Beef import market shares in Taiwan: implications for Australia[†]

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Market shares of major beef suppliers to Taiwan, including Australia, the United States and New Zealand, were estimated econometrically to determine their relative competitiveness. The analysis, based on monthly data from June 1990 to August 1997, showed that relative prices and consumer incomes were important factors influencing suppliers' market shares. Specifically, the demand for Australian beef responded little to an increase in price and negatively to an increase in consumer income. Furthermore, the growth in Taiwan beef consumption has slowed down and Australian beef suppliers need to re-assess the market potential and develop appropriate marketing strategies to maintain competitiveness.

1. Introduction

Beef imports in Taiwan have increased from 156 tonnes in 1970 to 66 000 tonnes in 1997 (Council of Agriculture 1998). During this period, Australia has been the largest supplier to Taiwan, followed by New Zealand and the United States. However, Australia's market share has declined in recent years. Since Taiwan is the fifth largest export market for Australian beef (ABARE 1998) and demand for beef in Taiwan is expected to continue to grow in the future, a declining market share in a major and growing market is a serious problem for the Australian beef industry.

In general terms, market shares depend on a number of factors such as relative prices, quality and reliability of supply, marketing strategies, and ability and willingness of suppliers to meet changing consumer preferences. The two aims of this study are to identify the major factors influencing Australia's market share, and to determine strategies by which Australia can improve its competitive position in the Taiwan market. The findings are

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relevant to the promotion, investment and production practices of the Australian beef industry.

The article begins with a brief introduction to the beef market in Taiwan, including trends in consumption and beef imports. In the following section, the empirical model explaining changes in market share is developed and estimated econometrically. The modelling results are then discussed, followed by implications for the Australian beef industry and concluding remarks.

2. Beef consumption in Taiwan

Traditionally, beef is not a major meat item in the Taiwanese diet. However, the situation has changed in recent decades as a result of market liberalisation, increasing personal incomes and changing consumer lifestyles (Hsu 1997). For illustrative purposes, changes in total red meat consumption in Taiwan are shown in table 1. It is evident that pork is the major red meat item consumed in the past three decades, accounting for more than 90 per cent of total red meat consumption. The remaining 10 per cent is made up of beef and mutton/lamb.

In table 2, per capita red meat consumption in Taiwan is compared with consumption of selected Western and Asian countries based on the most

Table 1 Annual per capita red meat consumption in Taiwan in selected years

	Beef/Veal	Pork	Mutton/Lamb	Total
	kilograms, carcass weight			
1965	0.39	12.07	0.06	12.52
1975	0.94	17.51	0.17	18.62
1985	1.74	35.96	0.40	38.10
1995	2.90	40.70	1.10	44.70

Source: *Taiwan Agricultural Yearbook*, Taiwan Provincial Government, various issues

Table 2 Annual per capita red meat consumption in selected countries, 1995

	Beef/Veal	Pork	Mutton/Lamb	Total
	kilograms, carcass weight			
Australia	34.2	16.6	16.9	67.7
USA	45.1	31.6	0.6	77.3
New Zealand	29.1	15.2	24.7	69.0
Taiwan	2.9	40.7	1.1	44.7
Hong Kong	11.8	38.6	NA	50.4
Japan	11.8	16.4	0.7	28.9
South Korea	9.0	18.7	NA	27.7

Source: USDA 1996

recent data available. As indicated, there are substantial differences in annual per capita red meat consumption. Particularly, there appear to be three groupings: a high rate of consumption in Australia and the United States of 68–77 kg; a medium rate of consumption in Hong Kong and Taiwan of 45–50 kg; and a relatively low rate of consumption in Japan and South Korea of under 30 kg. Consumption figures for different meat types also suggest that substantial differences exist in the make-up of red meat consumption. That is, Western countries tend to consume more beef while Eastern countries consume more pork. Lamb, on the other hand, is consumed only in small quantities except in Australia and New Zealand, where wool production is one of the major farm enterprises.

