

✓

# **AN INVESTIGATION INTO THE IMPACT OF IMPORTED PORK ON THE DEMAND FOR PORK IN QUEENSTOWN**

**By**

Adrian Luppnow  
202526733

Submitted in partial fulfillment of the requirements for the degree of  
**MASTER OF BUSINESS ADMINISTRATION**

Graduate School of Business, Faculty of Management  
University of KWAZULU-NATAL

Supervisor: Professor Sam Lubbe  
Co-Supervisor: Professor Anesh Singh

Date: 2007

## DECLARATION

This research has not been previously accepted for any degree, and is not being currently submitted in candidature for any degree.

I declare that this dissertation contains my own work except where specifically acknowledged.

Signed: \_\_\_\_\_ 

Date: \_\_\_\_\_ *29 May 2008* *096887*

## **ACKNOWLEDGEMENTS**

This study was made possible through the help, co-operation and patience of numerous people. I would like to thank all those who made contributions towards this study, several of whom I would like to make special mention of.

My supervisor, Professor Sam Lubbe, for his supervision, encouragement, high standard of research, patience and constructive criticism during this study.

My employer, Jack Miles, for his patience and for giving me the time to complete my study.

My family and Ulandi, for their understanding and moral support offered to me during this study, and for being satisfied with less time and attention than deserved.

My mother, Sonya, for her support on so many levels, the encouragement and example she has set to me all my life.

My dear friend, George van Heerden, without whom my study would not have been possible.

All respondents who took the time to take part in my study.

Finally, to my Almighty Father, for giving me the foresight to embark on this journey, for providing for me and giving me guidance and strength to complete this study.

## ABSTRACT

The demand for meat in South Africa may be growing faster than what the local market can supply. Imported pork may therefore help to meet the growing demand for pork or it may take market share away from the existing local pork market. A study of this nature could not be found. The majority of estimations found dated back to before 1994, many changes have occurred since then. New laws have been implemented and the meat industry has undergone substantial changes.

The main objective of this study is to investigate the effect imported pork products have on the demand for pork in Queenstown. The study set out to determine whether this effect was positive or negative for local business. The motivating factors were investigated to establish what made businesses sell imported pork products and not locally-produced pork products. The results were collected with the use of a questionnaire and were analyzed using Central Tendency Statistics and Descriptive Frequency Statistics. The sample size is relatively small due to the small size of Queenstown. A purposive sample had to be used and all respondents had to be contacted to achieve the highest rate of responses. The small sample size limited the accuracy and number of statistical tests available.

Analysis of the results revealed that the majority of businesses in Queenstown do not sell imported pork, and have not observed a decrease in demand for locally-produced pork products due to the importation of pork. Businesses that made use of imported pork did so to reduce costs of manufacture and also because of the decrease of availability of local pork due to the outbreak of Swine Fever at the time. It is recommended to develop or improve a marketing system for imported pork products. An investigation into the effect of imported beef, mutton and poultry on the demand for meat may give a better indication of demand for all meat products.

## TABLE OF CONTENTS

	PAGE
DECLARATION.....	i
ACKNOWLEDGEMENTS .....	ii
ABSTRACT .....	iii
TABLE OF CONTENTS .....	iv
LIST OF FIGURES .....	viii
LIST OF TABLES .....	ix
LIST OF APPENDICES .....	xi
LIST OF ABBREVIATIONS.....	xii

### Chapter 1: Introduction

1.1 Background .....	1
1.2 Objective of this Study.....	3
1.3 Methodology and Data Used .....	4
1.4 Chapter Outline .....	5
1.5 Conclusion .....	6

### Chapter 2: Literature Review

2.1 Introduction.....	7
2.2 South African Meat Industry .....	7
2.3 Current structure in the Meat Industry .....	10
2.3.1 Meat Board.....	10
2.3.2 Red Meat Research and Development Trust (RMRDT).....	11
2.3.3 Meat Industry Trust (MIT).....	11
2.3.4 Meat Industry Forum (MIF).....	11
2.3.5 South African Meat Industry Company (SAMIC).....	11
2.3.6 Red Meat Abattoir Association.....	12

2.3.7 Abattoir and Meat Classification .....	12
2.3.8 Abattoir Standards .....	15
2.3.9 Food Security .....	16
2.3.10. Animal Welfare.....	17
2.4 Pork Industry.....	17
2.4.1 Background .....	17
2.4.2 World Pork Industry .....	18
2.4.3 South African Pork Industry .....	18
2.4.4 Pork Imports.....	21
2.4.5 Subsidised Imports.....	23
2.4.6 Pig Diseases .....	24
2.5 Promotion and Marketing of Pork in South Africa.....	26
2.6 Per Capita Consumption of Pork .....	27
2.7 Related Studies.....	29
2.7.1 International Related Studies .....	33
2.8 Almost Ideal Demand System (AIDS).....	36
2.9 The Rotterdam and LA/AIDS models .....	39
2.10 Structural Change in Demand for Meat .....	41
2.11 Demand Analysis Models .....	42
2.12 Research Questions .....	42
2.13 Conclusion .....	43

### **Chapter 3: Research Design and Methodology**

3.1 Introduction.....	44
3.2 Types of Data .....	45
3.2.1 Primary Data .....	45
3.2.2 Secondary Data .....	45
3.2.3 Qualitative and Quantitative Data.....	46
3.3 Scaling.....	47
3.3.1 Guttman Scale .....	47

3.3.2 Thurstone Scaling .....	48
3.3.3 Likert Scale .....	50
3.4 Data Collection Method .....	51
3.4.1 Primary Data Collection .....	52
3.4.2 Questionnaire .....	53
3.4.3 Semi Structured Interview .....	54
3.4.4 Covering Letter .....	54
3.5 Questionnaire Validation .....	55
3.5.1 Pilot Test Questionnaire .....	55
3.5.2 University Approval of Questionnaire .....	56
3.6 Research Bias .....	56
3.7 Data Collection Process .....	58
3.8 Data Handling .....	59
3.8.1 Approach to Study .....	59
3.8.2 Central Tendency .....	59
3.8.2.1 Interpretation Rules .....	59
3.8.3 Measures of Dispersion .....	59
3.9 Conclusion .....	60

## **Chapter 4: Data Analysis and Results**

4.1 Introduction .....	61
4.2 Demographics .....	62
4.2.1 Profile of Respondents .....	62
4.2.1.1 Age .....	62
4.2.1.2 Gender .....	62
4.2.1.3 Ethnic Group .....	63
4.3 Meat Industry Sector .....	63
4.4 Position Held in Organisation .....	64
4.5 Demand for Pork .....	64
4.5.1 Pigs Sold/Slaughtered in a Given Month .....	65

4.5.2 Customer Base .....	65
4.5.3 Pork Products Sold .....	66
4.5.4 Respondents Opinion of Imported Pork Products .....	67
4.5.5 Pork Sales.....	67
4.6 Consumer Preference .....	69
4.6.1 Percentage Meat Sales .....	69
4.6.2 Imported Pork Products .....	70
4.6.3 Increased Demand.....	71
4.6.4 Consumer Awareness.....	72
4.7 Product Line.....	74
4.7.1 Quality of Imported Pork .....	74
4.7.2 Sale of Imported Pork Products .....	75
4.7.3. Hygiene Standards of Imported Pork.....	76
4.8 Demand .....	77
4.8.1 Ability to Meet Demand .....	77
4.8.2 Preference for Imported Pork Over South African Pork.....	78
4.9 Statistical Approaches.....	79
4.9.1 Central Tendency Statistics.....	80
4.10 Conclusion .....	91

## **Chapter 5: Conclusion and Recommendations**

5.1 Introduction.....	93
5.2 Research Questions and Findings .....	94
5.3 Limitations .....	99
5.3.1 Sample Size.....	100
5.4 Recommendations for Future Research .....	100
5.5 Conclusion .....	101



## LIST OF FIGURES

### PAGE

<b>Figure 1.1:</b> Map of the Eastern Cape (Source: Adapted, Places, 2006).....	1
<b>Figure 2.1:</b> The South African Pig Herd and Slaughtering (1970 – 2005) (Source: Statistics South Africa, 2006a and SAMIC, 2006b). ....	20
<b>Figure 2.2:</b> Pig Slaughter Numbers (2003 – 2006) (Source: Meat Traders Abattoir, 2006). 20	
<b>Figure 2.3:</b> Pork Import Statistics (2003 – 2005) (Source: Statistics South Africa, 2006a and SAMIC, 2006c).....	23
<b>Figure 2.4:</b> Relation Between Private Consumption Expenditure on Food and the Per Capita Consumption of Pork (1987 – 2004) (Source: Statistics South Africa, 2006c).....	28

## LIST OF TABLES

	PAGE
<b>Table 2.1:</b> Classification Characteristics of Pork. (Source: SAMIC, 2006a).....	14
<b>Table 2.2:</b> Household Preferences for Pork Products (Source: Oyewumi & Jooste, 2006)...	29
<b>Table 3.1:</b> The Difference Between Qualitative Methods and Quantitative Methods (Source: Guidelines for Master's Dissertation, 2006). .....	46
<b>Table 3.2:</b> The Difference Between a Scale and Response Scale (Source: Trochim, 2006). ..	47
<b>Table 4.1:</b> Respondent Age Group.....	62
<b>Table 4.2:</b> Respondent Gender .....	63
<b>Table 4.3:</b> Ethnic Group.....	63
<b>Table 4.4:</b> Meat Industry Sector.....	63
<b>Table 4.5:</b> Respondents' Position in their Organisation .....	64
<b>Table 4.6:</b> Number of Pigs Sold/Slaughtered in a Given Month .....	65
<b>Table 4.7:</b> Size of Customer Base .....	65
<b>Table 4.8:</b> Areas Other than Queenstown Supplied.....	66
<b>Table 4.9:</b> Pork Products Sold.....	66
<b>Table 4.10:</b> Pork Products Sold (Cross tabulation).....	67
<b>Table 4.11:</b> Respondents' Opinions of Imported Pork Products .....	67
<b>Table 4.12:</b> Drop in Sales of Fresh Pork due to the Importation of Pork .....	69
<b>Table 4.13:</b> Percentage of Imported Pork Products Making Up Overall Meat Sales .....	69
<b>Table 4.14:</b> Motivating Factors for Selling Imported Pork.....	70
<b>Table 4.15:</b> How Imported Pork Products are Purchased.....	71
<b>Table 4.16:</b> Increased Demand for Imported Pork Products.....	72
<b>Table 4.17:</b> Customer Awareness in Purchasing Imported Pork Products .....	72
<b>Table 4.18:</b> Respondent Concern Regarding Quality of Pork Sold .....	73
<b>Table 4.19:</b> Respondent Preference for Fresh or Frozen Pork .....	73
<b>Table 4.20:</b> Sales for Pork Products Driven by Price, Quality or Both.....	74
<b>Table 4.21:</b> Quality of Imported Pork Compared to Locally-produced Pork .....	75
<b>Table 4.22:</b> Attempt at Selling Imported Pork .....	76
<b>Table 4.23:</b> Awareness of Hygiene Standards of Imported Pork.....	76

<b>Table 4.24:</b> Concern Regarding Hygiene of Local Abattoirs and Meat Processing Plants ...	77
<b>Table 4.25:</b> Butcheries Able to Meet Demand for Pork Products.....	77
<b>Table 4.26:</b> Customers' Preference for Imported Pork over Local Pork .....	79
<b>Table 4.27:</b> Imported Pork Sold in Original Packaging.....	79
<b>Table 4.28:</b> Pork Sales Appear to be Price-Driven.....	79
<b>Table 4.29:</b> Central Tendency Statistics for Table 4.12, 4.16 and 4.17 .....	80
<b>Table 4.30:</b> Central Tendency Statistics for Table 4.18, 4.23 and 4.24 .....	83
<b>Table 4.31:</b> Central Tendency Statistics for Table 4.21, 4.22 and 4.27 .....	86
<b>Table 4.32:</b> Central Tendency Statistics for Table 4.25, 4.26 and 4.28 .....	88

## **LIST OF APPENDICES**

	<b>PAGE</b>
<b>APPENDIX A: Questionnaire .....</b>	<b>111</b>
<b>APPENDIX B: Concept Matrix.....</b>	<b>121</b>
<b>APPENDIX C: Ethical Clearance Letter .....</b>	<b>124</b>
<b>APPENDIX D: Letter from Meat Traders Abattoir.....</b>	<b>125</b>
<b>APPENDIX E: Letter from Vaughan's Edit.....</b>	<b>126</b>

## LIST OF ABBREVIATIONS

2SLS	– Two Stage Least Squares
AGE	– Applied General Equilibrium
AIDS	– Almost Ideal Demand System
BFAP	– Bureau for Food and Agricultural Policy
CSF	– Classic Swine Fever
EU	– European Union
FMD	– Foot and Mouth Disease
GATT	– General Agreement on Tariffs and Trade
HACCP	– Hazard Analysis Critical Control Points
HIV/AIDS	– Human Immunodeficiency Virus / Acute Immune Deficiency Syndrome
ILS	– Indirect Least Squares
LA/AIDS	– Linear Approximate / Almost Ideal Demand System
LCA	– Life Cycle Assessment
LV / AIDS	– Linear / Almost Ideal Demand System
MIF	– Meat Industry Forum
MIT	– Meat Industry Trust
NASA	– National Aeronautical and Space Administration
NDA	– National Department of Agriculture
NPF	– Novel Protein Foods
OLS	– Ordinary Least Squares
RMMA	– Red Meat Abattoir Association
RMRDT	– Red Meat Research and Development Trust
SAAU	– South African Agricultural Union
SACU	– South African Customs Union
SADC	– South African Development Community
SAMIC	– South African Meat Industry Company
SAMPA	– South African Meat Packers' Association
SAPPO	– South African Pig Producers' Organization
UK	– United Kingdom

USA	– United States of America
WHO	– World Health Organization
WOF	– Warmed Over Flavour

# CHAPTER 1

## INTRODUCTION

### 1.1 Background

The primary objective of this study is to conduct an analysis of the impact of imported pork on the demand for pork. Queenstown has been selected as the area of study for two reasons: The researchers' employer is situated in Queenstown, thus giving access to a customer base and potential respondents for research and secondly, the researchers' place of residence is Queenstown.



**Figure 1.1:** Map of the Eastern Cape (Source: Adapted, Places, 2006).

Figure 1.1 above, shows the geographical location of the town of Queenstown in the Eastern Cape.

According to South African Meat Industry Company (2006a), pigs are generally classified into three categories, namely Porkers, Baconers and Sausage Pigs. Porkers have a carcass weight of between 21kg – 57kg, and are generally used for the fresh meat market. Baconers have a carcass weight of between 58kg – 99kg, and can be used for the fresh meat market, but are generally used for meat processing. Sausage pigs weigh from 100kg upwards and are only used for meat processing. Generally a baconer category pig is ready for slaughter after 10 months from birth. A sow will have an average of 9 pigs per litter, and will have an average of two litters per year.

According to Streicher (2006), South Africa imports on average 23 000 tons of pork per annum. Brazil is the largest supplier of pork to the South African market with 72% of pork imports. The balance of pork imports come from Belgium, France, Italy, Ireland, Australia, Canada, Hungary, U.S.A., Zimbabwe and the U.K. Brazilian pork farmers are subsidized by the Brazilian government, thus making their pork products cheap to import, and often cheaper than South African pork products. South Africa has been importing pork from Brazil for the last ten years. According to Streicher (2006), South Africa initially imported pork carcasses from Brazil without the head and feet at an average of R6 per kilogramme, thus placing considerable pressure on the local market. The South African market has changed, however, and pork cuts are imported from Brazil and not the entire pork carcass as in the past. Imported pork ribs initially made up 80% of imports, with other processed meats making up 20%. Imported pork ribs now make up 50% of imports, with other processed meats making up 50%. Imports from Brazil are down, however, due to an outbreak of Foot and Mouth Disease (Streicher, 2006). An estimated 150 containers (3000 tons) containing beef and pork headed for South Africa had to be returned in 2005 due to the outbreak of this disease in Brazil (Gouws, 2005).

The price of pork in South Africa increased by 15% due to an outbreak of Classical Swine Fever in 2005 (Streicher, 2006). Swine Fever 'hot spots' in the Eastern Cape included Aliwal North, Queenstown, Butterworth, Centane, Cookhouse, Qumbu and Somerset East with an estimated 60 000 pigs having to be culled to curb the spread of the disease. Swine Fever is a



viral disease also known as Hog Cholera and European Swine Fever. It only affects domestic and wild pigs. The disease is untreatable, and can survive in fresh and frozen pork products for extended periods (Streicher, 2006). According to the Department of Agriculture Eastern Cape Province (2006), there are no reported cases of transmission of Classical Swine Fever to humans, but they nonetheless warn that pork meat from infected pig carcasses should not be eaten.

Classical Swine Fever occurs mainly in Asia, Central and South America and parts of Europe and Africa. The most recent case of Classic Swine Fever occurred in the Eastern Cape in South Africa for the past number of years. The last outbreak of Classical Swine Fever in South Africa was in 1918. The most recent outbreak of Classical Swine Fever can be traced to imported pork meat, but cannot be traced to the country of origin. Refrigeration has been found to preserve the virus, while temperatures of  $\pm 100$  degrees Celsius kills it. Inadequate cooking may thus not kill the virus, which may remain in the bone and could be spread to other areas (Streicher, 2006).

The South African processed meat industry is worth in excess of R900 million, with volumes of 80 000 tonne. Polonies have a 40% market share and vienna's have 30%. The remaining 30% market share is made up of bacon, meat spreads, sausages and meat rolls (Eskort, 2006). According to SAMIC (2006b) approximately two million pigs were slaughtered in South Africa in 2002, while pork imports accounted for a further 80 000 tons of pork meats.

## **1.2 Objective of this Study**

The overall objective of this study is to investigate the impact of imported pork on the demand for pork. From the above it can be seen that imported pork products make up a large percentage of pork sold in South Africa every year, hence the importance of this study. According to an animal production report published by SAMIC in 2003, the number of pigs slaughtered in the period 1998/99 was 1 809 773. This number had been reduced to 1 765

122 in 2002/03, showing a decline in the number of slaughter pigs. It is to be investigated whether a decline for locally-produced pork is noticed due to the importation of pork products and whether business such as butcheries and abattoirs can take advantage of a gap in the market and add imported pork to their product line.

### **1.3 Methodology and Data Used**

The research will investigate whether the impact of imported pork has any effect on local businesses. These include abattoirs, butcheries and livestock businesses. The findings of this research may be expected to help in giving businesses an understanding of the situation in the marketplace and offer ways to take advantage of selling imported pork products, or else to adjust business strategy to deal with a potential threat posed by cheaper imported pork products. The study will be conducted using the case study approach, as this will answer the 'who', 'why' and 'how' part of the study. The case study technique will therefore be the preferred research strategy.

A questionnaire will be used to obtain evidence as to the impact of imported pork in the local market. The sample size is expected to be relatively small due to the small size of Queenstown. The questionnaire and interviews will therefore be conducted on a purposive sample. The participants in the questionnaire will be given as much freedom as possible so as not to prejudice their responses, and hence the research findings. The questionnaire and interviews will be undertaken to obtain data from all perspectives of the meat industry.

Secondary data is available from sources such as SAMIC (2003; 2006a, b, c, & d), the National Department of Agriculture (2001), First National Bank (2005) and the South African Pork Producers' Organization (2006). The data obtained from these sources will be used to help obtain the results of this study.

SPSS for Windows™ will be used to code the responses to the results of the questionnaire and interviews. Microsoft Excel™ will be used for simple descriptive data analysis with charts and diagrams.

## **1.4 Chapter Outline**

The study will consist of five chapters, arranged as follows:

### **Chapter One Introduction**

- Background of local meat industry
- Objectives of the study
- Methodologies and data used

### **Chapter Two Literature Review**

- South African meat industry
- Structure of the meat industry
- Pork industry
- Promotion and marketing of pork in South Africa
- Per capita consumption of pork
- Related studies
- Almost ideal demand system (AIDS)
- The Rotterdam and LA/AIDS models
- Structural change in the demand for meat
- Demand analysis models
- Research questions

### **Chapter Three Research Design and Methodology**

- Types of data
- Scaling
- Data collection method

- Questionnaire validation
- Research bias
- Data collection process
- Data handling

#### **Chapter Four Data Analysis and Results**

- Demographics
- Meat industry sector
- Position held in organization
- Demand for pork
- Consumer preference
- Product line
- Demand
- Statistical approaches

#### **Chapter Five Conclusion and Recommendations**

- Research questions
- Review of findings
- Limitations
- Managerial guidelines
- Recommendations for future research

### **1.5 Conclusion**

This chapter started by examining the background to the pork industry and the import industry in South Africa. The objectives of the study were given; also the methodology to be followed and the data which will be used in the study. A chapter outline was then given with a breakdown of the five chapters of the study.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The demand for meat in South Africa is growing more rapidly than the capacity of the local market to supply (Willemse, 2005). The purpose of this study is to determine what effect imported pork has on the supply of locally-produced pork.

The research has been limited to Queenstown in the Eastern Cape. Demand for pork products has declined during the first quarter of 2006, and no research has been conducted to determine the effect of imported pork products on the demand for pork (Miles, 2006).

A search for information on the Internet was carried out through the use of several search engines such as Google, Google Scholar, Yahoo, Ananzi, Nexus, S.A. Media, Sabinet, Agrikon and Science Direct. The following key words were used: Pork production, South African pork, import meat, pork imports, meat demand, South African Agriculture, food, pork, meat, Swine Fever, pork demand, South African pig industry, pork consumption, meat industry and meat industry trends.

The chapter will consist of twelve sections namely: South African meat industry; Current structure in the meat industry; pork industry; promotion and marketing of pork in South Africa; per capita consumption of pork; related studies; Almost Ideal Demand System; The Rotterdam and LA/AIDS models; structural change in the demand for meat; demand analysis models and research questions and conclusion of the chapter

#### **2.2 South African Meat Industry**

Agriculture in South Africa makes up a relatively small share of the country's Gross Domestic Product (GDP), contributing less than 4%, with the agricultural sector employing

approximately 13% of the economically active population in South Africa (Brouwer, 2005). The deregulation of the South African meat industry began in the early 1990's, and the Meat Board was dissolved on 31 December 1997. The meat industry is the largest sub-sector of the South African agricultural sector. The meat industry has links to the leather, abattoir and manufacturing sectors to name a few (Dittmer, 1998). Private consumption expenditure on meat exceeded R 44 million during 2002/2003 (National Department of Agriculture, 2004).

The previous government created the Meat Board under the Marketing Act of 1968. Until its deregulation in 1997, the Meat Board was responsible for controlling and regulating the meat industry in the following ways:

- Densely populated and high-consumption areas were designated as controlled areas, with rural and production areas designated as uncontrolled areas.
- The movement of meat between one controlled area and another; between one uncontrolled area and another and between controlled and uncontrolled areas was restricted, while quotas and permits were issued to control the supply of meat.
- Producers had to abide by compulsory auctioning of carcasses, and had to use Meat Board accredited agency services.
- The Meat Board established floor prices for different grades of meat, thus largely taking this function away from the producer, and operating a single-channel marketing system for slaughter animals, meat, offal and hides and skins.
- Restrictions were imposed on the sale of offal and hides and skins, and restrictions were imposed on the number and size of new abattoirs.
- The Meat Board was the sole importer of meat into South Africa.

One of the restrictions imposed by the Meat Board was the floor-price scheme. This scheme defied economic law and market forces (Dittmer, 1998). The floor scheme was implemented to prevent the price of meat falling excessively due to oversupply. The same was true for high market prices, as a ceiling was set on the price of meat. The Meat Board was extended to farmers. During times of drought, farmers were not permitted to reduce herd sizes, as they were not granted access to the market where they could sell their livestock. This had dire consequences, as stock often died before access was granted to market or the veld was

heavily overgrazed, with consequent damage. Farmers tend to liquidate their flocks and herds in times of drought, leading to an increase in slaughter stock and a decrease in the size of the national herd. This increases the supply of meat in the market place and decreases meat prices. The floor-price scheme was often a cause of many meat freezers being filled to capacity and meat having to be destroyed due to a lack of demand due to excessively high meat prices (Brouwer, 2005).

Three large firms (known as the Big Three) controlled almost 80% of the meat industry in South Africa. These firms were Vleissentraal, Kanhym/Karoo and Imperial Cold Storage (I.C.S.) (Dittmer, 1998 & Luppnow, 2006).

The meat industry in South Africa changed after the Meat Board was abolished after 1993 with The Marketing of Agricultural Products Act (Act No. 47 of 1996) coming into effect on 1 January 1997 (Brouwer, 2005). The new act changed the way meat was marketed in South Africa, with the greatest impact being the following:

- The “Big Three” were significantly rationalized and are no longer a major force in the meat industry in South Africa. One of the Big Three has virtually ceased operating (Luppnow, 2006).
- Smaller abattoirs have been established in all areas of the country, which would not have been possible under the old Meat Board; there are now 470 abattoirs throughout South Africa (RMAA, 2006).
- Small retail and wholesale outlets have been established, and are able to trade freely.
- The abolition of the floor-price scheme has seen the supply of livestock to abattoirs reacting to market forces of supply and demand.
- Prices of livestock and meat are determined by the market and no longer set by a regulatory body.
- The price of offal and hides and skins increased by 500% to producers (Dittmer, 1998).

