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Hunt Partners Solicitors Pty Ltd

Benefit Cost Analysis of a Proposed Beef Grading and Labelling Scheme

Interim Report

March 2010

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1. Executive Summary

GHD Hassall was engaged by Hunt Partners Solicitors to complete a benefit cost analysis (BCA) of a beef grading and labelling system based on the *Food Amendment (Beef Labelling) Act 2009* (the Act) that was passed by the NSW parliament in November 2009. The Act is sometimes referred to as the 'Torbay Act'.

The Act gives the Minister the power to introduce a beef labelling system based on defined quality categories and consumer descriptors for beef. A beef labelling system will provide eating quality information to consumers of beef in Australia with the aim of increasing the consumption and/or price of beef to benefit the industry.

Australia currently produces about 2.1 million tonnes carcase weight of beef and veal with 738,000 tonnes consumed on the domestic market and the balance exported. Both AUS-MEAT (compulsory for exports) and MSA are programs that describe and grade beef but their use at retail level is variable. The Act seeks to ensure that food businesses which voluntarily use the language and grading components of these programs must do so consistently as prescribed in the legislation or otherwise they will be taken to have engaged in misleading and deceptive conduct.

A brief literature review of factors affecting beef consumption was completed and this showed multiple factors at play in determining consumption, and highlighted the difficulty of calculating consumption responses when factors vary.

Although the Act applies to NSW, this BCA is based on the assumption that it would be introduced nationally.

A model of the current usage of beef production and income was developed with assumptions made on product type, destination (export or domestic) and price. Particular attention was placed on the usage of 8 tooth cow beef. An alternative model was developed for post-Act scenarios.

Two scenarios were considered:

- Scenario 1: Domestic consumption remaining static but quality enhanced through a decline in usage of cow beef; and
- Scenario 2: Scenario 1 with the addition of increased consumption of beef (250g per serve, every six weeks, which is an increase in per capita consumption of 2.15kg cw equivalent per annum).

Based on a 10-year model period and a discount rate of 7%, the proposed beef grading and labelling scheme is estimated to provide a net present value, using farm gate prices, of:

- Scenario 1: $598 million, equivalent to $7.70 per animal sold; and
- Scenario 2: $1.8 billion, equivalent to $23 per animal sold.

The study includes a sensitivity analysis of farm gate price for non-cow beef and models increases of $0.25 and $0.50 per kg carcase weight. Based on an increase of $0.25 per kg carcase weight, NPVs are as follows:

- Scenario 1: $1.87 billion, equivalent to $24.34 per animal sold; and
- Scenario 2: $3.13 billion, equivalent to $40.69 per animal sold.

Note that Scenario 2, which assumes increases in consumption and price, is based on a staged increase in consumption over a six year period. The net benefit per annum at steady state (farm gate price) is $329 million and $511 million, assuming a zero and $0.25 per kg carcase weight increase respectively.

It should be noted that this BCA is considered to be interim in nature with ‘best bet’ assumptions adopted from the literature and from discussion with industry representatives. It is considered that these assumptions should be refined with other available evidence and through further discussion with industry. In particular, the model is highly sensitive to price increases and the assumptions underlying the increase need to be further investigated.

2. Introduction

2.1 Purpose and scope

GHD Hassall was engaged by Hunt Partners Solicitors to complete a benefit cost analysis (BCA) of a beef grading and labelling system based on the *Food Amendment (Beef Labelling) Act 2009* (the Act) that was passed by the NSW parliament in November 2009. The Act is sometimes referred to as the 'Torbay Act'.

The Act gives the Minister the power to introduce a beef labelling system based on defined quality categories and consumer descriptors for beef. The Act is not mandatory but is designed so that a person carrying on a food business is taken to have engaged in conduct that is misleading or deceptive if the person advertises, packages or labels beef that is not consistent with AUS-MEAT language or with the quality categories defined in the beef labelling scheme.

Although the Act applies to NSW, it is considered that when it is proclaimed it is likely to apply to labelling by processors in other states because of the significant amount of beef that is imported into NSW from other states. This imported beef will need to be sourced from processors adopting labelling consistent with the scheme outlined in the Act. For this reason, this BCA assumes that the labelling requirements apply across Australia.

The BCA relies on a number of assumptions relating to Australian beef production and consumption. Assumptions include proportions of product from various animal categories (e.g. age and sex); proportions that are for domestic consumption or are exported; prices for different categories and qualities; and the changes in assumptions following proclamation of the Act. Assumptions on the costs of implementing and auditing the labelling requirements are also required.