It is also clear from table 2 that annual per capita beef consumption in Taiwan (2.9 kg in 1995) is very low, compared with all other countries. The current low level of beef consumption in Taiwan seems to suggest that, as income growth and Westernisation continue, per capita beef consumption in Taiwan may one day reach a level which was observed in Hong Kong, where consumers have similar ethnic and cultural backgrounds, of about 12 kg. The questions are: whether it is likely, and how long it would take for Taiwan's beef consumption to reach the level currently being observed in Hong Kong.

To answer these questions, let us look at what has happened to Taiwan beef consumption in the past 30 years. Based on the data presented in table 1, the compound growth rates for each ten-year interval during 1965–95 were calculated using the discrete growth formula (Chiang 1984, p. 280). It was found that the compound growth rate per annum was 9.20 per cent during 1965–75, 6.35 per cent during 1975–85 and 4.45 per cent during 1985–95. The corresponding figure over the entire period was found to be 6.58 per cent. Based on these figures, it is clear that the rate of growth has slowed down.

There are two reasons for this slow growth. First, according to the survey conducted by CIE (1995), there is strong resistance and opposition to eating beef among the Taiwanese. In particular, it was found that 35 per cent of the consumers surveyed were opposed to eating beef while 50 per cent of them had not bought beef in the past month. The common reasons given were: (1) the use of cattle for farming; (2) unaccustomed to eating beef; and (3) religious belief that eating beef may bring bad luck. Consumer attitudes towards eating beef were thus a deterrent to growth in consumption. CIE (1995) also found that younger people and males were more likely to eat beef than older people and females.

Another reason for the slow growth is that Taiwan may be a mature market for animal protein (CIE 1995). That is, although beef consumption is low in Taiwan, per capita animal protein consumption (including red meats,

poultry and seafood) is similar to the levels which are observed in developed countries such as Australia and Japan. Therefore, an increase in beef consumption may have to come at the expense of other meats. Since beef costs almost twice as much as pork and three times as much as poultry, substitution away from other meats may not be easy (Council of Agriculture 1998; Chen and Hsiao 1995). Under these circumstances, the growth in beef consumption is likely to slow down further and a substantial increase in beef consumption may be difficult without drastic changes in consumer perceptions and in relative prices among meat types.

The answer to the second question, 'How long would it take for per capita beef consumption to reach the level of 12 kg per year?', would depend primarily on the projected growth rate. If per capita beef consumption were to continue to grow at the rate of 4.45 per cent per annum, as occurred during the period 1985–95, it would take till 2027 (about 30 years from now) for it to reach that level. To reach that level in ten years (by 2005) would require a growth rate of 15 per cent per annum.

In the following section, the relative competitiveness of major beef suppliers to Taiwan is discussed by comparing beef prices, product quality and market shares among sources of supply.

3. Beef import market in Taiwan

Since market liberalisation in Taiwan in 1975, the ratio of total beef imports over total beef consumption has increased from 20 per cent in 1974 to around 90 per cent in the decade from 1985 (Taiwan Provincial Government 1997). The major sources of beef imports to Taiwan are Australia, New Zealand and the United States.

Based on frozen beef imports during 1990–97, market shares, in volume terms, for Australia, New Zealand and the United States were 65, 20 and 15 per cent, respectively (see table 3). The corresponding average unit import values (CIF) are $US 2.83/kg, $US 4.01/kg and $US 5.77/kg. It is clear that Australian beef is relatively cheaper than New Zealand beef, which is cheaper than US beef.

Table 3 Average prices and market shares of frozen beef imports by source of supply, 1990–97

	Australia	New Zealand	United States	Average
Unit value ($US/kg)	2.83	4.01	5.77	3 .44
Volume share (%)	65.08	21.73	13.19	–

Source: *Monthly Statistics of the Republic of China*, Directorate-General of Budget, Accounting and Statistics, various issues

