Online Journals
- Australasian Agribusiness Review
  - 2005 - Volume 13
  - 2004 - Volume 12
  - 2003 - Volume 11
  - 2002 - Volume 10
  - 2001 - Volume 9
  - 2000 - Volume 8
  - 1999 - Volume 7
  - 1998 - Volume 6
  - 1997 - Volume 5
  - 1996 - Volume 4
  - 1995 - Volume 3
- Australasian Agribusiness Perspectives
- Connections
- Call for Papers
- Contact Us

Australasian Agribusiness Review - Vol. 13 - 2005

Paper 6
ISSN 1442-6951

Consumer Acceptance Of New Sheep Milk Cheeses

Michael Burton and Roberta Bencini

School of Agricultural and Resource Economics, and Animal Biology, Faculty of Natural and Agricultural Science, UWA

Abstract

This paper provides estimates of consumers willingness to pay for two new sheep milk cheeses, developed as part of a RIRDC research project. In 1998, following an in-store tasting, a sample of 215 consumers were asked to reveal what price they would be willing to pay for portions of the cheese. Analysis of the data reveals the probability that a consumer will purchase the product, as prices change. There are higher levels of acceptance of the soft cheese product as compared with the hard cheese, and higher prices paid (per kilo) for smaller portions. It is shown that the structure of the price revelation process in the survey has also influenced the results.

Introduction

Sheep milking in Australia was started in the 60s by farmers seeking to diversify from the traditional productions of wool and prime lambs. Since then, many enterprises have initiated sheep milking ventures with mixed fortunes. So far, the Australian sheep milking industry is far from being established despite good potential markets and high farm gate prices for the milk.

So far, manufacturers venturing into the processing of sheep milk have attempted to reproduce famous overseas cheeses such as the Pecorino and the Fetta. This was probably due to a desire to replace imports of these products, which are currently imported for the ethnic communities. However, these cheeses are either protected by DOC trademarks, or suffer from serious competition from cheap cow's milk imitations.

To establish a viable sheep milking industry it is essential to follow the example of other successful new industries, such as the wine industry, and develop local specialty Australian products. Australian consumers also have developed a taste for mild products rather than the strong flavours typical of the imported sheep milk cheeses. A RIRDC funded project had the objective of developing new sheep milk products made from sheep milk. This resulted in the development of methodologies for the production of two new cheeses. One of these is a soft spreadable cream cheese that has virtually no maturation time. It was developed to respond

to the need of manufacturers for a fresh product that would provide the 'cash flow' for the enterprise. The other is a semi mature cheese that has to be aged for about one month (Bencini and Agboola, 2003). This research into the technical development of the new products was complemented by a market research exercise, with both cheeses tested by a large group of consumers through a survey in a popular supermarket chain, and there willingness to pay for the products evaluated.

This paper reports the results from that assessment of consumer valuations for the product, and identifies the potential size of the market at differing consumer price levels.

Sheep milk dairy products

There is anecdotal evidence of the existence of local markets for sheep dairy products and that a share of these markets may be in the health food products. There is also a perception (M. Temby, Pers. comm.) that sheep milk products are preferred by the ethnic communities, in particular the Italian and Greek communities.

As with all new industries, the existence of markets for the products that are being developed is paramount for the success of the industry (Hyde, 1998).

A consumer survey was undertaken to determine consumer's acceptance and possible retail prices for sheep milk cheeses in general and for the two cheeses developed within the project in particular. The aim of the survey was to establish:

1. If there are local markets for sheep milk cheeses
2. Who are the potential consumers
3. What are the prices they would be prepared to pay for sheep milk cheeses and in which quantity would they buy them
4. What other sheep milk dairy products are they likely to buy
5. What is their conception of sheep dairy products (health, gourmet or ethnic products) and therefore where would they expect to buy them (supermarket, delicatessen, health food shop).

Survey design

215 consumers were interviewed at Woolworths Supermarkets at six different locations in WA (Ballajura, Cottesloe, Spearwood, Midland, Kingsway-Landsdale and Mount Hawthorn).

Participants were shown pictures of the two cheeses developed within the project and asked to rate them on a scale of 1 to 7. Then participants were asked to taste samples of the cheeses and rate them again. They were also asked if they had heard about sheep milk dairy products before, if they had tried them and if they were prepared to buy them and at what price and in what quantity. This was designed as a bidding process with prices starting from either end of a possible scale, and questionnaires were randomised in order not to bias the participants.

An example of the valuation question is given below in table 1:

Table 1

Indicate an entire round of the hard sheep's milk cheese in the photo.