The above assumptions are difficult to accurately predict and 'best bet' values are adopted from the literature and from discussion with industry representatives. The BCA includes a sensitivity analysis that shows the changes resulting from variations in the assumptions. This is an interim report that includes a methodology for completing the BCA and it will rely on further input from the beef industry to better refine the assumptions and thus provide improved accuracy of the BCA.

2.2 Methodology

A model of the current usage of beef production and income was developed with assumptions made on product type, destination (export or domestic) and price. Particular attention was placed on the usage of 8 tooth cow beef. An alternative model was developed for a post-Act scenario.

3. Background

3.1 The Australian cattle industry

3.1.1 Cattle numbers

Following is a brief summary of cattle numbers:

- Herd size of 27.8 million in June 2009 (beef and dairy cattle);
- Herd size was 27.3 million in June 2008 (beef herd was 24.8 million head, while the dairy herd was 2.5 million head);
- Cattle turnoff in 2009 is forecast to be 7.7 million head, with adult female slaughter at 3.8 million head and adult male slaughter at 3.9 million head;
- Total beef and veal production for 2009 is forecast at 2.1 million tonnes carcase weight, with carcase weights averaging 270kg/head (MLA 2009a).

3.1.2 Domestic beef usage

Of the 2.1 million tonnes carcase weight produced, 738,000 tonnes (or 421,700 tonnes retail weight) are for domestic use (see Table 1). This is equivalent to per capita consumption of 33.7 kg carcase weight per year.

Table 1 Total domestic beef usage and expenditure, Australia

Beef and Veal	2004-05	2005-06	2006-07	2007-08	2008-09[1]
Usage carcase weight ('000 tonnes)	726.5	752	760	726	738
Usage retail weight ('000 tonnes)	414.1	429.7	434.3	414.9	421.7
Average retail price ($/kg retail weight)	14.49	15.40	15.38	15.55	
Average retail price ($/kg carcase weight)[2]	8.27	8.54	8.74	9.21	
Retail value ($M)	6,001	6,424	6,641	6,685	
Increase in value on previous year ($M)	260	423	217	44	
Per capita consumption (kg cw)	35.9	35.8	36.3	35.6	33.7
Per capita expenditure ($ retail)	296.92	314.08	318.47	315.63	

Source: MLA 2008a, MLA 2009b and MLA 2010

[1] 2008-09 data are the latest estimates provided by MLA 2010. Usage data from previous years have also been updated to reflect these most recent estimates, however, the GHD Hassall analysis has been undertaken based on MLA 2008a and MLA 2009b estimates.

[2] Retail value divided by usage (cw)

More recent figures from MLA show that domestic usage of beef in 2008-09 was 738,000 tonnes carcase weight (33.7kg cw per capita), a decrease of 5.3% on 2007-08 usage (MLA, 2010).

Per capita consumption of beef and veal is compared with other meat types in Table 2 which also shows beef's percentage share of total meat consumption. Beef and veal has declined from a 33% share of total meat consumption in 2005 (in volume terms) to 31% in 2008. Table 2 provides a relatively brief time period and it is interesting to note that in 1977 beef and veal consumption was 70.3 kg per capita (59% share of 118.3 kg total meat consumption), and in 1984 was 44.3 kg (43% share of total 102.6 kg meat consumption).

Table 2 Per capita consumption of meat in Australia (kg/capita, carcase weight)

Class of Meat	**2004-05**		**2005-06**		**2006-07**		**2007-08**	
	Weight (kg)	Share	Weight (kg)	Share	Weight (kg)	Share	Weight (kg)	Share
Beef and veal	35.9	33%	35.8	33%	36.3	31%	35.6	31%
Mutton	3.0	3%	2.8	3%	3.2	3%	2.7	2%
Lamb	10.3	9%	10.2	9%	11.2	10%	11.4	10%
Pig meat	22.1	20%	22.8	21%	25.6	22%	26.2	23%
Poultry meat	37.7	35%	38.5	35%	39.5	34%	39.2	34%
Total Meat	109.0	100%	110.1	100%	115.8	100%	115.1	100%

Source: MLA 2008a

About 68% of beef used in the domestic market is sold through retail outlets, 27% through foodservice and 5% in processing (MLA 2009c).

Beef consumption and total meat and poultry consumption in the US is provided in Table 3 for comparison. Beef's share of total meat and poultry consumption has been steady at about 34% compared to the current share in Australia of 31%. A more complete understanding would be provided if a longer time series was analysed.