The meat industry in South Africa is changing. Both international and the South African markets are preparing for a possible outbreak of bird flu, which may cause large-scale

economic instability. Classic Swine Fever outbreaks in South Africa have already caused major losses and instability in the market. In South Africa the demand for meat is outgrowing the supply. The risk of further outbreaks of contagious animal diseases, both locally and abroad, could have a further negative effect on the South African meat industry. The pattern of food consumption in South Africa is changing and the trend will increase over the next three to four years. It is a worldwide phenomenon that growing economies lead to more disposable income and greater household spending, thus changing people's eating habits (Willemse, 2005).

Diets have been found to change from grain-based foods to protein-based foods with more expensive foods being consumed. This causes a decrease in grain consumption and an increase in meat and meat product consumption. More homes now have access to electricity and basic services, which have a direct influence on people's eating patterns. Disposable income has been given a further boost with the government introducing more grants, estimated at R72 million each year. Figures regarding the importation of meat showed a tendency to increase in the first quarter of 2005. A problem may arise with regard to the demand for meat, especially with the increase in animal disease in South Africa and abroad. An increase in the maize and oil cake price is putting pressure on the local meat industry with regard to profit margins as the price of animal feed increases. The market share for chicken and pork is growing in South Africa and abroad. This is due to shorter production cycles and more efficient technology being used in the production process. This involves improvements in turning grain into protein. There have also been greater marketing drives and product re-branding (Willemse, 2005).

## **2.3 Current Structure of the Meat Industry**

### **2.3.1 Meat Board**

The Meat Board was dissolved on 31 December 1997. It had been funded through a compulsory levy on meat and all meat products. This levy is still in existence due to the finalization of outstanding court cases involving the old Meat Board (Brouwer, 2005).



### **2.3.2 Red Meat Research and Development Trust (RMRDT)**

Before its abolition, the Meat Board concluded research contracts on behalf of the meat industry. The Minister of Agriculture approved a research trust in 1993, R15 million was set aside for this purpose. The Red Meat Research and Development Trust was created in January 1997 (Brouwer, 2005).

### **2.3.3 Meat Industry Trust (MIT)**

The Minister of Agriculture approved the MIT in March 1998. R1 million was set aside for it. A further R38 million has since been added. The Minister of Agriculture and other role players in the meat industry may each appoint three trustees to oversee the running of the MIT. These trustees oversee both the MIT and the RMRDT (Brouwer, 2005).

### **2.3.4 Meat Industry Forum (MIF)**

The MIF was created to represent each sector of the meat industry as a result of the Marketing of Agricultural Products Act (Act No. 47 of 1996). Any national organization may become a member of the MIF, provided certain criteria set out by the MIF are met (Brouwer, 2005).

### **2.3.5 South African Meat Industry Company (SAMIC)**

SAMIC is a national representative structure of the South African meat industry, managed through a democratically elected board of directors. SAMIC was established as a Section 21 company in 1997. SAMIC's vision is to promote the long-term global success of the South African meat industry. In its implementing role SAMIC's strategy focuses on the provision of services to meet its stated objectives. Hence SAMIC will:

- Be the custodian of the South African meat industry.
- Unify the strategic initiatives of the industry by promoting effective communication and co-ordination of their efforts. (SAMIC 2006d)

- Be efficient in the provision of specific common services required by the meat industry (SAMIC, 2006d).

The following role players in the meat industry are represented by SAMIC:

- SA Federation of Livestock and Meat Brokers (SAFLA&MB)
- SA Feedlot Association (SAFA)
- Red Meat Producers' Organization (RPO)
- SA Pork Producers' Organisation (SAPPO)
- National Emergent Red Meat Producers' Organisation (NERPO)
- SA Meat Processors' Organisation (SAMPA)
- National Federation of Meat Traders (NFMT)
- Skin, Hides and Leather Council (SHALC)
- Federation of Meat Traders' Unions
- SA National Consumers' Union (SANCU)
- Association of Meat Importers and Exporters (AMIE)
- Red Meat Abattoir Association (RMAA)

(SAMIC, 2006d)

### **2.3.6 Red Meat Abattoir Association**

The RMAA is a representative forum for abattoir owners in South Africa. The RMAA is an independent organization, which was formed in February 1991 and is based on membership (SAMIC, 2006d).

### **2.3.7 Abattoir and Meat Classification**

The South African Meat Industry Company (SAMIC) offers services to the meat industry such as training, health inspection, meat inspection and meat classification. SAMIC health inspectors are contracted to abattoirs, ensuring a uniform standard in the meat industry. This is achieved through meat inspection and classification (grading). In this way SAMIC strives to enhance the industry's competitiveness and stimulate consumer demand and confidence.

Table 2.1 (p. 14) outlines the different grading of pigs: conformation, sex and damage to pig carcass (SAMIC, 2006d). A pig carcass is graded according to the thickness of fat, an instrument known as an introscope being used for this purpose. The introscope is inserted into the pig carcass between the second- and third- last rib. It has a sharp point with a clear glass side, which houses a light. The light is switched on, the point inserted into the carcass and then withdrawn. This gives a measurement of the fat thickness, thus enabling grading. All instruments used for this purpose work on the same principle. The carcass conformation is judged by how rounded the pig carcass looks to the naked eye. The sex of the carcass is then checked, and any damage is graded 1 to 3, depending on severity (Miles, 2006).

The meat or health inspector may trim the damaged meat off the carcass if the damaged area is severe and looks unsightly; the trimmed meat will then be condemned and destroyed (Miles, 2006).

Abattoirs are graded as rural, low- or high- throughput, as set out in the Meat Safety Act (Act No. 40 of 2000), and this is determined by their lairage and chiller capacity. The area of a lairage and chiller is calculated in units of 0,6m of chiller space. This space is required for one beef or six sheep or two pig carcasses. The holding capacity of lairages is calculated as follows: one unit equals 1,75m<sup>2</sup> for cattle, 0,5m<sup>2</sup> for sheep and small pigs and 0,75m<sup>2</sup> for sausage pigs. This is set out in the Meat Safety Act of 2000 (National Department of Agriculture, 2001).

The requirements for rural abattoirs are as follows:

- A maximum of two units per day may be slaughtered.
- The abattoir building is to meet the requirements as set out by the Meat Safety Act of 2000 (National Department of Agriculture, 2001).

% 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 specification in respect of % meat applies in the case of Ru, Sucklers ≤20 Kg and Sausagers ≥ 91 Kg.		
** In case of introscope		
Fat Thickness *		
Muscle Thickness *		
(Only in the case of the Hennessy classification apparatus)		



Conformation	Class
Very Flat	1
Flat	2
Medium	3
Round	4
Very Round	5

Damage	Class
Slight	1
Moderate	2
Severe	3

<b>Sex</b> (Only boar carcasses are identified)
--

\* Measured between 2nd and 3rd last rib, 45mm from carcass midline.

**Marks for classification characteristics on pork carcasses:**

Trait	Mark	Where on the carcass
Class	P.O.R.C.U.S. Ru	One mark on each side. One mark on each side.
Suckling Pig	S	One mark on the forehead.
Sausager	W	One mark on the buttock.
Conformation (1 - 5)	E.g. Class 3 	One mark on each side.
Damage * (1 - 3)	< 1 > < 2 > < 3 >	Taking into account the area of damage, only one One mark on the carcass.
Sex		One mark on each side.

\* Damage, if it occurs, is indicated on a scale of 1 to 3 for the areas concerned, viz. B (buttock), L (loin), and F (Forequarter)

\* No roller marks are used on pork carcasses.

**Table 2.1:** Classification Characteristics of Pork. (Source: SAMIC, 2006a).

The requirements for low-throughput abattoirs are as follows:

- A maximum of twenty units per day may be slaughtered, but if only one species is slaughtered per day, the maximum throughput is:
  - Cattle, horses or sausage pigs > 90kg      20 units
  - Sheep or goats      40 units; or
  - Pigs      30 units
- The abattoir building is to meet the requirements as set out by the Meat Safety Act of 2000 (National Department of Agriculture, 2001).

The requirements for high-throughput abattoirs are as follows:

- The maximum slaughter units permissible per day is determined by the provincial executive officer and depends on the capacity of lairages, hourly throughput potential relative to equipment and facilities. This includes hanging space, chiller capacity and rough offal handling and chilling capacity.
- The abattoir building is to meet the requirements as set out by the Meat Safety Act of 2000 (National Department of Agriculture, 2001).

### **2.3.8 Abattoir Standards**

Almost all markets require a form of traceability from the exporting country. Many supply chains also require a form of traceability and high standards of hygiene from suppliers of meat products. A simple system of ear tags is sufficient as a form of traceability from the farmer, as the supply chain from the farmer to the abattoir is uncluttered. Very few changes of ownership take place until the animal is slaughtered. A farmer can make use of a very simple database system at a relatively low cost, and ear tags to keep track of livestock (Osborne, 2006).

Animals on the slaughter floor can be traced by making use of a barcode system linked to a central database. The carcass can then be traced from arrival at the abattoir to the slaughter floor to dispatch. A software package designed for this purpose (Abaserve for example) can trace an animal from arrival with an ear tag to dispatch with a barcode number. Abaserve

makes it possible for all animals dispatched to a customer to be traced back to a specific farmer. Meat processing plants require a more advanced system with additional capital outlay. Abadebone is an add-on programme to Abaserve, and is capable of supplying traceability of certain cuts to a specific carcass and back to the producer. This step is vital should an infectious disease be found in meat and processed meat products.

Recall procedures need to be in place at an abattoir in the event of detection of contaminated or diseased meat. Recall is an important aspect of HACCP (Hazard Analysis Critical Control Points). HACCP has become a requirement of most customers internationally, including South Africa. NASA and Pillsbury developed HACCP as a control measure to guarantee the safety of food used in the space program in the USA. A number of abattoirs and meat processing plants in South Africa are HACCP accredited. Abattoirs are required to meet the requirements set out in the Meat Safety Act, 2000. NDA inspectors pay regular visits to abattoirs to ensure compliance to the Meat Safety Act and compliance to the Hygiene Assessment System (SAPPO, 2006).

### **2.3.9 Food Security**

Food security has been improved internationally, as measured by the per-person availability of food for human consumption. Progress has been uneven, with many developing countries failing to improve, and the food security situation is worse now in some countries than twenty years ago. World production of food is sufficient to assure satisfactory nutrition levels. Undernourished and food-insecure people in the world are poor in terms of income with which to purchase food, or else they lack access to agricultural resources, education, technology, infrastructure and credit with which to produce their own food. They therefore depend on local agriculture to make a living. Development of agriculture is seen as the first crucial step toward development, reduction of poverty and food insecurity, and eventually freedom from economic dependence on poor agricultural resources (Alexandratos, 1999).

According to Mulder (2005), meat regulations will be imposed in South Africa, thus increasing the price of meat. Consumers will, however, have more peace of mind about the

safety of meat products purchased. Role-players such as abattoirs, meat handlers, importers, exporters, hides and skins and meat processors will be required to register. The National Agricultural Marketing Forum recommends that all role players pay a yearly tariff to be used for communication, consumer education, research, Black Economic Empowerment and customer assurances of quality and food safety. It is estimated that this yearly tariff would generate R27 million.

#### **2.3.10. Animal Welfare**

The welfare of farm animals is an important public and political issue in the United Kingdom and Europe, with consumers becoming increasingly concerned about the manner in which farm animals are treated and reared. Most food shopping is now taking place in supermarkets with several retailers in the chain between the farm and the food purchased by consumers. This has given supermarkets an enormous influence over animal welfare standards adopted in the production of meat sold in their stores. Supermarkets are a dominant force with great buying power. This gives them the ability to impose tight requirements on how the food they sell is produced. Woolworth's in South Africa, for example, sells only free-range eggs, where the chickens have access to feed, water and being outdoors instead of chickens confined in batteries. Supermarkets also have scope for promoting one product over another using price promotion, positioning of products in their stores, labeling and publicity or customer information campaigns (Lymbery, 2002).

### **2.4 Pork Industry**

#### **2.4.1 Background**

The South African Pig Development Association was founded during the 1930's by commercial pork producers, and voluntarily funded by its members. The S. A. Pig Development Association consisted of five provincial branches (Transvaal, Cape, Natal, Eastern Cape and Free State). This was the forerunner of the National Pig Committee of the former South African Agricultural Union (SAAU, now Agri S.A.), that has evolved into the

South African Pork Producers Organisation (SAPPO). The marketing and grading of pork differed from one abattoir to another; pork producers therefore wanted an opportunity to make their own decisions on matters concerning the pork industry, as commercial pork production is an intensive farming venture (SAPPO, 2006).

A full-time manager was appointed for SAPPO in 1992. SAPPO began functioning as an integrating national commodity organization within the SAAU in 1993. SAPPO serves commercial pork producers by cooperating and collective bargaining within agriculture, as well as liaising with other sectoral and government bodies in the interests of their members. SAPPO continuously lobbies with government on issues concerning the pork industry and the importation of pork products into South Africa, such as import tariffs (Streicher, 2006).

#### **2.4.2 World Pork Industry**

According to the National Department of Agriculture (2001), the pork industry is the largest meat industry in the world, producing more than eighty three thousand tones of pork per annum. China produces almost half of this, followed by the European Union (21%) and the USA (10%). South Africa's pig slaughter accounts for less than 0,2% of world pig production.

Average world pork consumption is 15 kilograms per capita per annum with Denmark, Germany and China being the countries with the highest per capita consumption of between 28 kilograms and 76 kilograms. South African pork consumption is approximately 3.1 kilograms per capita (Eskort, 2006).

#### **2.4.3 South African Pork Industry**

It is estimated that between 55% and 65% of all pork produced in South Africa is used for meat processing and manufacture. Manufactured meats consist of bacon, sausages, hams, vienna's and polonies. The remaining pork will be consumed as fresh meat, such as roasts, ribs and pork chops. Pork is seen as an alternative white meat, with consumer spending



increasing in pork products due to factors such as quality, taste, nutrition, health and affordability (Eskort, 2006 & Baderson, 2007).

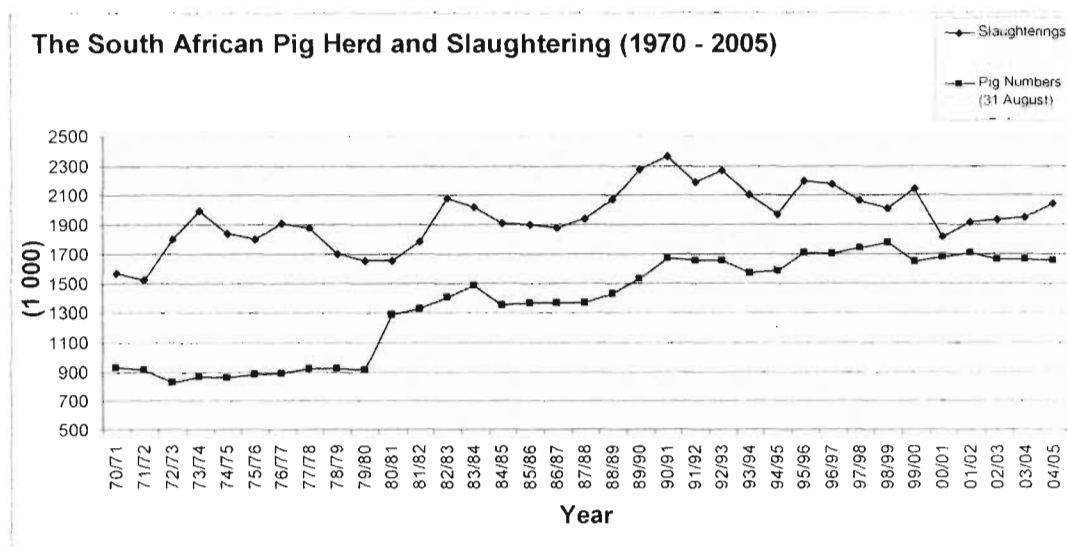
Pigs are found predominantly in the Eastern Cape, Western Cape and North-West Provinces. The majority of pigs are kept for slaughter (95%) with the remaining 5% kept for breeding purposes. It is estimated that pig numbers increased from 1,556 million in August 2000 to 1,592 million pigs in August 2001 (National Department of Agriculture, 2001).

The SAPPO membership is calculated in terms of the number of commercial sows in the country, and is as follows:

- Gauteng 13 400
- Limpopo 11 600
- Mpumalanga 11 700
- Northwest – 17 050
- Kwazulu Natal – 16 600
- Western Cape – 16 000
- Eastern Cape – 4 400
- Free State – 7 750
- Northern Cape – 1 500
- Total 100 000 Sows

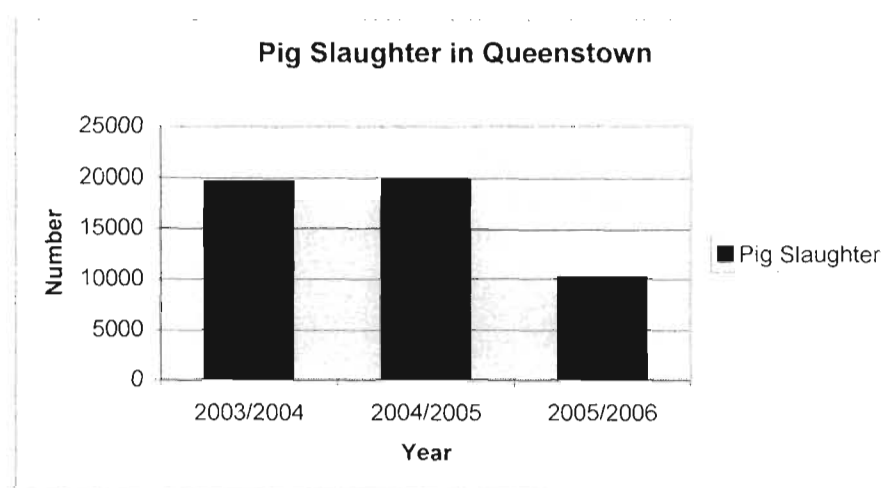
There are approximately 7 000 boars, and approximately 600 pig farmers in South Africa, of which 26 are stud breeders. There are a total of 46 registered pig abattoirs in South Africa accounting for 87% of the pigs slaughtered annually (SAMIC, 2006b).

The growth of the pig herd and the number of pigs slaughtered in South Africa can be attributed to increasing investment in the pork industry. Computerized feeding, environmental maintenance equipment and increased disease control are all factors contributing to improved production and efficiency in the pork industry. Figure 2.1, below, shows the relationship between the number of pigs slaughtered and the domestic pig herd in South Africa between 1970 and 2005.



**Figure 2.1:** The South African Pig Herd and Slaughtering (1970 – 2005) (Source: Statistics SA, 2006a and SAMIC, 2006b).

Figure 2.2, shows the number of pigs slaughtered by Meat Traders' Abattoir annually from 1 June 2003 to 31 May 2006. Meat Traders Abattoir is the only abattoir slaughtering pigs in the Queenstown area. The decrease in the number of pigs slaughtered by Meat Traders' Abattoir during the years 2005/2006 is due to the outbreak of Swine Fever (Miles, 2006).



**Figure 2.2:** Pig Slaughter Numbers (2003 – 2006) (Source: Meat Traders Abattoir, 2006).

According to Stoltz (2006) and Wright (2006), SAPPO and the South African Meat Packers' Association (SAMPA) should create a working committee with representatives from both organizations to tackle issues concerning both parties. The most important issues are illegal imports of pork products into South Africa, and food safety. According to Stoltz (2006) and Wright (2006), the industry will have to take responsibility for these issues, as the government appears unwilling to do so.

#### **2.4.4 Pork Imports**

According to National Department of Agriculture, (2006), import regulations for the importation of meat are as follows:

- 1) Imported meat entering South Africa must be stored in such a way as to ensure:
  - That no contamination, soiling or deterioration may take place in any way.
  - Imported meat cannot contaminate other products in the cold store.
- 2) Security measures have to be in place to ensure that no part of the consignment is removed before final release.
- 3) The veterinarian is to ensure that there is a proper correlation between the imported meat and the relevant import permit.
- 4) The temperature records of the meat during transport must be examined to ensure a continuous cold chain.
- 5) Samples must be removed for examination and it must be confirmed that no soiling, contamination or deterioration of the meat has taken place during transportation prior to storage.
- 6) The veterinarian is to conduct any other action necessary to ensure that the meat is safe and suitable for human consumption, and poses no threat of transmitting a contagious animal disease (National Department of Agriculture, 2006).

Imports of pork decreased from 8 579 tons in 2001 to 8 196 tons in 2002. In 2002, 70% of the total pork imports came from the Americas, of which 97% came from Brazil. The consumption of pork increased from 122 000 tons in 2001/2002 to 123 000 tons in

2002/2003. Imports of pork accounted for 6,7% of all pork consumed during 2002/2003 (SAMIC, 2003).

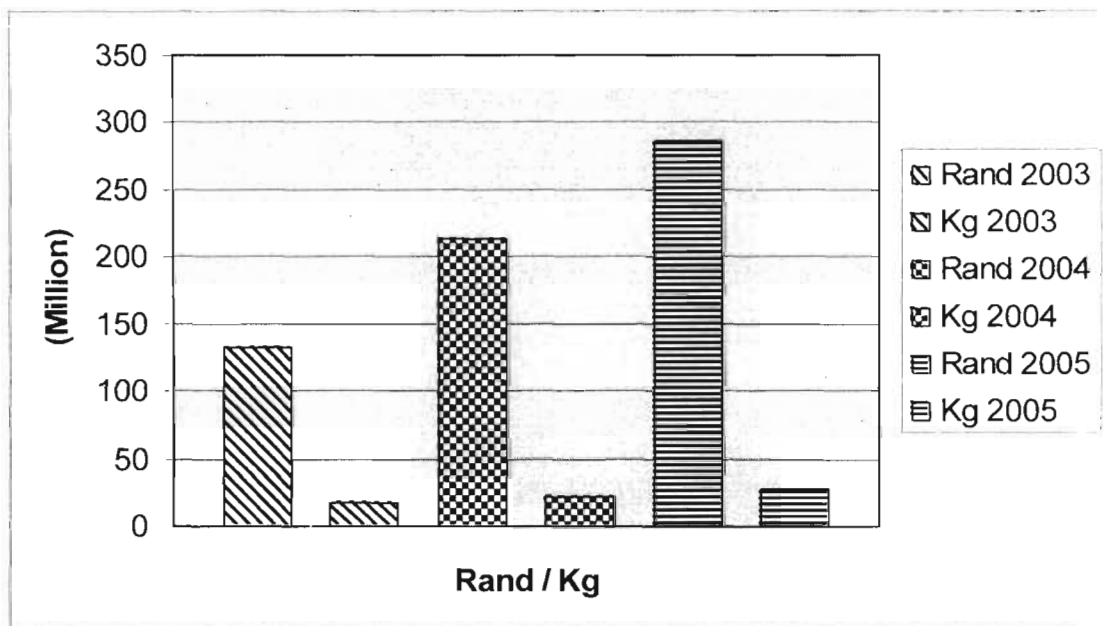
The biggest single threat to the South African pork industry is the large amount of poultry meat coming into South Africa, mainly from the USA. More than 50% of all imported meat is comprised of poultry meat (Visser, 2004). The chicken market in the USA has a preference toward chicken breast meat. Chicken portions are therefore a surplus product. Chicken portions make up the bulk of the chicken export market in the USA and land in South Africa at a lower price than the domestic producer price (Luppnow, 2006).

The ripple effect of the imported poultry market on the South African pork industry is as follows:

- The import levy on poultry meat is 17% at present, while turkey meat is duty-free.
- Imported poultry, turkey meat and mechanically deboned meat (MDM) are in direct competition with locally-processed fresh pork and poultry meat.
- The low product prices of imported meat are usually not passed onto the consumer, thus further pressuring the local pork and poultry producers (Visser, 2004).

SAPPO has made an appeal to government to increase import duties on pork after a 30 percent increase in imports following a strengthening of the South African Rand. SAPPO hopes that this will put an end to foreign markets dumping cheaper pork on the South African market (Schoeman, 2003).

The Southern African Development Community (SADC) agreement ensures that tariffs on meat will be reduced to zero over a five year period. This will be done in five equal cuts. Tariffs on products with a tariff higher than or equal to 17%, but lower than or equal to 25% will be eliminated over two years in three tariff cuts. Products with a tariff below 17% have carried a zero tariff rating from 1 September 2000. Certain pork products fall into the lower than 17% category. Specific tariffs to be reduced to zero over four years, but sanitary requirements will still be applied. Non-SADC and -SACU countries have up to twelve years to reduce their tariffs to zero (Brouwer, 2005).



**Figure 2.3:** Pork Import Statistics (2003 – 2005) (Source: Statistics SA, 2006b and Samic, 2006c).

Figure 2.3, shows the relationship between pork imports and the R/Kg price of imported pork products for the period 2003 to 2005. According to Tjaronda (2005) all meat import permits from Brazil were cancelled due to a foot and mouth outbreak in the country. The minister of agriculture, water and forestry took this precautionary measure. It was feared that this action might cause a shortage of pork in the market.

