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Do South African Consumers have an Appetite for an Origin-based Certification System for Meat Products? A Synthesis of Studies on Perceptions, Preferences and Experiments

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ABSTRACT

The introduction of Protected Designation of Origin (PDO) type certification schemes in countries outside Europe is a recent phenomenon as the philosophy of origin based foods obtains global traction. It is therefore interesting to understand whether consumers in these countries have a similar appreciation for these certification schemes and whether they are willing to pay a premium if the origin of the product is guaranteed. The Karoo Lamb case in South Africa provides an ideal opportunity to explore this question. At the same time the paper illustrates that the results and interpretation of consumer studies are sensitive to the methodology applied. We illustrate this argument by benefitting from a range of consumer studies that was undertaken over a period of five years in order to understand the South African consumers' perceptions about the Karoo region and their preferences and willingness to pay for the meat product from the Karoo. The studies which we compare and synthesise in this paper used different techniques such as perception analysis; stated preference methods (through a conjoint analysis); and a range of revealed preference methods including, an experimental auction and a retail store experiment. In essence the paper synthesises and compares the results from the different studies and illustrates how different techniques bring different results and conclusions. We then try to establish whether there is consistency in the results across methods to help us getting to a conclusive position on the consumer value of this product. From these results we are able – in a more comprehensive way - to tell whether PDO-type products are likely to be of value to South African consumers.

Keywords: Origin based food;, Consumer preferences and perceptions; willingness to pay; Karoo Lamb

Highlights:

- *Our paper benefits from a unique opportunity to synthesise consumer studies using different methods on an origin based meat product.*
- *It is not often that one can compare different studies on the same product amongst consumers from the same income and racial groups*
- *The paper illustrates that the conclusions from consumer studies are to a large extent framed by the method used which should suggest that interpretation of studies that only apply one method could easily be biased.*
- *The combined reflection on the results of different studies show that South African consumers have a reasonable good appetite for an origin based food certification system.*

1 Introduction

Internationally there is a rich literature dealing with consumer preferences for typical food products and origin-based food systems. These studies all had specific focuses. For example, Janssen and Hamm (2012) analysed consumer preferences for organically produced food while other studies focused largely on how quality (in this case origin) certification influences the behaviour of European consumers (Resano-Ezcaray, Sanjuan-Lopez and Albiso-Aguado, 2010; Carpenter and Larceneux 2008; Espejel, *et al.,* 2008; Guerrero *et al*., 2009; Bonnet and Simioni, 2001; Verbeke *et al.,* 2012; and Dekhili, *et al.* 2011). Other studies focused more on the country of origin and presented analyses on how consumers perceive the value of Country of Origin Labelling (COOL) in the United States (Loureiro & Umberger, 2006; Evans *et al*., 2008; Lim, *et al.,* 2011). These studies used various techniques ranging from standard willingness to pay techniques; including other techniques to measure stated preferences such as conjoint analysis or conjoint ranking experiments; and also using revealed preference methods. Nowhere was a specific opinion expressed about the merit of each of the methodologies in getting a clear understanding of consumers' preferences and perceptions on origin based food products. We argue here that the choice of analytical technique or method has an impact on the interpretation of consumer preferences and consumers' willingness to pay for these origin certification labels. By using only one preference method one could end up with biased results. We illustrate this argument by comparing the results based on consumer studies done by different members of the research group on one specific product carried out to show the different results and interpretations. We benefit in this paper from a range of consumer studies on one origin based product our research group has carried out over the last five years. The main objective of the paper is therefore twofold: Firstly, we endeavour to show the result outcomes from applying different analytical techniques and secondly, to gauge the consumer preferences for a specific PDO product in South Africa, namely Karoo Lamb.

The Karoo region in central South Africa is a vast semi-arid region of the country where virtually no crop production takes place. Wool, lamb and mutton production, on natural grazing with a grazing capacity of between 6 to 10 hectares per small stock unit, is the dominant economic activity. At the same time the images of the Karoo are embedded in the minds of many South Africans when they think of the region. Because of these and the tranquillity and honesty of the Karoo way of life the 'Karoo' concept has become synonymous with quality, tradition and wholesomeness. As a result of this, people and businesses, not even remotely linked to the geography or the values and images of the region, tend to exploit the word 'Karoo' in profit-making ventures.

Karoo Lamb has gained a reputation over decades for its quality and unique sensory attributes such as the flavour of the meat which has tested and proven links directly with the natural veld. This unique taste in combination with the nostalgia generated by the perception of the Karoo region presents a powerful identity and regional connotation, and therefore a clear marketing opportunity.

Convincing producers and retailers that establishing an origin-based certification scheme is a good idea is a difficult task. This is especially so due to the absence of collective action and producers being dispersed across the region that covers 700 km^2. Moreover, it is an area in which logistics for accessing the main markets is a major concern. It is therefore argued that the only aspect that will influence the ultimate decision to go for a scheme of certified and coordinated marketing is whether the product's image and identity can extract a premium from the market that is above lamb and mutton from other regions, and from different production systems in South Africa. It is therefore critical to understand consumer preferences for this type of product and to assess whether consumers will be willing to a pay premium for the product from this region. Several methods can be used to understand consumer preference, perceptions and the value they attach to the product. This is the main topic of discussion in this paper.

The studies, which we compare and synthesise in this paper, used different techniques such as perception analysis; stated preference methods (through a conjoint analysis); and a range of revealed preference methods including, an experimental auction and a retail store experiment. It is not often that one can compare different studies on the same product amongst consumers in two similar urban metropolitan areas and within similar income and racial groups. This allowed us to assess the merit of the product as a typical origin based food product. In essence the paper compares the results from the different studies and illustrates how different techniques bring different results and conclusions. We then try to establish whether there is consistency in the results across methods to help us getting to a conclusive position on the consumer value of this product. From these results we are able - in more comprehensive way - to tell whether Protected Designation or Origin (PDO)-type products are likely to be of value to South African consumers.

It should be noted that the system and tradition of origin-based foods (or the PDO system and GI system) is not well rooted in South African cultural life and food marketing. It would therefore be interesting to

understand the views of South African consumers about products that have origin dimensions and a geographical name attached to it and to know whether these perceptions and preferences are different to those of European consumers.

The paper begins by reviewing the experience in the literature of the application of different analytical techniques in order to establish consumer preferences. Section 3 reviews the different methods applied in the various studies, which we synthesise in this paper and then in Section 4 the results from the different studies are presented. Section 5 concludes with the main findings and messages from the synthesis of the various studies and explores subsequent marketing and economic implications.

2 The State of the art in establishing consumers' preferences and willingness to pay

Willingness to pay (WTP) could be defined as the maximum amount of money a consumer would pay for a given quantity of a product, given a specific set or bundle of attributes present in the product (Kalish & Nelson, 1991). The methods applied in economic scientific literature to measure consumers' willingness to pay (WTP) for products with particular quality attributes fall into two main groups: stated preference and revealed preference methods (Lusk & Shogren, 2007).

Stated preference methods rely on the statements of individuals about their preferences in a set of options that estimates their utility function (Kroes & Sheldon, 1988). Loureiro, *et al*. (2003) define stated preference methods as simply asking respondents questions with the intention of eliciting their preferences for a specific good, without requiring that the participant acts according to preference. The three most widely used stated preference methods applied to general analysis of consumers' choices and WTP for products or services are conjoint analysis, choice experiments and the contingent valuation method (Van Zyl, 2011). The main strength of the family of stated preference methods is that the researcher can create a hypothetical market where goods are bought or sold, implying that consumer choices about the hypothetical product can be analysed (Lusk & Shogren, 2007). According to Kimenju, *et al*. (2005) stated preference methods are relatively easy to control and are not as costly as revealed preference methods with the reason being that only hypothetical situations and products are presented. Stated preference methods are also more flexible as they are able to deal with a wide variety of variables within a particular experimental design (Kroes & Sheldon, 1988). The most significant criticism against stated preference methods relates to the potential discrepancy between the participants stated preferences and their actual preferences and behaviour. This would imply that WTP values could easily be under- or overstated due to factors such as the hypothetical nature of the product and / or the lack of incentive to state their true WTP since there is no commitment or consequences for their stated value (i.e. lack of incentive compatibility) (Wardman, 1988; Loureiro, *et al*., 2003; Kimenju, *et al*., 2005; Voelckner, 2006).