Table 3 United States per capita beef consumption, and total meat and poultry consumption

Year	Beef (kg cw)	Total meat and poultry (kg cw)
2003	42.0 (33.8%)	124.3
2004	42.7 (33.9%)	125.9
2005	42.4 (33.8%)	125.4
2006	42.6 (33.9%)	125.6
2007	42.1 (33.6%)	125.4

Source: USDA website

3.2 Factors affecting beef consumption

The Australian red meat industry recognises the importance of influencing consumer choice to ensure profitable growth in demand for red meat products. The industry has developed a number of Meat Industry Strategic Plans (MISPs) over the years with the 1996 report stating that "consumer willingness to keep on buying red meat is heavily influenced by their recent eating experience. Consistency and palatability are determinative factors in consumer decision-making. By enhancing consumer confidence in the product, a system which provides correct information about eating performance can both improve per capita consumption and attract a price premium".

The current 2010-2015 MISP states the need to promote the positive attributes of red meat to engender consumer trust so red meat becomes the product of choice, and to also adopt new marketing techniques and encourage retail innovation to maximise efficiency and effectiveness in growing demand for red meat and livestock.

The rationale for the introduction of Meat Standards Australia (MSA) noted that per capita consumption of beef was on a long term trend decline of about 1.7% per year. The report stated that it was possible to increase per capita consumption through lower prices to consumers but that this was not an attractive long term strategy. The challenge was to increase *real* demand recognising that repeat purchase is heavily influenced by eating performance (MLA 1998). Moving to a cuts-based grading system was estimated to substantially increase the retail value of a carcase, e.g. to more than $1,500 for an MSA graded carcase with 'minor' processing and around $1,950 for a carcase with 'moderate' cut processing (MLA 2008). Domestic beef consumption was also estimated to grow, due to the labelling of all beef according to eating quality and cooking method.

The factors influencing beef consumption are complex with expected eating quality one of many issues that are involved. Mannion et al (2000) studied the decline in beef consumption in Ireland and stated that factors influencing meat consumption can be separated into economic (price) and non-economic factors (e.g. quality). They listed factors affecting choice of meat as:

- Convenience;
- Animal welfare;
- Safety (antibiotic use, animal diseases such as BSE);

- Healthiness (nutrition);
- Intrinsic quality cues (e.g. colour, leanness, eating experience);
- Extrinsic quality cues (e.g. price, place of purchase, brand name); and
- Sensory factors.

Their research found that safety and status of meat (healthiness) had greatest influence but that these accounted for only 8% of variance in beef consumption changes. They concluded that there were difficulties in measuring consumer perception and further research was required.

Care is needed when interpreting the above outcomes for the Australian market as the research was conducted when food safety related to BSE was of high importance and this would have potentially detracted from the importance of quality issues.

Davis and Lin (2005) discussed factors affecting beef consumption in the US and cited research that showed that:

- Even if consumers' taste for beef had remained constant over time, lower poultry prices would lead to lower beef demand; and
- Consumers who purchase 'select' top loin steaks use tenderness as their primary determinant of satisfaction, with a majority (65%) stating they would purchase all their beef from one retail store if that store supplied a line of beef cuts guaranteed to be tender.

Food safety as a result of BSE resulted in plummeting beef sales in the UK which recovered after the introduction of the '30 Month Rule' prohibiting the sale of meat for human consumption from cattle over 30 months. It is unclear whether the recovery was due to the improved quality of younger beef or consumer satisfaction with food safety. In Germany, where beef consumption had also declined as a result of BSE, the government's response was to introduce BSE 'quick tests' to ensure food safety. German beef consumption largely recovered by November 2001 (Beck et al 2007).

Per capita beef consumption in Germany and the UK, over the period 1991 to 2007, is presented in Table 4.

Table 4 Per capita beef consumption in the UK and Germany, 1991 – 2007

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Germany	20.6	19.3	19.8	17.5	16.6	15.3	14.5	15.1	15.1	14.0	10.0	12.0	12.0	12.0	12.0	13.0	13.0
UK	19.2	19.5	17.8	18.1	17.6	14.2	16.4	16.2	17.2	17.0	19.0	20.0	15.0	21.0	16.0	21.0	21.0

Source: Eurostat

In a recent review of the marketing levy for MLA (MLA 2009b) the consultants considered recent changes in Australian meat consumption and noted that trends need to be considered in the context of broader market influences including:

- Domestic consumption can be strongly influenced by short run supply conditions which can be impacted by, among other things, seasonal conditions, export opportunities and competition from imports;
- Strong demand for Australian beef from Japan and Korea, with their continuing restrictions on US imports, has limited the volumes available for local consumption. At the same time, seasonal conditions have reduced supply to the domestic market and this has added upward pressure in retail beef prices. Demand for beef has been further inhibited by pressure on household budgets from high fuel prices and high interest rates;
- For pig meat, the availability of low priced imports in recent years has led to a glut in supply, reduced domestic retail prices and severe profit downgrades for Australian producers while they adjust to significant changes in their trading environment; and
- For chicken, increased market penetration has been achieved in recent years, particularly in the fast food sector as low cost bulk protein.