11. Would you buy an entire round *(800g)* of the hard sheep's milk cheese for:

if it were free	Yes	No	
$8?	Yes	No	*($10 per kilo)*

$20?	Yes	No	*($25 per kilo)*
$28?	Yes	No	*($35 per kilo)*
$40?	Yes	No	*($50 per kilo)*

Thus they were given information on both the cost of the piece of cheese, and also its cost per kilo. By proceeding down the list of prices they would respond to each price, and then either switch from a positive to a negative answer, indicating the band within which there valuation lay, or would continue to the end, in which case one knows only that the valuation exceeds $50 per kilo. The question also gives the opportunity to indicate that they are not willing to 'purchase' the product, even if it were free. A number of people took this opportunity, which may appear to violate rationality: with free disposal of the product it might be surprising that they did not wish to be given the product for free, but it may simply reflect an aversion to the product.

Half of the sample were offered a reversed sequence of prices:

Table 2

Indicate an entire round of the hard sheep's milk cheese in the photo.

11. Would you buy an entire round *(800g)* of the hard sheep's milk cheese for: *(800g)*

$40?	Yes	No	*($50 per kilo)*
$28?	Yes	No	*($35 per kilo)*
$20?	Yes	No	*($25 per kilo)*
$8?	Yes	No	*($10 per kilo)*
if it were free	Yes	No	

(e.g. starting at $50 per kilo and then descending to it being made available for free). In principle this should not change their revealed valuation, but the extensive literature on anchoring within surveys suggests that inferred values do alter depending on the order in which consumers are presented with options. The identification of this effect is one feature of the statistical analysis that follows.

Each respondent was asked to value 4 products: a round (800g) and a slice (160g) of hard cheese, and a tray (200g) and small tub (100g) of soft cheese.

The participants were asked also demographic questions relating to age, education, occupation, household structure, income bracket and country of origin.

Results

In total 142 females and 67 men were interviewed. Of the respondents, 94 (44%) had heard of sheep milk cheeses before and only 24 (11%) had previously tried them.

When asked to predict how much they would like the cheeses developed within our project by examining a photograph of the cheeses, both cheeses achieved the same mark. The average mark (out of 7) was 4.1±032 for the semi mature cheese and 4.1±0.35 for the soft spreadable cheese.

When invited to taste the cheeses, only 15 people (7%) refused to try the hard cheese and 24 (11.5%) refused to try the soft cheese. Of these, 7 and 9 respectively would have tried the cheeses if they were made with cow's milk.

After tasting the cheeses, the average taste score rose to 4.7±0.37 for the hard cheese and to 5.5±0.29 for the soft cheese, an increase of 8.6 and 20% respectively. The two cheeses seem to appeal to quite different tastes: the correlation between post-taste scores is only 0.28.

The statistical analysis of the willingness to pay takes advantage of the sequential nature of the choices that were presented: one can conceive of a 'survival' function which indicates the probability that a respondent will still be willing to pay for the product as prices rise. The Cox proportional hazards model (Lancaster, 1990) is a convenient method of identifying this function: it does not impose a functional form on the underlying survival function, it can accommodate the 'discrete' nature of the responses (i.e. if an individual was willing to pay at x, but not at x+n, one knows only that the transition from purchase to non purchase lies within a band, but not at what level within the band) and it allows for additional covariates to influence the willingness to pay. A similar model has been applied to the analysis of environmental willingness to pay data (Burton, 2000). It also has an intuitive use in a marketing context: it shows how one might expect the market to decline as the price of the product increases. In the current context one cannot interpret these as strict demand curves, as the survey did not make any attempt to gauge frequency of purchase at these prices.

Formally, the Cox model can be represented through the hazard function

Where h_0 is the baseline hazard, x are covariates and β a corresponding vector of coefficients and p the price of the product. The hazard represents the conditional probability that the consumer will switch from purchase to non-purchase at price p, conditional upon their being a purchaser up to that price. The baseline hazard is not specified in the Cox model, but evaluated non-parametrically at each point where there is a transition from one state (willing to purchase) to another (not willing to purchase). The exponential function of covariates, x, simply shifts the baseline.

The survival function (or estimate of the proportion of the population who will purchase at a price p) can be identified from the hazard function by:

(Lancaster, 1990).

Cox proportional models have been estimated for all 4 products. An exact partial likelihood method is used to accommodate the large number of 'ties' in the data set (i.e. people switching from one state to the other within the each price range). Within the analysis for each product, a dummy variable is use to identify if the survey instrument used a price sequence that was increasing or decreasing and included in the regression model to identify if the structure of the survey has an impact on the estimate of the hazard. A number of possible covariates that may influence the acceptability of the product are available, including age, gender, income, employment status, country of origin etc. In fact, there were no covariates that were significant, apart from the type of survey that was used (up or down indicated by a dummy variable, *b*, =1 if descending survey used) and the ranking scale for whether they liked the sample of cheese they had eaten (*Taste,* ranging from 1-7). The parameters for the Cox proportional hazard model is given in Table 3 below.

