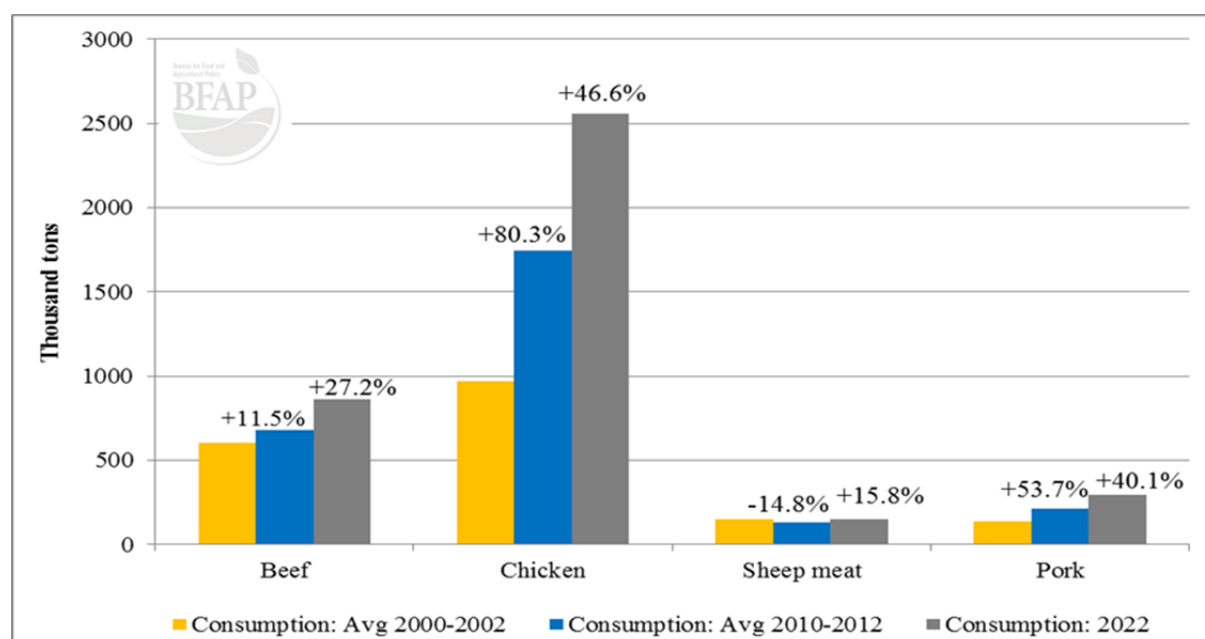


Figure 1: Meat consumption growth in South Africa

Source: BFAP, 2013

Drivers of meat consumption

The demand for pork in South Africa was first modelled by Nieuwoudt (1998), who projected pork consumption in South Africa from 2000 to 2022. While significant differences were evident 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. Nieuwoudt (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 Nieuwoudt for pork consumption in 2010 was only 5% more than the actual consumption of pork in 2010 would suggest that the drivers isolated by Nieuwoudt were accurate. A crucial finding from the study then is that the income elasticity of demand for pork products was found to be 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.

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. The past decade has been characterised by a steady increase in per capita consumption levels (South African Reserve Bank, 2013), as well as a growing, increasingly urbanised population. Improved purchasing power resulted in rapid growth in meat consumption through the past decade.

Economically, relative prices of different meat products remain an important determinant of pork consumption in relation to alternative meats. Despite being a relatively low cost option, 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 (Figure 2).