#### 2.4.5 Subsidised Imports

The meat industry in South Africa was exposed to the European Union's (EU) subsidized agricultural sector in 1992 with the introduction of GATT. Agriculture is a highly subsidized sector in the world economy. This gives exporting countries an advantage over South African agriculture, as subsidized meat products can be exported to South Africa at a cheaper rate than the local producers can supply. The importation of pork and pork products is in the process of being applied to export countries which do not subsidise meat exports as is done by EU countries (Brouwer, 2005).

#### **2.4.6 Pig Diseases**

The outbreak of stock diseases has cost the meat industry large sums of money over the last decade, and in some cases, a long-term loss of an established market. After 1995 an increased application of policy guidelines implemented by countries to ensure food safety and stock disease control led to feedback to the SPS committee in the World Health Organisation (WHO) of any disease- or health- related occurrence in terms of meat. In 2004, 200 cases were recorded, representing 60% of reported cases. Outbreaks of disease had a dramatic influence on international markets, influencing both price and availability of meat. Favourable results may be expected for non-producing countries once the USA is re-admitted as an exporter. This could, however, pose a serious threat to smaller producing markets without the necessary protection, as was the case with Brazil's over-production of pork on smaller, unprotected industries in the past (Du Toit, 2004).

Classical Swine Fever (CSF) or Hog Cholera is a notifiable, controlled and contagious febrile, viral disease of domesticated and wild pigs. The disease occurs in much of Asia, Central and South America, parts of Europe and Africa. South Africa has been free of the disease since 1918. The virus survives well in cold conditions, and can survive in processed meat for long periods. The virus is not known to affect humans. CSF can be transmitted from live infected pigs or uncooked pig products. The virus is found in the blood, all tissues, secretions and excretions of sick and dead animals. Transmission of the disease can occur through direct contact between animals, indirect contact through premises, implements, people, vehicles, clothes, traders and farm visitors, insufficiently-cooked waste food fed to pigs and transplacental infection to piglets (Department of Agriculture Eastern Cape Province, 2005).

CSF can affect the pig industry as the disease can spread rapidly amongst pigs, causing a very high mortality rate, which could wipe out an entire industry if left uncontrolled. A country has to be free of CSF in order to be accepted as an international trade partner for the import and export of pork meat and other products derived from pigs. The National Department of Agriculture warns against the consumption of pork meat or pork products

from sick or diseased animals; although CSF is not harmful to humans, other infections may have harmful consequences (Department of Agriculture Eastern Cape Province, 2006).

The outbreak of CSF in South Africa in 2006 can be traced to imported pork, though the country of origin cannot be traced (Streicher, 2006). A consignment of imported pork went 'bad' due to a break in the cold chain. This pork was then fed to pigs in the Western Cape as waste food. The infected pigs were then culled and donated to a needy community, which transmitted the disease further. Refrigeration has been found to preserve the virus, while a temperature of +/- 100°C would kill the virus. The virus may therefore still be present in the bone of cooked pork, which may spread the disease to other areas (Streicher, 2006).

The outbreak of CSF in 2006 led to the culling of between 18 000 and 26 000 pigs in the Eastern Cape, thus losing production capacity. Number Two Piggeries, the largest pork producer in the Eastern Cape, lost pig units in Aliwal North and Cookhouse, costing the company an estimated R65 million in income (Moodley, 2006). The market slaughter value of the pigs which were lost at these units is estimated at about R21 million (Blatch, 2005). The culling of pigs is likely to increase South Africa's reliance on pork imports, as South Africa is a net importer of pork (Njobeni, 2005). Kabeli (2005), notes that the outbreak of Swine Fever in the Eastern Cape could lead to the culling of 27 000 pigs from Mr. David Osborne a main supplier of pork in South Africa. This may have an impact on the supply of pigs to abattoirs by increasing the demand for imported pork products.

Foot and mouth disease (FMD) is one of the most contagious diseases of mammals, and can cause huge economic losses if not controlled. The disease affects only cloven-hoofed animals (Tjaronda, 2005). FMD is an acutely infectious disease, which causes fever, followed by the development of blisters, mainly in the mouth and on the feet of the animal. The virus is present in the fluid found in the blisters, milk, dung and saliva. The disease can be transmitted through contact with any of these objects, and is a danger to other stock. The virus is present in blood at the height of the disease; pigs produce large numbers of virus particles. FMD can be spread through the air under favourable climatic conditions, and

animals can contract the disease through contact with infected animals or feed which has been contaminated by another infected animal (Tjaronda, 2005).

In the past, outbreaks of the disease have been linked to the importation of meat and meat products. The movement of animals, people and vehicles has been known to spread the disease. Contaminated vehicles may leave the virus on the road surface where other vehicles may pick it up, thereby aiding in the spread of the disease. Disinfecting vehicles is effective against this. FMD is commonly found in Asia, South America and Africa, and is rarely contracted by humans. The last known case of a human contracting FMD was in 1966 in Great Britain (DEFRA, 2003). FMD symptoms in pigs are fever, lameness, loss of appetite, and dullness in colour. Mouth symptoms are not usually visible, but blisters may develop on the snout and tongue. FMD can be destroyed by sunlight, heat, low humidity and certain disinfectants. The virus may be preserved in frozen or chilled meat and meat products from an infected animal. There is at present no known cure for FMD, which will run its course in two to three weeks, after which most animals will recover naturally. Slaughter of infected animals may be the best action, as this will inhibit widespread transmission of the disease, which could otherwise cause significant welfare and economic problems for a country. Infected carcasses may be buried or incinerated (DEFRA, 2003).

Meat destined for South Africa from Brazil was returned in 2005 due to an outbreak of foot and mouth disease. The South African government cancelled all meat import permits from Brazil. One hundred and fifty containers (3 000 tons) of beef and pork products were returned (Gouws, 2005).

## **2.5 Promotion and Marketing of Pork in South Africa**

According to Leach, (2006), there are three main demand factors regarding pork consumption in South Africa, namely, disposable income, food safety and quality assurance and promotion of the product. The main price factors for pork are input costs, seasonal costs and imports. Input costs are costs of feed such as maize, protein, wheat bran, vitamins and minerals. Seasonal costs are those that depend on the demand for pigs and the pigs' breeding



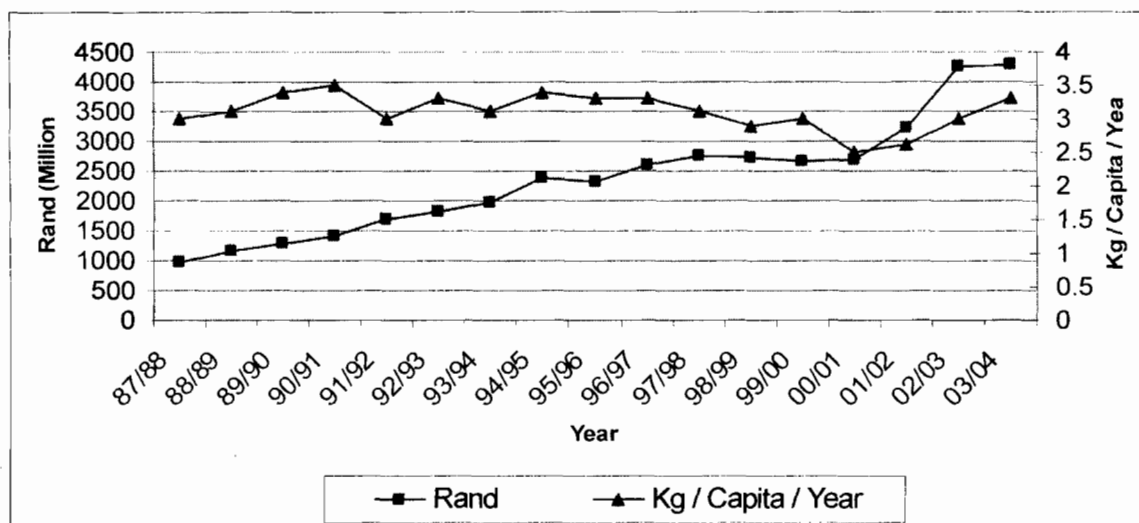
cycles, for example, the increased demand for pork and pork products from November to January. Import costs are incurred with the importing of pork, such as import tariffs and the exchange rate at the time (Leach, 2006).

Pork promotion has been a highly debated issue for many years within the industry. SAPPO embarked on advertising and marketing campaign in the past, with little impact on the pork industry as a whole (SAPPO, 2006). The per capita consumption of pork declined after the closure of the Meat Board from 3,4kg in 1996 to 3kg in 1999 / 2000, with R500 000 having been spent on advertising (Visser, 2004). A study undertaken by Dransfield, Ngapo, Nielsen, Bredahl, Sjoden, Magnussen, Campo and Nute, (2004), found that consumers were focused on colour and fatness of the meat, and that they preferred pork labeled as originating from their own country compared with pork that was labeled as imported.

The months January to May are traditionally a low consumption period. This lower consumption, with supply not adjusting, tends to force prices down, putting pressure on profits. The periodic decline is due to lower consumer spending. Pork and pork products are usually at the lower end of the price range compared to other meat products. The level of pork imports is also lower due to animal diseases such as FMD and CSF, in major export countries. These factors lead to a lower demand, which could be addressed through greater promotion and marketing to stimulate domestic demand for pork, especially with the emergent middle-income group, who are not traditionally pork consumers. This group represents the fastest growing sector in the South African market, and includes Asians, and urban and rural blacks (SAPPO, 2006).

## **2.6 Per Capita Consumption of Pork**

The per capita consumption of pork has remained relatively constant since 2000, as can be seen in Figure 2.4 below, which shows the relation between private consumption expenditure on food and per capita consumption of pork (Statistics SA, 2006c).



**Figure 2.4:** Relation between private consumption expenditure on food and the per capita consumption of pork (1987 – 2004) (Source: Statistics SA, 2006c).

Income levels affect the type of meat cuts purchased by consumers, with a greater demand for more expensive meat cuts as income levels increase. In low-income countries increase in per capita income, urbanisation and changes in prices have been the main factors behind a higher demand for meat. In high-income countries factors other than income have become important, as shown in studies of consumer buying patterns. These are health, diet, convenience food and changes in demographic features (Brouwer, 2005).

Table 2.2, below, shows the household preferences for pork products by race and product preference, in a study undertaken by Oyewumi and Jooste (2006). From the Table it can be seen that whites consume the most pork products, while the percentage of blacks who consume value-added pork products is close to the consumption of whites. Asians consume the least pork products of all the respondents in the survey. A reason for this may be due to religious beliefs where the consumption of pork may be forbidden (Oyewumi & Jooste, 2006).

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

**Table 2.2:** Household preferences for pork products (Source: Oyewumi & Jooste, 2006).

## 2.7 Related Studies

A study undertaken by Oyewumi and Jooste (2006), regarding measuring the determinants of pork consumption in Bloemfontein, Central South Africa, set out to investigate the determinants of household pork consumption by using a logistic regression procedure. The equation shows the regression procedure used; the model was then fitted with ten variables that affect meat consumption in South Africa. Six variables were found to be significant at the ten percent level of significance. These include monthly household income, current household monthly expenditure on meat, relative price of pork, preference for value-added pork products, price of substitutes and the response of household change to pork quality. Simulations revealed that quality assurance and value-adding have a high potential to double household pork consumption. According to Oyewumi and Jooste (2006) households derive utility from food consumption; decisions regarding food are made on the basis of a set of perception characteristics that translate to preferences. Below is the model used by Oyewumi and Jooste (2006) to determine factors affecting household choice of pork consumption.

$$\phi_i = E(y_i = 1 / X_i) = \frac{1}{1 + e^{-(\beta_0 + \sum_j \beta_j x_{ij})}}$$

where:  $\phi_i$  stands for the probability that household  $i$  consume pork,  $y_i$  is the observed pork consumption status of the household  $i$ ,  $x_{ij}$  are factors determining household pork consumption  $i$ , and  $\beta_j$  stands for the parameters to be estimated.

Denoting  $\beta + \sum_{j=1}^{k=n} \beta_{ij}$  as  $Z_i$ , equation 1 can be written to give the probability of pork consumption of household  $i$  as:

$$\phi_i = E(y_i = 1/X_i) = \frac{1}{1 + e^{-Z_i}}$$

Given equation 2, the probability that a household will not consume pork can be written as  $(1 - \phi_i)$ . This is expressed in equation 3 as follows:

$$(1 - \phi_i) = \frac{1}{1 + e^{Z_i}}$$

From the two equations above, the odds ratio,  $\phi_i / (1 - \phi_i)$ , is given by equation 4 as

$$\left( \frac{\phi_i}{1 - \phi_i} \right) = \frac{1 + e^{Z_i}}{1 + e^{-Z_i}} = e^{Z_i}$$

The natural logarithm of the odds ratio in equation 4 gives rise to equation 5

$$\text{Ln} \left( \frac{\phi_i}{1 - \phi_i} \right) = \beta + \sum_{j=1}^{k=n} \beta_{ij} + \varepsilon_i$$

Rearranging equation 5 with the dependent variable (pork consumption) in log odds, the logistic regression can be manipulated to calculate conditional probabilities as:

$$\phi_i = \frac{e \left( \frac{\beta_0}{\beta_0} + \sum_{j=1}^{k=n} \frac{\beta_j x_{ij}}{\beta_j x_{ij}} \right)}{1 + e \left( \frac{\beta_0}{\beta_0} + \sum_{j=1}^{k=n} \frac{\beta_j x_{ij}}{\beta_j x_{ij}} \right)}$$

Once the conditional probabilities have been calculated for each sample household, the partial effects of the continuous individual variables on household pork consumption can be calculated by the expression:

$$\frac{\partial \phi_i}{\partial x_{ij}} = \phi_i (1 - \phi_i) \beta_j$$

The “partial” effects of the discrete variables are calculated by taking the difference of the probabilities estimated when the value of the variable is set to 1 and 0 ( $x_i = 0, x_i = 1$ ) respectively (Oyewumi & Jooste, 2006).

Demand relations for meat in South Africa were estimated and interpreted by Taljaard (2003). He used the Rotterdam and Linearized Almost Ideal Demand System (LV/AIDS) models. These models were estimated and tested to determine which one would give the best fit for South African meat data. Tests for separability included an F and likelihood ratio. Both tests rejected the null hypothesis of weak separability between meat, eggs and milk as protein sources, thus indicating that the demand model for meat should be estimated separately from eggs and milk. Tests between the four meat products failed to reject the null hypothesis, thus confirming that these meat products should be modeled together. The results showed that beef and mutton are luxury goods in South Africa (Taljaard, 2003).

Visser (2004) undertook an in-depth review of meat market surveys covering the years from 1970 to 2000. The object of the study was to reconcile meat quality; genetics and the consumer with bio-economic pig production in the South African pig supply chain. An analysis of the pig supply chain was carried out. The pig industry structure was researched with an emphasis on production statistics, pig feed, genetic improvement, and pig information systems, abattoirs and slaughter statistics. All levels in the production chain must be integrated to embrace the concept of quality (Visser, 2004).

Meat consumption trends in South Africa were analyzed to give a broader understanding of South African consumer spending on meat by Taljaard, Jooste and Asfaha (2006a). Changes

in per capita meat consumption were observed in different meat categories, although the aggregate per capita meat consumption in South Africa has remained constant for the last thirty-four years. Changes in the contributions of economic and non-economic factors towards meat demand were identified over time by applying ordinary least squares (OLS) and the Johansen cointegration approach to a conventional demand function. It was found from the analysis that non-economic factors play a role in determining meat consumption in South Africa.

Expected consumption of protein feed in South Africa by 2020 was analyzed and interpreted by McGuigan and Nieuwoudt (2002). Pork production prices were projected to decline because of expected technological advances. This factor was projected to contribute to an increase in protein usage, assuming an absence of significant real income growth rates. It was found that population growth remained the most important demand driver. Scenario analysis showed that alternative population growth rates have a significant impact on projections, and the negative effect of HIV/AIDS on population growth and the restrictions on protein use were evident. According to Lukoto (2004), families across South Africa will be cutting back on non-essential purchases such as meat in order to survive the financial impact of HIV/AIDS on their household budgets, due to medical and transport costs of family members who have contracted the HI virus and the increase in interest rates.

According to McGuigan and Nieuwoudt (2002), Estimating future South African consumption under alternative assumptions of expected future economic and social conditions will help guide decisions affecting future production capacity. From 1990 to 2000 world pork production increased and prices declined while the slaughter weights of pigs in the USA increased. This could be attributed to the effects of technology, while future improvements are likely as researchers learn more about animal requirements and genetics, and develop improved feeding strategies. A future price index for pork production was calculated as shown:

$$PI_{py} = TI_{py} * IPI_y$$

where

$PI_{py}$  = price index for product p in year y.

$TI_{py}$  = technology index for product p in year y.

$IPI_y$  = international protein price index.

The effect of projected prices on consumption is calculated as:

$$FCon_p = Pe_p * (Pi_p - 100) * DDF_p$$

where

$FCon_p$  = future consumption index of product p in year y.

$Pe_p$  = price elasticity of demand for product p.

$DDF_p$  = demand index for product p.

Future price index for pork production

(Source: McGuigan & Nieuwoudt, 2002).

Comparing consumption indices with demand indices shows the effect of expected price trends. Real prices of pork were predicted to decrease. Therefore future consumption is expected to increase more than predicted on demand shifters alone (McGuigan & Nieuwoudt, 2002).

### 2.7.1 International Related Studies

A study undertaken by Bryhni, Byrne, Rodbotten, Claudi-Magnussen, Agerhem, Johanssen, Lea and Martens (2002), regarding consumer perceptions of pork in Denmark, Norway and Sweden set out to determine how the consumer perceived eating quality of pork. Multivariate statistical techniques were applied to investigate differences among consumers. Flavour was ranked as the most important attribute, while the most important reason for buying pork was its suitability for many dishes, pleasant flavour, everyday food, accessibility, affordability, leanness, juiciness, tenderness and generally a good food to have at a party or banquet. It was found that the most important sensory quality of pork is flavour, juiciness and the absence of "off" flavour such as rancidity and warmed over flavour (WOF). WOF occurs in pre-cooked

and ready-to-eat products, when there may be a loss of meatiness and a development of rancid off flavours with cooked meat chill storage. The present results indicate that most consumers have a positive perception of pork. Young health-conscious consumers were more aware of fat content and were found to consume less pork than older consumers (Bryhni *et al.*, 2002).

A study undertaken by Guenther, Jensen, Batres-Marquez and Chen (2005), regarding socio-demographic, knowledge, and attitudinal factors related to meat consumption in the United States, set out to provide information regarding meat consumption and factors explaining differences within subpopulations, and also to evaluate how knowledge and attitudes towards nutrition and awareness of diet and health influence meat consumption. The study sampled both children and adults from the Continuing Survey of Food Intakes by Individuals, from the Diet and Health Knowledge Survey. Food intake and self-assessed dietary characteristics were described by weighted averages and means. Relationships between types of meat intake, dietary characteristics and demographics were evaluated using a two-stage, multivariate regression model. It was found that individuals in higher-income households consumed more chicken, while those in lower-income households consumed mostly processed pork products. Socio-demographic indicators were found to be strong predictors of the probability of choosing particular types of meat, and the amounts consumed. Knowledge and attitudes toward diet and meat products were found to influence choices (Guenther *et al.*, 2005).

A study conducted by Ngapo, Martin and Dransfield (2005), regarding international preferences for pork appearance: II. Factors influencing consumer choice, found that the preference for pork varied in fat covering, lean colour, marbling and drip differed among the twenty-two countries studied. It was found that the influence of Socio-demographic factors and eating habits of consumers was a poor predictor of preferences for pork appearance characteristics. In the study 80% of consumers liked pork and thought that the quality was almost always good. Pork was liked mostly for its taste. It was found that gender had the most consistent influence, with a greater proportion of women choosing a leaner external fat covering, though not on marbled pork.



A study by Bredahl, Grunert and Fertin (1998), regarding, relating consumer perceptions of pork quality to physical product characteristics found that consumers form expectations about pork quality at the point of purchase. Expectations are based on quality cues available to them in the shop. The results of their study show that quality expectations and experience diverge widely, and that both are only weakly related to objective product characteristics (Bredahl *et al.*). A similar study was undertaken by Dransfield *et al.* (2004), regarding consumer choice. They sought to determine how choice and suggested price was related to various factors: appearance, taste, information concerning country of origin and organic pig production. They tested the reaction of consumers to the appearance and taste, with and without information concerning outdoor production of pigs. The tests were conducted in France, Denmark, Sweden and the U.K. All consumers focused on colour and fatness of the meat. It was found that consumers preferred pork labeled as originating from their own country to that labeled as imported. Pork labeled as home-produced or outdoor-produced was more appreciated (Dransfield *et al.*, 2004).

Another similar study was undertaken by Glitsch (2000), regarding consumer perceptions of fresh meat quality: cross-national comparison was carried out in six European countries, namely, Germany, Ireland, Italy, Spain, Sweden and the U.K. Quality evaluation of fresh meat is supposed to consist of two phases. The first phase occurs before the actual purchase and the second phase after purchase, and the meat is consumed. It was found that for pork the place of purchase plays an important role as a quality indicator, while the colour of the meat is the most important intrinsic quality indicator. The second phase of quality evaluation (after purchase) found that the flavour of the meat is one of the most significant quality characteristics, while freshness was shown to be the most important indicator of all (Glitsch, 2000).

A study was conducted by Verbeke and Viaene (1999), regarding beliefs, attitude and behaviour towards fresh meat consumption in Belgium: empirical evidence from a consumer survey set out to investigate forces impacting on meat consumption and consumer attitude towards meat in many European countries. Attitudes, beliefs and behaviour towards fresh beef, pork and poultry were investigated. Quantitative marketing research was undertaken by

means of a survey, which included 320 fresh meat consumers in Belgium. Data analysis included descriptive profile analysis, factor analysis and statistical validation of perceived associations by means of chi-squared, F-statistics and t-statistics. The analysis demonstrated the importance of safety-related meat attributes in impacting beef and pork consumption. It was found from the results that future meat consumption will be based on guarantees of safety by the beef and pork sectors. Consumer perceptions of such products were also found to be important, especially in the case of pork products. Key points that emerged for the future include animal welfare and production methods, as well as the leanness of meat (Verbeke & Viaene, 1999).

A study by Zhu and van Ierland (2005), regarding a model for consumer preferences for novel protein foods and environmental quality set out to develop an environmental Applied General Equilibrium (AGE) model. This model includes the economic functions of the environment, to investigate the impact of consumer preference changes towards a greater consumption of Novel Protein Foods (NPF), and towards a greater willingness to pay more for the protection of the environment in the European Union (EU). NPFs are modern plant protein-based food products designed to be desirable in flavour and texture, and can be manufactured from peas, soybeans, other protein crops and grasses. An environmental life-cycle assessment (LCA) showed that NPFs are more environmentally friendly than pork production, as animal protein production, especially pork, was shown to have high environmental impacts. According to Zhu and van Ierland (2005), several studies indicate that health and food safety concerns have become important to consumers when purchasing food products. For many consumers these concerns show themselves in the selection of products, as can be seen in increased purchases of diet and low fat foods (Zhu & van Ierland, 2005).

## **2.8 Almost Ideal Demand System (AIDS)**

The Almost Ideal Demand System model was developed by Deaton and Meulbauer in the late 1970's and is the most recent breakthrough in demand system generations. According to Alston and Chalfant, (as cited by Taljaard, 2003), the AIDS and Rotterdam models have

become prominent in demand analysis in the field of agricultural economics and has been widely adopted by agricultural economists, making it the model of choice for demand analysts (Taljaard, 2003).

According to Deaton and Meulbauer, Alston and Chalfant and Eales and Unnevehr, (as cited by Taljaard, 2003), the popularity of the Almost Ideal Demand System model can be explained by:

- It is as flexible as other locally flexible function forms, but has the advantage of being compatible with aggregation over consumers. The AIDS model can therefore be interpreted in terms of economic models of consumer behaviour when estimated with aggregated or disaggregated data (Glewwe, 2001) and (Taljaard, 2003).
- It corresponds with a well-defined preference structure, and is derived from a specific cost function, making it convenient for welfare analysis.
- Estimated parameters are easily tested and/or imposed, as the AIDS model depends only on homogeneity and symmetry restrictions.
- The Linear Approximate version of the AIDS models (LA/AIDS) is relatively easy to estimate and interpret.
- It gives an arbitrary first order approximation to any demand system.
- It satisfies the axioms of choice exactly.
- It aggregates perfectly across consumers without invoking parallel linear Engel curves.
- It has a functional form which is consistent with known household budget data (Taljaard, 2003).

Intercepts of share equations generally include demand shift variables. In the Almost Ideal Demand System the estimates depend on units of measure. Demand analysis often includes variables other than price and income in equations. Demographic and seasonal variables may often be included. In applications of AIDS the intercepts of the expenditure share equations are commonly expressed as linear functions of other explanatory variables, which mean that results are not invariant to disproportionate changes in units of measure (Alston, Chalfant and Piggott, 1999).