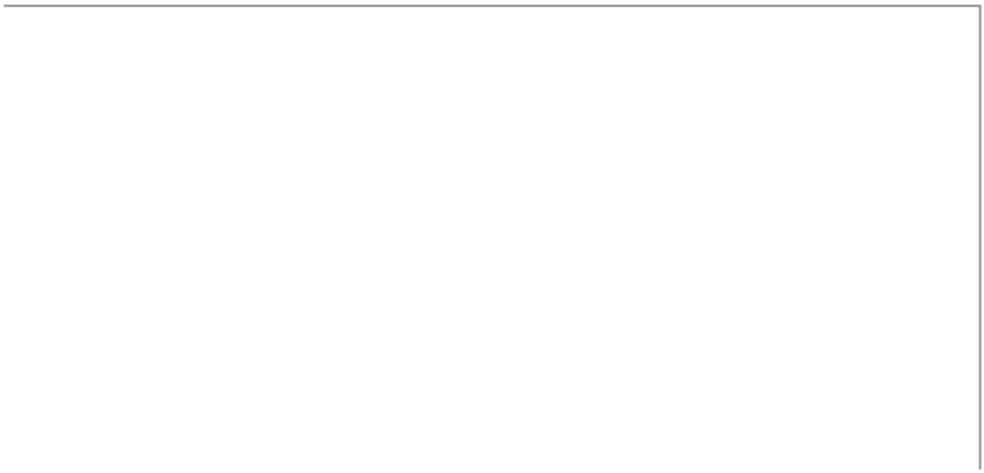
Table 3 Parameter estimates for the Cox proportional model

Product	b	(s.e.)	Taste	(s.e.)
Hard Cheese (large)	-0.66	(0.23)	-0.42	(0.08)
Hard Cheese (small)	-1.50	(0.26)	-0.39	(0.08)
Soft cheese (large)	-1.01	(0.22)	-0.19	(0.08)
Soft Cheese (small)	-1.13	(0.23)	-0.33	(0.08)

Standard errors in parenthesis

It should be noted that these are estimates of the exponential term applied to the baseline *hazard*: the conditional probability of switching from purchase to non-purchase within a price range. An estimated negative coefficient implies that the variable reduces the size of the hazard, and hence shifts the survival function to the right: they remain purchasers at higher prices. Thus, the coefficients on the taste ratings is as expected: those that liked the cheese are less likely to switch from purchase to non-purchase within any price range. The significant coefficient on b in all cases is more worrying: it implies that the willingness to pay for the cheese is higher if the respondent is initially presented with a price of $50 a kilo and then asked to move down the price range, as compared to those that start at zero, and move up. The implication of this is more clearly shown in Figures 1-4 below, which gives the estimated survival functions (evaluated at the average value for *Taste*) for all 4 cheeses, with the estimates of the impact of the two types of survey on the estimated survival function revealed.

Figure 1: Survival functions for hard sheep cheese: Large portion



Note: for all graphs, the solid line is for b=1 (the descending survey), the broken line b=0 (the ascending survey).