Revealed preference methods use actual consumer decisions to model consumers' preferences by using the consumer's actual purchasing behavioural information to reveal preferences (Loureiro, *et al*., 2003). Revealed preference methods, in particular experimental auctions, are quickly gaining momentum in terms of food preference research. As confirmed by Corrigan, *et al*. in 2009 they were then already one of the most common experimental valuation methods in agricultural economics. The main strength of revealed preference methods is that real choices are examined, and the data obtained is therefore accurate (Lusk & Shogren, 2007). One of the weaknesses of this family of methods is that the revealed preference method cannot be used when a novel product is being developed, because no direct observation of consumer behaviour is possible (Kroes & Sheldon, 1988). A further disadvantage of revealed preference methods, as pointed out by Caldas & Black (1997), is that the results and choices made against the actual set of options depends only on the respondent's perception of the market. The boundaries in the actual market situation where data was observed are pre-specified thus the researcher cannot control the boundaries of the experiment. Any external influences could affect the respondent's market perception and this would affect the consumer's choices. Over these the researcher has no control. Finally, due to generally higher cost implications of revealed methods lower sample sizes are usually applied compared to stated preference methods.

3 Materials and Methods

This paper aims to establish South African consumers' willingness to pay (WTP) a premium for mutton and lamb from the Karoo under a scheme that guarantees the origin of the product. To provide a more comprehensive picture we use this paper to provide a synthesis of a number of methods that were applied to test consumers' perceptions towards and WTP for mutton or lamb from the Karoo. These methods included stated WTP preference methods (simple WTP perception statement, Van Westendorp's

WTP technique and conjoint analysis); and two revealed preference methods namely an experimental auction and a retail store experiment. Table 1 provides a summary of the five consumer studies that provide the basis for the synthesis presented in this paper.

Table 1 (Part 1).
Methodology overview of the various studies on Karoo Lamb focusing on consumer behaviour, perceptions and willingness to pay

Study scope:	**Initial survey to establish the reputation of Karoo lamb ('Study 1')**	**Applying conjoint analysis to investigate consumers' preference for Karoo lamb ('Study 2')**
Year conducted:	**2007**	**2009**
Study objective(s):	To investigate the reputation of Karoo lamb through consumers' awareness and perceptions of the product	To determine consumers' evaluation of key attributes and attribute levels that influence their purchasing decision of mutton/lamb with a focus on Karoo lamb (meat-of-origin) (including traceability)
Methodology overview:	Questionnaire containing a combination of open- and closed questions (i.e. categorical options and rating scale options)	Conjoint analysis with a fractional factorial design and part-wise evaluations(Hair, *et al*., 1998; Koo, *et al*., 1999, North & de Vos, 2002)
Target sample:	Wealthier consumers of all main ethnic groups within LSM 8 to 10[*] who consumes mutton / lamb at least once per month Geographic focus: Gauteng and Western Cape provinces[†]	Wealthier consumers who consume mutton / lamb, with variations within gender, income group and age categories
Sample size:	Target: Gauteng, n = 120; Western Cape, n = 120 Valid: Gauteng, n = 93; Western Cape, n = 99	Electronic questionnaires distributed to 1011 respondents Valid responses: 352 questionnaires (34.9% response rate)
Sampling approach:	A combination of random and convenience sampling	A random selection of respondents on the research database of the Consulta marketing research firm
Data gathering procedure:	A combination of personal interviews and self-completion of questionnaires	Electronic distribution of self-completion questionnaires
Main survey components:	Demographic background; basic questions on the purchasing, consumption and affordability of various meat types; more specific questions on the purchasing and consumption of mutton / lamb; consumers' awareness, purchase behaviour, consumption and perceptions related to Karoo mutton / lamb and the Karoo region specifically	The conjoint analysis attributes and attribute levels: traceability (to animal/birth farm/abattoir/processing plant/none); origin (local region/SA national/no region/Karoo specific region); quality (through certification/labelling, branding/origin/ not assured); safety (through certification/labelling, branding/place of purchase/not guaranteed/no safety knowledge); [rice (9 levels +10% to -10%)
Data analysis procedures:	Descriptive statistics and one-way ANOVA average comparisons conducted in SPSS	Conjoint analysis syntaxes in SPSS

[*]*Wealthy consumers were targeted, given the expensive nature of mutton. Consumers in LSM 8 to 10 account for an estimated 45% of total household expenditure on mutton in South Africa (calculation based on data from the Bureau of Market Research – Martins, 2006).*

[†]*Gauteng was included in the study since, according to industry representatives the bulk of Karoo mutton / lamb produced in South Africa is marketed within the Gauteng region. On the other hand the Western Cape was included in the survey given the geographical proximity and cultural links with the Karoo region.*

Table 1 (Part 2).
Methodology overview of the various studies on Karoo Lamb focusing on consumer behaviour, perceptions and willingness to pay

Study scope:	**Applying Means-end-chain theory and association pattern technique to investigate consumers' preferences and WTP for Karoo mutton / lamb ('Study 3')**	**Applying experimental economics to determine consumers' willingness to pay for Karoo mutton / lamb (Study 4)**
Year conducted:	**2009**	**2009 / 2010**
Study objective(s):	To investigate the perceptions driving consumers' purchase decisions regarding Karoo lamb by considering relevant attributes, consequences and values according to the means-end chain theory To investigate consumers' willingness to pay (WTP) for Karoo lamb	To apply an *n*th price experimental auction to determine consumers' WTP for certified Karoo mutton / lamb and to test the impact of different information treatments on consumers' bidding behaviour
Methodology overview:	The association pattern technique (APT) was applied as a data collection method to apply means-end chain theory (Gutman, 1982; Ter Hofstede, *et al*., 1998; Olson & Reynolds, 1983; Feunekes & den Hoed, 2001; Nielsen *et al*, 1998).Estimation of WTP with Van Westendorp's technique (Draeger & Perham, 2009).	*n*th price experimental auction with six bidding rounds incorporating three information treatments (based on Cunningham, 2003)
Target sample:	Wealthier consumers who consume mutton / lamb, with variations within gender, income group and age categories	Wealthier mutton / lamb consumers who are also the main buyers of meat in the household. Gender and age not specified.
Sample size:	Valid responses: 276 completed questionnaires	60 respondents were invited, of whom 31 consumers participated in the auction
Sampling approach:	A random selection of respondents on the research database of the Consulta marketing research firm	Convenience sample complying with the target sample selection criteria
Data gathering procedure:	Electronic distribution of self-completion questionnaires	Central location *n*th price experimental auction to complement self-completion survey instrument
Main survey components:	Initial focus groups Application of APT to elicit attributes, consequences and values of Karoo lamb consumers Estimation of WTP with Van Westendorp's technique's perceived price levels (too expensive, expensive, affordable, too cheap – bad quality)	Pre-survey: • Red meat and mutton / lamb (generic and Karoo) purchasing and consumption behaviour • Karoo mutton / lamb perceptions • Demographics Experimental auction: bidding on a 400 g packet of lamb chops with a R200 monetary endowment • Round 1 & 2: exposure to Karoo lamb logo on label • Round 3 & 4: exposure to information sheet as well • Round 5 & 6: exposure to informative talk as well
Data analysis procedures:	Means-and-chains were analysed through hierarchical value maps WTP was analysed by applying the Van Westendorp's technique	Pre-survey: Descriptive and comparative statistics (e.g. Pearson Chi-square test) in SPSS Auction: one-way ANOVA to explore differences between bidding rounds and other variables in SPSS

The rest of the paper focuses on the results obtained within the various studies and how they contradict or confirm the results of each study. The first results section (4.1) presents the results from the first studies employed to establish the reputation of Karoo lamb (i.e. the initial perception survey). Then further evidence is explored to support the establishment of the reputation of Karoo lamb and the estimation of WTP (i.e. the conjoint and APT analyses). The final results section (Section 4.2) focuses on the applied revealed preference methods to estimate WTP for Karoo lamb (i.e. an experimental auction and a retail store experiment).