The equation shows that the Almost Ideal model is derived from the expenditure function:

$$E(p, u) = \exp[a(p) + ub(p)],$$

Where:

$$a(p) + \ln P = \delta + \alpha' \hat{p} + (1/2) \hat{p}' \Gamma \hat{p}$$

and

$$b(p) = \prod_{j=1}^n p_j^{\beta_j}$$

The corresponding vector of share equation is:

$$w = \alpha + \Gamma \hat{p} + \beta \ln(M/P),$$

where:  $w$  denotes the vector of budget shares,  $p$  denotes the vector of prices,  $M$  is total expenditure,  $\hat{p}$  denotes the vector of logarithms of  $p$ , and the parameters to be estimated are  $\delta$ , the vectors  $\alpha$  and  $\beta$ , and the matrix  $\Gamma$ . Let  $i$  denote a unit vector. To satisfy homogeneity, adding up and symmetry the following restrictions must hold:

$$i' \alpha = 1, \quad i' \Gamma = 0, \quad i' \beta = 0, \quad \Gamma' = \Gamma.$$

When the intercepts ( $\alpha$ ) of the share equations are expressed as linear functions of some demand shift variable  $Z$ ,  $\alpha$  is redefined as  $\alpha = \alpha_0 + \lambda' Z$ , and the restrictions  $i' \alpha_0 = 1$  and  $\lambda = 0$  are required for adding up. The effects of change in  $Z$  are thus seen as changes in the parameters of the expenditure function, and integrability is preserved in the share equations by letting each element of  $\alpha$  vary with  $Z$ , while retaining the adding up restriction. The share equations become:

$$W = \alpha_0 + \lambda' Z + \Gamma \hat{p} + \beta \ln M - \beta [\delta + (\alpha_0 + \lambda' Z)' \hat{p} + (1/2) \hat{p}' \Gamma \hat{p}].$$

Expenditure function derived from the Almost Ideal Demand Model. (Source: Alston *et al.*, 1999).

Zhuang and Abbott (2006) used the AIDS model to generate a systems estimate of the key agricultural commodities in China, namely, wheat, rice, corn, pork and poultry. Estimation results for single commodity simultaneous equation models were presented and tested on market power in trade, using results for the AIDS model of food demand. They then compared the results of estimated elasticities from previous studies, with their own estimated elasticities. The price elasticity of pork in China was found to be  $-0.339$ . Pork is therefore seen as a necessity and is price inelastic. The income elasticity of pork in China was found to be  $0.136$ . The findings suggested that elasticity in foreign import demand or export supply tended to be greater and more statistically significant when the foreign behavioral equation was specified inversely in each commodity model. The estimation results found that China has market power in the trade of all five agricultural commodities mentioned above (Zhuang & Abbott, 2006).

## **2.9 The Rotterdam and LA/AIDS models**

According to Taljaard, Van Schalkwyk and Alemu (2006b), the Linear Approximated Almost Ideal Demand System (LA/AIDS) model has proved to be better suited to South African meat demand studies. A study was undertaken by Taljaard *et al.* in 2004 regarding the demand for meat in South Africa: An almost ideal estimation was used to anticipate the demand relations for four meat types (beef, chicken, pork and mutton) in South Africa from 1970 – 2000. A test for weak separability, including an F and likelihood ratio version failed to reject the null hypothesis of weak separability, thus confirming that the four meat types are not separable, and should therefore be modeled together. According to Taljaard *et al.*, (2004), the only difference between the AIDS and the LA/AIDS lies in the specification of the price index and the use of differential functional forms of the index. The LA/AIDS model provides results that compare reasonably well to the AIDS model as discussed above.

In the study a system-wide demand approach was used to estimate the demand relations for meat in South Africa. The calculated expenditure elasticities showed that beef and mutton are luxury products, with pork being considered close to a luxury product. Chicken was the only meat considered a necessity. Compared to previous estimates for meat in South Africa, the compensated and uncompensated own and cross price elasticities, the LA/AIDS estimates were lower (more inelastic). This was attributed to two factors; the fact that the estimates were for different time periods, and the estimation technique used. The LA/AIDS estimates were found to compare better to estimates of countries like the US, UK and Korea, with similar time periods and techniques (Taljaard *et al.*, 2004).

According to Taljaard *et al.* (2006b), the Rotterdam and LA/AIDS models exhibit many similarities. They both have locally flexible functional forms, same data requirements are equally thrifty with respect to number of parameters, and both are linear in parameters. Since these two models share these characteristics they are likely to continue to be selected more often.

Consider the following two models:

$$\begin{array}{ll} \text{LA/AIDS: } f(y) = X\beta_1 + u_1 & u_1 \approx N(0, \sigma_1^2 I) \\ \text{Rotterdam: } g(y) = Z\beta_2 + u_2 & u_2 \approx N(0, \sigma_2^2 I) \end{array}$$

Where:  $X$  is an  $x \times k$  vector and  $Z$  is a  $n \times l$  vector.

The two models may generally have some explanatory variables in common, so that:

$$X = [X_1 X_*] \quad Z = [X_1 Z_*]$$

Setting up a composite or artificial model within which both models are nested. The composite model can be written as:

$$\text{Composite: } y = (1-\alpha)X\beta + \alpha(Z\gamma) + u$$

Where:  $\alpha$  is a scalar parameter. When  $\alpha = 0$ , the composite model reduces to the LA/AIDS model, and when  $\alpha = 1$ , the composite model reduces to the Rotterdam Model.

LA/AIDS Models (Taljaard *et al.*, 2006b).

## 2.10 Structural Change in the Demand for Meat

According to Chavas (1983), economists have long thought that shocks in the economy can lead to permanent changes in behavioral relationships. Supply and demand elasticities estimated from econometric models may therefore change over time; this could be due to technology, a shift in consumer preferences or institutional change. Allowing parameters to change as the situation changes in a linear model may be one way of handling this problem so that the model provides a local approximation of the behavioral relationship. Numerous examples of structural change exist, such as the change in the demand for meat in the late 1970's. The concern of consumers about fat and cholesterol may have produced an important shift in meat preferences. Consider the linear model:

$$Y_t = X_t \beta_t + e_t$$

where:  $Y_t$  is a  $(n \times 1)$  vector of the observations on  $n$  dependent variables.  $X_t$  is a  $(n \times k)$  matrix of  $n$  observations on  $k$  predetermined variables.  $\beta_t$  is a  $(k \times 1)$  vector of parameters and  $t$  denoted the  $t$ th time period. The term  $e_t$  is a  $(n \times 1)$  random vector, serially uncorrelated and distributed with mean zero and covariance matrix,  $E(e_t e_t') = \sigma$  (Chavas, 1983).

U.S. meat demand in the 1970's identified structural changes that occurred for beef and poultry, but not for pork during the last part of the 1970's identifying a growing influence of pork prices on beef consumption (Chavas, 1983).

## **2.11 Demand Analysis Models**

Bowmaker (1988) estimated a set of demand equations for three South African agricultural products, representing three demand systems (red meats, fruits and vegetables). He used monthly data taken from crops and markets from December 1982 to February 1988 inclusive. Primary demand equations were estimated using Ordinary Least Squares (OLS) to correctly specify the price/consumption relationships represented by the data. Data in all equations were deflated with a commodity price index and converted to natural logarithmic form. The Two Stage Least Squares (2SLS) regression procedure was used to obtain the results. The purpose of the study was to promote understanding of how these demand systems function. Hancock (1983) estimated South Africa's demand for red meat, poultry and pork using OLS, Indirect Least Squares (ILS) and the 2SLS regression procedures in order to calculate own and cross elasticities.

## **2.12 Research Questions**

The research questions to be answered in this study are:

1. What is the effect of importing pork on the demand for pork?
2. Do consumers prefer imported pork to South African-produced pork, and are they made aware that they are purchasing an imported pork product?
3. Can an abattoir such as Meat Traders take advantage of imported pork products by offering a wider product line, and is quality an important factor to consumers when purchasing pork products?
4. Do butcheries sell imported pork products, and what are the motivating factors for a butchery to sell imported pork, such as price, quality or the local pork market not meeting demand for pork products?



## 2.13 Conclusion

This chapter started by giving an overview of the South African meat industry and the old Meat Board. An overview of the current situation in the South African meat industry was given, and all the bodies making up the South African meat industry were considered in detail. Abattoir standards, food security and animal welfare were considered in detail, as well as their role in the meat industry. An overview of the pork industry in South Africa and the world was given, and shown to be one of the largest meat industries. Import regulations regarding the importing of meat were listed and the danger of imported pork and subsidized imports on the local pork industry were shown. It was shown how devastating pig disease can be to an industry if not controlled.

A review of literature on international and local meat demand relations proved that the demand for meat products has changed over time as consumers' tastes and preferences have changed and developed. The Almost Ideal Demand System (AIDS), Rotterdam and Linear Approximated Almost Ideal Demand System (LA/AIDS) were found to be popular in agricultural economics.

Little research on this specific topic could be found locally. For this reason a study of this nature may be of importance to the local pork industry and suppliers of pork products, as noted in the chapter.

The next chapter discusses the design and methodology followed in conducting field work, which will be carried out with the help of a questionnaire. The sample design and sampling techniques used will be discussed. The choice of the sample size will be discussed, as well as the limitations encountered with regard to the sample size. Full details of the data collection process will be given, including data techniques, procedures used and data gathering methods. The use of computer software such as SPSS for Windows™ will provide encoding and answers to collected data from questionnaires. The quality of data collected will be discussed, showing any shortcomings and limitations in the data collected.

## **CHAPTER 3**

### **RESEARCH DESIGN AND METHODOLOGY**

#### **3.1 Introduction**

The previous chapter dealt with a literature review detailing all literature relevant to this study. This chapter will detail the practical aspect of research, which will be conducted to answer the following research questions:

1. What effect does the importing of pork have, on the demand for local pork?
2. Do consumers prefer imported pork to South African-produced pork, and are they made aware of the fact that they are purchasing an imported pork product?
3. Can an abattoir such as Meat Traders take advantage of imported pork products by offering a wider product line, is quality an important factor to consumers when purchasing pork products and are imported pork products of a higher quality than locally produced pork products?
4. Do butcheries sell imported pork products, and what are the motivating factors for a butchery to sell imported pork, such as price, quality or the local pork market not meeting demand for pork products?

In this chapter various forms of data, such as primary and secondary data, will be investigated. The design and methodology followed in conducting field work, which will be carried out with the help of a questionnaire, will be discussed in this chapter. The choice of the sample size will be considered, as well as the limitations encountered with regard to sample size. Full details of the data collection process will be given. This will include data techniques and procedures used, and data gathering methods. Different forms of scaling a questionnaire will be described. The use of a questionnaire, covering letter, questionnaire for distribution and pilot testing a questionnaire will be investigated. The use of SPSS for Windows™ computer software will provide encoding and answers to collected data from questionnaires.

A search for information on the Internet regarding research methodology was carried out through the use of several search engines such as Google, Google Scholar and Yahoo. Textbooks and articles were used to gather information on research methodology. Finally, a conclusion will summarize the chapter.

## **3.2 Types of Data**

According to Mouton (2005), it is usual to distinguish between primary and secondary information sources. Primary information sources refer to data, whether it is newly collected or from an existing source, while secondary data refers to written sources. According to Lubbe and Klopper (2005), the data that can be collected can be from either a primary or a secondary source.

### **3.2.1 Primary Data**

According to Mouton (2005), primary data may already exist or may still have to be collected, and is usually available in one of two forms. Textual information or qualitative data, includes documents, transcripts of interviews, autobiographies, diaries, letters, annual reports, mission statements, memoranda, musical scores, plays and novels. Numeric information or quantitative data such as questionnaire responses, scaled data, test scores, financial statistics, experimental observations, physical readings and medical measures are included in this category.

### **3.2.2 Secondary Data**

According to Mouton (2005), secondary data from written sources, discuss, comment, debate and interpret primary sources of information. Sources such as articles, books, specific chapters or Internet articles, consulted for an informed opinion about a topic, are secondary sources.

### 3.2.3 Qualitative and Quantitative Data

In the lecture handout "Guidelines for Masters Dissertation" (2006), refers to two broad approaches to research, quantitative and qualitative. The quantitative approach emphasizes information that can be numerically manipulated in a meaningful way. The qualitative approach emphasizes words and feelings. The skills and experience of the researcher play an important role in the analysis of data. Quantitative and qualitative approaches to research can be combined in the same study. According to Lubbe and Kloppe (2005) the research question will determine whether a researcher will use qualitative or quantitative methods. Table 3.1 highlights the main differences between qualitative and quantitative methods.

**Table 3.1:** The difference between Qualitative Methods and Quantitative Methods (Source: Guidelines for Master's Dissertation (2006).

Qualitative Methods	Quantitative Methods
<ul style="list-style-type: none"><li>- Emphasis on understanding</li><li>- Focus on understanding from respondents' / informant's point of view</li><li>- Interpretation &amp; rational approach</li><li>- Observations &amp; measurements in a natural setting</li><li>- Subjective "insider view" &amp; closeness to data</li><li>- Explorative orientation</li><li>- Process-oriented</li><li>- Holistic perspective</li><li>- Generalization by comparison of properties &amp; contexts of the individual Organism</li></ul>	<ul style="list-style-type: none"><li>- Emphasis on testing &amp; verification</li><li>- Focus on facts and/or reasons for social events</li><li>- Logical &amp; critical approach</li><li>- Controlled measurement</li><li>- Objective "outsider view" distant from data</li><li>- Hypothetical - deductive, focus on hypo dissertation testing</li><li>- Result-oriented</li><li>- Particularistic &amp; analytical</li><li>- Generalization by population membership</li></ul>

### 3.3 Scaling

According to Trochim (2006) scaling is the branch of measurement that involves the construction of an instrument that associates qualitative constructs with quantitative metric units. To scale a statement a number has to be assigned to that statement. Scaling is getting numbers that can be meaningfully assigned to objects. A response scale is the way responses are collected from people on an instrument. A dichotomous response scale like Agree/Disagree, True/False or Yes/No may be used, or else an interval response scale with a rating like 1 to 5 or 1 to 7. Table 3.2, shows the main differences between a scale and a response scale.

**Table 3.2:** The difference between a Scale and Response Scale (Source: Trochim, 2006).

<b>Scale</b>	<b>Response Scale</b>
<ul style="list-style-type: none"><li>- Results from a process</li><li>- Each item on the scale has a scale value</li><li>- Refers to a set of items</li></ul>	<ul style="list-style-type: none"><li>- Is used to collect the response for an item</li><li>- Item is not associated with a scale value</li><li>- Used for a single item</li></ul>

According to Trochim, (2006), scales are generally divided into two broad categories, namely, unidimensional and multidimensional. Examples of Unidimensional scaling methods are Thurstone (Equal-Appearing Scaling), Likert (Summative Scaling) and Guttman (Cumulative Scaling).

According to Wikipedia.org (2006), there are several scales available to the researcher, namely, the Guttman, Thurstone and Likert Scales. These are discussed in greater detail:

#### 3.3.1 Guttman Scale

According to Trochim (2006), the purpose of Guttman scaling is to establish a one-dimensional continuum for a concept to be measured. Guttman scaling would ideally predict item responses perfectly while knowing only the total score for the respondent. For example,

if the respondent scores a four, it should mean that he/she agreed with the first four statements, whereas if it were eight, then he/she agreed with the first eight statements. The object of the Guttman scale is to find a set of items that perfectly matches this pattern. Trochim notes that in practice this seldom matches a cumulative pattern perfectly. Scalogram analysis is used to determine how closely a set of items corresponds with this idea of cumulativeness.

The focus for the scale must be defined, as with all scaling methods, and a large set of items reflecting the concept must be developed, again, as with all scaling methods. A group of judges will be used to rate the statements or items in terms of how favourable they are to the concept. The judges will not personally agree with the statement, but rather judge how the statement is related to the construct of interest. The key to Guttman scaling lies in the analysis. A matrix or table showing the responses of all the respondents on all of the items must be constructed (Trochim, 2006).

Trochim notes that scalogram analysis will be used when there are many items in a matrix. Scalogram analysis will be used to determine the subsets of items from the pool that best approximates the cumulative property of the matrix. The respondent will then be presented with the items and asked to check with which they agree. Each scale item has a scale value associated with it, which will be obtained from the scalogram analysis. A respondents' score will be scaled from the total of the scale values of every item they agree with.

### **3.3.2 Thurstone Scaling**

Trochim notes that Thurstone developed three different methods of developing a unidimensional scale, namely, the method of equal-appearing intervals, successive intervals and paired comparisons. The main difference between the three methods is how the scale values for items are constructed. The respondents rate the resulting scale in the same way.

The method of equal-appearing intervals starts, like most other scaling methods, with the development of the focus for the scaling project. It is assumed that the concept being scaled

is reasonably thought of as one-dimensional as the scaling method being used is unidimensional. The description of the concept should be as clear as possible, so that the creation of the statements actually measure what is being researched. The focus for a scaling project must take the form of a command. A large set of candidate statements (80 – 100) must be gathered from which to select the final scale items for the research project (Trochim, 2006).

The next step is to rate the scale items. Judges must rate each statement on a 1 – 11 scale in terms of the extent to which each statement indicates a favourable response to the topic of research. The participants are not necessarily to agree with the statements, but rather rate their favorableness towards each statement. The rating data is then to be analyzed. The median and interquartile range for each statement is to be computed. The median is the value above and which 50% of the ratings fall. The first quartile is the value which 25% of the cases fall and above which 75% of which the cases fall. The interquartile range is the difference between the third and first quartile (Trochim, 2006).

The final statements for the scale must be selected. The statements that are at equal intervals across the range of medians are selected. Then the statement that has the smallest interquartile range within each value is selected. This is the statement with the least amount of variability across the judges. The value in parenthesis after each statement is its scale value. Once a scale has been created it can be given to a respondent to agree or disagree with. The scale can be used as a yardstick for measuring respondents' attitudes toward the topic being investigated. To get the respondents' total scale score the scale scores must be averaged across all the items with which the respondent agreed (Trochim, 2006).

Trochim notes that other scaling methods developed by Thurstone are similar to the method of equal-appearing intervals. All methods begin by focusing on a concept that is assumed to be unidimensional, and involve generating a large set of potential scale items. All methods result in a scale consisting of relatively few items, which the respondent rates on an Agree/Disagree basis. The main difference in these methods lies in how the data from the judges is collected. The method of paired comparison requires each judge to make a

judgment about each pair of statements. This process can be very time-consuming when there are many statements. Thurstone's methods illustrate how a simple unidimensional scale may be constructed.

### **3.3.3 Likert Scale**

According to Wikipedia.org (2006), a Likert Scale is a type of psychometric response scale often used in questionnaires, and is the most widely used in survey research. When responding to a Likert questionnaire item, respondents specify their level of agreement to a statement. A typical test item in a Likert Scale is a statement. The respondent is asked to indicate their degree of agreement with a statement. Traditionally a five-point scale is used, though many psychometricians advocate a seven or nine point scale. The five point scale asks a respondent whether they strongly disagree / disagree / neither agree nor disagree / agree or strongly agree with a statement. Likert scaling is a bipolar scaling method, measuring either positive or negative responses to a statement. After a questionnaire is completed, each item may be summarized separately, or item responses may be summed to create a score for a group of items.

When responses to several Likert items are summed they can be treated as interval data measuring a latent variable. If the summed responses are normally distributed parametric statistical tests, such as the analysis of variance, can be applied. Data from Likert Scales are sometimes reduced to the nominal level by combining all agree and disagree responses into two categories of accept and reject. The Chi-Square, Cochran Q and McNemar Test are commonly used statistical procedures. The five response categories represent an ordinal level of measurement. The categories represent an inherent order, but the numbers assigned to the categories do not indicate the magnitude of difference between the categories in the way an interval or ratio scale would (Wikipedia, 2006).

The intercorrelations between all pairs of items must be computed. There are several analyses that can be done in making judgments about which items to retain for the final scale. Firstly, all items that have a low correlation with the total score across all items can be discarded. A



statistical program such as SPSS for Windows™ will make it relatively easy to compute this type of item total correlation. A new variable, which is the sum of all the individual items for each respondent, must be created. This variable is then included in the correlation matrix computation. All items with a correlation with a total score less than 0.6 may, for example, be eliminated. Secondly, for each item the average rating for the top quarter of judges and the bottom quarter must be computed. A t-test should be conducted on the differences between the mean value for the item for the top- and bottom-quarter judges. Items with higher t-values are better discriminators, so these items should be kept. The final scale should have a relatively small number of items. These items should have high item-total correlations and high discrimination or t-values (Trochim, 2006).

The Likert Scale asks each respondent to rate each item on some response scale. Respondents may, for example, rate each item on a 1 to 5 scale where 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree and 5 = strongly agree. All odd-numbered scales have a middle value, which is often labeled neutral or undecided. It is possible to use a forced choice response scale, which will have an even number of responses with no middle neutral or undecided choice. In this case the respondent is forced to decide whether he/she agrees or disagrees for each item. The final score for the respondent on the scale is the sum of his/her ratings for all of the items. Some scales may have items which are reversed in meaning from the overall direction of the scale. These are known as reversed items. In this case the response item for each value must be reversed before summing for the total. For example if the respondent answered a 1, then this value must be reversed to be a 5, if they gave a 2 then it must become 4, 3 = 3, 4 = 2 and 5 = 1 (Trochim, 2006).

The Likert scale is the preferred method of scaling used in the coding of responses from questionnaires in this research study.

### **3.4 Data Collection Method**

A questionnaire will be used to obtain evidence on what impact imported pork has in the market place. The questionnaire and interviews will be conducted on a purposive sample.

The participants in the questionnaire will be given as much freedom as possible so as not to prejudice their responses and hence the research findings. Secondary data is available from sources such as SAMIC (2003; 2006a, b, c, & d), The National Department of Agriculture (2001), and SAPPO (2005; 2006).

### **3.4.1 Primary Data Collection**

According to Mouton (2005) there are some decision rules which should be applied when managing primary data. The first rule is to establish the authenticity of the data source. It must not be assumed that data is valid and reliable. The second is to learn as much as possible about the data production process used. It must be established when exactly the data was produced, sample size, population and the objectives of the data collection. The third rule is to establish the format of the data. The data may or may not be in computerized format. The fourth is to capture new data efficiently. The fifth is to select the right data capture and storage software. Data collected in this study will be done with the use of a word processing program such as Microsoft Word™. Microsoft Excel™ will be used for simple descriptive data analysis with charts and diagrams. SPSS for Windows™ will be used for coding and interpreting data obtained from a questionnaire. The sixth rule is to ensure zero error through data editing. All captured data must be checked for errors.

A number of different qualitative techniques have evolved over time; some of these techniques are interviews, observation, diaries, case studies and action research (Writing your MBA Dissertation, 2006).

Observation measures what people say and do in real-life situations. Success in observation as a research tool depends on accurate reporting and description of the topic under investigation. The observer must have a good understanding and background of the topic being researched. The specific type of information to be observed must be identified.

Diaries are used by respondents to record ideas and reflect on personal circumstances and attitudes. A diary ensures collected information comes directly from respondents.

Case studies are not single qualitative techniques, as several methods are used. Many case studies include quantitative questionnaires, although they make use of descriptive evidence such as interviews and observation. Case studies may be used to generate a theory and idea about a topic, or to test a theory to see if it occurs and applies to a real-life situation.

Action research is linked to a plan of action to bring about change in a situation or environment, which brings about an improvement. A common theme present in action research is the management of change over time and how it involves people. Action research is cyclic, and uses techniques such as interviews, focus groups, diaries and observation, and is concerned with planned and evaluated interventions involving groups or individuals.

### **3.4.2 Questionnaire**

There are mainly two formats of questionnaire. Postal questionnaires, are sent and returned by mail or e-mail, or collected personally. Self-administered questionnaires are completed by the researcher asking a respondent questions. This type of questionnaire can be completed over the phone, or the interviewer may leave a questionnaire with a respondent to be collected at a prearranged date and time.

According to Lubbe and Klopper (2005), the questionnaire is among the most widely used instruments to collect data. A questionnaire is a printed list of questions which respondents are asked to answer. It requires planning to ensure that the data collected can be objectively analyzed afterwards. A closed questionnaire is one in which the respondents are given a collection of alternative answers to choose from, or the respondents may be asked to assign a numerical score or ranking to questions.

According to Lubbe and Klopper (2005), a good questionnaire is complete, and gets all the data sought; is short, asking only relevant questions; gives clear instructions to the respondent; has precise and easily understandable questions; has questions that do not suggest an answer; starts with general questions and moves to more specific questions; sequences most sensitive questions toward the end of the questionnaire, and uses mostly closed-ended questions.

A questionnaire following the format mentioned above will be used to collect raw data. The questionnaire to be used in this study will ask respondents to answer closed questions. Where possible an appointment will be made with respondents to enable them to answer the questionnaire. Where not possible the questionnaire will be left with a respondent to be collected at a prearranged date and time.

### **3.4.3 Semi Structured Interview**

An interview involves a one-to-one verbal interaction between the researcher and respondent. An interview should have a plan, and the interviewer must not influence the person's answers through his tone of voice or through the way the questions are phrased (Lubbe and Klopper, 2005).

The questionnaire and interviews will be used to obtain data from all perspectives of the meat industry by asking closed questions. Ad hoc interviews may be conducted as a last resort on as few respondents as possible. Ad Hoc interviews will be conducted on a respondent who may not be in a position to complete a questionnaire in their own time. Ad hoc interviews may be conducted on one or two respondents. Interviews are a widely-used form of data collection, and can provide a rich source of material when correctly conducted. The interviewer can be face to face with the interviewee, and can immediately clear up any misunderstandings which may arise. An interview is however, time consuming, and the interviewee may want to please the interviewer and answer questions accordingly (Writing Your MBA Dissertation, 2006).