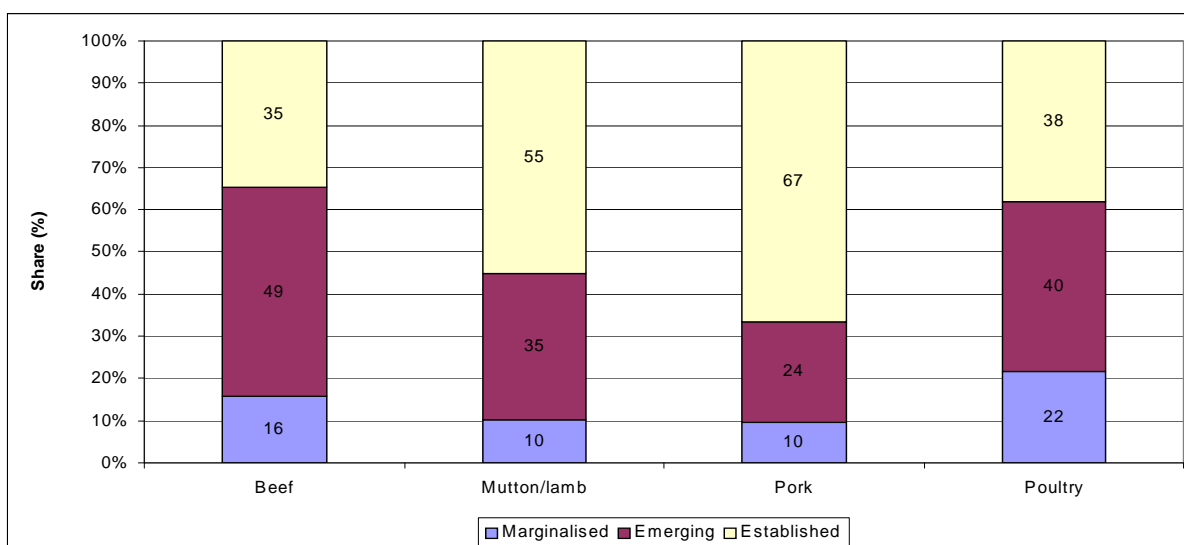


Figure 2: Meat consumption in South Africa disaggregated by consumer group
Source: BMR 2006 and BFAP 2008

Oyewumi and Jooste (2006) further indicate that South African consumers prefer value added pork products as opposed to fresh meat (Table 1). The survey conducted by Oyewumi and Jooste (2006) indicated that, across all races, a higher percentage of households consume value added pork than fresh pork, except for coloureds, where the decrease was marginal. 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.

Table 1: 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)

The preference for more expensive, value added products, and the share of total pork consumed by high income consumers, suggests that pork consumption may be less elastic to economic factors like price and income levels, as concluded by Niewoudt (1998). Consequently, non-economic factors that influence consumption patterns become an increasingly important consideration for the industry.

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.

Pork production

In response to demand increases, 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. From 2000 to 2012, the number of pigs slaughtered in South Africa increased by 23.6%, yet pork production increased by 69.3% through the same period as a result of increased slaughter weights. Following the impressive projected growth in pork consumption in the coming decade, pork production has the potential to increase accordingly. 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. Sufficient planning and investment to increase the sow herd will be required if the projected consumption increase is to be met with domestic production increases as opposed to increased imports as illustrated in Figure 3.

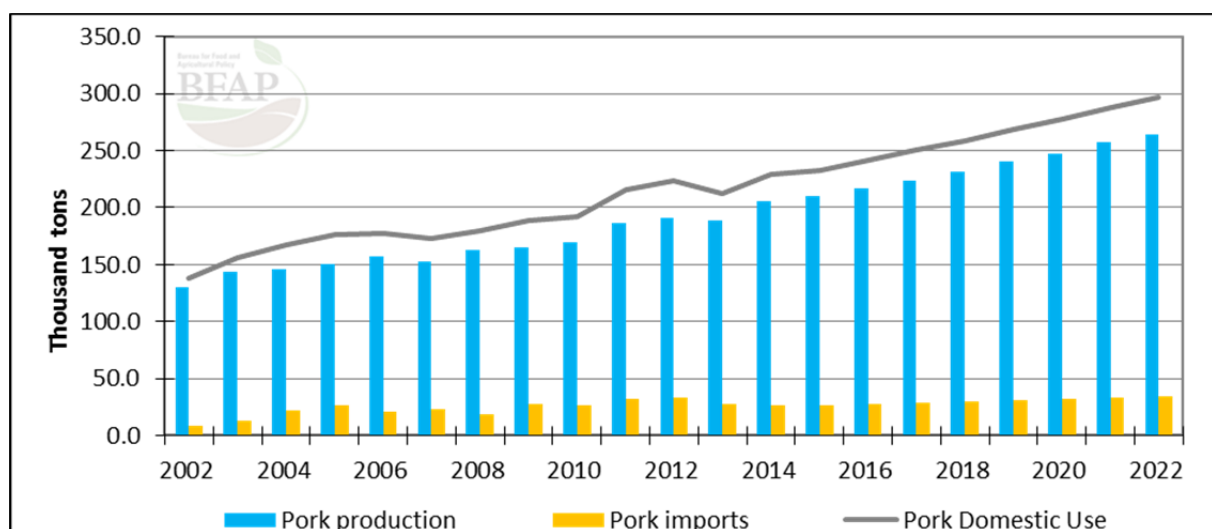


Figure 3: Pork production, consumption and imports 2002-2022

Source: BFAP, 2013

Trade in pork products

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. While domestic consumption increased significantly through the past decade, this increased demand has largely been met by growth in imported products. Imports have a fundamental role in balancing the pork market in South Africa, a fact illustrated by the product mix, where ribs account for more than half of total pork products imported into South Africa (Trademap, 2013).