4 Results and discussion

4.1 Reputation and perceptions of Karoo Lamb

Before we can test the consumers' willingness to pay it is important to establish whether this product has a reputation that could present some inherent value to the consumer. Reputation is a shared asset determined by the product's historical presence in the region, product specificity and consumers' perceptions that could be determined on a local, national or international basis (Barjolle & Sylvander, 2002). The historical presence of Karoo lamb within South Africa is a well-established fact. On the other hand, as mentioned earlier, the potential product specificity of Karoo lamb relates specifically to the unique flavour of the meat, associated with the Karoo grazing plants eaten by the sheep. Thus, in order to establish the product specificity of Karoo lamb and mutton it was critical to apply sound scientific methodologies in order to determine whether there is a detectable sensory difference between mutton produced in the Karoo region compared to mutton produced in a different area in South Africa namely Free Sate and a neighbouring country (Namibian lamb available in the South African fresh meat trade). Detailed results of this are presented in (Vermeulen, Schönfeldt & Kirsten, 2008) and are not repeated here for the sake of brevity. The second component of a product's reputation relates to consumers' perceptions regarding the reputation of the product, which in this case had to be investigated on a national level, since Karoo mutton / lamb is not an export product. We discuss this in more detail below since it links to consumer perceptions and their view on the intrinsic value of the product.

An important component of a product's reputation relates to consumers' perceptions regarding the reputation of the product. Thus, in order to develop further evidence towards establishing the reputation of Karoo lamb consumer research was undertaken on a national level to investigate consumers' awareness and perceptions of Karoo lamb, to estimate the demand for Karoo lamb and assess consumers' willingness to pay a premium for the product. The study methodology is summarised in Table 1 (referred to as 'Study 1' of the process).

The study used a questionnaire containing a combination of open- and closed questions (i.e. categorical options and rating scale options) amongst wealthier consumers of all main ethnic groups within LSM 8 to 10 who consume lamb at least once per month. The geographic focus was the two main urban metropolitan centres of South Africa, i.e. Gauteng and Western Cape Provinces. A combination of random and convenience sampling methods which eventually realised 93 valid responses in Gauteng and 99 in the Western Cape.

A significant share (53.6%) of the consumers indicated that they are aware of Karoo lamb, even though only 68.0% of them (i.e. 36.5% of the total consumer sample) purchased it if it was available. Consumers from the Western Cape, as well as white and coloured consumers generally revealed a significantly greater awareness and knowledge of Karoo lamb as well as a willingness to purchase the product. Yet only 39.8% of these consumers (i.e. 21.4% of the total consumer sample) indicated a particular preference for Karoo lamb.

The similarities between the purchasing frequencies and the consumption frequencies for Karoo lamb indicate a tendency among consumers to only buy Karoo lamb for a specific meal occasion, which is in contrast to the tendency towards bulk-buying behaviour observed for lamb in general (i.e. purchasing frequencies were generally larger than consumption frequencies as detailed in Table 2). These results could be indicative of the 'niche' nature of Karoo lamb, confirmed by the observation that the Karoo lamb purchasing and consumption frequencies are significantly lower than the frequencies for lamb in general (i.e. 48.6% consuming 'regular' mutton / lamb at least once per week or more often, compared to only 4.7% for Karoo lamb).

Table 2.
Overview of mutton / lamb purchase and consumption frequencies

Frequency:	'Regular' mutton / lamb:		Karoo lamb:	
	Purchasing:	Consumption:	Purchasing:	Consumption:
Once per week or more	23.4%	48.6%	4.7%	4.7%
Once or twice per month	60.5%	41.8%	14.6%	14.1%
Less than once per month	16.1%	9.5%	16.7%	17.2%

The most widely supported purchase locations for all lamb were the supermarkets and independent butcheries, according to 82.3% and 37.0% of the consumers respectively[‡]. For Karoo lamb only 55.3% of the consumers who were aware of Karoo lamb, knew where to buy the product. Almost a quarter (23.3%) of these consumers indicated that the product was widely available. Karoo lamb was perceived as the least affordable meat option, since only 21.4% of the total consumer sample had this opinion. The average affordability rating of 2.8 contrasted markedly with chicken meat rated as affordable by 77.1% of consumers and having an average affordability rating of 1.9[§].

In terms of consumers' awareness of meat origin in general and Karoo lamb specifically, a significant 61.3% of the sample of the total sample indicated that they did not have a preference for lamb coming from a specific region. Among the consumers who had a definite lamb origin preference the most preferred options were 'Any region in South Africa' and the 'Free State', whilst lamb from the Karoo rated as a lesser preferred option.

The nature of the Karoo mutton / lamb reputation was investigated through different approaches. The respondents were initially asked to list the three main differences (if any) between Karoo mutton / lamb and mutton / lamb from other regions in South Africa (i.e. in an open question format to elicit non-prompted answers). Many of the consumers who were aware of Karoo mutton / lamb did not have any idea about differences between the product and mutton / lamb from other regions (41.7%). Among the respondents' top three responses, taste and tenderness dominated in the perception sets of more than 20% of the sample who were aware of Karoo mutton / lamb, even though the tenderness factor between them should not necessarily have differed. Given that the potential product specificity of Karoo lamb related to its unique meat flavour, the perceptions appertaining flavour and taste are particularly significant.

In order to further investigate Karoo mutton / lamb's reputation, consumers were also asked to indicate, on a 5 point rating scale, their level of agreement with a number of statements covering issues concerning the difference and superiority of Karoo mutton / lamb in terms of quality, aroma, colour, tenderness and taste. Figure 1 provides a summary of the average rating scores for the various statements.

Within the sample of consumers who were aware of Karoo mutton / lamb, 63.1% perceived Karoo mutton / lamb as 'different', particularly in terms of taste and aroma dimensions, 63.1% and 53.4% respectively. These observations have positive implications for the establishment of an origin based certification system for Karoo mutton / lamb. However, only 47.6% of these consumers perceived it as being 'better' than 'generic' mutton / lamb, a trend that is particularly seen in the specific attributes of mutton / lamb's taste and aroma, 42.7% and 34.0% respectively. This is also reflected in the average ratings given in Figure 1 (taste [$F=13.584$, $df=1$, $p=0.000$] and aroma [$F=12.014$, $df=1$, $p=0.001$]).

Considering willingness to pay (WTP) only 27.2% of these consumers indicated a willingness to pay more for Karoo mutton / lamb compared to 'regular' mutton / lamb.

[‡]Shares add to more than 100% due to shopping at multiple outlets.
[§]Mean affordability score scale: 1=Very affordable; ...; 4=Very expensive

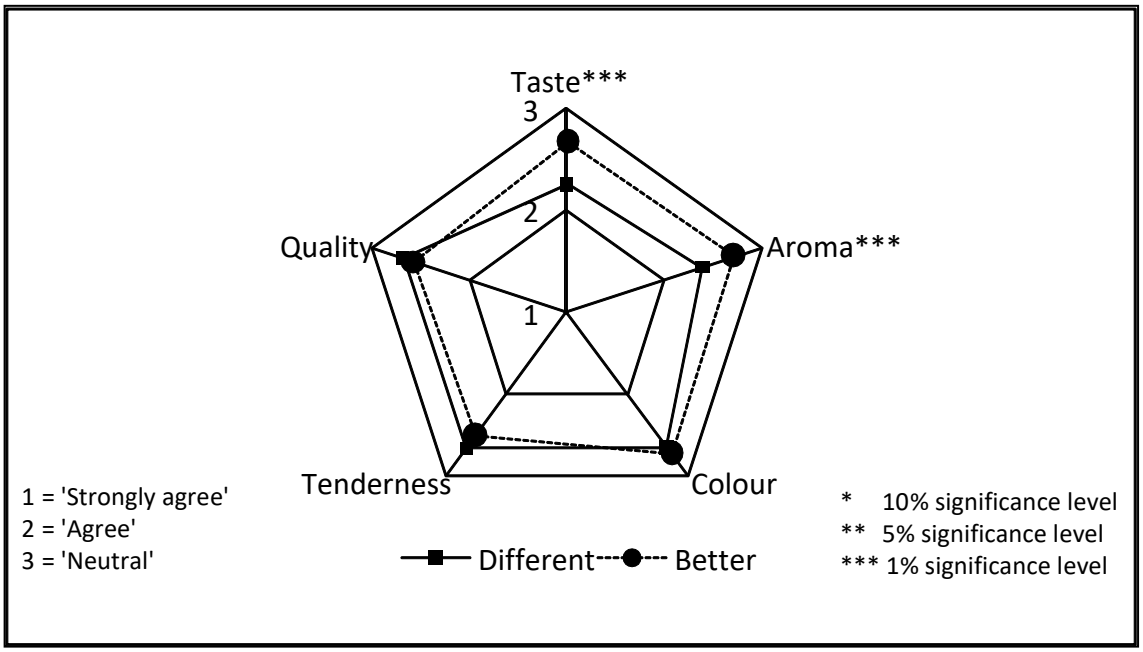

Figure 1. A spider graph illustrating the perceptions of the consumers who are aware of Karoo mutton / lamb based on a series of evaluation statements, expressed as mean rating scores