The report found that despite the decline in beef consumption, consumer expenditure on beef has increased by approximately $700m per year (from $6.0 billion to $6.7 billion) which is equivalent to a per annum increase of 3.7%.

The report considered mainly economic factors to explain consumption changes (supply, price differentials, exchange rates) and did not consider in detail the non-economic factors such as quality.

MLA also contracted research on consumer expectations of beef which found that cheaper prices for the same cut (rump) of beef signify that it will be more tough and chewy and not as suited to grilling, however respondents are still positively disposed to grilling the cheaper rump. The research recommended that to prevent any dissatisfaction with beef that this may induce, a label be placed on cheaper rump cuts indicating the type of cooking that cheaper cuts of rump are more suited to.

The above research also found that younger people have less knowledge about beef and how to cook it, and are therefore more likely to look for guidance when purchasing meat. Labelling appears to be important for younger people who don't have the benefit of experience like older respondents. The authors recommended that even though respondents know there are two different cuts of rump, they are unable to entirely distinguish between them based on visual cues and rely heavily on current labelling/pricing regimes to indicate differences (MLA 2000).

The recent Senate Committee report on meat marketing (Australian Senate 2009) suggested that current 'budget' labelling arrangements meant that information presented to consumers is inadequate or misleading, making choosing beef products something of a lottery. Because quality variability makes accurate value for money judgements on beef difficult, consumers may lose confidence in the product to the detriment of the industry as a whole.

A tracking study commissioned by MLA (Millward Brown 2003) involving 280 consumers reported that perceptions of beef quality improved in the period 2000 to 2003, with 38% of those surveyed identifying improved beef quality versus 13% believing quality had worsened over the period. Per capita beef

consumption also increased 1.3% to 35.7kg per person between 2000 and 2006 with retail value of beef increasing by 59.3% over the same time frame.

Other research has been completed on consumers' willingness to pay (WTP) for beef of differing grades. Lyford et al (2009) measured WTP as a ratio of 'good everyday quality' and results showed that consumers in Australia, United States, Japan and Ireland were willing to pay for premium quality. Australian consumers accepted 4 and 5 star product being valued at 1.5 and 2.3 times the value assigned to 3 star product.

3.3 The current classification and grading systems

The following descriptions are extracted from the Senate Report (Australian Senate 2009).

3.3.1 AUS-MEAT system

AUS-MEAT Ltd has responsibility for developing uniform specifications for beef through its AUS-MEAT Language ('the Language') which is a national uniform description system based on objective carcass measurements. The Language classifies a number of carcass traits at various stages of processing including dentition (age), sex, weight and fat measurement at the slaughter floor; marbling, meat colour, fat colour and rib fat at the chiller stage; and cut description, cut lines and fat depth in the boning room.

The AUS-MEAT system ensures that accredited processors are required to provide objective purchasing specifications subject to independent verification, ensuring consistency for buyers at the wholesale level.

However, the AUS-MEAT system does not presently provide a tailored solution to the problem of consumer information. Accreditation to AUS-MEAT Standards and use of the Language is voluntary for meat marketed domestically, while being compulsory for meat for export. However, many processors serving the domestic market also export and are subject to AUS-MEAT requirements.

The AUS-MEAT system is primarily designed to ensure that claims about the characteristics of the various sections of the carcass are reliable. The system is not designed to provide more comprehensible information to the ordinary consumer when purchasing meal portions at the retail level. Instead, the imperative of the system is to ensure that processors are providing what they purport to, via uniform and objective classifications.

With respect to labelling arrangements for beef from old cows, in 2002 a voluntary retail beef labelling agreement between MLA and the major supermarket chains and a large number of retail butchers to label beef from cows with eight teeth 'budget' was reached. Eight teeth indicate that the animal is over three years old and potentially yields meat of poorer eating quality than cuts from younger animals. In response to the budget beef agreement, AUS-MEAT uses the descriptors 'budget cow' and 'manufacturing' for animals with eight teeth. The purpose of the agreement and the AUS-MEAT descriptors are to prevent old cow beef being sold as higher quality product.

3.3.2 Meat Standards Australia (MSA)

MSA has implemented a grading system that has been developed to provide consumers with simpler and more meaningful information on eating quality for a given cooking method, rather than carcass specifications. Using the predictive inputs from the carcass, computer modelling generates a quality rating for each muscle cooked by any designated method. The outcome is that customers in the store will be presented with a piece of beef that has been given a three-, four- or five-star descriptor for its optimal

cooking method. The system provides a simple value proposition and cooking instruction to maximise the consumer's eating experience.