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 various stages of the supply chain complicates the identification of a generic supply chain that represents the entire industry. Figure 4 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.

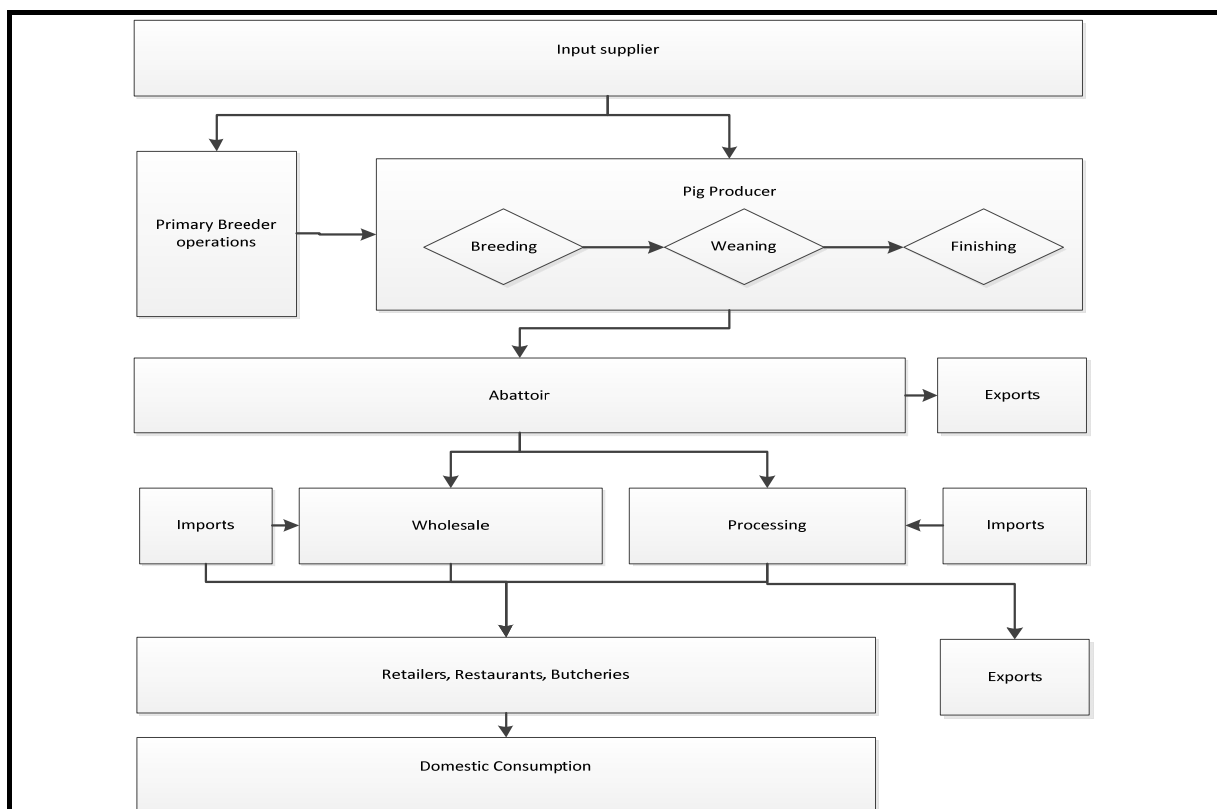


Figure 4: Diagrammatic representation of the pork value chain in South Africa
Source: Author compilation, 2013

Input supply

Despite the small size of the pork industry relative to other animal production sectors in South Africa, it accounted for the consumption of 10% of all feed produced in South Africa in 2012 (AFMA, 2012). 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 70% to 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	Inclusion Rates Visser (2004)	Inclusion Rates Louw <i>et al.</i> (2011)
Grain (Maize, wheat and sorghum)	65%	60% - 70%
Bran	16%	5% - 10%
Fishmeal	7%	15% - 25%
Oilcakes	8%	
Salt	1%	
Premixes	2%	5% - 10%
Synthetic lysine and macro minerals	1%	

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

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. 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 (BFAP, 2013), resulting in import parity based pricing of domestically produced soya oilcake for the foreseeable future.

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 approximately 4015 sows and 692 boars. 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 is regarded as a strength of the South African pork industry.