Finally the nature of the Karoo image in consumers' minds was investigated through an open question stating "When you think about the Karoo, please describe the first images and words that come to your mind". The main Karoo image in the consumers' minds related to the Karoo being a desert, dry, hot and dusty (54.2% of consumers), implying that the majority of consumers had a rather negative image of the arid Karoo region. Only a small share (12.3%) of consumers recalled the typical Karoo bush as an important element in shaping the unique taste of Karoo Lamb. Specifically positive images entailed reference to a memorable pleasant food image (7.4%), open spaces (6.9%) and the peacefulness of the Karoo region (4.4%).

4.2 Linking attributes and reputation to consumer preferences

It could well be that consumers' preferences in terms of product attributes could be different than those attributes entrenching the reputation of the product. If there is no or limited correspondence between consumer preferences and the attributes that shape their purchasing decision then one can argue that the product should have limited intrinsic value and therefore the willingness to pay a premium might be low.

In order to do this assessment our research group completed two additional studies that were designed as follows. In the first instance we applied conjoint analysis amongst wealthier consumers who consume mutton / lamb, with variations within gender, income group and age categories. This is a much more comprehensive survey with electronic questionnaires randomly distributed to 1011 respondents on the research database of a large marketing research firm. We however only received 352 valid responses (34.9% response rate).

The conjoint analysis focused on attributes and attribute levels: traceability (to animal/birth farm/abattoir/processing plant/none); origin (local region/SA national/no region/Karoo specific region); quality (through certification/labelling, branding/origin/ not assured); safety (through certification/labelling, branding/place of purchase/not guaranteed/no safety knowledge).

In the second study in this group around preferences and reputation we apply the means-end-chain theory and association pattern technique to determine the perceptions driving consumers' purchase decisions regarding Karoo lamb by considering relevant attributes, consequences and values according to the means-end chain theory. The association pattern technique (APT) was applied as a data collection method to apply means-end chain theory (Gutman, 1982; Ter Hofstede, et al., 1998; Olson & Reynolds, 1983; Feunekes & den Hoed, 2001; Nielsen et al, 1998). This study also used the same database of the marketing firm and randomly distributed questionnaires to those members on the database that are wealthier and also consumers who consume lamb. We eventually received 276 valid responses.

4.2.1 Conjoint analysis

The conjoint analysis study was aimed at identifying and evaluating the key attributes and attribute levels that influence the purchasing decisions of lamb, with a specific focus on traceability and quality. The analysis specifically considered the relative importance of the five attributes of the consumers' purchasing decision of lamb. The results (Table 3) show that price has the largest impact (30.4% contribution) followed by safety, quality, traceability and origin.

The utility values of the product attribute levels were estimated to establish the value that consumers place on certain ones. It is clear that consumers strongly prefer mutton / lamb that is traceable to the birth farm and abattoir, originates from the Karoo and has quality and safety guaranteed through certification. On the other hand, the least preferred attributes are the absence of traceability, no particular region of origin and quality and safety not necessarily being assured. Thus, it is clear that the consumer preferences focus more on a sophisticated and clearly identifiable product with a specific identity. However, considering price, the sampled consumers derived the highest utility from a price discount of 5% to 7%.

Table 3.
Conjoint analysis estimation results

Attribute	Attribute relative importance (%)	Attribute levels	Attribute level utility value
1. Traceability	15.7	Trace to animal	-0.001
		Trace to birth farm	**0.075**
		Trace to abattoir	0.031
		Trace to processing plant	0.001
		No trace	-0.106
2. Origin	13.8	Origin: Local region	0.003
		Origin: National (SA) region	-0.052
		Origin: No region	-0.070
		Origin: Specific region (Karoo)	**0.118**
3. Quality	17	**Quality through certification**	**0.089**
		Quality through labelling/branding	0.049
		Quality through origin	0.054
		Quality not assured	-0.193
4. Safety	23.1	**Safety through certification**	**0.162**
		Safety through labelling/branding	0.063
		Safety through place of purchase	0.144
		Safety not guaranteed	-0.181
		No safety knowledge	-0.188
5. Price	30.4	10% more	-0.118
		7.5% more	-0.103
		5% more	-0.084
		2.5% more	-0.036
		Same price	-0.033
		2.5% less	0.040
		5% less	**0.135**
		7.5% less	**0.138**
		10% less	0.061

4.2.2 Application of means-end-chain theory and association pattern technique (APT)

Here we investigated the perceptions driving consumers' purchase decisions regarding Karoo lamb by considering relevant attributes, consequences and values according to means-end-chain theory according to the compilation of the two matrixes, attribute-consequence (A-C) matrix and the consequences and values (C-V) matrix that are portrayed in Figure 2. It was established that 79% of consumers would, if given the choice, prefer to consume Karoo lamb, with the remaining 21% not having a specific preference regarding origin. According to the attribute-consequence (A-C) matrix (Table 4) there seems to be a clear difference between Karoo and non-Karoo lamb consumers.

The A-C matrix clearly indicates that Karoo lamb consumers associate the price attribute with quality, contrasting with the value-for-money perception of the consumers with no preference for origin who associated quality with the brand attribute. Karoo lamb consumers associated product image with quality and the brand and origin attributes with confidence in local produce. However, minimal differences were found in the consequences and values (C-V) matrix. All of the most mentioned linkages between consequences and values indicated similar end-states (values) illustrating that the physical properties of Karoo lamb which are the visible attributes, are important to consumers. However, at a higher level of abstraction, the emotional, the origin becomes less important.

Table 4. The A-C (attribute-consequence) matrix

	Consequences:	
	Consumers preferring Karoo lamb (n = 219)	**Consumers with no origin preference (n = 57)**
Attribute 1: Price	Quality indicator (23.6%)	Good value for money (33.3%)
Attribute 2: Image	Quality (21.4%)	No health risk (6.5%)
Attribute 3: Brand	Confidence in local produce (16.6%)	It is a quality product (22.9%)
Attribute 4: Origin	Confidence in local produce (20.4%)	Confidence in local produce (27.4%)

According to the hierarchical value map (HVM) for Karoo lamb as illustrated in Figure 2, the most important attribute for Karoo lamb was taste and for non-Karoo, taste and tenderness were most important. The most prominent and strongest link from attributes to consequences for Karoo lamb were the attributes price and label, indicative of the consequence of a quality product. For non-Karoo, a clear link between the attribute price and consequence value for money was evident indicating that the choice of a non-labelled product comes down to a lower price.