Figure 2: Survival functions for hard sheep cheese: small portion

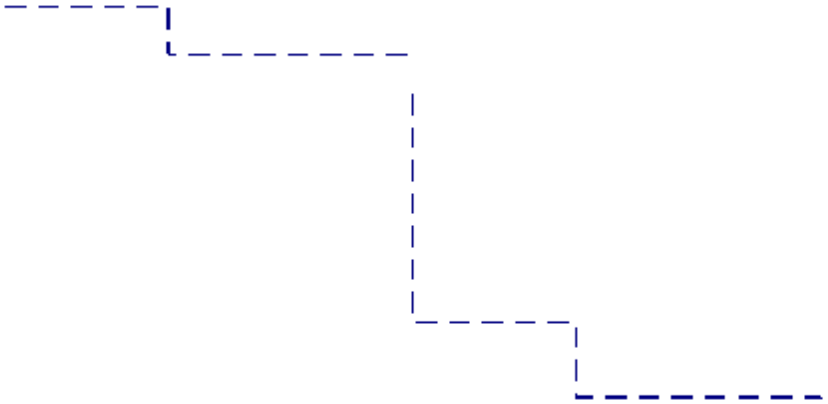


Figure 3: Survival functions for soft sheep cheese: Large portion

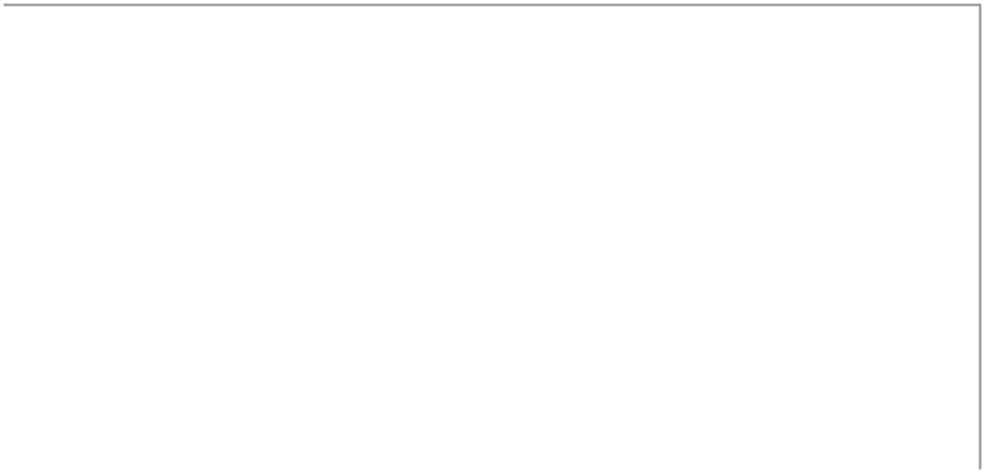
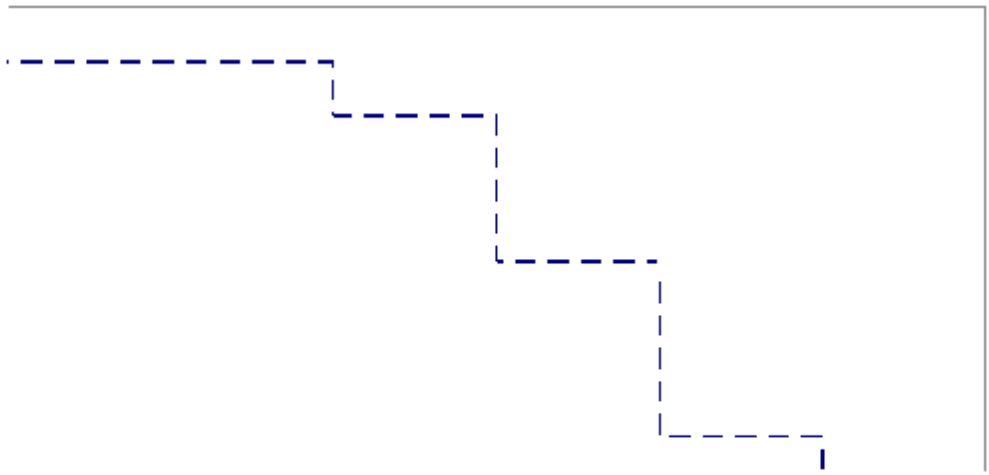


Figure 4: Survival functions for soft sheep cheese: Small portion



All graphs indicate the significance of the two structures of the survey: those where they start with a high price, and are asked to work down until they are willing to pay, consistently yield distributions that are to the right of those where they start with low prices, and work up to the price where they are no longer willing to pay. Also note that the survival functions do not start at unity, as strictly one might expect. This reflects the fact that a considerable proportion of the samples were not willing to purchase the product, even at a zero price (34% and 14% for large and small hard cheese respectively, 20% and 13% for large and small soft cheese respectively). Some exploratory analysis was undertaken to see if it was possible to identify the characteristics of those who would not purchase the cheese at a zero price: the only significant determinant was the assessment of taste. Willingness to sample the cheese was not significant, nor age, gender, income etc.

Conclusions

The implications of the results for potential markets for sheep milk cheese is complicated by the presence of two alternative estimates, depending on the structure of the survey. However, they do indicate some clear results. The willingness to pay is greater, in $/kilo, for the smaller portion sizes. Significant proportions of the consumers are still willing to pay for the small portions at significant prices: for the hard cheese the median is around $30/k, for soft cheeses around $40/k. There do not seem to be any age or gender barriers to consumption, although significant proportions of the population indicate that they would never consume the cheese at any price. On a positive note, since the survey was conducted, and as a consequence of the research project as a whole, a local WA cheese manufacture has started to produce the soft cheese product, and successfully retailing it at $35/kilo.

References

Bencini,R. and Agboola,S. (2003) *Marketable Products from Sheep Milk* Rural Industries Research and Development Council, Canberra

Burton,M.P. (2000) A semi-parametric estimator of willingness to pay applied to dichotomous choice contingent valuation data *Australian Economic Papers* 39(2) 200-214

Hyde,K. (1998) Success factors for developing new rural industries. In *The new rural industries- a handbook for farmers and investors*, Rural Industries Research and Development Council, Canberra.

Lancaster, (1990) The econometric analysis of transition data, Cambridge University Press, Cambridge.

Acknowledgement

The ongoing support of Bencini by RIRDC for this research is gratefully acknowledged: RIRDC projects UWA-23A,-44A,-66A

top of page

Contact us

Contact the University : Disclaimer & Copyright : Privacy : Accessibility