Primary production

Primary pork production in South Africa is a relatively small industry, with a commercial sow herd of approximately 103 000 sows, managed by around 240 commercial producers. Louw *et al.* (2011) indicates that economic viability requires 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 occurs in specialised housing with advanced climate control features, ensuring optimal growing conditions, yet the cost of housing represents a significant barrier to entry for potential market participants. The capital outlay for a new pork farm is 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. At R50 000 per sow, construction of a 300 sow unit would require a capital investment of R15 million. The high level of asset specificity associated with the investment in modern housing facilities creates a further barrier to exist the industry; specialised production units cannot readily be converted to another use, implying 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 costs related to 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.

Despite the small number of 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 implies that many producers have only a small number of abattoirs that they can realistically deliver to. Due to the intensive nature of the production system, 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 reduces flexibility in postponing marketing, leaving producers with few alternatives to accepting the price offered by the abattoir. Prices follow cyclical pattern 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.

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 been particularly hard on pig producers, as feed is the greatest component of variable production costs (Table 3). 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. The share of important variable cost components of the primary producer is summarised in Table 3. Whilst not included in the table, fixed costs represent a significant component of total costs, particularly when producers invest in modern housing facilities that are technically efficient, but costly.

Table 3: Prices and cost structure of primary producers

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

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. 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.

Abattoir level

In South Africa, abattoirs that slaughter 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 at all, 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 capital investment required to enter the market. Markets require a high standard of hygiene as well as

traceability and abattoirs 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).

Margins at abattoir level are small and profitability is greatly dependant on sufficient throughput levels, resulting in varying levels of coordination between producers and abattoirs. While several abattoirs contract producers to deliver a weekly quota, few of these contracts cover price formation; instead prices are determined by market conditions. Within a small number of contracts, the price is determined by a formula that includes cost of production. The fundamental difference in price formation based on the formula and prices discovered based on supply and demand in the market often leads to substantial differences between the two prices. The lack of trust regarding the transparency of price formation at abattoir level does not encourage efficient practice within the value chain and greater access to price information would improve trust at this point.

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). 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. 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.

Producer prices 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 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 be disaggregated 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. Figure 5 illustrates the main cost components and margins at abattoir level, based on prices obtained in March 2013. The sales price accounts for the primal cuts or whole carcass, as well as additional income from the fifth quarter.

The margin received at abattoir level is greater on a Baconer carcass than on a Porker carcass, whilst margins increase 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.

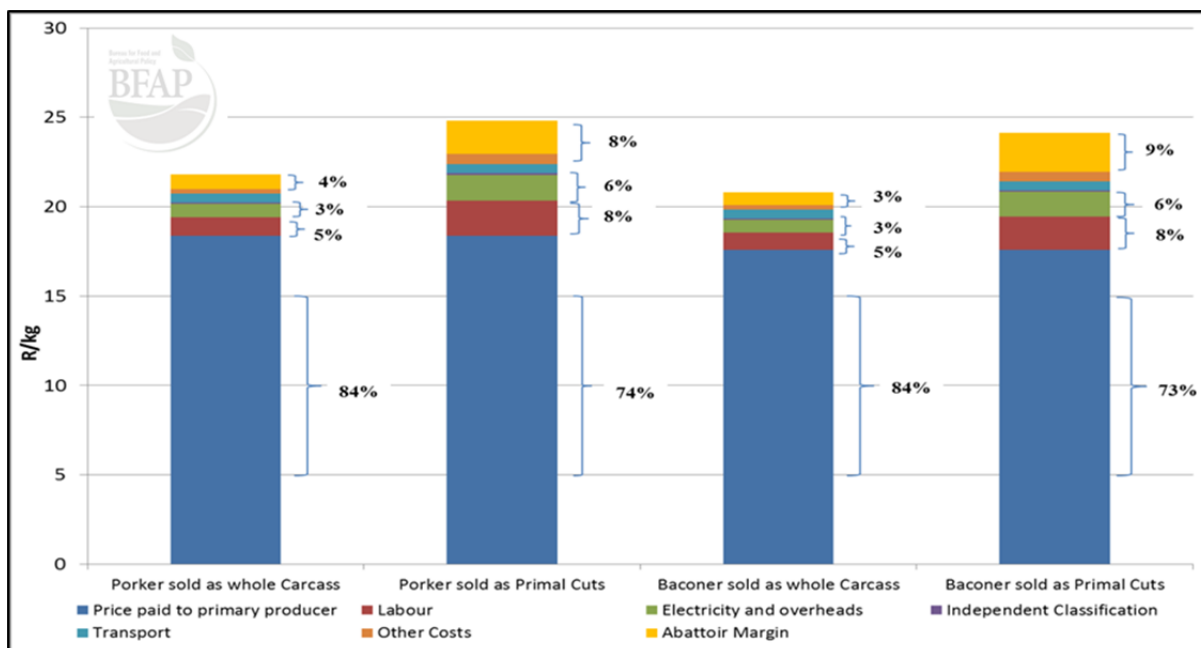


Figure 5: Margins and cost allocations at abattoir level

Source: Compiled from confidential interviews

Processing and Wholesale

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, 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.