### **3.4.4 Covering Letter**

According to Klopper (2006) an account has to be given of how permission was obtained from the relevant authorities to access respondents. Phiri (2006) notes that a researcher must obtain a consent form from the respondent participating in a questionnaire survey. Written permission has been obtained from Mr. Jack Miles (2006), co-owner of Meat Traders Abattoir, granting the researcher permission to conduct a questionnaire survey on Meat

Traders customers in the Queenstown area. A consent form will be attached to the questionnaire asking the respondent to give permission for the responses in the questionnaire to be used for the purpose of academic research. Respondents will be asked to read and sign the consent form at the back of the questionnaire, under the heading “Note to the respondent” on the front page of the questionnaire.

### **3.5 Questionnaire Validation**

#### **3.5.1 Pilot Test Questionnaire**

According to Pallant (2006) a poorly planned and designed questionnaire will not give good data with which to address research questions. The questionnaire must therefore go through a trialing process. This will help to clear any uncertainty which may arise from poorly worded questions. The following problems encountered in pilot testing the questionnaire were. incorrect wording of questions, questions not making complete sense and more than one answer being applicable when given a choice. Problem questions were rephrased and respondents were requested to give the most applicable answer when more than one answer could be given.

Lubbe and Klopper (2005), note that a pilot questionnaire is essential if questionnaires are to be used as a means of survey research. A test questionnaire must be conducted with a small sample of respondents to reduce costs. A revised questionnaire can then be submitted for final approval.

The questionnaire used in this study has been pilot tested with the participation of friends, family and colleagues. Participants in the pilot test questionnaire will not be involved in the final questionnaire used to collect raw data. Due to the small size of Queenstown, and therefore a small sample size, none of the potential respondents was contacted for pilot testing the questionnaire. Valuable input was gained from the pilot test questionnaire session.

### **3.5.2 University Approval of Questionnaire**

The questionnaire used for the purpose of field work will be included as an appendix to the dissertation. This will be done once the questionnaire has received approval from the Ethical Clearance Committee of The University of KwaZulu-Natal and an ethical clearance number has been issued. The ethical clearance number will be displayed on the front page of all the questionnaires.

### **3.6 Research Bias**

According to UK Medicines Information (2007), bias can creep into research for a number of reasons, and can affect the way the questionnaire is administered. Hammersley and Gomm (1997) note that it is not only research but also evaluations of research that can be biased, and that bias is generally seen as a negative feature, as something that can and should be avoided. Often the term refers to any systematic deviation from validity. Quantitative researchers refer to measurement of sampling bias, by which is meant systematic error in measurement or sampling procedures that produce flawed results. The term can also refer more specifically to a particular source of systematic error; a tendency on the part of the researcher to collect data, and interpret and present it in such a way as to favour false results that may reflect the researcher's prejudgments, or political or practical obligations. This may take the form of a positive tendency towards a particular, but false, conclusion; it may also exclude from consideration a set of possible conclusions, which may include the truth.

Kaptchuk (2003), notes that facts do not accumulate on the blank slates of researchers minds, and data do not simply speak for themselves. Good science invariably embodies a tension between concrete data and the persuasive influence of deeply-held convictions. Unbiased interpretation of data is as important as performing rigorous experiments. The quality of findings must be appraised. This may, however, cause confirmation bias. Researchers may evaluate evidence that supports their prior belief differently from that apparently challenging these convictions.

There are several forms of bias, namely Confirmation Bias, which evaluates evidence that supports one's preconceptions differently from evidence that challenges these convictions. Rescue Bias discounts data by finding selective faults in the experiment. Auxiliary Hypothesis Bias introduces ad hoc modifications to imply that an unanticipated finding would have been different, had the experimental conditions been different. Mechanism Bias is less skeptical when underlying science furnishes credibility for the data. Time Will Tell Bias asserts that different scientists need different amounts of confirmatory evidence. Orientation Bias harbours the possibility that the hypothesis itself introduces prejudices and errors and becomes a determinant of experimental outcomes (Kaptchuk, 2003).

According to Babbie (1998) the meaning of someone's response to a question depends in large part on its wording. Some questions may encourage particular responses from respondents, more than other questions may. Questions that encourage respondents to answer in a particular way are biased.

According to UK Medicines Information (2006), when an interviewer is used and questionnaires are not self-completed, there is a high potential for interviewer bias. Interviewers can influence responses in many ways. It is far easier to lead in an interview than it is in a questionnaire. The advantage of using an interviewer is flexibility; in that interviewers can probe more deeply, build rapport, put respondents at ease and keep them interested. If the interview is unstructured or semi-structured, reporting respondents' answers verbatim is vitally important. Timing and venue for an interview can also lead to bias, while a self-completed questionnaire, of course, eliminates interviewer bias. Response Bias appears to be more pronounced with self-completion and postal questionnaires.

According to Babbie (1998), conscious and unconscious Sampling Bias may become a problem in the selection of a sample to conduct research on. Beyond the risks of studying people who are conveniently available, other problems can arise. Personal leanings may affect the sample to the point where it does not truly represent the population. The researcher may consciously or unconsciously avoid interviewing certain people, as he may feel intimidated by them. The researcher may also feel that the attitudes of certain respondents

would be unhelpful to the research purposes, and thus avoid these respondents. When bias is referred to in sampling it simply means that those selected are not typical or representative of the larger population(s) they have been chosen from. The sample used for this study will be purposive due to the small population size of potential respondents. All potential respondents will therefore voluntarily be included in the sampling population.

Hammersley and Gomm (1997), note that bias can be seen as a positive feature. It can be illuminating, as it indicates important aspects of phenomena that are hidden from other perspectives. Bias may highlight what may otherwise be overlooked.

The points mentioned above have been taken into account in this study. The questionnaire has been developed to be easily understood and not to lead a respondents' answer through the wording of a question. This option has been chosen as the preferred method of data collection as it will ensure a high response rate in the conditions of small sample size.

### **3.7 Data Collection Process**

Mouton (2005), notes that data may be gathered by various methods. Data collection methods available to the researcher are observation, interviewing, archival/documentary sources and physical sources. The most common errors in data capturing are capturing errors when data is captured manually, post-coding errors in questionnaire and interviews, too many missing values due to incomplete questionnaires and omission of data validation as a first step in data analysis.

The data collection process chosen for this study will be questionnaire and semi-structured interview, which will be done on a one-to-one basis. All of the questions will be coded and scaled according to the Likert Scale method. Gathered data will then be captured in SPSS for Windows™ to provide statistical conclusions.



## **3.8 Data handling**

### **3.8.1 Approach to study**

Due to the small size of Queenstown and therefore a small sample size, all stakeholders will be contacted and a questionnaire will be conducted. It may be unlikely to receive more than thirty prospective respondents. The sample to be used for this study will be purposive due to the small population size of potential respondents. All potential respondents will therefore voluntarily be included in the sampling population.

### **3.8.2 Central Tendency**

According to Leedy and Ormrod (2005), a point of central tendency is a point around which the data revolves. Mode, Median and Mean are the most commonly used statistics for this. Mode is a single number which occurs most frequently. Median is the numerical centre of a set of data. Mean is the average of scores within a set of data.

#### **3.8.2.1 Interpretation Rules**

The measurement scale code for Mean, Median and Mode is interpreted as follows:

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Undecided
- 4 = Agree
- 5 = Strongly Agree

### **3.8.3. Measures of Dispersion**

According to Leedy and Ormrod (2005), Standard Deviation is the measure of validity for data on interval and ratio scales and is most appropriate for normally distributed data.

Variance is standard deviation squared. Variance is used for data on interval and ratio scales and is most appropriate for normally distributed data. Variance is especially useful in inferential statistical procedures such as analysis of variance.

### **3.9 Conclusion**

This chapter started by looking at two types of data, namely, primary and secondary data. Primary data referred to data collected or obtained from an existing source, while secondary data referred to written sources. Qualitative and quantitative data were explained, with the differences between the two approaches being highlighted.

An overview of scaling was given, and three different scaling methods were explained. These were Guttman (Cumulative Scaling), Thurstone (Equal-Appearing Scaling) and Likert (Summative Scaling). An overview of data collection methods was given. The case study technique was noted as the preferred research strategy for the study. A questionnaire would be used to obtain evidence to answer the research questions posed at the beginning of the chapter.

Due to the small size of Queenstown and therefore a small sample size, all stakeholders will be contacted in order to achieve the highest possible rate of responses. The participants of this study will include persons from the butchery, abattoir and livestock sectors of the meat industry.

The next chapter discusses the results of the field work. A discussion of the sample and its characteristics will be given. The main results of the field work will be summarized, and the main trends and patterns in the data will be discussed with reference to the hypotheses and research questions. The main findings will then be interpreted and discussed. The quality of data collected will be discussed, showing any shortcomings and/or limitations.

## **CHAPTER 4**

### **DATA ANALYSIS AND RESULTS**

#### **4.1 Introduction**

The previous chapter dealt with research, design and methodology of this study. This chapter will deal with the results obtained from the data collected from the questionnaire.

The problem researched is the impact imported pork has on the demand for locally produced pork in Queenstown. According to an animal production report published by SAMIC in 2003, the number of pigs slaughtered in the period 1998/99 was 1 809 773. This number had been reduced to 1 765 122 in 2002/03, showing a decline in the number of slaughter pigs. It was to be investigated whether a decline for locally-produced pork was noticed due to the importation of pork products and whether business such as butcheries and abattoirs can take advantage of a gap in the market and add imported pork to their product line.

A discussion of the demographic profile of respondents and its characteristics will be given. We will discuss the age, gender and ethnic group of respondents. The sector of the meat industry of respondents such as butchery, abattoir, import, export or livestock will be noted, as well as the position held by respondents in their organization, such as manager or owner. The demand for pork products will be investigated and the following will be discussed: number of pigs sold/slaughtered in a month, size of customer base, whether imported or locally-produced pork is sold, respondents' opinion of imported pork, pork sales and pork products. Customer preference for pork will determine what percentage of meat sales are made up of pork products, how imported pork products are purchased, an increase in demand for imported pork products and customer awareness of purchasing an imported pork product. Pork product lines, supplier ability to meet the demand for pork products and a preference for imported or locally-produced pork products will be investigated.

The results of the field work will be summarized, discussed and interpreted. Tables will be used to highlight aspects of the results. The statistical approaches used, why they were chosen, and their significance will be discussed. Finally, a conclusion will summarize the chapter.

## 4.2 Demographics

### 4.2.1 Profile of respondents

The profile of respondents includes factors such as age, gender and ethnic group.

#### 4.2.1.1 Age

Descriptive frequency statistics given in Table 4.1 show the respondent age group of participants in the project to be: 26 – 30 years: 4.3%; 31 - 35 years: 13.0%; 36 – 40 years: 30.4%; 41 – 45 years: 17.4%; 46 – 50 years: 17.4%; above 50 years: 17.4%. From the table it can be seen that the majority of the respondents who participated in the questionnaire were between the ages of 36 – 40 years.

**Table 4.1: Respondent Age Group**

	Frequency	Percent
Valid 26 - 30 yrs	1	4.3
31 - 35 yrs	3	13.0
36 - 40 yrs	7	30.4
41 - 45 yrs	4	17.4
46 - 50 yrs	4	17.4
Above 50 yrs	4	17.4
Total	23	100.0

#### 4.2.1.2 Gender

Descriptive frequency statistics given in Table 4.2 below show the gender of participants in the project. From the table it can be seen that they were 52.2% male and 47.8% female.

**Table 4.2: Respondent Gender**

		Frequency	Percent
Valid	Male	12	52.2
	Female	11	47.8
	Total	23	100.0

#### **4.2.1.3 Ethnic Group**

Descriptive frequency statistics given in Table 4.3 show the ethnic group dispersion of participants. From the table it can be seen that 91.3% of respondents were white and 8.7% of respondents were coloured. It would appear that the majority of respondents involved in the meat industry in Queenstown are white.

**Table 4.3: Ethnic Group**

		Frequency	Percent
Valid	White	21	91.3
	Coloured	2	8.7
	Total	23	100.0

#### **4.3 Meat Industry Sector**

Descriptive frequency statistics given in Table 4.4 below, show that 65.2% of the participants in the project are in the butchery sector of the meat industry in Queenstown, 30.4% are in the abattoir sector and 4.3% of respondents are in the livestock sector.

**Table 4.4: Meat Industry Sector**

		Frequency	Percent
Valid	Butchery	15	65.2
	Abattoir	7	30.4
	Livestock	1	4.3
	Total	23	100.0

#### 4.4 Position Held in Organisation

Descriptive frequency statistics given in Table 4.5, show that 21.7% of participants own the business, 60.9% hold the position of manager, 4.3% hold the position of buyer and 4.3% hold the position of salesperson.

**Table 4.5: Respondents' Position in their Organisation**

		Frequency	Percent
Valid	Owner	5	21.7
	Manager	14	60.9
	Buyer	1	4.3
	Sales	1	4.3
	Total	21	91.3
Missing	System	2	8.7
Total		23	100.0

#### 4.5 Demand for Pork

The demand for pork was investigated. Willemse (2005) notes that the demand for meat in South Africa is growing faster than the ability of the local market to supply, and that economic growth is changing people's eating patterns from starch-based to protein-based foods. Descriptive frequency statistics were used to determine how many pigs were sold/slaughtered by butcheries and abattoirs in a given month; the size of the customer base; whether imported, local or both imported and local pork products were sold; respondents' opinions of imported pork products and whether a drop in sales for fresh pork was observed due to the importation of pork products. Whites consume the most pork products, while the percentage of blacks who consume value-added pork products is approximately equal to that of whites. Asians consume the least pork products of all the respondents in the survey. A reason for this may be religious beliefs, where the consumption of pork may be forbidden (Oyewumi & Jooste, 2006). Pork products refer to pork carcasses and any manufactured pork products.

**Table 4.8: Areas other than Queenstown Supplied**

		Frequency	Percent
Valid	Yes	15	65.2
	No	8	34.8
	Total	23	100.0

It can be seen from Table 4.8 above, that 65.2% of participants supply areas other than Queenstown, while 34.8% of respondents do not supply areas other than Queenstown. Table 4.6 above shows that 17.4% of respondents sell/slaughter more than 800 pigs per month. Many of these pigs may be supplied to butcheries that do not fall in the Queenstown area or manufactured pork products may be supplied from the Queenstown area to surrounding areas.

#### **4.5.3 Pork Products Sold**

Table 4.9 shows a preference for locally-produced pork products. The sales of local pork products comprised 91.3%, while 8.7% of sales comprised both imported and locally-produced pork products.

**Table 4.9: Pork Products Sold**

		Frequency	Percent
Valid	Local	21	91.3
	Both	2	8.7
	Total	23	100.0

Table 4.10 below, giving comparison dispersion statistics, shows, however, that while 8.7% of butcheries sold both imported and local pork products, the abattoir and livestock sector sold no imported pork products. This may be due to the fact that live slaughter pigs are readily available and sold to abattoirs for resale as pork carcass.

**Table 4.10: Pork Products Sold (Cross tabulation)**

		Which sector of the meat industry are you in			Total
		Butchery	Abattoir	Livestock	
Which pork products do you sell?	Local	56.5%	30.4%	4.3%	91.3%
	Both	8.7%			8.7%
Total		65.2%	30.4%	4.3%	100.0%

#### 4.5.4 Respondents' Opinion of Imported Pork Products

Table 4.11 indicates that 43.5% of respondents had no firm opinion about imported pork products, while 39.1% had a favourable opinion of them, and 17.4% of respondents had a negative opinion of imported pork products. The majority of respondents may never have had a need for imported pork products, or may have never taken the trouble to purchase them. Respondents who had purchased imported pork products in the past had a good opinion of them. Many respondents noted that they were unaware that imported pork products could be purchased for processing and re-sale.

**Table 4.11: Respondents' Opinions of Imported Pork Products**

		Frequency	Percent
Valid	Good	9	39.1
	Bad	4	17.4
	Don't know	10	43.5
	Total	23	100.0

#### 4.5.5 Pork Sales

A study by Bredahl *et al.* (1998), relating consumer perceptions of pork quality to physical characteristics of the product, found that consumers form expectations about pork quality at the point of purchase. Expectations are based on quality cues available to them in the shop. A study undertaken by Dransfield *et al.* (2004), found that consumers focused on colour and fatness of the meat, and that consumers preferred pork labeled as originating from their own country to pork that was labeled as imported. The welfare of farm animals is recognized as an important public and political issue in the United Kingdom and Europe, with consumers



becoming increasingly concerned about the manner in which farm animals are treated. Most food shopping is now taking place in supermarkets, with several retailers being the main link between the farm and the food purchased by consumers. This has given supermarkets an enormous influence over animal welfare standards adopted in the production of meat sold in their stores. Supermarkets are a dominant force, and therefore have great buying power. This gives them the ability to impose tight requirements on how the food they sell is produced. Supermarkets also have scope for promoting one product over another using price promotion, in-store positioning of products, labeling, and publicity or customer information campaigns (Lymbery, 2002). Socio-demographic indicators were found to be strong predictors of the probability of choosing particular types of meat and the amounts consumed. Knowledge and attitudes toward diet and meat products were found to influence choices (Guenther *et al.*, 2005).

It is estimated that between 55% and 65% of all pork produced in South Africa is used for meat processing and manufacture. The remaining pork is consumed as fresh meat. Pork is seen as an alternative white meat, with consumer spending on pork products increasing due to factors such as quality, taste, nutrition, health and affordability (Eskort, 2006). According to SAMIC (2003), consumption of pork increased from 122 000 tons in 2001/2002 to 123 000 tons in 2002/2003. Imported pork accounted for 6.7% of all pork consumed during 2002/2003. According to Leach (2006), there are three main demand factors regarding pork consumption in South Africa, namely, disposable income, food safety and quality assurance and promotion.

Table 4.12 below, shows the perceptions of respondents: 8.7% strongly disagree, 52.2% disagree, 26.1% were undecided and 13% agree with the statement that a drop in sales for fresh pork has been observed due to the importation of pork products. It can be seen from Table 4.12 that 52.2% of respondents disagree that a drop in sales of fresh pork due to the importation of pork has been observed.

**Table 4.12: Drop in Sales of Fresh Pork due to the Importation of Pork**

		Frequency	Percent
Valid	Strongly Disagree	2	8.7
	Disagree	12	52.2
	Undecided	6	26.1
	Agree	3	13.0
	Total	23	100.0

## 4.6 Consumer Preference

The question of consumer preference for imported or locally-produced pork products was investigated. Descriptive frequency statistics were used to determine the percentage of imported pork products sold by butcheries and abattoirs; what motivating factor led these businesses to sell them; whether an increase in demand for imported pork products was observed; how butcheries and abattoirs purchased them and whether customers were made aware of the fact that they may be purchasing imported pork rather than locally-produced pork products. These points will be discussed in detail, with supporting tables.

### 4.6.1 Percentage Meat Sales

Respondents were asked to rate as a percentage the sales which imported pork products contributed to overall meat sales in a given month. Table 4.13 shows that 69.6% (16) respondents indicated that imported pork products make up 0 – 20% of overall meat sales, while 17.4% (4) respondents did not know. This may show that none of the respondents sell imported pork products (0%) or, all of the respondents sell imported pork products (20%).

**Table 4.13: Percentage of Imported Pork Products Making Up Overall Meat Sales**

		Frequency	Percent
Valid	0 - 20	16	69.6
	21 - 40	1	4.3
	41 - 60	2	8.7
	Don't know	4	17.4
	Total	23	100.0

#### 4.6.2 Imported Pork Products

Respondents were asked what motivating factors made them decide to sell imported pork products. According to Table 4.14 below, 17.4% mentioned price. According to Baderson (2007), imported pork is mainly used for the production of sausages, vienna's, bacon, cold meats and as a supplement in other meat products, as imported pork is usually cheaper than the local products so can be used to lower the price of production. Willemse (2005) notes that as the economy of the country grows so will the demand for meat and meat products. According to Baderson (2007), locally-produced pork carcasses are mainly used for display counters. Display counters include shoulder and loin chops, belly and leg roasts and rolled roasts. 65.2% of respondents mentioned that they did not know what motivating factors for selling imported pork were. These respondents may be owners of a business who are not involved in the day to day manufacturing or buying of meat products for manufacture, or the respondents may hold sales positions in the organisation and will therefore not know how the products have been manufactured as this does not form part of their function in the business.

**Table 4.14:** Motivating Factors for Selling Imported Pork

		Frequency	Percent
Valid	Price	4	17.4
	Don't know	15	65.2
Missing	System	4	17.4
Total		23	100.0

Table 4.15 below shows that 13% of respondents indicated that they purchase imported pork by the pallet or by the box. While 21.7% of respondents purchase imported pork products by other means and 52.2% of respondents did not respond to the question. The respondents who did not respond to the question may not be involved in the buying function of the business and would therefore not know how imported pork products are purchased or the respondents may not purchase imported pork products. Respondents that purchase imported pork products by other means (21.7%) may purchase ready packed pork products in trays.

**Table 4.15: How Imported Pork Products are Purchased**

		Frequency	Percent
Valid	Pallet	3	13.0
	Box	3	13.0
	Other	5	21.7
Missing	System	12	52.2
Total		23	100.0

#### **4.6.3 Increased Demand**

As per Table 4.16 below, 47.8 % of participants were undecided about whether demand for imported pork products is increasing, while 26.1% of respondents agreed that there is an increased demand. According to Baderson (2007), a contributing factor to the increase of imported pork products during the time of the study may be due to the outbreak of Swine Fever in South Africa. The resulting decline in the national herd as infected pigs were culled decreased the availability of local pork products. According to Miles (2006), the decrease in the number of pigs slaughtered by Meat Traders Abattoir during the years 2005/2006 was due to the outbreak of Swine Fever. Kabeli (2005), notes that the outbreak of Swine Fever in the Eastern Cape could lead to the culling of 27 000 pigs on the farms of Mr. David Osborne, a major supplier of pork in South Africa. This may have an impact on the supply of pigs to abattoirs, thus increasing the demand for imported pork products. The culling of pigs is likely to increase South Africa's reliance on pork imports, as South Africa is a net importer of pork (Njobeni, 2005). Brouwer (2005) notes that income levels affect the type of meat cuts purchased, with a greater demand for more expensive meat cuts as income levels increase.

In low-income countries an increase in per capita income, urbanization and changes in prices have been the main factors accounting for a higher demand for meat.

**Table 4.16: Increased Demand for Imported Pork Products**

		Frequency	Percent
Valid	Strongly Disagree	2	8.7
	Disagree	3	13.0
	Undecided	11	47.8
	Agree	6	26.1
	Strongly Agree	1	4.3
	Total	23	100.0

#### 4.6.4 Consumer Awareness

As per Table 4.17 below, 39.1% of the respondents strongly disagreed, and 39.1% of respondents were undecided, about whether consumers are aware that they are purchasing an imported pork product. Consumers may be unaware of imported pork, or may not know the difference, or may not be concerned about the origin of the pork they purchase. According to Baderson (2007), imported pork is mainly used for the production of meats and as a supplement in other meat products, while locally produced pork is mainly used for display counters. Consumers who purchase processed meats may be unaware of the origin of the meat contained in these products. The results from Table 4.26 in section 4.8.2 shows 26.1% of respondents disagree and 56.5% of respondents were undecided whether imported pork was sold in original packaging.

**Table 4.17: Customer Awareness in Purchasing Imported Pork Products**

		Frequency	Percent
Valid	Strongly Disagree	9	39.1
	Disagree	3	13.0
	Undecided	9	39.1
	Agree	1	4.3
	Strongly Agree	1	4.3
	Total	23	100.0

From Table 4.18 below, it can be seen that 43.5% of respondents agree that the customers are concerned about the quality of pork sold, while 17.4% of respondents strongly agree. This highlights the fact that much emphasis is placed on quality of pork purchased, and is

therefore an important factor when purchasing a pork product. As per Table 4.23, 47% of respondents agree and 26% of respondents strongly agree that the hygiene of local abattoirs and meat processing plants are a concern. This shows that hygiene standards of how pork has been handled, is a concern to customers regarding the quality of pork sold. Pork that has not been handled in a hygienic way may therefore be of a poor quality.

**Table 4.18: Customer Concern Regarding Quality of Pork Sold**

	Frequency	Percent
Valid Strongly Disagree	1	4.3
Disagree	6	26.1
Undecided	2	8.7
Agree	10	43.5
Strongly Agree	4	17.4
Total	23	100.0

**Table 4.19: Customer Preference for Fresh or Frozen Pork**

	Frequency	Percent
Valid Fresh	20	87.0
Don't know	3	13.0
Total	23	100.0

From Table 4.19 above, it can be seen that 87% of respondents indicated that their customers prefer fresh pork, whether locally-produced or imported, as long as the pork purchased is fresh.

From Table 4.20 below, it can be seen that 26.1% of respondents agree that sales for pork products are driven by price, 69.6% of respondents agree that both price and quality drive sales for pork products while 4.3% of respondents don't know what drives sales for pork products. Respondents who agree that price is a driver of sales for pork products may supply customers who are not concerned regarding the quality of pork sold, but will rather purchase the cheapest meat product available to them. Respondents who agree that pork sales are driven by both price and quality may use a quality pork product for manufacture and supply

customers who want a quality product, while respondents who don't know what the drivers for sales of pork products are may not be involved in the selling function of the business.