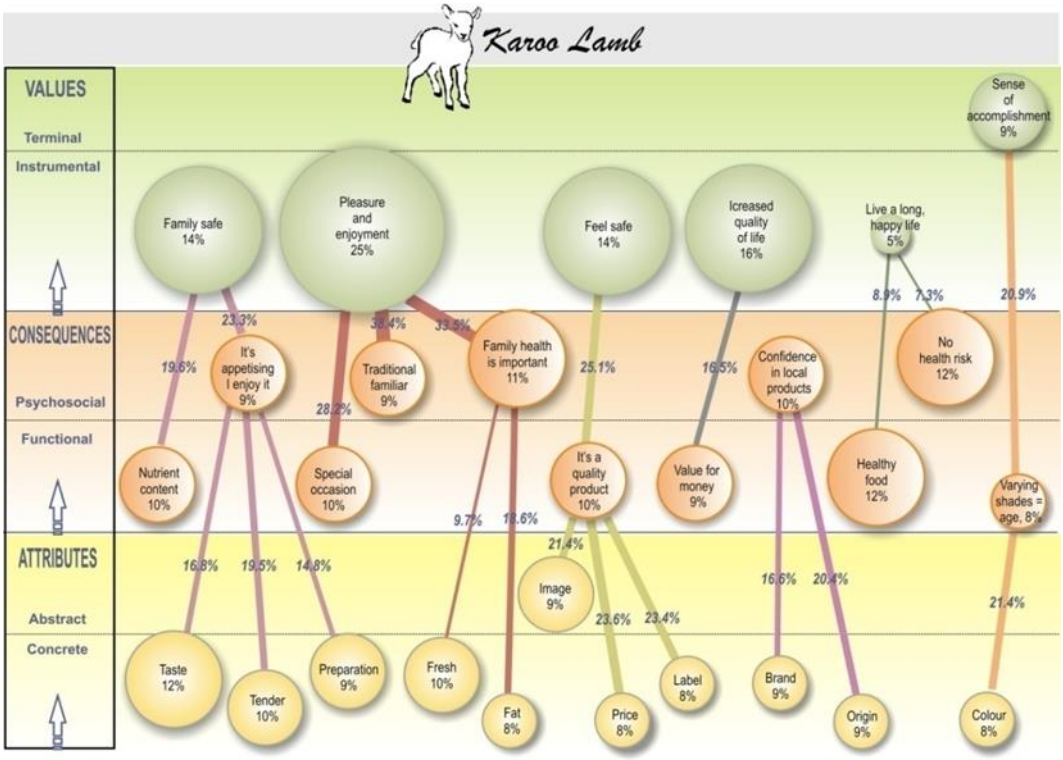

Figure 2. The hierarchical value map for consumers with a preference for Karoo lamb

4.3 Establishing consumers' willingness-to-pay for Karoo lamb

The literature on willingness to pay is clustered around 'stated preference methods' and 'revealed preference methods'. The stated preference methods link closely to consumer preference studies explained above. The first study use the same survey data in the application means-end-chain theory and association pattern technique and then applies the Van Westendorp technique to state the consumers' willingness-to-pay (WTP) for Karoo lamb.

In the two remaining studies we apply novel techniques (more linked to experimental methods) to force consumers to reveal their willingness to pay. These methods are considered to reveal WTP values that should be closer to real life situations. The international arguments around the stated preference methods are that these methods result in the so-called "Hypothetical bias" – or a value much more than the consumer will really pay. It is hoped that the experimental methods in real life circumstances will reduce this tendency.

4.3.1 Stated preference methods: The Van Westendorp price sensitivity analysis

The Van Westendorp's technique is based on simple questions about the price of the product or service (Draeger & Perham, 2009):

1. At what price on the scale would you consider the product or service to be expensive?
2. At what price on the scale would you consider the product or service to be cheap?
3. At what price would you consider the product or service to be so expensive that it is beyond you considering buying?
4. At what price do you consider the product or service to be so cheap that you would question the quality?

The Van Westendorp price sensitivity analysis (Figure 3) indicates that Karoo lamb consumers are willing to pay 6% more for the product of origin. On the other hand non-Karoo consumers revealed significant price sensitivity. This further links non-Karoo lamb consumer's linkage of price and value for money, illustrating their extreme price sensitivity.

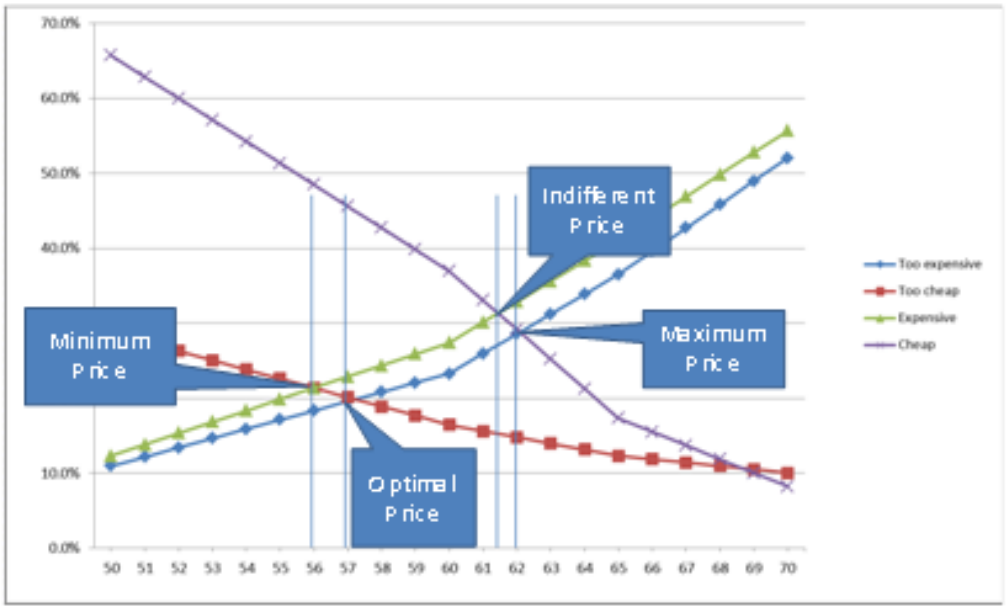

Figure 3. Van Westendorp price sensitivity analysis for Karoo lamb

4.3.2 Revealed preference methods: The random nth-price experimental auction

The experimental auction applies the random *n*th-price auction (Shogren, *et al*., 2001) that combines the features of the Vickrey second-price auction and the Becker-DeGroot-Marschak mechanism. The Vickrey second-price auction encourages competition amongst bidders whereas the Becker-DeGroot-Marschak mechanism gives all bidders a chance to win the auction (Lusk & Shogren, 2007). The key element of the random *n*th-price auction is a *random* and *endogenous* market-clearing price. The randomness of the price ensures that all bidders are engaged, while the endogenous price guarantees that the payment (market-clearing) price is in line with the value that the consumer attaches to the product (the private value) of the bidders (Shogren, *et al*., 2001). Shogren, *et al*. (2001) found that each bidder should bid sincerely in a random *n*th-price auction because they cannot depend on the random market-clearing price as a marker or price indicator.

In the experimental auction real money was given to 30 invited participants (high income and high LSM consumers) as part of an attempt to create a more realistic experiment, as recommended by Horowitz and McConnell (2002). An unmarked packet of approximately 500 g of lamb loin chops (base product) was

sent around the auction audience. At the time of the experiment the market value of this product was around R50. A second similar 500 g packet of lamb loin chops was sent around, with a prototype "Karoo lamb" label.

Participants were then asked to place a bid to upgrade the base product to the product certified as Karoo lamb. No verbal or written constraints on bids were placed during the auction. If participants wished to bid more than R200 as the premium, they would have the option to pay the difference from their own pocket (as would be the realistic market situation). It is important to note that participants were only bidding their willingness to pay a premium above current retail prices for 'generic' South African lamb. The aim of this was to assess the value of clearly identifying and marketing a meat product of origin for the consumer, similar to studies done by Alfnes and Rickertsen (2003) and Evans, *et al*. (2008) where consumers' willingness to pay for meat of origin was tested using an experimental auction. In this specific experiment the reason for not bidding on the entire product was to simplify data analysis by extracting bidding values as explained by Corrigan, *et al*. (2009). The method was particularly suitable since the specific product in this auction was only an 'upgraded' version of an existing product with which the participants were familiar. All the bids were collected and sorted from the highest to the lowest bid. A random number (*n*) was drawn to determine the cut-off position that would indicate the market clearing price.