As a result of the immense capital investment required to enter the meat processing sector, concentration levels are high and the 2 largest processors (Enterprise Foods and Eskort) account for 80% of the market between them. Extensive overhead costs related to the processing facility further mean that high throughput is required in order to capitalize on economies of scale benefits. In other industries with similar characteristics, significant vertical integration has occurred in order to ensure numbers through the processing facility; yet in the pork processing sector, vertical integration has not been adopted as widely. While most processors are backward integrated to an abattoir, only a few small processors have integrated the entire chain to primary producer level. Enterprise Foods use contracts 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 which includes the cost of production. Producers within this system are assured of a market for output, with clear price formation. 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.

Margin evaluation at processor level requires the calculation of an equivalent selling price for the entire carcass, allowing comparisons with carcass prices at abattoir level. From a processors perspective, much of the carcass is not useful in the production of final products demanded by the consumer and is sold off 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. The block test model insures that 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 4. 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 4: 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 4, 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 5. The price indicated is simply derived from the block test before any margins or conversion costs are added.

Table 5: 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

An illustration of margins and key cost components obtained in comparing a representative price for the entire carcass at processor level with carcass prices at abattoir level are summarised in Figure 6. As processors procure whole carcasses and not primal cuts, the margins are only calculated for a Class BP Baconer whole carcass.

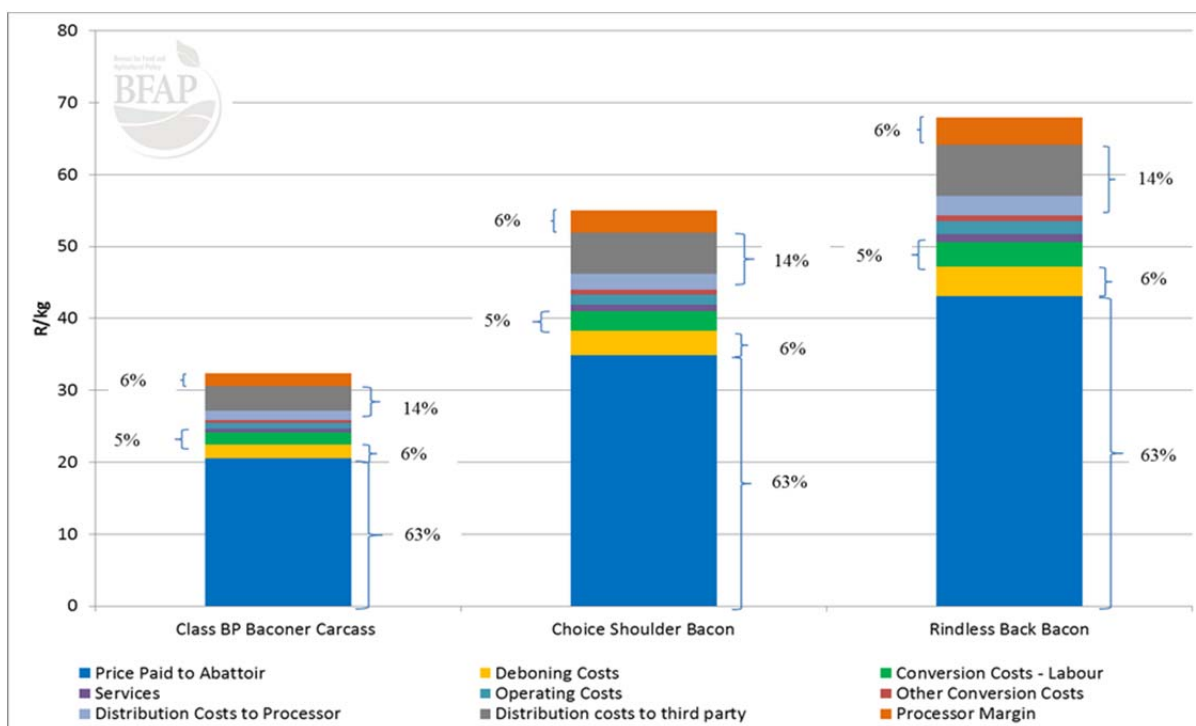


Figure 6: Margins and cost allocations at processor level

Source: Compiled from confidential interviews

Processor distribution to retail level is typically not undertaken by the processors themselves, but rather contracted to a third party distributor, that 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. Primary transport to the distribution centre remains the responsibility of the processor and total distribution costs for the processor 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.