**Table 4.20: Sales for Pork Products Driven by Price, Quality or Both**

		Frequency	Percent
Valid	Price	6	26.1
	Both	16	69.6
	Don't know	1	4.3
	Total	23	100.0

## 4.7 Product Line

The question of whether a butchery or abattoir can take advantage of imported pork products by offering a wider product line was investigated. It was also investigated whether the quality of pork is important when making a purchasing decision regarding pork products. Descriptive frequency statistics were used to determine whether the perception regarding the quality of imported pork products was higher than that of locally-produced pork products among butcheries and abattoirs. Respondents were asked whether a specific attempt has been made to sell imported pork products. The final section investigated whether hygiene standards of locally-produced pork products are important, and whether the respondents were aware of how hygienically imported pork has been handled. These points will be discussed in greater detail with supporting tables.

### 4.7.1 Quality of Imported Pork

According to Mulder (2005), meat regulations will be imposed in South Africa, thus increasing the price of meat. Role-players such as abattoirs, importers, exporters and meat processors will be required to register. Consumers, however, will have more peace of mind about the safety of meat products. The National Agricultural Forum recommends that the tariff be used for customer assurances of quality and food safety.

Respondents were asked to strongly agree, agree, undecided, disagree and strongly disagree with the following statement: “Imported pork products are of a higher quality than locally-produced pork products.” It can be seen from Table 4.21 that 47.8% of the respondents disagreed with the statement, while 43.5% were undecided. Butcheries and abattoirs are therefore satisfied with the quality of locally-produced pork. The results below further prove that the quality of imported pork is not of a higher standard compared with locally produced pork.

**Table 4.21: Quality of Imported Pork Compared to Locally-produced Pork**

		Frequency	Percent
Valid	Strongly Disagree	2	8.7
	Disagree	11	47.8
	Undecided	10	43.5
	Total	23	100.0

#### **4.7.2 Sale of Imported Pork Products**

Respondents were asked to strongly agree, agree, undecided, disagree and strongly disagree with the following statement: “An attempt to take advantage of selling imported pork has been made.” Table 4.22 below shows that 30.4% of the respondents disagreed, were undecided or agreed with the statement. This shows that the same number of respondents have attempted selling imported pork products, not attempted selling imported pork products or are unaware if any attempt has been made by their organization to sell imported pork products. Possible reasons for this could be that not all respondents use pork for manufactured products, some respondents such as supermarkets may buy in ready made products and are therefore unaware if imported pork has been used in the manufacturing process or respondents are able to meet the demand for pork using local pork and have not had to look for alternate suppliers.



**Table 4.22: Attempt at Selling Imported Pork**

		Frequency	Percent
Valid	Strongly Disagree	2	8.7
	Disagree	7	30.4
	Undecided	7	30.4
	Agree	7	30.4
	Total	23	100.0

#### **4.7.3. Hygiene Standards of Imported Pork**

According to Table 4.23, below, 43.5% of respondents disagree, 13 % strongly disagree and 30.4% are undecided regarding their awareness on how imported pork has been handled in terms of hygiene in a foreign country. This may show that respondents have not taken the time to investigate how imported pork products have been handled in terms of hygiene or importers of pork have not made this type of information available to their customers or do not know themselves. A small portion of the sample, 8.7% agree and 4.3% strongly agree that they are aware of how imported pork has been handled in terms of hygiene.

**Table 4.23: Awareness of Hygiene Standards of Imported Pork**

		Frequency	Percent
Valid	Strongly Disagree	3	13.0
	Disagree	10	43.5
	Undecided	7	30.4
	Agree	2	8.7
	Strongly Agree	1	4.3
	Total	23	100.0

Table 4.24 further demonstrates that the hygiene of abattoirs and meat processing plants is of concern to the respondents, as 47.8% of respondents agree with the following statement: “The hygiene of local abattoirs and meat processing plants are a concern to us” and 26.1% of respondents strongly agree. This highlights the importance respondents place on the level of hygiene management used by local abattoirs and meat processing plants.

**Table 4.24: Concern Regarding Hygiene of Local Abattoirs and Meat Processing Plants**

		Frequency	Percent
Valid	Strongly Disagree	2	8.7
	Disagree	2	8.7
	Undecided	2	8.7
	Agree	11	47.8
	Strongly Agree	6	26.1
	Total	23	100.0

## 4.8 Demand

The question of whether butcheries or abattoirs in Queenstown sell imported pork products, and what the motivating factors for selling imported pork products were, such as price, quality or the local pork market not meeting the demand for pork products was investigated. Descriptive frequency statistics were used to determine whether butcheries and abattoirs are able to meet the demand for pork products. Respondents were asked whether they were aware if customers prefer imported pork products to locally-produced pork products, and if imported pork products were sold in their original packaging, or repacked. Finally, they were asked whether pork sales appear to be driven by price. These points will be discussed in greater detail below, with supporting tables.

### 4.8.1 Ability to Meet Demand

Table 4.25 shows that 52.2% of the respondents agreed, and 43.5% of the respondents strongly agreed that they were able to meet the demand for pork products.

**Table 4.25: Butcheries Able to Meet Demand for Pork Products**

		Frequency	Percent
Valid	Disagree	1	4.3
	Agree	12	52.2
	Strongly Agree	10	43.5
	Total	23	100.0

#### **4.8.2 Preference for Imported Pork over South African Pork**

Respondents were asked whether they are aware if customers prefer imported pork products to locally-produced pork products, and if imported pork products are sold in their original packaging or repacked, and whether pork sales appear to be price-driven. Table 4.26 below, shows that 47.8% of the respondents disagreed with the statement that customers prefer imported pork products. Table 4.17 above, confirms that consumers are unaware that they are purchasing an imported pork product. It may thus appear that consumers do not know whether they are purchasing an imported pork product unless it is sold in its original packaging which states the country of origin. In that case the consumer may not show a preference for the imported pork product, but rather make a buying decision based only on price, as shown in Table 4.28 below. Table 4.27 below, shows that 56.5% of respondents were undecided and 26.1% disagreed with the statement that imported pork is sold in its original packaging. Consumers may therefore not prefer imported pork to locally-produced pork, but rather make a purchasing decision based on the amount of money in their pocket, and choose the cheapest at the time, but still of a high quality. This is shown by Table 4.18, which states that 43.5% of respondents agreed that customers are concerned about quality. Table 4.19 shows that 87% of customers prefer fresh pork.

A customer may therefore want to purchase pork which appears fresh and of a high quality at a good price, irrespective of whether it is imported or locally-produced. According to Streicher (2006), imported pork products are frozen at the source and exported to South Africa on refrigerated container ships. This is due to the lengthy transport time from a foreign country to South Africa. The shelf life of a frozen product is much greater than that of a fresh product.

**Table 4.26: Customers' Preference for Imported Pork over Local Pork**

		Frequency	Percent
Valid	Strongly Disagree	6	26.1
	Disagree	11	47.8
	Undecided	5	21.7
	Strongly Agree	1	4.3
	Total	23	100.0

**Table 4.27: Imported Pork Sold in Original Packaging**

		Frequency	Percent
Valid	Strongly Disagree	1	4.3
	Disagree	6	26.1
	Undecided	13	56.5
	Agree	3	13.0
	Total	23	100.0

Table 4.27 shows, that 4.3% of respondents strongly disagree that imported pork is sold in original packaging, while 13% of respondents agree that imported pork is sold in original packaging. This can be as a result of most imported pork being used for manufacture, in which case it would be removed from its original packaging for further processing or otherwise may be purchased in bulk boxes and then repacked in smaller containers.

**Table 4.28: Pork Sales appear to be Price-driven**

		Frequency	Percent
Valid	Disagree	4	17.4
	Agree	12	52.2
	Strongly Agree	7	30.4
	Total	23	100.0

## 4.9 Statistical Approaches

Several statistical tests were conducted on the data collected during field work. Descriptive statistics describe a body of data (Leedy and Ormrod, 2005). Descriptive frequency statistics

and comparison descriptive statistics were used to describe the characteristics of the sample. Their purpose was to check the variables for any contradiction of the assumptions underlying the statistical techniques used to analyze the research questions stated earlier (2.12) (Pallant, 2006). SPSS for Windows™ computer software was used to provide encoding and answers to collected data from questionnaires.

#### 4.9.1 Central Tendency Statistics

According to Leedy and Ormrod (2005), a point of central tendency is a point around which the data revolves, a middle point around which the data regarding a particular variable are equally distributed. The most commonly used statistics for this are the mode, median and mean. The mode is a single number or score which occurs most frequently. The median is the numerical centre of a set of data, with exactly as many scores above it as below. The mean represents the single point at which the two sides of a distribution balance. The mean is therefore the average of scores within a set of data.

**Table 4.29: Central Tendency Statistics for Table 4.12, 4.16 and 4.17**

		Table 4.12	Table 4.16	Table 4.17
N	Valid	23	23	23
	Missing	0	0	0
Mean		2.00	3.00	2.00
Median		2.00	3.00	2.00
Mode		2	3	1
Std. Deviation		.843	.976	1.166
Variance		.711	.953	1.360
Range		3	4	4
Minimum		1	1	1
Maximum		4	5	5

Table 4.29, shows central tendency statistics results of study statements for a drop in sales for fresh pork due to the importation of pork, increased demand for imported pork products and customer awareness of purchasing imported pork products. The measurement scale code was interpreted as follows: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree and 5 = Strongly Agree.

The mean results from Table 4.29 show that the study variables have a mean value of 2.00 for the data set of Table 4.12. This shows that the respondents had an expressed average perception corresponding to “Disagree”. The median results show that the study variables have a median value of 2.00 for the data set shown in Table 4.12. This shows that “Disagree” is the median perception of the respondents. The mode results show that the study variables have a mode value of 2.00 for the data set shown in Table 4.12. This indicates that “Disagree” is the mode perception of the respondents. The Mean, Median and Mode results presented above, show that the respondents disagree that a drop in sales has been noticed due to the importation of pork. According to Table 4.29 the variables in Table 4.12 shows a standard deviation of 0.843. This demonstrates that there is a difference in the respondents’ perceptions regarding a drop in sales for fresh pork due to the importation of pork. According to central tendency statistics, the variables in Table 4.12 show a variance of 0.711. This shows that there is a variation in the respondents’ perceptions regarding a drop in sales for fresh pork due to the importation of pork. According to Table 4.9, 91.3% of respondents sell only locally-produced pork products. This could mean that they can therefore meet the demand, and have not had to look for alternative supplies such as imported pork products. The range for Table 4.12 is 3, which indicates that the respondents have expressed the same opinion toward a drop in sales for fresh pork due to the importation of pork. The minimum variable value shown indicates that respondents “Strongly Disagree” that a drop in sales for fresh pork has been observed due to the importation of pork, while the maximum variable value is 4, which indicates that respondents “Agree” that there is a drop in sales of fresh pork due to the importation of pork.

The mean results from Table 4.29 show that the study variables have a mean value of 3.00 for the data set in Table 4.16. This indicates that the respondents in the study have expressed an average perception of “Undecided” toward the study variables. The median results show that the study variables have a median value of 3.00 for the data set shown in Table 4.16. This indicates that “Undecided” is the median perception of respondents in the study. The mode results show that the study variables have a mode value of 3.00, indicating that “Undecided” is also the mode perception of the respondents in the study. The Mean, Median and Mode results presented above, show that the respondents are undecided regarding an

increase in demand for imported pork products. According to Table 4.29 the variables in Table 4.16 has a standard deviation of 0.976. This standard deviation shows that there is a difference in respondents' perceptions regarding increased demand for imported pork products. According to Table 4.29, the variables in Table 4.16 show a variance of 0.953. This indicates that there is a variation in respondents' perceptions regarding an increased demand for imported pork products.

The range of variables for Table 4.16 is 4, which indicates the respondents have expressed the same opinion regarding an increase in demand for imported pork products. The minimum variable value shown is 1, which indicates that the respondents have articulated minimum perception of "Strongly Disagree", while the maximum variable value for Table 4.16, is 5, indicating that respondents have articulated maximum perception of "Strongly Agree" that there is an increased demand for imported pork products.

The mean results from Table 4.29 show the study variables have a mean value of 2.00 for the data set in Table 4.17. This indicates that the participants in the study have an expressed average perception of "Disagree" towards the study variables. The median results show that the study variables have a median value of 2.00. This shows that "Disagree" is the median perception of the respondents in the study. The mode results from the table show that the study variables have a mode value of 1.00. This indicates that "Strongly Disagree" is the mode perception. The Mean and Median results presented above, show that the respondents disagree while the Mode results presented above, show that the respondents strongly disagree regarding customer awareness in purchasing imported pork products. According to Table 4.29 the variables in Table 4.17 have a standard deviation of 1.166. This indicates that there is a difference in respondents' perceptions regarding customer awareness of purchasing pork products. According to Table 4.29 the variables in Table 4.17 show a variance of 1.360. This indicates a variation in respondents' perceptions regarding customer awareness in purchasing imported pork products.

According to Table 4.29 the range for the variables in Table 4.17 is 4, which indicates that the respondents have expressed the same opinion. The minimum variable value shown for

Table 4.17 is 1, which indicates that respondents have articulated minimum perception of “Strongly Disagree”, while the maximum variable value for Table 4.17 is 5, which indicates that the respondents have articulated maximum perception of “Strongly Agree” toward customer awareness of purchasing imported pork products.

**Table 4.30: Central Tendency Statistics for Table 4.18, 4.23 and 4.24**

		Table 4.18	Table 4.23	Table 4.24
<b>N</b>	Valid	23	23	23
	Missing	0	0	0
Mean		3.00	3.00	4.00
Median		4.00	2.00	4.00
Mode		4	2	4
Std. Deviation		1.199	.994	1.214
Variance		1.439	.988	1.474
Range		4	4	4
Minimum		1	1	1
Maximum		5	5	5

Table 4.30, shows central tendency statistics results of study statements for respondent concern regarding quality of pork sold, awareness of hygiene standards of imported pork and concern regarding hygiene of local abattoirs and meat processing plants. The measurement scale code was interpreted as follows: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree and 5 = Strongly Agree.

The mean results from Table 4.30 show that the study variables have a mean value of 3.00 for the data set in Table 4.18. This shows that the respondents in the study have an expressed average perception corresponding to “Undecided” in the study variables. The median results show the study variables have a median value of 4.00 for the data set shown in Table 4.18. This indicates that “Agree” is the median perception of respondents in the study. The mode results show the study variables have a mode value of 4.00 for the data set shown in Table 4.18. This indicates that “Agree” is the mode perception of respondents in the study. The Mean results presented above, show that the respondents are undecided with regard to quality of pork sold. Median and Mode results presented above, show that the respondents agree with regard to quality of pork sold. According to Table 4.30 the variables in Table 4.18 has a standard deviation of 1.199. This standard deviation indicates that there is a difference in



respondents' perceptions when it comes to customer concern regarding the quality of pork. According to Table 4.30 the variables in Table 4.18, show a variance of 1.493. This indicates a variance in respondents' perceptions with regard to customer concern regarding the quality of pork sold.

According to the Table 4.30 the range of the values in Table 4.18 is 4, which indicates the respondents have expressed the same opinion. The minimum variable value for Table 4.18 is 1, which indicates respondents have articulated minimum perception of "Strongly Disagree", while the maximum variable value is 5, which indicates respondents have articulated maximum perception of "Strongly Agree" regarding the quality of pork sold.

The mean results from Table 4.30 show the study variables have a mean value of 3.00 for the data set in Table 4.23. This indicates that the respondents in the study have an expressed average perception corresponding to "Undecided" towards the study variables. The median results show the study variables have a median value of 2.00 for the data set shown in Table 4.23. This indicates that "Disagree" is the median perception of respondents in the study. The mode results show the study variables have a mode value of 2.00 for the data set shown in Table 4.23. This indicates that "Disagree" is the mode perception of respondents in the study. The Mean results presented above, show that the respondents are undecided with regard to their awareness of hygiene standards of imported pork. Median and Mode results presented above, show that the respondents disagree regarding their awareness of hygiene standards of imported pork. According to Table 4.30 the variables in Table 4.23 has a standard deviation of 0.994. This standard deviation indicates that there is a difference in respondents' perceptions regarding their awareness of hygiene standards of imported pork. According to Table 4.30 the variables in Table 4.23 show a variance of 0.988. This indicates that there is a variance in respondents' perceptions with regard to their awareness of hygiene standards of imported pork.

According to Table 4.30 the range for the values in Table 4.23 is 4, which indicates the respondents have expressed the same opinion regarding their awareness of hygiene standards of imported pork products. The minimum variable value shown for Table 4.23 is 1, which

indicates respondents have articulated minimum perception of “Strongly Disagree”. while the maximum variable value for Table 4.23 is 5, which indicates an articulated maximum perception of “Strongly Agree” regarding awareness of hygiene standards of imported pork.

The mean results from Table 4.30 show the study variables have a mean value of 4.00 for the data set in Table 4.24. This indicates that the respondents in the study have an expressed average perception corresponding to “Agree” towards the study variables. The median results show the study variables have a median value of 4.00 for the data set shown in Table 4.24. This indicates that “Agree” is the median perception of the respondents in the study. The mode results show the study variables have a mode value of 4.00 for the data set shown in Table 4.24. This indicates that “Agree” is the mode perception of respondents in the study. The Mean, Median and Mode results presented above, show that the respondents agree that they are concerned regarding hygiene of local abattoirs and meat processing plants. According to Table 4.30 the variables in Table 4.24 has a standard deviation of 1.214. This indicates that there is a difference in respondents’ perceptions when it comes to their concern regarding the question of hygiene. According to Table 4.30 the variables in Table 4.24 show a variance of 1.474. This indicates that there is a variance in respondents’ perceptions when it comes to their concern regarding the question of hygiene. According to Table 4.30 the range for the values in Table 4.24 is 4, which indicates the respondents have expressed the same opinion when concerning the question of hygiene. The minimum variable value shown for Table 4.24 is 1, which indicates respondents have articulated minimum perception of “Strongly Disagree”. While the maximum variable value for Table 4.24, is 5, which indicates an articulated maximum perception of “Strongly Agree” toward their concern regarding the matter of hygiene.

**Table 4.31:** Central Tendency Statistics for Table 4.21, 4.22 and 4.27

		Table 4.21	Table 4.22	Table 4.27
N	Valid	23	23	23
	Missing	0	0	0
Mean		2.00	3.00	3.00
Median		2.00	3.00	3.00
Mode		2	2	3
Std. Deviation		.647	.984	.736
Variance		.419	.968	.542
Range		2	3	3
Minimum		1	1	1
Maximum		3	4	4

Table 4.31, shows central tendency statistics results of study statements for quality of imported pork compared to locally-produced pork; attempts at selling imported pork, and imported pork sold in original packaging. The measurement scale code was interpreted as follows: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree and 5 = Strongly Agree.

The mean results from the Table 4.31 show the study variables have a mean value of 2.00 for the data set in Table 4.21. This indicates that the respondents in the study have an expressed average perception corresponding to “Disagree” towards the study variables. The median results show the study variables have a median value of 2.00 for the data set shown in Table 4.21. This indicates that “Disagree” is the median perception of respondents in the study. The mode results show the study variables have a mode value of 2.00. This indicates that “Disagree” is the mode perception of respondents in the study. The Mean, Median and Mode results presented above, show that the respondents disagree regarding the quality of imported pork compared to locally-produced pork. According to Table 4.31 the variables in Table 4.21 has a standard deviation of 0.647. This indicates that there is a difference in respondents’ perceptions regarding the quality of imported pork compared to locally-produced pork. According to Table 4.31 the variables in Table 4.21 show a variance of 0.419. This indicates that there is a variance in respondents’ perceptions regarding the quality of imported pork compared to locally-produced pork. According to Table 4.31 the range for the values in Table 4.21 is 2, which indicates the respondents have expressed the same opinion regarding the quality of imported pork compared to locally-produced pork. The minimum variable

value shown in Table 4.31 is 1, which indicates respondents have articulated minimum perception of “Strongly Disagree”, while the maximum variable value for Table 4.21 is 3, which indicates respondents have articulated maximum perception of “Undecided”. Respondents therefore disagree that imported pork products are of a higher quality than locally-produced pork.

The mean results from Table 4.31 show the study variables have a mean value of 3.00 for the data set in Table 4.22. This indicates that the respondents in the study have an expressed average perception corresponding to “Undecided” towards the study variables. The median results show the study variables have a median value of 3.00 for the data set shown in Table 4.22. This indicates that “Undecided” is the median perception of respondents in the study. The mode results show the study variables have a mode value of 2.00 for the data set shown in Table 4.22. This indicates that “Disagree” is the mode perception of respondents in the study. The Mean and Median results presented above, show that the respondents are undecided with regard to their attempt at selling imported pork. Mode results presented above, show that the respondents disagree with regard to their attempt at selling imported pork. According to Table 4.31 the variables in Table 4.22 has a standard deviation of 0.984. This indicates that there is a difference in respondents’ perceptions at attempting to sell imported pork. According to Table 4.31 the variables in Table 4.22 show a variance of 0.968. This indicates that there is a variance in respondents’ attempts at selling imported pork. According to Table 4.31 the range of the values in Table 4.22 is 3, which indicates the respondents’ attempt at selling imported pork. The minimum variable value shown for Table 4.22 is 1, which indicates respondents have articulated minimum perception of “Strongly Disagree”, while the maximum variable value is 4, which indicates respondents have articulated maximum perception of “Agree” at attempting to sell imported pork products.

The mean results from Table 4.31 shows the study variables have a mean value of 3.00 for the data set in Table 4.27. This indicates that the respondents in the study have an expressed average perception corresponding to “Undecided” towards the study variables. The median results shows the study variables have a median value of 3.00 for the data set shown in Table 4.27. This indicates that “Undecided” is the median perception of the respondents. The mode

results shows the study variables have a mode value of 3.00 for the data set shown in Table 4.27. This indicates that “Undecided” is the mode perception of respondents in the study. The Mean, Median and Mode results presented above, show that the respondents are undecided with regard to imported pork being sold in its’ original packaging. According to Table 4.31 the variables in Table 4.27 has a standard deviation of 0.736. This indicates that there is a difference in respondents’ perceptions at selling imported pork in its original packaging. According to Table 4.31 the variables in Table 4.27, shows a variance of 0.542. This again indicates a variance in respondents’ perceptions at selling imported pork in its original packaging. According to Table 4.31 the range for the values in Table 4.27 is 3, which indicates the respondents’ perception of selling imported pork in its original packaging. The minimum variable value shown in Table 4.31 for Table 4.27 is 1, which, indicates respondents have articulated minimum perception of “Strongly Disagree”, while the maximum variable value for Table 4.27, is 4, which indicates respondents have articulated maximum perception of “Agree” that imported pork is sold in its’ original packaging.

**Table 4.32: Central Tendency Statistics for Table 4.25, 4.26 and 4.28**

		Table 4.25	Table 4.26	Table 4.28
N	Valid	23	23	23
	Missing	0	0	0
Mean		4.00	2.00	4.00
Median		4.00	2.00	4.00
Mode		4	2	4
Std. Deviation		.714	.949	1.022
Variance		.510	.901	1.043
Range		3	4	3
Minimum		2	1	2
Maximum		5	5	5

Table 4.32, shows central tendency statistics results of study statements for butcheries able to meet the demand for pork products; customer preference for imported pork over local pork, and whether pork sales appear to be price-driven. The measurement scale code was interpreted as follows: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree and 5 = Strongly Agree.

The mean results from Table 4.32 shows the study variables have a mean value of 4.00 for the data set in Table 4.25. This indicates that the respondents in the study had an expressed average perception corresponding to “Agree” towards the study variables. The median results show the study variables have a median value of 4.00 for the data set shown in Table 4.25. This indicates that “Agree” was the median perception of respondents in the study. The mode results show the study variables have a mode value of 4.00 for the data set shown in Table 4.25. This indicates that “Agree” was the mode perception of respondents. The Mean, Median and Mode results presented above, show that the respondents agree that butcheries are able to meet the demand for pork products. According to Table 4.32 the variables in Table 4.25 have a standard deviation of 0.714. This indicates that there was a difference in respondents’ perceptions that butcheries are able to meet the demand for pork products. According to the Table 4.32 the variables in Table 4.25 show a variance of 0.510. This indicates a variance in respondents’ perceptions that butcheries are able to meet the demand for pork products. According to Table 4.32 the range for the values in Table 4.25 is 3, which indicates the respondents’ have the same perception toward butcheries being able to meet the demand for pork products.

The minimum variable value shown in Table 4.32 for Table 4.25 is 2, which indicates respondents’ articulated minimum perception of “Disagree”, while the maximum variable value for Table 4.25 is 5, which indicates their articulated maximum perception of “Strongly Agree” toward butcheries being able to meet the demand for pork products.