MSA is a voluntary grading system. To be eligible for MSA grading, certain requirements along the beef supply chain must be met. These include meeting pre-slaughter handling requirements with an emphasis on stress reduction; sending cattle to an MSA licensed abattoir; and conforming to specified rates of pH-temperature decline. These grading standards for eating quality have been integrated into the AUS-MEAT Language where applicable.

MSA's 2008-09 Annual Outcomes Report states that during the period 979,228 cattle were graded through the MSA program, 16.9 per cent more than the previous year. The majority were Queensland cattle, with over 450,000 graded in that state. Cattle consigned for grading during 2008-09 averaged 90.9% compliance to the MSA standard. The report does not indicate how many of the MSA graded cattle were sold on to the export market (MLA 2009d).

With respect to price premiums, the average wholesale and retail premium for MSA beef across all cuts was $1.60/kg and $1.36/kg respectively (Millward Brown 2009).

3.3.3 Number of licensed establishments

Table 5 provides the number of processing and boning establishments in Australia that are licensed by AUS-MEAT and for MSA. There are an estimated 138 processors in Australia (www.ampc.com.au) and if 88 are AUS-MEAT accredited, there are 50 processors that are not AUS-MEAT accredited.

Although 50 processors (36% of total) are not AUS-MEAT accredited, it does not follow that 36% of total beef production is non-AUS-MEAT accredited. For example, in 2007 the top 25 largest red meat processors accounted for approximately 79% of national production and operated 51 processing sites (MLA, 2008b). It is suggested that the vast majority of beef sold on the domestic market has been processed in AUS-MEAT accredited establishments.

Table 5 Number of accredited processors

	Domestic	Export	Total
MSA Processors	-	-	49
AUS-MEAT Processors	20	68	88
AUS-MEAT Boning rooms	23	20	43

Source: www.mla.com.au, www.ausmeat.com.au

4. Proposed labelling system

The *Food Amendment (Beef Labelling) Act 2009*, when proclaimed, will amend the NSW Food Act 2003 by including a section that will enable beef labelling schemes to be established. In summary the legislation states that a person carrying on a food business is taken to have engaged in misleading and deceptive conduct if:

(a) the person does not use AUS-MEAT language consistently (unless complying with a prescribed scheme), or

(b) the person voluntarily adopts, but does not consistently comply with a prescribed scheme, or

(c) the beef is advertised, packaged or labelled with the word “budget” and does not also include the words “low grade or “low quality”, or

(d) the beef is advertised, packaged or labelled with the word “manufacturing” and does not include the words “suitable for mince only”.

The Act provides exemptions for restaurants, take-away food shops and similar outlets and makes provision for the appointment of a food labelling auditor by the NSW Food Authority.

The Regulation accompanying the Act describes a voluntary scheme for labelling beef with one of the following quality categories: Platinum, Gold, Silver, Bronze, Budget and Manufacturing. It also contains ‘Consumer Descriptors’ that are referenced to certain cuts of meat as described by the AUS-MEAT Language. A Schedule in the Regulation provides a detailed description of the quality categories and references both AUS-MEAT Language and MSA Guidelines.

Proclamation of the Act is considered to have most impact on the sale of budget beef and may result in certain cuts from 8 tooth animals that are currently sold on the domestic market being diverted to the export market. The price received for cuts diverted to the export market is likely to be lower than for the same cuts sold on the domestic market. This is likely to reduce the price received by producers for 8 tooth animals.

It is hypothesised that the accurate labelling of beef (which could result in the removal from the domestic market of cuts from 8 tooth animals) will improve the overall quality of beef on the domestic market and that this will either increase consumption or price or both. This hypothesis is tested in the accompanying BCA.

5. Analysis

5.1 Introduction

The research cited above does not provide an accurate assessment of the impacts of the labelling scheme on domestic beef consumption. For that reason, GHD Hassall firstly constructed a theoretical model of current beef usage, expenditure and total value of beef production consistent with available statistical information. An alternative model with assumed changes to key variables as a result of the labelling legislation was then developed as a comparison.

The assumptions were based on objective data where available and 'best bet' assumptions where this was not available. Sensitivity analyses were completed for key variables to demonstrate the impact of changes in assumptions.

Note that the models have been developed based on best information available at the time and assumptions are transparent. The authors encourage industry input to improve the accuracy of the assumptions, particularly given the sensitivity of the results to these assumptions.

The assumptions are based on the labelling scheme being applied nationally and no consideration has been given to the impacts of a beef labelling scheme operating only in NSW.