Retail

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.

Margin evaluation at retail level requires a similar approach 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 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 6 indicates the percentage carcass composition of key cuts that are typically expensive, as well as parts of the carcass that receives little return.

Table 6: 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 price information at retail level is 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 7. 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.

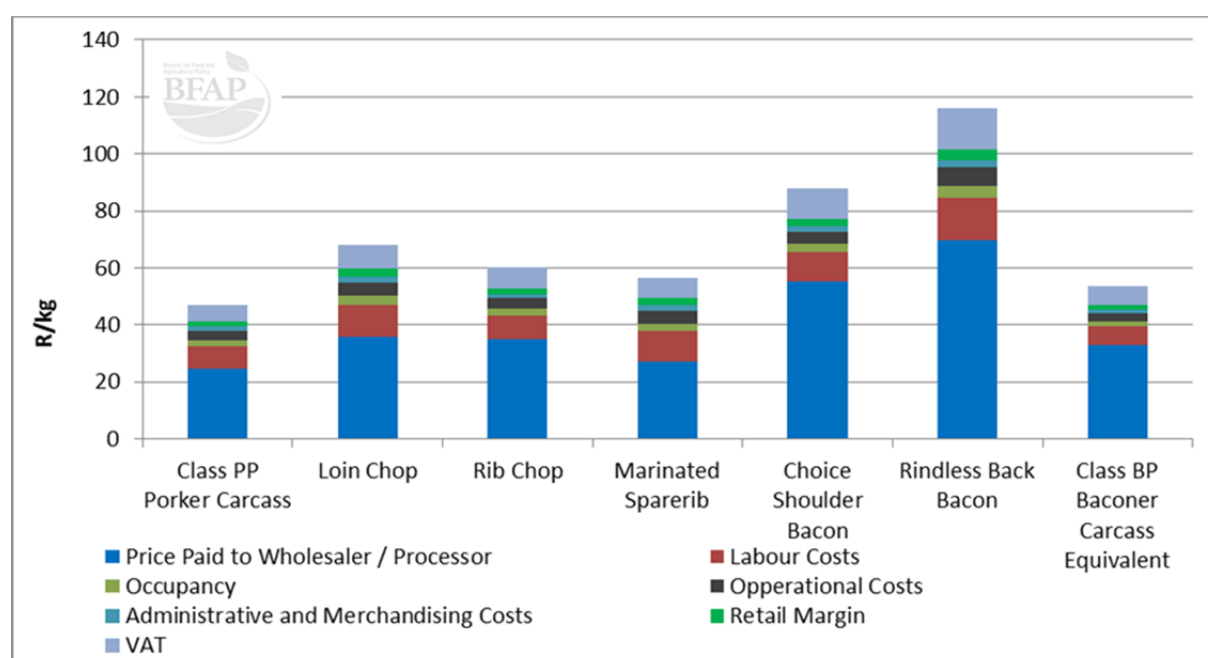


Figure 7: Margins and Cost allocation at retail level

Source: Compiled from confidential interviews and company reports

MARGINS OVER TIME

Previous sections provide a snapshot of the share of the margin added between producer and retail value, 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 7. From Table 7, 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 7: 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)	R40.50/kg	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. 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. Consideration of the processed pork chain shows that margins have increased slightly over the four year period under consideration (Figure 8), a fact attributable to substantial increases in key cost components.