Table 5 presents a summary of the results of average bids of each of the six bidding rounds as well as grouped bids within each information treatment group. A one-way ANOVA analysis to check for consistency between the duplicate bidding rounds revealed that no significant difference was found at a 10% level of significance. Thus, the average sample bids were consistent and justified further use of an average between the duplicate rounds within the various information treatments in further analyses. It is also worth noting that throughout the entire auction, most of the participants submitted a non-zero bid, indicating a general willingness to pay a premium for certified Karoo lamb. Furthermore, when the average bids obtained from the auction were linked to demographic variables, it was found that females generally bid higher than male participants, while older participants (over 40 years of age) submitted higher bids than younger participants.

As mentioned, an important objective of this study was to investigate the potential impact of information treatments on bidding behaviour by comparing the average bids for the various treatments (Table 5). It is evident that there was a significant difference [F=9,199; df=2; p=0.004] between the average bid from bidding rounds one and two (where participants were only exposed to the Karoo lamb label) and the average bid from bidding rounds three and four (where participants were further exposed to the Karoo lamb information sheet), with a 55% increase in the premium participants were willing to pay. It is important to note that there was no significant difference between the average bid from bidding rounds three and four (where participants were further exposed to the Karoo lamb information sheet) and the average bid from bidding rounds five and six (exposure to Karoo lamb presentation). Thus, the presentation did not add significant value to participants' bidding behaviour. An increase in average bids of only 15% was observed, which was not statistically significant. Thus, the exposure to the Karoo information sheet resulted in the largest significant increase in average bids, implying that print media can have a significantly positive impact on consumers' willingness to pay for Karoo lamb.

The general lack of availability of Karoo lamb was revealed as approximately 82% of the participants indicated that they had not bought Karoo lamb before as the product was not readily available. Another serious concern the survey results brought to light was the fact that 18.2% of the participants stated that they did not buy Karoo lamb because they did not trust the authenticity of the product. Despite these observations regarding Karoo lamb, approximately 58% of the sample did say that they were willing to pay a premium for Karoo lamb. This is a very important finding, serving as a clear indication that having Karoo lamb certified as meat of origin would be well received by the general public.

From a marketing perspective, an obvious opportunity and case for intellectual property protection exists when considering the case of Karoo lamb. The results from the experimental auction suggest that participants are willing to pay a premium for certified Karoo lamb, with an average bid of R21.80/kg being recorded. At the time of the experiment market prices for lamb loin chops ranged from R89.95/kg to R118.16/kg, as ascertained from butcheries and supermarkets in the survey area (Pretoria, South Africa). More details of the study can be found in Van Zyl (2011) and Van Zyl, Vermeulen and Kirsten (2013).

Table 5
Average bidding amounts during the experimental auction for a 500 g packet of loin lamb chops certified as meat from the Karoo region

Bidding round:	Information Treatment	Individual bidding rounds:			Information treatments:		
		Average premium price bid (R/kg)	Standard Deviation	Significant Differences	Average premium price bid (R/kg)	Standard Deviation	Significant differences:
Round 1	Exposure to Karoo lamb Label (IT1)	R16.52/kg	7.742	None, p = 0.520	R15.12/kg (a)	5.266	Significant differences [*f*=9.199, df=2, p<0.000] Between: IT1 & IT2 (p=0.004) IT1 & IT 3 (p=0.000) No significant difference was found between IT2 & IT3 (p>0.1)
Round 2		R13.74/kg	4.225				
Round 3	Exposure to Karoo lamb information sheet (IT2)	R21.42/kg	5.113	None, P= 0.207	R23.38/kg (b)	5.443	
Round 4		R25.36/kg	6.274				
Round 5	Exposure to Karoo lamb Presentation (IT3)	R26.58/kg	5.878	None, p= 0.540	R26.88/kg (c)	5.879	
Round 6		R27.16/kg	5.949				

4.3.3 Revealed preference method: the supermarket experiment

The difference between hypothetical and real values when evaluating consumers' preferences (termed the 'hypothetical bias') has received significant attention in scientific literature, as the outcome of this bias is often an overestimation of WTP values (Little & Barrens, 2003; Lusk & Schroeder, 2004, Murphy and Stevens, 2004; Murphy *et al.*, 2005; Harrison, 2006;; Alfnes *et al.*, 2009; Moser *et al.*, 2014). Furthermore, some studies record that the initial endowment given to participants in experimental research could create a 'house money effect' where consumers will spend more money since it is viewed as bonus money and thus not spent according to the same considerations as regular income (Battalio *et al*., 1990; Arkes *et al*., 1994; Keasy and Moon, 1996; Carlsson *et al*., 2009; Moser *et al.*, 2014). Authors such as de-Magistris *et al*., (2013) tried to deal with the problem Harrison (2006) identified by introducing an "honesty priming task" for participants but did not really get indifferent results between the different treatments. We have tried to deal with the main source of hypothetical bias - the fact that a good is not actually paid for or delivered - and introduced a market or retail store experiment setting where consumers have to use their own money if they are interested in buying a particular product could be a potential solution but could cause lower participation rates or an underestimation of consumers' WTP (Lusk *et al.*, 2008; Moser *et al.*, 2014). Examples of market-level experiments to evaluate consumers' WTP for products with particular attributes are relatively limited. Kiesel and Villas-Boas (2010) investigated the impact of information cost on consumers' choices in the context of nutritional labels through a supermarket experiment. The role of production methods such as production systems that employ different mixtures of chemicals, natural substances and beneficial microorganisms providing a progressive healthier and safer product, in fruit purchasing behaviour was investigated by Moser *et al.* (2010) by comparing the results from a hypothetical choice experiment and real payment supermarket choice experiment. Birol *et al.* (2010) investigated consumers WTP for grapes in the context of information and credible certification on food safety through a randomized market experiment.

Our market experiment was used in order to validate South African consumers' demand and WTP for Karoo lamb as a branded and guaranteed meat-of-origin and was conducted in two Checkers supermarkets in Cape Town's northern suburbs on a month-end weekend in February 2011. Both these supermarket outlets stock 'generic' lamb meat and the well-established Certified Natural Lamb brand. The well-established premium brand Certified Natural Lamb (CNL) shares several similarities with Karoo lamb. CNL is guaranteed to be free range, natural (no chronic antibiotics or added hormones to aid growth), microbiologically safe, traceable to accredited farms of origin and produced by farms that are ecologically audited to ensure sustainability.

The Karoo lamb product was sourced under the CNL code of practices with the added qualification that it should be from farms in the identified Karoo region. The carcasses were delivered to the stores and packed. The Karoo lamb packets were branded with the Karoo certification mark and barcoded with unique barcodes to enable extraction of scanner sales data after completion of the experiment. All the different Karoo meat cuts were sold at a R5/kg price premium above the prices of the similar cuts of Certified Natural Lamb. The particular price premium was selected based on the following considerations:

- Mutton / lamb prices were observed at selected general retail and butchery locations in Cape Town and Pretoria during January 2011 and ranged from R3/kg to R27/kg above the price above the price of Checkers generic lamb at that time.
- The random nth-price experimental auction indicated an average premium of about R23/kg.
- Certified Natural Lamb is usually sold at premiums of roughly R3/kg to R10/kg above generic lamb in Checkers stores.

After consultation with the experts from Checkers Meat Markets a premium of R5/kg above the price of Certified Natural Lamb (CNL) was agreed upon as a 'high but potentially feasible' price level. Due to logistical considerations, such as the carry-over of meat on shelves between trading days as well as complexities surrounding the creation of different price levels (that has to be done from the Meat Markets head office) it was not possible to work with more than one price premium level.

The in-store promotion of certified Karoo lamb was based on four point-of-sale items: packaging labels (displaying the certification mark), shelf dividers, shelf strips as well as a large in-store banner advertising Karoo Lamb. All artwork and manufacturing of the POS items were handled and coordinated by a professional branding company. Checkers Meat Markets allocated a share of the lamb procured for anticipated CNL sales towards Karoo Lamb, which amounted to about a third of the CNL volumes. Thus, during the experiment Checkers Meat Markets procured the same quantity of meat they would have procured in the absence of Karoo Lamb of the shelves (which amounted to about four to five Karoo carcasses per store for the three experimental days). In both stores the Karoo Lamb display was in close proximity to the CNL display.