Table 6 provides some general information on the potential costs and benefits from the introduction of a beef labelling system.

Table 6 Potential costs and benefits from a labelling system

Stakeholder	Costs	Benefits
Producers	Reduction in price for 8 tooth animals	Increase in prices for other cattle due to increased demand and/or price of beef on the domestic market
Processors	Additional audit costs for AUS-MEAT accredited works	Increased throughput from increase in demand
	AUS-MEAT accreditation and audit costs for currently non-accredited works	Premium received for labelled product
	Grading costs	
	Premium paid for graded cattle	
	Additional packaging/labelling costs	
Wholesalers	Premium paid for labelled product	Premium received for labelled product
	Additional packaging/labelling costs	Ability to guarantee quality to customer – consistency and palatability
		Enhanced consumer confidence
		Improved access to markets
Retail Butchers and supermarkets	Premium paid for labelled product	Premium received for labelled product
	Additional labelling costs	Ability to guarantee quality to customer – consistency and palatability
	Employee training	
	Auditing	Enhanced consumer confidence

Stakeholder	Costs	Benefits
		Tool to secure market share
		Increased employee skills
		Labelling promotional material and support
Food Service Outlets	Premium paid for labelled product	Ability to guarantee quality to customer – consistency and palatability
		Enhanced consumer confidence

This analysis considers two scenarios following the introduction of the labelling legislation:

- Scenario 1: Domestic consumption remaining static but quality enhanced through a decline in usage of cow beef; and
- Scenario 2: Scenario 1 with the addition of increased consumption of beef (250g per serve every six weeks – an increase in per capita consumption of 2.15kg cw equivalent per annum).

5.2 Assumptions for costs and benefits – Scenario 1

5.2.1 Background

The analysis is based on:

- A 7% discount rate; and
- A 10-year assessment period (2010/11 – 2019/20).

Scenario 1 assumes that changes to the labelling of beef from 8 tooth cattle result in no prime cuts being sold on the domestic market (with the exception of tenderloin which is exempt from the proposed legislation). It is assumed that these cuts are diverted to the export market.

The assumptions and results of Scenario 1 are presented in the remainder of this chapter.

5.2.2 Slaughters of 8 tooth cows

Beef cows

The NSW Department of Primary Industries' *Farm Budget Series* (NSW DPI 2009) includes the following assumptions for a representative 100 cow self-replacing beef cattle herd:

- 7 cast for age cows; and
- 11 other cows culled.

Assuming that 50% of these 'other' cows are 8 tooth cattle, this equates to 5.5 cows per 100 cow breeding herd. It is therefore estimated that 18% of beef breeding cows are culled for slaughter annually and that 12.5% of beef breeding cows that are culled are 8 tooth cows.

Dairy cows

It is assumed that 15% of adult dairy females are culled as 8 tooth cows per year.

To calculate the estimated total number of 8 tooth cows (beef and dairy) slaughtered in Australia the following assumptions were made:

- Total number of breeding females on **beef** enterprises estimated to be 11,913,000 head[3]; 12.5% of breeding females are culled as old cows (per annum); total = 1,489,125
- 1.6 million **dairy** cow herd[4]; 15% of dairy cows are culled as old cows (per annum); total = 240,000
- Total (beef and dairy) 8 tooth cows slaughtered per year = 1,729,125.
- 50% of these assumed to be 'trade' cows and 50% 'manufacturing'.

5.2.3 Value of 8 tooth cattle

The assumptions underlying the estimated meat values of trade cows and manufacturing cows (and their respective cuts) are presented in Table 7 and Table 8 respectively.

Table 7 Trade cows

Cut	% of total body	Kg meat	Domestic price of cut ($ cw)	Export price of cut ($ cw)	% to domestic market (current)	% to export market (current)	% to domestic market (future)	% to export market (future)
Rump	6.0	10.2	5.50	4.00	90%	10%	0%	100%
Striploin (incl shortloin)	4.0	6.8	6.50	5.50	90%	10%	0%	100%
Cuberoll	4.0	6.8	11.00	7.00	90%	10%	0%	100%
Tenderloin	2.0	3.4	16.50	14.00	90%	10%	90%	10%
Inside	8.0	13.6	4.00	3.70	70%	30%	70%	30%
Outside	8.0	13.6	4.10	3.70	70%	30%	70%	30%
Knuckle	6.0	10.2	4.60	4.10	70%	30%	70%	30%
Trim	62.0	105.4	3.20	3.20	0%	100%	0%	100%
	100%	**170***						

* Based on 250kg cw at 68% yield.