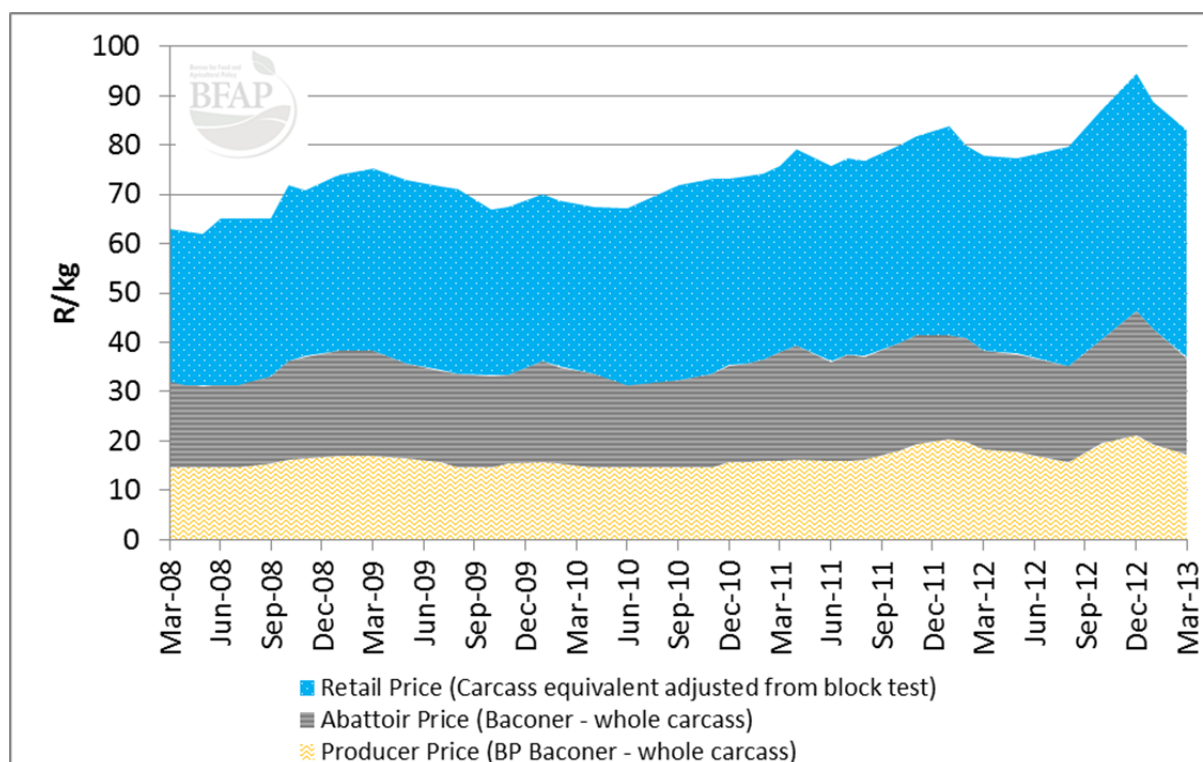


Figure 8: Processed pork margins from 2008 - 2012

Source: Compiled from Stats SA and BFAP data, 2013

The most significant contributors to the cost of various actors across the chain related to labour, distribution, electricity and overheads. When the changes in these three key cost components are considered, the cost of value adding has increased at a much greater rate than inflation (Table 8).

Table 8: 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

COMPETITIVENESS

Factors that affect competitiveness at different levels of the value chain 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. Higher scores indicate factors that enhance competitiveness, while lower scores indicate factors that constrain competitiveness.

Various factors affect the competitiveness of role players at different stages of the pork value chain, yet certain factors, particularly at macro level, were identified that constrain

competitiveness across the entire value chain. These factors include national infrastructure, the political climate, the costs and regulations related to labour, labour productivity and the cost of administered prices like fuel and electricity (Figure 9 and 10).