At the price level of R5/kg above CNL and about R8/kg above generic lamb, the scanner data sales results for the Karoo lamb during the experimental period contributed about 20% of sales volumes (21% of sales values) and represented 47% of generic lamb sales and 52% of CNL sales. The best trading days for Karoo lamb (and the generic lamb) were Saturday and Sunday even though the CNL sales were more consistent over the three trading days of the experiment possibly indicating a well-established brand. The lower sales volumes of Karoo lamb on the Friday could also be attributed to a problem experienced on that day as the product codes and descriptions of three of the Karoo lamb meat cuts were incorrect and subsequently these meat cuts were only shelved on Saturday once the codes had been fixed at the Meat Markets head office. The Karoo lamb sales volumes were significantly higher at the one store which could be explained by the fact that a local well-established butcher is located near the store and has been selling Karoo lamb for many years to customers in the suburb. The two Checkers stores revealed similar shares for generic lamb and CNL.

The results confirm the reputation of the product but show that, amongst some consumers, there is still no real appreciation of the 'origin' attribute of food products. Price and food safety remain the dominant criteria influencing purchasing choices. Although these are valid, some evidence is reflected in the tabulated summary (Table 6) that suggests that the identity of the meat having a genuine Karoo origin could be important. The various willingness to pay estimates yielded different results but at least the stated preference methods confirm the hypothesis that consumers will be willing to pay a premium price. The positive results from the experimental auction and the in-store experiment (despite the limited promotional activities during this experiment) could be viewed as a decisive indication of the marketing potential of origin-based Karoo mutton / lamb. The product has the potential to be sold at a price premium similar to or slightly higher than comparable existing luxury and niche lamb brands on the South African market. This premium position will certainly be enhanced by effective promotion and information dissemination programmes.

Table 6.
Summary table of key findings

Study:	**Key finding:**
'Study 1': Initial survey to establish the reputation of Karoo mutton / lamb	Only 15% of the total sample of mutton / lamb consuming consumers was willing to pay a premium for Karoo mutton / lamb - the potential magnitude of the WTP was not investigated in this study
'Study 2': Conjoint analysis to investigate consumers' preference for Karoo lamb	Even though the sampled consumers derived the highest utility from a 'sophisticated' product (that is traceable to birth farm (and abattoir), originates in the Karoo and has quality and safety guaranteed through certification), a price discount of 5% to 7% was seen as acceptable
'Study 3': Means-end-chain theory and APT to investigate consumers' preferences and WTP for Karoo mutton / lamb through Van Westendorp's technique	WTP 6% price premium (i.e. R6/kg) for Karoo lamb One of the strongest links in the hierarchical value map for Karoo lamb related to the association between price and a positive quality perception
'Study 4': Random *n*th-price experimental auction	Average bidding premiums for Karoo lamb: • After information sheet exposure: R23/kg • After informative talk: R27/kg Generally higher bids for older consumers and females
The supermarket experiment	At a premium for Karoo lamb of R5/kg above the price of Certified Natural Lamb (CNL) and about R8/kg above generic lamb sold at Checkers stores Karoo lamb sales contributed 20% of sales volumes (21% of sales values) representing about 50% of CNL sales during the experimental period

5 Conclusions

This paper presented results from a set of studies applying different methodologies to test the perceptions, preferences and willingness to pay for a meat product that originates from the Karoo region in South Africa. The paper has brought together five years of work and different studies to help us understand the differences or similarity in consumers' preferences and willingness to pay related to this unique product. The paper on the one hand makes it possible for readers to see how different methods behave when applied to the same product. At the same time it presents a clear set of results for the future marketing plan related to Karoo Lamb – South Africa's first origin based meat product.

The paper also presents useful results for the evaluation of consumer studies of Protected Denomination of Origin (PDO) products and illustrate that the conclusions from consumer studies are to a large extent framed by the method used, which should suggest that interpretation of studies that only apply one method could easily be biased. Our paper illustrated the different results from different methods but nevertheless show that South African consumers – on balance – have a reasonable good appetite for this new certification scheme for one of its culinary jewels.

The results do however show that the reputation of the product is not that well known and not well appreciated as compared to similar products in Europe. There is thus a considerable amount of work to be done to educate consumers about the value and uniqueness of the product and to increase the awareness across all consumer groups. The results further illustrate that the marketing programme should be well supported so that the appreciation for the taste and uniqueness of the product can grow. It is always important to ensure that consumers get to know and get to understand the "story" of the Karoo and how it shapes the reputation of Karoo Lamb.

References

Alfnes, F., Rickertsen, K. (2003). European Consumers' Willingness to Pay for U.S. Beef in Experimental Auction Markets*. American Journal of Agricultural Economics,* **85**(2): 396-405.

Alfnes, F., Yue, C., and Jensen, H.H. (2009). Cognitive Dissonance as a Means of Reducing Hypothetical Bias. Working Paper 09_WP 486, 1-40. Available at www.card.iastate.edu.

Arkes, H., Joyner, C., Pezzo M., Nash, J.G., Siegel-Jacobs, K., and Stone, E. (1994). The Psychology of Windfall Gains. *Organizational Behaviour and Human Decision Processes*, **59**: 331-347.

Barjolle, D., Sylvander, B. (2002). Some Factors of Success for "Origin Labelled Products" in Agro-Food Supply Chains in Europe: Market, Internal Resources and Institutions, *Économies et Sociétés*, **25**(9-10): 1441.

Battalio, R., Kagel, J., and Jiranyakul, K. (1990). Testing Between Alternative Models of Choice Under Uncertainty: Some Initial Results. *Journal of Risk and Uncertainty*, **3**: 25-50.

Birol, E., Roy, D., and Torero, M. (2010). How Safe Is My Food? Assessing the Effect of Information and Credible Certification on Consumer Demand for Food Safety in Developing Countries. IFPRI Discussion Paper 01029, October 2010. www.ifpri.org/sites/default/files/publications/ifpridp01029.pdf

Bonnet, C., Simioni, M. (2001). Assessing consumer response to Protected Designation of Origin Labelling: a mixed multinomial logit approach. *European Review of Agricultural Economics*, **28**: 433-449.

Caldas, M.A.F., Black, I.G. (1997). *Formulating a Methodology for Modelling Revealed Preference Discrete Choice Data – The Selectively Replicated Logit Estimation*. Transport Research Part B: Methodological, **31**(6): 462-472.

Carlsson, F., He, H., Martinsson, P. (2009). Easy come, easy go. The role of windfall money in lab and field experiments. *Working Paper n. 374, School of Business, Economics and Law, University of Gothenburg.*

Carpenter, M., Larceneux, F. (2008). Label equity and the effectiveness of values-based labels: an experiment with two French protected geographic indication labels. *International Journal of Consumer Studies*, **32**: 499-507

Corrigan, J.R., Depositario, D.T., Nayga, R.M., Wu, X. and Laude, T.P. (2009). Comparing Open-Ended Choice Experiments and Experimental Auctions: An Application to Golden Rice. *American Journal of Agricultural Economics,* **91**(3): 837-853.

Cunningham, C.F. (2003). *The impact of information on willingness to pay for Bison*. Unpublished Masters thesis. Saskatoon: University of Saskatchewan.

Dekhili, S., Sirieix, L., and Cohen, E. (2011). How consumers choose olive oil: The importance of origin cues. *Food Quality and Preference*, **22**: 757-762.

de-Magistris, T., Gracia, A., Nayga, R. M. (2013). On the Use of Honesty Priming Tasks to Mitigate Hypothetical Bias in Choice Experiments. *American Journal of Agricultural Economics*, **95**(5): 1136-1154.

Draeger, R., Perham, K. (2009). Pricing examples using the PSM Pricing Survey, Part 11. *Journal of Professional Pricing.*

Espejel, J., Fandos, C., and Flavian, C. (2008). Consumer satisfaction: A key factor of consumer loyalty and buying intention of a PDO food product. *British Food Journal*, **110**: 865-881.