[3] AusVet Animal Health Services, 2006

[4] Dairy Australia, 2009

Table 8 Manufacturing cows

Cut	% of total body	Kg meat	Domestic price of cut ($ cw)	Export price of cut ($ cw)	% to domestic market (current)	% to export market (current)	% to domestic market (future)	% to export market (future)
Rump	6.5	9.4	5.00	4.00	80%	20%	0%	100%
Striploin (incl shortloin)	4.0	5.8	5.50	5.00	80%	20%	0%	100%
Cuberoll	4.0	5.8	8.00	5.00	80%	20%	0%	100%
Tenderloin	2.0	2.9	15.00	14.00	80%	20%	80%	20%
Inside	8.0	11.6	4.00	3.70	60%	40%	60%	40%
Outside	8.0	11.6	4.00	3.80	60%	40%	60%	40%
Knuckle	6.0	8.7	4.50	4.10	80%	20%	80%	20%
Trim	61.5	89.3	3.50	3.50	0%	100%	0%	100%
	100	**145***						

* Based on 220kg cw at 66% yield.

The key assumptions regarding cattle slaughters are provided in Table 9.

Table 9 Slaughter numbers and consumption

ASSUMPTION:	RATIONALE:
Number of cows slaughtered at 8 tooth	Refer to Section 5.2.2 above – 1,489,125 beef cows; 240,000 dairy cows; total equals 1,729,125 cows slaughtered at 8 tooth.
Domestic consumption of all beef	Remains constant over the model period.

Assumptions regarding selected attributes of trade and manufacturing cows are shown in Table 10.

Table 10 Attributes of trade and manufacturing cows

ASSUMPTION:	RATIONALE:
Trade cow average carcase weight	250kg cw
Manufacturing cow average carcase weight	220kg cw
Trade cow yield	68%
Manufacturing cow yield	66%
Composition of total old cow slaughters	50% of total old cow slaughters are trade cows; the remaining 50% are manufacturing cows.
Wholesale price of trade cow – current scenario	$715 per head
Wholesale price of manufacturing cow – current scenario	$604 per head
Average domestic retail price per kg cw of 8 tooth cow meat – current scenario	$6.19 per kg cw
Wholesale price of trade cow – future scenario	$671 per head
Wholesale price of manufacturing cow – future scenario	$580 per head
Average domestic retail price per kg cw of 8 tooth cow meat – future scenario	$5.61 per kg cw
Average domestic retail price per kg cw of all other beef (i.e. younger than 8 tooth)	$9.35 per kg cw in the absence of any increase due to improved quality (equivalent to $16.37 per kg retail weight).

Table 11 shows the multipliers used to convert prices and volumes in the analysis.

Table 11 Multipliers for conversions

Item	Multiplier
Farm gate to wholesale price	1.15[5]
Wholesale price to retailer price	1.56[6]
Carcase weight to retail weight	1.75[7]

Estimates of the additional costs associated with auditing, grading and labelling are provided in Table 12.

[5] Pastoralists and Graziers Association of Western Australia and the Western Australian Farmers Federation, 2008

[6] Pastoralists and Graziers Association of Western Australia and the Western Australian Farmers Federation, 2008

[7] As per Table 1

Table 12 Costs

ASSUMPTION:	RATIONALE:
Auditing/compliance costs (additional to current costs):	
(a) AUS-MEAT accreditation for currently non-accredited processors/boning rooms	50 works @ $2,000 per yr
(b) Increased AUS-MEAT auditing for existing accredited works	131 works @ $1,000 per year
(c) Increased Food Authority audits	1,200 retailers @ $250 per year (extra 1 hour audit per year)
(d) MSA compliance – retailers	50% of 1,200 = 600 @ $500 per year
Increased grading costs:	
(a) Currently MSA accredited processors	No increase
(b) Non accredited MSA processors	50% of 89 @ $4,000 per year
Increased labelling / packaging costs	Kg domestic consumption multiplied by $0.01/kg[8]

5.3 Results and sensitivity analysis

5.3.1 Scenario 1

The results of the BCA are presented in Table 13, as well as an analysis of the sensitivity of the results to the discount rate. At a discount rate of 7%, the net present value (retail price) of the proposed scheme is estimated to be $1.08 billion over ten years.