The mean results from Table 4.32 show the study variables have a mean value of 2.00 for the data set in Table 4.26. This indicates that the respondents in the study had an expressed average perception corresponding to “Disagree” towards the study variables. The median results show the study variables have a median value of 2.00 for the data set shown in Table 4.26. This indicates that “Disagree” is the median perception. The mode results show the study variables have a mode value of 2.00 for the data set shown in Table 4.26. This indicates that “Disagree” is the mode perception of respondents. The Mean, Median and Mode results presented above, show that the respondents disagree that customers prefer imported pork over local pork products. According to Table 4.32 the variables in Table 4.26 have a standard

deviation of 0.949. This indicates that there is a difference in respondents' perceptions regarding customer preference for imported pork over local pork. According to Table 4.32 the variables in Table 4.26 show a variance of 0.901. This again indicates that there is a variance in respondents' perceptions regarding customer preference for imported pork over local pork. According to Table 4.32 the range for the values in Table 4.26 is 4, which also indicates a difference in the respondents' perceptions toward customer preference for imported pork over local pork. The minimum variable value shown in Table 4.32 for Table 4.26 is 1, which, indicates respondents have articulated minimum perception of "Strongly Disagree", while the maximum variable value for Table 4.26 is 5, which indicates respondents have articulated maximum perception of "Strongly Agree" toward customer preference for imported pork over local pork.

The mean results from Table 4.32 show the study variables have a mean value of 4.00 for the data set out in Table 4.28. This indicates that the respondents in the study had an expressed average perception corresponding to "Agree" towards the study variables. The median results show the study variables have a median value of 4.00 for the data set shown in Table 4.28. This indicates that "Agree" is the median perception of respondents. The mode results show the study variables have a mode value of 4.00 for the data shown in Table 4.28. This indicates that "Agree" is the mode perception of respondents. The Mean, Median and Mode results presented above, show that the respondents agree that pork sales appear to be price-driven.

According to Table 4.32 the variables in Table 4.28 have a standard deviation of 1.022. This indicates that there is a difference in respondents' perceptions that pork sales appear to be price-driven. According to Table 4.32 the variables in Table 4.28 show a variance of 1.043. This again indicates a variance in respondents' perceptions that pork sales are price-driven. According to Table 4.32 the range for the values in Table 4.28 is 3 and 4, which also indicates a difference in the respondents' perception toward pork sales being price-driven. The minimum variable value shown in Table 4.32 for Table 4.28 is 1, which indicates respondents have articulated minimum perception of "Strongly Disagree", while, the maximum variable value for Table 4.28 is 5, which indicates respondents have articulated

maximum perception of “Strongly Agree” with regard to pork sales appearing to be price-driven.

#### **4.10 Conclusion**

This chapter started by considering the demographic profile of the respondents taking part in the field work. It was found that the age group of respondents was between the ages of 36 – 40 years, and that the respondents were white males. 65% of them are in the butchery trade and 66% of respondents hold the position of manager in their organization.

Between 0 – 100 pigs are sold/slaughtered in a given month by 60% of the respondents. and 52% have a customer base of more than 250. Local pork products sold account for 91% of all pork products sold. 39% of respondents’ opinion of imported pork products is good. When asked if a drop in sales for fresh pork had been observed due to the importation of pork, 52% of respondents replied in the negative.

According to the respondents, pork made up 0 – 20% of total meat sales in their organization. 78% of respondents did not know what the motivating factors are for selling imported pork products. Respondents were undecided (47%) about whether an increase in demand for imported pork products had been observed, 39% of respondents strongly disagree or are undecided if customers are aware that they are purchasing an imported pork product.

When asked whether imported pork is of a higher quality than locally-produced pork products, 47% of respondents disagreed, while 30% disagreed, were undecided or agreed that an attempt has been made by them to take advantage of selling imported pork products. 43% of respondents disagreed that they are aware of how imported pork has been handled in terms of hygiene. Respondents agreed (52%) that they were able to meet the demand for pork; 52% felt that pork sales appear to be driven by price, and 47% disagreed that there is a preference for imported pork over South African-produced pork.



Statistical approaches such as Descriptive Frequency Statistics and Central Tendency Statistics were applied to the data collected from the questionnaire. This data was interpreted and discussed with the help of various tables.

The next chapter discusses limitations encountered with the research and research sample, as well as deviations encountered in the data. The research questions of the dissertation posed earlier will be discussed, and recommendations made. Managerial guidelines will be given for businesses who may want to take advantage of selling imported pork products to broaden their existing product line, or to businesses wanting to use imported pork products for production in order to lower costs.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

The previous chapter dealt with data analysis and results obtained from data collected with the use of a questionnaire.

The study was undertaken to investigate what impact imported pork products have on the demand for fresh pork in Queenstown. The need for a study of this nature arose as no study of this kind had been undertaken regarding pork consumption. According to Miles (2006), the recent outbreak of Swine Fever in the Eastern Cape appeared to have had a negative effect on demand for pork products and the supply of pigs from the livestock sector, as pig herds had had to be culled to combat the spread of Swine Fever to other areas of the country.

According to an animal production report published by SAMIC in 2003, the number of pigs slaughtered in the period 1998/99 was 1 809 773. This number had been reduced to 1 765 122 in 2002/03, showing a decline in the number of slaughter pigs. An article by Willemse (2005), notes that the demand for meat in South Africa is growing faster than the ability of the local producers to provide. Imported pork may therefore not affect local production. The research problem investigated was the effect of imported pork on the demand for locally-produced pork, and whether imports have a negative positive or zero effect on the local market, as the number of slaughter pigs appear to be declining.

The research questions investigated concerned the effect of imported pork on the demand for pork; consumer preference for local pork; customer awareness of purchasing imported pork products; to determine if businesses can take advantage of selling imported pork together with locally-produced pork; what motivating factors exist for butcheries selling imported pork product, and, finally, the ability of businesses to meet the demand for pork products.

This chapter will deal with the research questions posed at the beginning of the study; a review of the findings of the study; limitations of the sample size; managerial guidelines for businesses which may want to take advantage of using imported pork products for production (or as an added line to their existing product offering); any threats which imported pork products may pose to businesses and finally, recommendations for future research. The chapter will end with a conclusion.

## **5.2 Research Questions and Findings**

The research question posed at the beginning of the study was what effect importing pork will have on demand for locally-produced pork. The main trends revealed in the data from Chapter 4, with regard to the above research questions showed that 91.3% of respondents sell local pork products, as can be seen in Section 4.5.3, while 8.7% of respondents sell both imported and local pork products. Section 4.5.5 indicates that 8.7% of respondents strongly disagree and 52.2% of respondents disagree that a drop in sales for local pork has been observed due to the importation of pork. This suggests that the importing of pork has no effect on the demand for locally-produced pork. However, according to Willemse (2005), the demand for meat in South Africa is growing faster than the ability of the local producers to provide. This would indicate that the demand for imported pork products ought to have been greater than what was found. Consumers may therefore be purchasing greater quantities of alternative meats, such as beef, mutton and poultry. The extent of demand for alternative meat products is unknown. According to McGuigan and Nieuwoudt (2002), pork production prices were projected to decline because of expected technological advances. This may therefore make locally-produced pork products more competitive with the cheaper imported pork products.

The research question was whether consumers prefer imported pork to South African pork, and whether they are made aware of the fact that they may be purchasing an imported pork product. According to Section 4.8.2, 47.8% of respondents disagreed, and 26.1% strongly disagreed that consumers prefer imported pork to locally-produced pork. Section 4.6.4 indicated that 78% of respondents strongly disagreed or were undecided about whether

consumers are aware that they are purchasing imported pork. The data in Section 4.8.2 also shows that 82% of respondents were undecided or disagreed, that imported pork products are sold in their original packaging, while 39.1% of respondents were undecided about whether consumers are aware that they are purchasing an imported pork product. Imported pork is mainly used for the production of meats and as a supplement in other meat products, while locally produced pork is mainly used for display counters. Consumers who purchase processed meats may be unaware of the origin of the meat contained in these products (Baderson, 2007). According to Dransfield *et al.*, (2004), labels on meat products play an important role when selling a product, and, further, consumers prefer pork products labeled as British to pork products labeled as merely imported. The same may be said for the local pork market. If given the choice, consumers may choose locally-produced pork over imported pork, but they would first have to be made aware that they are purchasing an imported pork product. According to Oyewumi and Jooste (2006) regarding measuring the determinants of pork consumption in Bloemfontein, six variables were found to be significant. These were: monthly household income, household monthly expenditure on meat, relative price of pork, preference for value-added pork products, price of substitutes (the most preferred household meat type) and response of household to change in pork quality. Consumers may have no preference regarding the origin of the pork product, as long as it the criteria mentioned by Oyewumi and Jooste (2006).

The research question was to determine whether an abattoir can take advantage of selling imported pork by offering a wider product line, and whether quality is an important factor to consumers when purchasing pork products. It can be seen above and in Section 4.5.3, that 91.3% of respondents sell local pork, while Section 4.8.2 shows that 52.2% of respondents agree that sales for pork are generally driven by price. An abattoir may therefore be able to meet the demand for pork, but may also be able to take advantage of selling imported pork when the prices are much lower than those of local pork products, or when the livestock sector is unable to supply abattoirs with pigs, as was the case with the recent outbreak of Swine Fever in the Eastern Cape. According to Willemse (2005), Classic Swine Fever outbreaks in South Africa have already caused major losses and instability in the market and according to Miles (2006), the decrease in the number of pigs slaughtered by Meat Traders

Abattoir during the years 2005/2006 was due to the outbreak of Swine Fever. Section 4.7.2. shows 30.4% of respondents have made an attempt at selling imported pork, or have not made any attempt at selling imported pork, and 30.4% of respondents were undecided as to whether an attempt at selling imported pork had been made. Table 4.4 shows that 30.4% of respondents are in the abattoir sector of the meat industry and 4.3% of respondents are in the livestock sector of the meat industry. These respondents may have been undecided as no attempt to sell imported pork products has been on their part. According to Section 4.6.4, the quality of pork is an important factor when making a purchase of a pork product, as 87% of respondents preferred fresh pork, while Section 4.7.1, indicates that 47.8% of respondents disagreed that imported pork is of a higher quality than locally-produced pork. Respondents agree (Section 4.6.4, 43.5%) that quality is an important factor when making a purchase of pork products.

The research question posed earlier in the study was to determine if butcheries sell imported pork products, and what factors influence a butchery to sell imported pork products. These factors may include price, quality or an inability of the local pork market to meet demand. According to Section 4.5.3, respondents who sell imported pork products made up 8.7% while Section 4.8.2 shows that 52.2% of respondents agreed that price is the motivating factor for selling imported pork products. Section 4.8.1 shows 52.2% of respondents agree that they are able to meet the demand for pork products. Therefore butcheries which sell imported pork products only do so as the price is cheaper than locally-produced pork. Butcheries may therefore use imported pork in the production of processed meats to lower the price of the product, and may not sell imported pork cuts such as chops and roasts. According to Eskort (2006), it is estimated that between 55% and 65% of all pork produced in South Africa is used for meat processing and manufacture. Cheaper imported pork may therefore play a significant role in the manufacture of these processed meats. The research questions highlighted above have been satisfactorily answered.

Managerial guidelines for business in Queenstown are as follows:

1. According to the results shown in Chapter 4, businesses can take advantage of using imported pork for re-sale and manufacture. It can be seen from Section 4.5.3 that 91.3% of businesses sell only locally-produced pork products, while Section 4.5.4 shows that 43.5% of respondents had not formed an opinion on imported pork products. This may show that respondents have not enquired about imported pork products for re-sale or manufacture, or importers of pork products have not made any attempt at selling imported pork to businesses.
2. Section 4.5.5 shows that 52.2% of respondents disagreed that a drop in sales for fresh pork has been observed due to the importation of pork. According to Section 4.6.3, 47.8% of respondents were undecided, these respondents may not have identified a need to purchase or sell imported pork products and would not have noticed a demand for imported pork products, while 26.1% of respondents agreed that there has been an increase in demand for imported pork products. This may be due to the recent outbreak of Swine Fever in South Africa, thus causing a shortage of pork products for the market, and forcing some businesses to explore alternative sources. According to the National Department of Agriculture (2006), Classical Swine Fever can affect the pig industry, as the disease can spread rapidly amongst pigs, causing a very high mortality rate, which could wipe out an entire industry if left uncontrolled.
3. According to Section 4.6.4, 87% of respondents prefer fresh pork to frozen pork products, while Section 4.5.3, shows 8.7% of respondents sell both imported and local pork products. This may indicate why most businesses have not attempted purchasing imported pork products for re-sale and manufacture, while a small number of businesses purchase both imported and local pork products. Local abattoirs should therefore take advantage of this, and market fresh pork products more aggressively to customers. Abattoirs in Queenstown may also consider widening their fresh pork product line, and not only sell fresh pork carcasses, for example, but also fresh pork primal cuts such as legs, bellies and shoulders. According to Dransfield *et al.*, (2004), the perceived eating quality of pork labeled as fresh has increased.

4. According to Glitsch (2000), freshness, flavour and tenderness are the most important characteristics for determining the quality of pork. Section 4.6.4 shows that 43.5% of respondents are concerned with the quality of pork sold, while Section 4.7.3 shows 47.8% of respondents agree that they are concerned regarding the hygiene of local abattoirs and meat processing plants. Local suppliers of pork products should therefore embark on a customer awareness campaign to highlight hygiene standards adhered to and the hygiene management systems used to adhere to these standards.
5. Abattoirs and butcheries scoring high on Department of Health audits on their hygiene management systems should publicize the fact to their customers, thereby assuring customers of the hygiene standards achieved and maintained. It can be seen from the study conducted by Dransfield *et al.*, (2004) that labels on meat products are important when selling a product to consumers. The study conducted by Verbeke and Viaene (1999), showed the importance of safety-related meat attributes in affecting beef and pork consumption. It was found from the results that future meat consumption will be based on the ability of the beef and pork sectors to produce, deliver and guarantee products that are safe to consume.
6. Businesses which use imported pork for manufacture or resale should make customers aware of the fact that they are purchasing an imported pork product. Section 4.8.2 shows that 56.5% of respondents were unsure whether imported pork was sold in its original packaging, while Section 4.6.4 shows that 39.1% of respondents were undecided and strongly disagreed that customers, are aware that they are purchasing an imported pork product. Businesses should consider making customers aware of the fact that they are purchasing an imported pork product. Many customers may not want to purchase imported pork, but only South African-produced pork products. According to Dransfield *et al.*, (2004), when pork was presented with labels detailing origin and method of production, the labels had a significant effect on both the appreciation and price offered. British consumers preferred pork labeled "British", rather than "Imported", while in all the countries studied, the labels influenced preferences for fresh pork, and increased the perceived eating quality.

### 5.3 Limitations

Due to the small size of Queenstown and therefore the small sample size, all stakeholders had to be contacted in order to achieve the highest possible rate of responses. The participants of this study included persons from the butchery, abattoir and livestock sectors of the meat industry.

The following limitations were encountered while conducting field work:

- No existing research could be found regarding this subject. This made it difficult to find a starting point from which to conduct research. It was, of course, impossible to proceed from previous research conducted in this area.
- Time is a valuable resource to business owners and managers. It was therefore difficult to arrange a suitable time to meet with respondents. Although the questionnaire required but a few minutes to complete, it was difficult to receive the completed questionnaire from respondents. Most respondents preferred to complete the questionnaire at home after hours or over a weekend.
- The small sample size limited the accuracy and number of statistical tests available. Only twenty three respondents could be contacted to complete the questionnaire. The sample included owners, managers and administrative staff in butcheries, abattoirs and the Livestock Sector of the Meat Industry.
- Many respondents noted that they were not aware that one could purchase imported pork products for manufacture or resale. They were therefore unable to answer many of the questions accurately.
- Those respondents who were administrative staff felt that they did not have an adequate knowledge of the products sold or manufactured by the organization, thus limiting their answers.



### 5.3.1 Sample Size

It was highly unlikely to receive more than thirty prospective respondents due to the small size of Queenstown. According to Leedy and Ormrod (2005), the larger the sample size, the less the statistics obtained will diverge from population parameters.

Parametric statistical tests could not be carried out due to the small sample size. As the sample size was less than thirty respondents, non parametric statistical tests had to be conducted on the data. According to Leedy and Ormrod (2005), parametric statistics are based on certain assumptions about the nature of the population. Two of the most common assumptions are: the data reflects an interval or ratio scale, and the data falls in a normal distribution. Non-parametric statistics are not based on such assumptions as they are appropriate for data that is ordinal rather than interval.

## 5.4 Recommendations for Future Research

- Developing or improving the marketing system for imported pork, as many role-players in the trade are unaware that imported pork is available as an alternative to locally-produced pork products.
- Importers of meat products should make hygiene standards of imported meats available to purchasers, as the handling in terms of hygiene proved to be an important factor. The recent outbreak of Swine Fever in SA is a good example of this.
- Full traceability of all imported meat should be provided to all role-players in the supply chain, from when the product leaves a foreign country to when it is sold to the final consumer. This would make a product recall easier to co-ordinate, should the need arise.
- A standardized system should be investigated whereby all pork products that are imported for resale or manufacture should be labeled as such at the point of sale. Customers may not want to purchase imported pork products, but may prefer locally-produced pork products. A similar study was carried out in Europe by Dransfield *et al.*, (2004), but no study of this nature could be found locally.

- An investigation into the effect of imported beef, mutton and poultry on the demand for meat. This may give a better indication of demand for all meat products.
- There may be a problem when using the Chi-Square Test and Spearman Rank Order Correlation as some cells may have less than 5 values. It is therefore suggested that follow-up research be conducted using a larger sample to confirm the findings of this study.

## **5.5 Conclusion**

This chapter started by examining the research questions and found that the importing of pork has no effect on the demand for locally-produced pork in Queenstown. Consumers do not prefer imported pork to locally-produced pork, and many consumers are unaware that they may be purchasing an imported pork product. An abattoir may be able to take advantage of selling imported pork when the prices are lower than those of local pork products, or when the livestock sector is unable to supply abattoirs with pigs, as was the case with the recent outbreak of Swine Fever in the Eastern Cape. Respondents agreed that quality is an important factor when making a purchase of pork products. Butcheries in Queenstown which sell pork products only do so as the price is cheaper than locally-produced pork products, and respondents agreed that they are able to meet demand.

A study of this nature is important, as no other study could be found to determine the effect of imported pork on the demand for locally-produced pork products in Queenstown. Businesses now have a base to work from, and business plans may be formulated to incorporate imported pork products into existing product lines and manufacturing. The effect of imported pork products on the local market is now known.

096887

## REFERENCES

### A. Books, Journals, etc

*Guidelines for Masters Dissertation*, 2005, Pamphlet in lecture at Graduate School of Business, University of KwaZulu-Natal

*Writing Your MBA Dissertation*, 2006, Pamphlet in lecture at Graduate School of Business, University of KwaZulu-Natal

Alexandratos, N. 1999, *World food and agriculture: Outlook for the medium and longer term*, Colloquium Paper, Vol. 96:, p 5908–5914.

Alston, J.M., Chalfant, J.A. and Piggott, L.E. 1999, *Incorporating demand shifters in the Almost Ideal Demand System*, Economics Letters 70 (2001), p 73–78

Babbie E. 1998, *The practice of social research*, Wadsworth Publishing Company, Belmont, USA

Baderson B. Owner, Komani Meats Butchery, July 2007, Personal conversation

Bowmaker, P.A.M. 1988, *Demand functions for selected South African agricultural commodities*, Unpublished Masters Thesis, University of Natal, Pietermaritzburg.

Bredahl, L. Grunert, K.G. and Fertin, C. 1998, *Relating consumer perceptions of pork quality to physical product characteristics*, Food Quality and Preference, Vol. 9(4), p 273–281

Brouwer, A. 2005, *Multi-market analysis of the impact of trade restrictions of importing live animals into South Africa*. Unpublished M.Sc. Thesis, University of Pretoria, Pretoria

Bryhni E.A., Byrne D.V., Rodbotten M., Claudi--Magnussen C., Agerhem H., Johanssen M., Lea P., and Martens M., 2002, *Consumer perceptions of pork in Denmark, Norway and Sweden*. Food Quality and Preference, Vol. 13, p 257–266.

Chavas, J.P., 1983, *Structural change in the demand for meat*, American Agricultural Economics Association, Amer. J. Agr Econ, p 148–153

Cloete, C. 2005, *Meat Levy: Don't think for consumers*, Farmer's Weekly, 29 July, p 7.

Department Of Agriculture Eastern Cape Province, State Veterinary Services, 2005, *Classic Swine Fever*, Pamphlet, Produced by Animal Disease Surveillance Unit, Eastern Cape Province, South Africa

Dittmer N. 1998, *The meat board carve-up*, Monograph 22, The Free Market Foundation, Sandton, South Africa

Dransfield E., Ngapo T.M., Nielsen N.A., Bredahl L., Sjoden P.O., Magnussen M., Campo M.M. and Nute G.R., 2004, *Consumer choice and suggested price for pork as influenced by its appearance, taste and information concerning country of origin and organic pig production*, Meat Science 69 (2005), p 61–70

Du Toit D. 2004, *Regulatory: Environment and the Meat Industry*, Speech Presented at Red Meat Producers Organization

Gay S.H. 2006, *The free trade agreement between South Africa and the European Union: Implications for the fruit trade*, Institute of Rural Studies, Federal Agricultural Research Centre, Braunschweig, Germany

Glitsch K. 2000, *Consumer perceptions of fresh meat quality: Cross-national comparison*, British Food Journal, Vol. 102 No. 3, p 177-194

Gouws A. 2005, *Baie vleis verbied oor bek-en-klou*, Landbouweekblad, 11 November, p 107

Guenther P.M., Jensen H.H., Batres-Marquez S.P. and Chen C.F., 2005, *Socio-demographic knowledge and attitudinal factors related to meat consumption in the United States*, Journal of the American Dietetic Association, Vol. 105 No. 8, p 1266-1274

Gujarati D. 1992, *Essentials of Econometrics*, 2<sup>nd</sup> Edition, Irwin McGraw Hill, USA

Hancock P.J. 1983, *An Econometric Demand and Policy Analysis of the South African Meat Industry* Unpublished Masters Thesis, University of KwaZulu-Natal

Harman A. 2006, *World News*, Farmer's Weekly, 4 August, p 17

Kabeli A. 2005, *Price of pork up 15% with Swine Fever culling*, The Daily Dispatch, 13 September, p 9

Keifer I, Rathmanner T and Kunze M. 2005, *Eating and dieting differences in men and women*, Journal of Men's Health and Gender, Vol. 2 No. 2, p 194-201

Klopper R, 2006, *Organization of Dissertation*, Pamphlet in lecture at Graduate School of Business, University of KwaZulu-Natal, South Africa

Leedy P.D, and Ormrod J.E., 2005, *Practical Research Planning and Design*, 8<sup>th</sup> Edition, Pearson Prentice Hall, Upper Saddle River, New Jersey, USA

Lubbe S and Klopper R, 2005, *Introduction to research design in information technology*, 2<sup>nd</sup> Edition, Dolphin Coast Publishers, South Africa

Lubbe S and Klopper R, 2005, *Concept Matrix*, CD-ROM in lecture at Graduate School of Business, University of KwaZulu-Natal, Durban, South Africa

Lukoto M, 2004, *HIV/Aids likely to push tobacco, meat and sugar off the menu*, The Sunday Independent, 30 May, 2004, p 3

Luppnow E.F. Director Elliott Brothers Auctioneers, 2006, Personal conversation

Lymbery P. 2002, *Supermarkets and farm animal welfare: raising the standard*, Compassion in World Farming Trust, United Kingdom

Mager A. Owner, Peace Abattoir, June 2006, Personal conversation

McGuigan S.M. and Nieuwoudt W.L. 2002, *The expected consumption of protein feed in South Africa by 2020*, Agrekon, Vol. 41 No. 1, p 1-24

Meat Traders Abattoir, 2006, *Monthly slaughter units*, Unpublished internal report, Queenstown, South Africa

Miles J., 2006, Co-owner, Meat Traders Abattoir, June 2006, personal conversation

Moodley N. 2006, *Fever will not hurt local pork farmers*, The Star, 13 April, p 4

Mouton J. 2005, *How to succeed in your master's and doctoral studies*, 1<sup>st</sup> Edition, 8<sup>th</sup> Impression, Van Schaik Publishers, South Africa

Mulder N. 2005, *Vleisregulasies maak dit dalk duurder; gee gemoedsrus*, Die Beeld, 2 June, p 7

Olivier P. 2001, *Red meat crisis*, The Citizen, 19 November, P 7

Olivier G.C. 2004, *An analysis of the South African beef supply chain: from farm to fork*, Unpublished Masters Thesis, Rand Afrikaans University, Johannesburg, South Africa

Osborne D., 2006, Owner, Number Two Piggeries, June 2006, Personal conversation

Oyewumi O.A. and Jooste A. (2006a), *Measuring the determinants of pork consumption in Bloemfontein, Central South Africa*, Agrekon, Vol. 45 No. 2

Pallant J. (2006), *SPSS Survival Manual*, 2<sup>nd</sup> Edition, Open University Press, McGraw-Hill Education, New York, USA

Phiri M., Research Co-Coordinator at Graduate School of Business, University of KwaZulu-Natal, June 2006, Personal Communication

Stoltz I., 2006, *Afdreiging werk nie*, Landbouweekblad, 17 March, P 62

Streicher S. 2006, Chief Executive at SAPPO, August 2006, Personal conversation

Taljaard P.R. 2003, *Econometric estimation of the demand for meat in South Africa*. Unpublished M.Sc Thesis, University of the Free State, Bloemfontein