Evans, J.R., Brown, C., Collins, A.R., D'Souza, G.E., Rayburn, E.B., Sperow, M. (2008). Determining Consumer Perceptions of and Willingness to pay for Appalachian Grass-fed Beef: An Experimental Economics Approach. Selected *Paper prepared for presentation at the American Agricultural Economics Association Annual Meeting, Orlando, FL, July 27-29, 2008*.

Feunekes, G.I.J., Den Hoed, W. (2001). *Quantifying consumers' motivational structures for food products. In: Excellence in Internal Research.* The World Association of Research Professionals. Amsterdam. Netherlands.

Gutman, J. (1982). A Means-End Chain Model based on consumer's categorization process. *Journal of Marketing,* **46**: 60-72.

Guerrero, L., Guàrdia, M.D., Xicola, J., Verbeke, W., Vanhonacker, F., Zakowska-Biemans, S., Sajdakowska, M., Sulmont-Rossé, C., Issanchou, S., Contel, M., Scalvedi, L.M., Granli, B.S., and Hersleth, M. (2009). Consumer-driven definition of traditional food products and innovation in traditional foods. A qualitative cross-cultural study. *Appetite*, **52**: 345-354.

Hair, Jr., J. F., Anderson, R. E., Tatham, R. L., and Black, W. C. (1998). *Multivariate data analysis* (5th ed.). New Jersey: Upper Saddle River: Prentice Hall.

Harrison, G.W. (2006). Experimental Evidence on Alternative Environmental Valuation Methods. *Environmental & Resource Economics*, **34**: 125-162.

Horowitz, J.K., and McConnell, K.E. (2002). A Review of WTA / WTP Studies. *Journal of Environmental Economics and Management,* **44**: 426 – 447.

Janssen, M., Hamm, U. (2012). Product labelling in the market for organic food: Consumer preferences and willingness-to-pay for different organic certification logos. *Food Quality and Preference,* **25**: 9-22.

Kalish, S., Nelson, P. (1991). A comparison of ranking, rating and reservation price measurement in conjoint analysis. *Marketing Letters,* **2**(4): 327-335.

Keasy K., Moon P. (1996). Gambling with the house money in capital expenditure decisions. An experimental analysis. *Economics Letters*, **50**: 105-10.

Kiesel, K., Villas-Boas, S.B. (2010). Can Information Costs Affect Consumer Choice?—Nutritional Labels in a Supermarket Experiment. *Paper prepared for presentation at the 1st Joint EAAE/AAEA Seminar "The Economics of Food, Food Choice and Health", Freising, Germany, September 15 – 17, 2010.*

Kimenju, S.C.; De Groote, H., and Morawetz, U.B. (2005). Comparing accuracy and costs of revealed and stated preferences: the case of consumer acceptance of yellow maize in East Africa. *Contributed paper for presentation at the International Association of Agricultural Economists conference, Australia.*

Koo L.C., Tao F.K.C., and Yeung, J.H.C. (1999). Preferential segmentation of restaurant attributes through conjoint analysis. *International Journal of Contemporary Hospitality Management,* **11**(5): 242-250.

Kroes, E.P., and Sheldon, R.J. (1988). Stated Preference Methods: An Introduction. *Journal of Transport Economics and Policy,* **22**(1): 11-25.

Lim, K.H., Maynard, L. J., Hu, W., and Goddard, E.W. (2011). U.S. Consumers' Preference and Willingness to Pay for Country-of-Origin-Labeled Beef Steak and Food Safety Enhancements. *Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's 2011 AAEA & NAREA Joint Annual Meeting, Pittsburgh, Pennsylvania, July 24-26, 2011.*

Little J., Berrens, E. (2003). Explaining Disparities between Actual and Hypothetical Stated Values: Further Investigation Using Meta-Analysis. *Economics Bulletin,* **3**(6): 1-13.

Loureiro, M., McCluskey, J.J., and Mittelhammer, R.C.(2003). Are Stated Preferences Good Predictors of Market Behaviour? *Land Economics,* **79**(1): 44-55.

Loureiro, M. L., Umberger, W. J. (2007). A choice experiment model for beef: What US consumer responses tell us about relative preferences for food safety, country of origin labelling and traceability. *Food Policy,* **32**: 496–514.

Lusk J. L., Fields D., and Prevatt W. (2008). An incentive compatible conjoint ranking mechanism. *American Journal of Agricultural Economics*, **90**(2): 487-498.

Lusk, J.L., Schroeder, T.C. (2004). Are Choice Experiments Incentive Compatible? A Test with Quality Differentiated Beef Steaks. *American Journal of Agricultural Economics,* **86**(2): 467-82.

Lusk, J.L., Shogren, J.F. (2007). *Experimental Auctions: Methods and Applications in Economic and Marketing Research.* Cambridge: Cambridge Universal Press.

Martins, J.H. (2006). *Total household cash expenditure in South Africa by Living Standard Measure (LSM) group and product, 2005*. Research report no. 347, Pretoria: Bureau of Market Research.

Moser, R., Raffaelli, R., and Notaro, S. (2014). Testing hypothetical bias with a real choice experiment using respondents' own money. *European Review of Agricultural Economics*, **41** (1): 25-46.

Murphy JJ, Stevens TH (2004). Contingent valuation and hypothetical bias in experimental economics. Agricultural and Resource Economics Review **33**(2): 182-92

Murphy, J.J., Allen P.G., Stevens, T.H.,and Weatherhead, D. (2005). A Meta-Analysis of Hypothetical Bias in Stated Preference Valuation. *Environmental and Resource Economics*, **30**(3): 313-325.

Nielsen, N.A., Bech-Larsen, T., and Grunert, K.G. (1998). *Consumer purchase motives and product perceptions: A laddering study on vegetable oil in three countries.* Journal of Food Quality and Preference, **9**(6): 455-466.

North, E., de Vos, R., (2002). The use of conjoint analysis to determine consumer buying preferences: A literature review. *Journal of Family Ecology and Consumer Sciences*, **30**: 32-39.

Olson, J.C., Reynolds, T.J. (1983). *Understanding consumers' cognitive structure: implication for advertising strategy*. Lexington. MA: Lexington Books.

Resano-Ezcaray, H., Sanjuán-López, A.I., and Albisu-Aguado, L.M. (2010). Combining Stated and Revealed Preferences on Typical Food Products: The Case of Dry-Cured Ham in Spain. *Journal of Agricultural Economics,* **61**(3): 480–498.

Shogren, J.F., Maroglis, M., Koo, C., and List, J.A. 2001. A random nth-price auction. *Journal of Economic Behaviour & Organization,* **46**: 409-421.

Ter Hofstede, F., Audenaert, A., Steenkamp, J.B.E.M., and Wedel, M. (1998). An investigation into the association pattern technique as a quantitative approach to measuring means-end chain. *International Journal of Research in Marketing,* **15**: 37-50.

Van Zyl, K. (2011). *Applying experimental economics to determine consumers' willingness to pay for food attributes*. M Com Agricultural Economics Thesis, University of Pretoria.

Van Zyl, K, Vermeulen, H., and JF Kirsten (2013). Determining South African consumers' willingness to pay for certified Karoo lamb: An application of an experimental auction. *Agrekon* **52** (4):1-20 (December 2013).

Verbeke, W, Pieniak, Z., Guerrero, L., and Hersleth, M. (2012). Consumers' Awareness and Attitudinal Determinants of European Union Quality Label Use on Traditional Foods. *Bio-based and Applied Economics* **1**(2): 213-229, 2012

Vermeulen, H., Schönfeldt, H.C., and Kirsten, J.F. (2008). *The reputation of Karoo mutton / lamb: A sensory and consumer perspective. Internal research report*. Department of Agricultural Economics, Extension and Rural Development, University of Pretoria, 17 April 2008.

Voelckner, F. (2006). An empirical comparison of methods for measuring consumers' willingness to pay. *Marketing Letters,* **17**: 137-149.

Wardman, M. (1988). A Comparison of Revealed Preference and Stated Preference Models of Travel Behaviour. *Journal of Transport Economics and Policy,* **22**(1): 71-91.