Table 13 Results and sensitivity analysis of discount rate (Scenario 1)

	Base assumption	Lower discount rate	Higher discount rate
Discount rate	7%	5%	10%
NPV (retail price)	$1.08 billion	$1.16 billion	$967.8 million
NPV (farm gate price)[9]	$597.8 million	$645.0 million	$537.7 million
NPV (farm gate price per animal slaughtered)[10]	$7.76	$8.38	$6.98

Table 13 is based on the price of 'other' beef ($/kg cw) remaining constant over the model period. The increased value of domestic beef sales from 'other' cattle (less than 8 teeth) therefore reflects an

[8] GHD Hassall estimate

[9] Based on multiplier of 1.8

[10] Calculated by dividing NPV (farm gate price) by 77 million slaughters (7.7 million p.a. over 10 years).

increase in the proportion of 'younger' beef eaten, relative to cow beef (with total domestic consumption of all beef remaining stable at 754,200 tonnes carcase weight).

If the price of other beef increases because of an increase in competition for better quality product, the NPV will increase accordingly. Table 14 presents NPVs (at 7% discount rate) based on an increase of $0.25 and $0.50 per kg carcase weight (farm gate price). Note that the model is highly sensitive to price increases and the assumptions underlying the increase need to be further investigated.

Table 14 Results and sensitivity analysis of farm gate price (Scenario 1)

	Base assumption	Small price increase	Larger price increase
Increase in farm gate price (c/kg cw)	$0.00	$0.25	$0.50
NPV (retail price)	$1.08 billion	$3.37 billion	$5.64 billion
NPV (farm gate price)[11]	$597.8 million	$1.87 billion	$3.14 billion
NPV (farm gate price per animal slaughtered)[12]	$7.76	$24.34	$40.72

5.3.2 Scenario 2

Scenario 2 considers a hypothetical situation whereby the introduction of a labelling scheme results in domestic beef consumption growth (i.e. total domestic beef consumption is greater than 754,200 tonnes carcase weight). This growth reflects the possibility that due to improved labelling of beef, consumers experience more consistent beef quality and therefore consume more beef per capita.

The assumptions for the Scenario 2 analysis are presented in Table 15.

Table 15 Assumptions for Scenario 2

Discount rate	7%
Assessment period	10 years (2010/11 – 2019/20)
Population of Australia	22,163,201
Price per kg cw 'other' beef	Remains the same as Scenario 1, @ $9.35/kg cw
No. of additional serves of meat per capita, per annum	8.6 (i.e. 1 additional serve every six weeks)
Size of each additional serve of prime meat cut (kg)	0.250 kg of meat (i.e. assumes additional 250g per capita, every 6 weeks); equals 2.15kg of beef per year. Using a multiplier of 1.75, equals 3.76kg cw per capita per year.
Domestic beef consumption growth	Increases over the first five years of the analysis, reaching a peak in the sixth year before plateauing.

[11] Based on multiplier of 1.8

[12] Calculated by dividing NPV (farm gate price) by 77 million slaughters (7.7 million p.a. over 10 years).

Based on per capita consumption of 35.6kg cw in 2007/08, this growth would result in beef consumption rising 10% to 39.36kg per capita.

The results of the analysis are presented in Table 16. At a discount rate of 7%, the net present value (retail price) of the proposed scheme is estimated to be $3.2 billion over ten years.

Table 16 Results and sensitivity analysis of discount rate (Scenario 2)

	Base assumption	Lower discount rate	Higher discount rate
Discount rate	7%	5%	10%
NPV (retail price)	$3.2 billion	$3.6 billion	$2.8 billion
NPV (farm gate price)	$1.8 billion	$2.0 billion	$1.6 billion
NPV (farm gate price per animal slaughtered)	$23.37	$25.69	$20.43

If the price of other beef increases because of an increase in competition for better quality product, the NPV will increase accordingly. Table 17 presents NPVs (at 7% discount rate) based on an increase of $0.25 and $0.50 per kg carcase weight (farm gate price). Note that the model is highly sensitive to price increases and the assumptions underlying the increase need to be further investigated.

Table 17 Results and sensitivity analysis of farm gate price (Scenario 2)

	Base assumption	Small price increase	Larger price increase
Increase in farm gate price (c/kg cw)	$0.00	$0.25	$0.50
NPV (retail price)	$3.2 billion	$5.64 billion	$8.01 billion
NPV (farm gate price)[13]	$1.8 billion	$3.13 billion	$4.45 billion
NPV (farm gate price per animal slaughtered)[14]	$23.37	$40.69	$57.80
Net benefit per annum (steady state at farm gate)	$329 million	$511 million	$667 million

5.3.3 Opportunities for future research

An additional study could investigate the impact of Scenario 3, which refers to the change in labelling of beef from 8 tooth cattle (Scenario 1) with the addition of quality descriptors for beef from other cattle (i.e. younger than 8 tooth).

[13] Based on multiplier of 1.8

[14] Calculated by dividing NPV (farm gate price) by 77 million slaughters (7.7 million p.a. over 10 years).

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