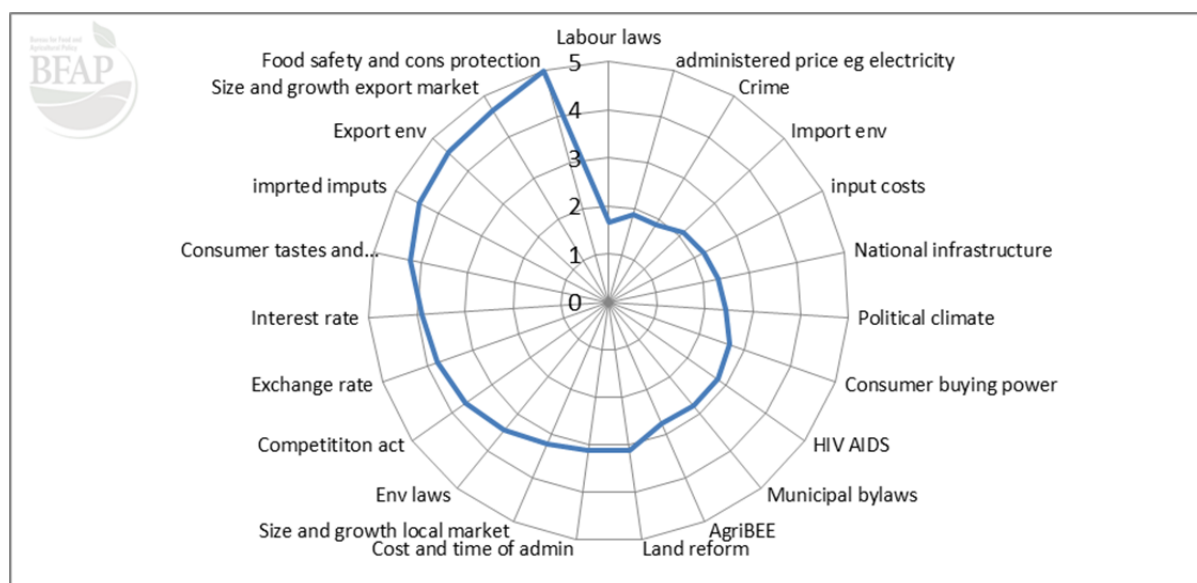


Figure 9: Factors that influence competitiveness in the pork value chain at macro level

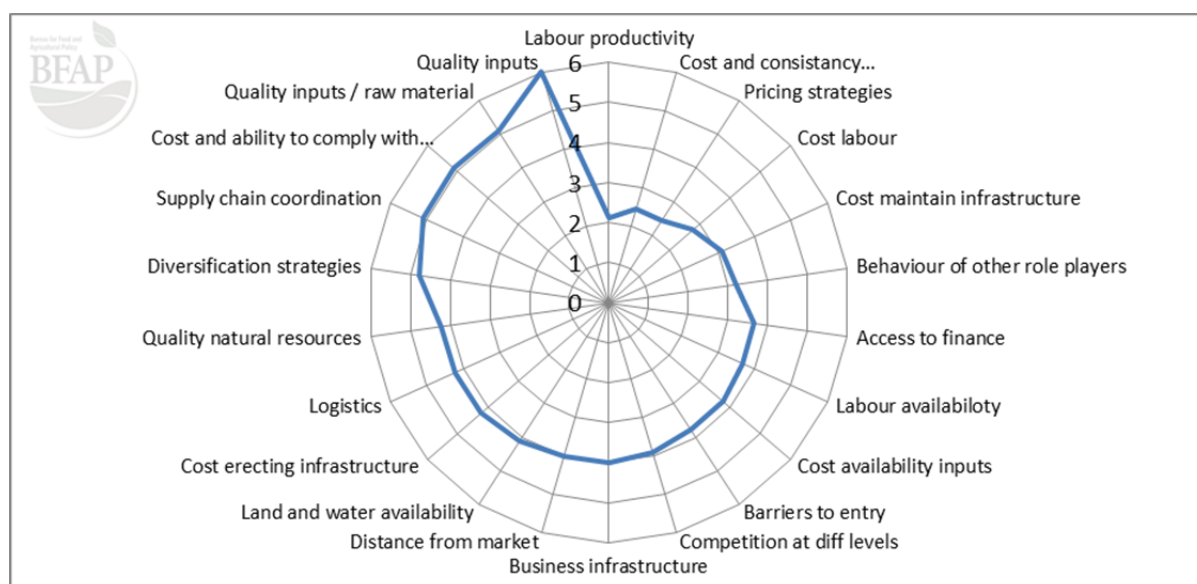


Figure 10: Factors that influence competitiveness in the pork value chain at macro level

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.

CONCLUSION

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. The fundamental drivers of pork consumption were also considered. Though price remains an important consideration, non-economic factors were found to be equally significant in influencing pork consumption patterns in South Africa.

Pork production is very capital intensive, across the value chain from primary production through to processing and the result is that significant economies of scale are required to produce profitably. The scale of production required, as well as the small share of pork in total meat consumption has led to high levels of concentration throughout the value chain. While the number of primary producers is small compared to other agricultural industries, primary producers still outnumber the abattoirs and processors and as a result have limited bargaining power related to prices. The nature of the production system does not allow producers to retain pigs later than the marketing age and hence producers must accept the price offered. The situation often leads to a lack of trust in the price formation mechanism. Modern production technology requires significant investment into highly specific assets and the lack of surety regarding the price received for pigs does not encourage investment into technologies that increases production efficiency significantly.

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.

Competitiveness is affected by various factors at different levels of the value chain; however the study highlighted specific factors that constrain competitiveness throughout the value chain. The constraining factors identified 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. There is no doubt that investment will be required in order to increase production levels and improve the efficiency of the value chain in the long run, however such investment is more likely to materialise in a macro environment that supports the efficient functioning of the South African pork value chain.

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