Taljaard P.R., Alemu Z.G. and Van Schalkwyk H.D. 2004, *The demand for meat in South Africa: An almost ideal estimation*, Agrekon, Vol. 43 No. 4, p 1-14

Taljaard P.R., Jooste A. and Asfaha T.A. 2006a, *Towards a broader understanding of South African consumer spending on meat*, Agrekon, Vol. 45 No. 2, p 1-11

Taljaard P.R., Van Schalkwyk H.D. and Alemu Z.G. 2006b, *Choosing between the AIDS and Rotterdam models: A meat demand analysis case study*, Agrekon, Vol. 45 No. 2, p 1-15

Tjaronda W. 2005, *Brazil meat imports banned*, New Era, 13 October, p 1

Van Rensburg F. Operations Manager, East London Abattoir, June 2006, Personal conversation

Verbeke W and Viaene J. 1999, *Beliefs, attitude and behaviour toward fresh meat consumption in Belgium: empirical evidence from a consumer survey*, Food Quality and Preference 10, p 437-445

Vink N., Meyer F. and Strauss P.G., 2006, *Some direct financial impacts of AgriBEE on farm level in South Africa, a case study of four different farms*, The Bureau for Food and Agricultural Policy, Department of Agricultural Economics, University of Pretoria, Pretoria

Visser D.P. 2004, *Structuring of breeding objectives in the pork supply chain in South Africa*. Unpublished Doctoral Thesis, University of Pretoria, Pretoria

Willemse J. 2005, *Hou jou oog op vleis pryse*, Landbouweekblad, 25 November, p 8

Zhu X and Van Ierland E.C. 2005, *A model for consumers' preferences for novel protein foods and environmental quality*, Economic Modelling, 22, p 720-744

#### B Internet sources:

Bureau for Food and Agricultural Policy, *South African agricultural outlook for the grain, livestock and dairy industry*, Accessed 22 June 2006, (Online), Available at <http://www.bfap.co.za>

Blatch, N. 2005, *Fever won't affect pork production*, The Eastern Province Herald Accessed 22 June 2006, (Online), Available at <http://www.theherald.co.za>

DEFRA, 2003, Department for Environment Food and Rural Affairs, (Online), Available at <http://www.defra.gov.uk/footandmouth>

Eskort, 2006, *About the pork industry*, Accessed 20 August 2006, (Online), Eskort, Available at <http://www.eskort.co.za/about.htm>



FNB, 2005, *Agri-Weekly*, Accessed 22 June 2006, (Online), First National Bank, Available at <http://www.fnb.co.za>

Food Outlook, *Global Market Analysis*, Accessed 22 June 2006, (Online), Available at <http://www.fao.org>

Hammersley M. and Gomm R. 1997, *Bias in Social research*, Accessed 7 April 2007, (Online), Available at <http://www.socresonline.org.uk>

Kaptchuk T.J. 2003, *Effect of interpretive bias on research evidence*, (Online) Accessed 4 April 2007, Available at <http://www.bmj.com>

Leach G, 2006, *South African Pork Industry*, (Online) Accessed 11 August 2006, Available at <http://www.ufs.ac.za>

Map of Eastern Cape, (Online), Accessed 9 August 2007, Available at <http://www.places.co.za>

Marketing Act of 1968, (Online), Accessed 26 June 2006, Available at <http://www.nda.agric.za/docs>

Marketing of Agricultural Products Act (ACT NO. 47 OF 1996), (Online), Accessed 26 June 2006, Available at <http://www.info.gov.za/gazette/acts>

Meat Safety Act 40 of 2000, (Online), Accessed 26 June 2006, Available at <http://www.info.gov.za/gazette/acts>

National Department of Agriculture, 2001, (Online) *Trends in the agricultural sector*. Accessed 28 December 2005, Available at <http://www.nda.agric.za>

Ngapo T.M., Martin J.F. and Dransfield E. 2005, *International preferences for pork appearance: II. Factors influencing consumer choice*, (Online), Accessed 11 September 2006, Available at <http://www.elsevier.com>

Njobeni S., 2005, "Massive cull in Eastern Cape after swine fever hits", *Business Day*, Accessed 22 June 2006, (Online), Available at <Http://www.businessday.co.za>

Red Meat Abattoir Association (RMMA), *Homepage, Background* (Online), Accessed 22 June 2006, Available at <http://www.rmaa.co.za/background/htm>

SAMIC, 2003, *Animal production report*, (Online), Accessed 24 June 2006, Available at <http://www.samic.co.za>

SAMIC, (2006a), *Classification characteristics of pork*, (Online), Accessed 24 June 2006, Available at <http://www.samic.co.za>

SAMIC, (2006b), *The South African pig herd and slaughtering, 1970-2005*, (Online), Accessed 24 June 2006, Available at <http://www.samic.co.za>

SAMIC, (2006c), *Pork import statistics, 2003-2005*, (Online), Accessed 24 June 2006, Available at <http://www.samic.co.za>

SAMIC, (2006d), *Home Page*, (Online), Accessed 24 June 2006, Available at <http://www.samic.co.za>

SAPPO, 2006, *Future competitiveness of the pork industry*, (Online), Accessed 15 August 2006, Available at <http://www.sapork.com>

Schoeman L., 2003, *Pork farmers alarmed by increase in cheap imports*, *The Eastern Province Herald*, (Online), Accessed 22 June 2006, Available at <http://www.theherald.co.za>

STATISTICS S.A. 2005, *Census on commercial agriculture, 2002: key findings: financial and production statistics*”, (Online), Press Release, Accessed 24 June 2006, Available at <http://www.statssa.gov.za>

STATISTICS S.A. (2006a), *South African pig herd and slaughtering, 1970-2005*, (Online), Accessed 24 June 2006, Available at <http://www.statssa.gov.za>

STATISTICS S.A. (2006b), *Pork import statistics, 2003-2005*, (Online), Accessed 24 June 2006, Available at <http://www.statssa.gov.za>

STATISTICS S.A. (2006c), *Relation between private consumption expenditure on food and the per capita consumption of pork, 1987-2004*, (Online), Accessed 24 June 2006, Available at <http://www.statssa.gov.za>

Trochim W.M.K., 2006, *Research methods knowledge base*, (Online), Accessed 26 June 2006, Available at <http://www.socialresearchmethods.net>

United Kingdom Medicines Information, *Research help – skills*”, (Online), Accessed 26 June 2006, Available at <http://www.ukmi.nhs.uk>

Wikipedia, 2006, *Online Encyclopedia*, Accessed 26 June 2006, (Online), Available at <http://en.wikipedia.org>

Wright J., 2006, *Future Competitiveness of the Pork Industry*, (Online), Available at <http://www.sapork.com/87john.html>

Zhuang R and Abbott P., 2006, *Price elasticities of key agricultural commodities in China*, *China Economic Review*, Accessed 11 September 2006, (Online), Available at <http://www.sciencedirect.com>

## APPENDIX A

### Questionnaire

This questionnaire is used to investigate the effect of imported pork on the demand for fresh pork.

Voluntary questionnaire for role-players in the fresh meat industry

Researcher:

Adrian Luppnow, Student number 202526733: Graduate School of Business, Faculty of Management Sciences, Program of Master of Business Administration (MBA), University of KwaZulu Natal, South Africa

Research:

An investigation into the impact of imported pork on the demand for pork

Supervisor: Professor Sam Lubbe (Lubbesi@unisa.ac.za).

Ethical Clearance Number: HSS/0324/07M

### **Note to the respondent**

- Although we would like you to help us, your participation is voluntary.
- If you do not want to take part, just hand in the blank questionnaire at the end of the survey session.
- You may stop at any point you wish.
- What you say in this questionnaire will remain private and confidential and your name will not be made public.
- All data obtained from this questionnaire will be secured at the Graduate School of Business at the University of KwaZulu-Natal for a period of five years.

The questionnaire consists of 5 sections:

- Section 1 requests your consent to use your responses for academic research
- Section 2 requests your personal and organizational particulars.
- Section 3 requests information relating to your area of supply, customer base and pork products sold.
- Section 4 requests information relating to imported pork products, demand for imported pork products, how imported pork products are purchased and consumer awareness of imported pork products.
- Section 5 requests information relating to drivers of pork sales, pork quality, fresh and frozen pork, pork hygiene, abattoir and processing plants hygiene standards and pork packaging.

### **How to complete the questionnaire**

- Please tick each answer with a pen (not a pencil).
- Please read and sign the consent form in section 1 of this questionnaire.
- Pork products refer to pork carcasses and any manufactured pork products.

University of KwaZulu-Natal  
Graduate School of Business

Section 1: Consent / Declaration

Supervisor: Prof S. Lubbe      Contact: [lubbesi@unisa.ac.za](mailto:lubbesi@unisa.ac.za) 012-429 6009

Co-Supervisor: Prof A. Singh      Contact: [singham@ukzn.ac.za](mailto:singham@ukzn.ac.za) 031-260 7061

Dear Sir or Madam

As part of the requirement of my MBA studies at the Graduate School of Business, I am undertaking research into the impact of imported pork on the demand for pork. The research sets out to understand what effect imported pork has on the demand for locally-produced pork in the market place. It is not known whether the effect of imported pork has a positive or negative impact on the meat industry. Please complete the attached questionnaire. It should only take a few minutes of your time.

Thank you for your time and participation in the study.

Yours truly,

Adrian Luppnow

202526733

Permission to use my responses in this questionnaire for academic research

I ..... (Full names) hereby give permission that my responses in this questionnaire be used for academic research and that I will remain anonymous. I understand the contents of this questionnaire and consent to participating in the research project. I understand that I am able to withdraw from the project at any time, should I so wish.

.....  
Signature

.....  
Date

Contact number.....

## Section 2:

This section asks questions regarding yourself and the type of organization for which you work.

### 1. What is your age?

- |                   |                          |                  |                          |
|-------------------|--------------------------|------------------|--------------------------|
| 1. 0 – 25 years   | <input type="checkbox"/> | 4. 26 – 30 years | <input type="checkbox"/> |
| 2. 31 – 35 years  | <input type="checkbox"/> | 5. 36 – 40 years | <input type="checkbox"/> |
| 3. 41 – 45 years  | <input type="checkbox"/> | 6. 46 – 50 years | <input type="checkbox"/> |
| 7. above 50 years | <input type="checkbox"/> |                  |                          |

### 2. What is your gender?

- |         |                          |           |                          |
|---------|--------------------------|-----------|--------------------------|
| 1. Male | <input type="checkbox"/> | 2. Female | <input type="checkbox"/> |
|---------|--------------------------|-----------|--------------------------|

### 3. To which race group do you belong?

- |           |                          |             |                          |             |                          |
|-----------|--------------------------|-------------|--------------------------|-------------|--------------------------|
| 1. White  | <input type="checkbox"/> | 2. African  | <input type="checkbox"/> | 3. Coloured | <input type="checkbox"/> |
| 4. Indian | <input type="checkbox"/> | 5. Oriental | <input type="checkbox"/> | 6. Other    | <input type="checkbox"/> |

### 4. Which sector of the meat industry are you (You may make more than one choice)?

- |             |                          |              |                          |             |                          |
|-------------|--------------------------|--------------|--------------------------|-------------|--------------------------|
| 1. Butchery | <input type="checkbox"/> | 2. Abattoir  | <input type="checkbox"/> | 3. Import   | <input type="checkbox"/> |
| 4. Export   | <input type="checkbox"/> | 5. Livestock | <input type="checkbox"/> | 6. Consumer | <input type="checkbox"/> |

### 5. What position do you hold in your organization?

- |          |                          |            |                          |          |                          |          |                          |
|----------|--------------------------|------------|--------------------------|----------|--------------------------|----------|--------------------------|
| 1. Owner | <input type="checkbox"/> | 2. Manager | <input type="checkbox"/> | 3. Buyer | <input type="checkbox"/> | 4. Sales | <input type="checkbox"/> |
|----------|--------------------------|------------|--------------------------|----------|--------------------------|----------|--------------------------|

### 6. How many years have you been involved in the meat industry?

- |                  |                          |                  |                          |                      |                          |
|------------------|--------------------------|------------------|--------------------------|----------------------|--------------------------|
| 1. 0 – 5 years   | <input type="checkbox"/> | 2. 6 – 10 years  | <input type="checkbox"/> | 3. 11 – 15 years     | <input type="checkbox"/> |
| 4. 16 – 20 years | <input type="checkbox"/> | 5. 21 – 25 Years | <input type="checkbox"/> | 6. 26 years and more | <input type="checkbox"/> |

### Section 3:

In this section you will be asked about the size of the customer base serviced by yourselves, units sold and opinion of imported pork products.

7. Do you supply areas other than Queenstown?

1. Yes ☐ 2. No ☐

8. How many pigs are sold / slaughtered by you in a given month?

1. 0 – 100 ☐ 2. 101 – 200 ☐ 3. 201 – 300 ☐  
4. 301 – 400 ☐ 5. 401 – 500 ☐ 6. 501 – 600 ☐  
7. 601 – 700 ☐ 8. 701 – 800 ☐ 9. 800 above ☐

9. How large is your customer base?

1. 1 – 50 ☐ 2. 51 – 100 ☐ 3. 101 – 150 ☐  
4. 151 – 200 ☐ 5. 201 – 250 ☐ 6. 250 above ☐

10. Which pork products do you sell?

1. Local ☐ 2. Imported ☐ 3. Both ☐

11. What is your opinion of imported pork products?

1. Good ☐ 2. Bad ☐ 3. Don't know ☐

12. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

A drop in sales for fresh pork has been observed due to the importation of pork:

1. Strongly Disagree ☐ 2. Disagree ☐ 3. Undecided ☐  
4. Agree ☐ 5. Strongly Agree ☐



Section 4:

In this section you will be asked about pork sales, deciding factors with regards to selling imported pork and demand for imported pork.

13. What percentage do imported pork products make up your overall meat sales?

1. 0 – 20    ☐    2. 21 – 40    ☐    3. 41 – 60    ☐  
4. 61 – 80    ☐    5. 81 – 100    ☐    6. Don't know    ☐

14. What made you decide to sell imported pork products?

1. Price    ☐    2. Quality    ☐    3. Availability    ☐  
4. New products    ☐    5. Many different products    ☐  
6. Don't know    ☐

15. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

The demand for imported pork products is increasing:

1. Strongly Disagree    ☐    2. Disagree    ☐    3. Undecided    ☐  
4. Agree    ☐    5. Strongly Agree    ☐

16. How do you purchase imported pork products?

1. Container    ☐    2. Pallet    ☐  
3. Box    ☐    4. Packet    ☐  
5. Other    ☐

17. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

Customers are aware that they are purchasing imported pork products from us:

1. Strongly Disagree ☐ 2. Disagree ☐ 3. Undecided ☐  
4. Agree ☐ 5. Strongly Agree ☐

### Section 5:

In this section you will be asked about pork sales, quality, hygiene, demand for pork products and estimated monthly turnover

18. Are sales for pork products driven by price, quality or both?

1. Price ☐      2. Quality ☐      3. Both ☐      4. Don't know ☐

19. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

Customers are concerned with the quality of pork sold:

1. Strongly Disagree ☐      2. Disagree ☐      3. Undecided ☐

4. Agree ☐      5. Strongly Agree ☐

20. Do your customers prefer fresh or frozen pork?

1. Fresh ☐      2. Frozen ☐      3. Don't know ☐

21. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

We are aware of how imported pork has been handled in terms of hygiene:

1. Strongly Disagree ☐      2. Disagree ☐      3. Undecided ☐

4. Agree ☐      5. Strongly Agree ☐

22. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

The hygiene of local abattoirs and meat processing plants are a concern to us:

1. Strongly Disagree ☐      2. Disagree ☐      3. Undecided ☐

4. Agree ☐      5. Strongly Agree ☐

23. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

Imported pork products are of a higher quality than locally-produced pork products:

1. Strongly Disagree ☐ 2. Disagree ☐ 3. Undecided ☐

4. Agree ☐ 5. Strongly Agree ☐

24. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

An attempt to take advantage of selling imported pork has been made:

1. Strongly Disagree ☐ 2. Disagree ☐ 3. Undecided ☐

4. Agree ☐ 5. Strongly Agree ☐

25. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

Imported pork products are sold in their original packaging:

1. Strongly Disagree ☐ 2. Disagree ☐ 3. Undecided ☐

4. Agree ☐ 5. Strongly Agree ☐

26. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

We are able to meet the demand for pork products:

1. Strongly Disagree ☐ 2. Disagree ☐ 3. Undecided ☐

4. Agree ☐ 5. Strongly Agree ☐

27. What is the estimated monthly turnover of pork products sold in your business?

- |                        |                          |                        |                          |
|------------------------|--------------------------|------------------------|--------------------------|
| 1. R0 – R50 000        | <input type="checkbox"/> | 2. R50 001 – R100 000  | <input type="checkbox"/> |
| 3. R100 001 – R200 000 | <input type="checkbox"/> | 4. R200 001 – R300 000 | <input type="checkbox"/> |
| 5. R300 001 – R400 000 | <input type="checkbox"/> | 6. R400 001 – R500 000 | <input type="checkbox"/> |
| 7. R500 001 – R600 000 | <input type="checkbox"/> | 8. R600 001 above      | <input type="checkbox"/> |

28. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

Customers prefer imported pork to South African pork:

- |                      |                          |                   |                          |              |                          |
|----------------------|--------------------------|-------------------|--------------------------|--------------|--------------------------|
| 1. Strongly Disagree | <input type="checkbox"/> | 2. Disagree       | <input type="checkbox"/> | 3. Undecided | <input type="checkbox"/> |
| 4. Agree             | <input type="checkbox"/> | 5. Strongly Agree | <input type="checkbox"/> |              |                          |

29. Do you strongly agree, agree, undecided, disagree or strongly disagree with the following statements?

Pork sales appear to be driven by price:

- |                      |                          |                   |                          |              |                          |
|----------------------|--------------------------|-------------------|--------------------------|--------------|--------------------------|
| 1. Strongly Disagree | <input type="checkbox"/> | 2. Disagree       | <input type="checkbox"/> | 3. Undecided | <input type="checkbox"/> |
| 4. Agree             | <input type="checkbox"/> | 5. Strongly Agree | <input type="checkbox"/> |              |                          |

End of the Questionnaire

Thank you for your time in completing this questionnaire and participating in this research.

## APPENDIX B

**Theme:** An Investigation into the Impact of Imported Pork on the Demand for  
Pork

Concepts	Imported Pork	Meat / Pork Demand	Meat Price	Animal Disease	Supply Chain / Pork Production	Competition	Pig Industry	S.A. Agriculture	Meat / Pork	HIV / AIDS	Import / Slaughter Statistics	Pork Consumption / Quality	Research Design / Statistical Analysis
<b>References</b>													
Alexandratos (1999)		✓		✓	✓						✓	✓	✓
Alston <i>et al.</i> (1999)													✓
BFAP (2005)		✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
Blatch (2005)	✓	✓		✓	✓						✓	✓	✓
Bowmaker (1988)		✓	✓										
Bredahl <i>et al.</i> (1998)		✓		✓	✓						✓	✓	✓
Brouwer (2005)	✓	✓		✓	✓						✓	✓	✓
Bryhni <i>et al.</i> (2002)		✓		✓	✓						✓	✓	✓
Chavas (1983)		✓							✓				✓
Cloete (2005)		✓		✓	✓						✓	✓	✓
DEFRA (2003)				✓									
Dept. Agri (2005)	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
Dittmer (1998)		✓		✓	✓		✓		✓		✓	✓	✓
Dransfield <i>et al.</i> (2004)	✓	✓	✓	✓	✓				✓		✓	✓	✓
Du Toit (2004)		✓		✓	✓						✓	✓	✓
Eskort (2006)		✓	✓	✓	✓		✓		✓		✓	✓	✓
FNB (2004)		✓	✓	✓	✓	✓		✓			✓	✓	✓
Food Outlook (2006)	✓	✓	✓		✓								
Gay (2006)		✓		✓	✓			✓			✓	✓	✓
Glitsch (2000)		✓	✓						✓			✓	
Gouws (2005)				✓					✓				
Guenther <i>et al.</i> (2005)		✓	✓	✓	✓				✓		✓	✓	✓
Gujarati (1992)		✓		✓	✓						✓	✓	✓
Hancock (1983)			✓		✓			✓				✓	
Harman (2006)		✓		✓	✓						✓	✓	✓
Kabeli (2005)		✓		✓	✓		✓				✓	✓	✓

Keifer <i>et al.</i> (2005)		✓		✓	✓						✓	✓	✓
Klopper (2006)		✓		✓	✓						✓	✓	✓
Leach (2006)	✓	✓	✓	✓	✓		✓				✓	✓	✓
Lubbe – Klopper (2005)													✓
Lukoto (2004)		✓		✓	✓					✓	✓	✓	✓
Luppnow (2006)			✓	✓				✓	✓				
Lymbery (2002)					✓							✓	
Mager (2006)	✓	✓	✓			✓			✓		✓		
McGuigan – Nieuwoudt (2002)		✓	✓									✓	
Meat Board												✓	
Meat Traders (2006)			✓		✓						✓		
Miles (2006)		✓	✓		✓	✓	✓	✓	✓		✓	✓	
Moodley (2006)	✓			✓								✓	
Mouton (2005)													✓
Mulder (2005)								✓					
NDA (2001)			✓		✓		✓		✓		✓	✓	
Ngapo <i>et al.</i> (2005)		✓		✓	✓				✓		✓	✓	✓
Njobeni (2005)	✓	✓		✓	✓						✓	✓	✓
Olivier (2001)		✓	✓	✓	✓						✓	✓	✓
Olivier (2004)		✓		✓	✓	✓		✓			✓	✓	✓
Osborne (2006)	✓	✓	✓	✓	✓		✓		✓			✓	
Oyewumi – Jooste (2006)		✓	✓						✓		✓	✓	
Pallant (2001)													✓
Samic (2003)								✓	✓				
Samic (2006)	✓	✓	✓		✓	✓		✓			✓	✓	
SAPPO (2006)	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	
Schoeman (2003)	✓	✓	✓	✓	✓	✓					✓	✓	✓
Stats SA (2005)		✓	✓		✓						✓	✓	
Stoltz (2006)	✓		✓	✓	✓		✓						
Streicher (2006)	✓	✓	✓	✓	✓		✓				✓		
Taljaard (2003)	✓	✓	✓					✓				✓	
Taljaard <i>et al.</i> (2004)		✓	✓										✓
Taljaard <i>et al.</i> (2006)		✓											✓
Tjaronda (2005)	✓	✓		✓	✓						✓	✓	✓
Van Rensburg (2006)	✓	✓	✓			✓			✓		✓	✓	

Verbeke – Viaene (1999)												✓	
Vink <i>et al.</i> (2006)		✓		✓	✓			✓	✓		✓	✓	✓
Visser (2004)	✓	✓		✓	✓	✓	✓				✓	✓	✓
Willemse (2005)	✓	✓	✓	✓	✓						✓	✓	✓
Zhu – van Ierland (2005)					✓							✓	✓
Zhuang – Abbott (2006)		✓		✓	✓				✓		✓	✓	✓



APPENDIX C

RESEARCH OFFICE (GOVAN MBEKI CENTRE)  
WESTVILLE CAMPUS  
TELEPHONE NO.: 031 – 2603587  
EMAIL : [ximbap@ukzn.ac.za](mailto:ximbap@ukzn.ac.za)

---

11 JUNE 2007

MR. A LUPPNOW (202526733)  
GRADUATE SCHOOL OF BUSINESS

Dear Mr. Luppnow

ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0324/07M

I wish to confirm that ethical clearance has been granted for the following project:

**“An investigation into the impact of imported pork on the demand for pork in Queenstown”**

PLEASE NOTE: Research data should be securely stored in the school for a period of 5 years

Yours faithfully

  
.....  
MS. PHUMELELE XIMBA  
RESEARCH OFFICE

cc. Post-Graduate Office (Christel Haddon)  
cc. Supervisor (Prof. S Lubbe)  
cc. Prof. A Singh

APPENDIX D

**MEAT TRADERS**

P.O. BOX 899, QUEENSTOWN, 5320

TEL: 045 - 838 3012/3/4 ~~~~ FAX: 045 - 839 7606

---

Mr. Adrian Luppnow  
92 Wodehouse Street  
Queenstown  
5320

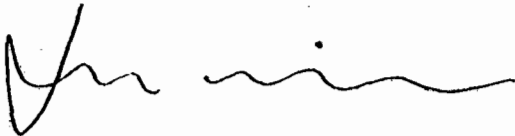
29 August 2006

To Whom It May Concern:

This serves to confirm that I Jack Miles owner of Meat Traders Abattoir have no objection to Mr. Adrian Luppnow conducting a questionnaire survey on Meat Traders customers in the Queenstown area.

The questionnaire survey will be conducted as part of a dissertation in partial fulfillment toward his MBA degree.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Jack Miles', with a stylized, flowing script.

Jack Miles

## **APPENDIX E**

### **TO WHOM IT MAY CONCERN**

This is to confirm that I have read through the thesis of Mr. A Luppnow: An Investigation into the Impact of Imported Pork on the Demand for Pork in Queenstown.

I have checked it for typographical errors and syntax, grammar and style. I have suggested changes where necessary.

S Vaughan.  
25 September 2007

Vaughan's Edit  
vaughansedit.com  
082 330 0847