The price differentials reflect transport differentials and quality differentials among different sources of supply. Quality differentials are attributable to differences in production method (e.g. grain-fed versus grass-fed), type of beef carcass (e.g. fresh/chilled versus frozen), degree of processing (e.g. whole carcass, boxed beef, bone-in versus boneless) and retail cuts (e.g. sirloin steak versus shin shank). Generally speaking, US beef is considered of higher quality, comprising grain-fed beef, and is classified as 'special grade' (Hwang 1993). By comparison, Australian and New Zealand beef is considered of lower quality, comprising mostly grass-fed and some grain-finished beef, and is classified as 'general grade'. The general grade has attracted higher tariffs than the special grade. For example, in 1997, the tariff rates were $NT (New Taiwan) 27/kg ($US 0.85/kg) for the former and $NT 22.1/kg ($US 0.70/kg) for the latter (Ministry of Finance 1997). Because domestically produced beef (derived primarily from the dairy herd) is of the general grade, the differential tariff rates were designed to make domestic beef more competitive (Hwang 1993). However, the differential rates on imported beef are expected to disappear in the near future as part of the Taiwanese government's effort to comply with the entry criteria for joining the World Trade Organisation (Chen and Hsiao 1995; NZMPB 1997).

In terms of beef cuts, Taiwan beef imports can be broken down into four categories: (1) special quality beef; (2) steaks; (3) shin shank and intercostals; and (4) others, accounting for 8, 30, 35 and 23 per cent, respectively, of the total beef imports (NZMPB 1997). While the United States and New Zealand dominate the high value, steaks sector, Australia dominates the lower value markets for shin shank and intercostals and others. These products are generally sold through different channels. For example, special quality beef and steaks are mostly available at Western-style restaurants and supermarkets while shin shank and intercostals are usually sold through wet markets (Chen and Hsiao 1995; CIE 1995; NZMPB 1997).

Although Australia is the lowest cost supplier and has the highest market share in the Taiwan market (see table 3), closer examination of the data shows a worrying trend for Australia. That is, during the period 1981–97, there was a steady decline in Australia's market share from 78 per cent to 49 per cent (table 4, column D). The decline in market share coincides with the fact that there was little growth in export volumes destined for the Taiwan market while total beef imports into Taiwan increased during the same period (table 4, column A).

Since Australia is the dominant supplier in the Taiwan market, a weakened market position in a growing market could mean that Australia is losing its market competitiveness. However, it could simply be a result of a well thought out marketing strategy, reflecting Australia's desire to focus its

Table 4 Australia's beef import shares in Taiwan, 1981–97 [b]

	A	B	C	D = B/A	E = B/C
	1000 tonnes, carcass weight			%	
1981	20	15.5	459.4	78	3.4
1982	24	16.2	623.5	68	2.6
1983	28	19.8	504.4	71	3.9
1984	29	19.2	386.0	66	5.0
1985	33	21.3	437.2	65	4.9
1986	39	24.5	515.0	63	4.8
1987	39	26.0	584.4	67	4.5
1988	46	29.6	585.2	64	5.1
1989	46	26.1	591.4	57	4.4
1990	46	29.9	730.8	65	4.1
1991	54	32.3	746.3	60	4.3
1992	58	36.5	822.5	63	4.4
1993	57	32.8	790.4	58	4.1
1994	62	35.6	792.4	57	4.5
1995	66	31.7	748.9	48	4.2
1996	59	33.8	694.8	57	4.9
1997 [a]	72	35.0	801.7	49	4.4

Source: *Australian Commodity Statistics,* ABARE, various issues
Notes:
[a] 1997 figures are ABARE projections.
[b] Figures in columns are defined as follows:
  A. Total beef imported into Taiwan;
  B. Beef imported from Australia;
  C. Total beef exports of Australia;
  D. Australia's market share in Taiwan;
  E. The ratio of Australia's total beef exports to Taiwan to Australia's total beef exports.

marketing efforts on other Asian markets with better growth and profit potential, such as Japan and South Korea. This conjecture, however, cannot be verified without a more complete model that takes into account interactions in various markets. The use of such a model is beyond the scope of this study.

Table 5 shows two types of beef being imported into Taiwan. One observation is that in general, fresh/chilled beef commands a price two to three times higher than frozen beef. These figures are consistent with the finding of Asian Market Intelligence (1994), that freshness and quality are highly valued in the Taiwanese beef market and are the major considerations for purchasing. Jiien and Wu (1988) found that Taiwanese consumers generally prefer domestically produced beef over imported beef because it is perceived to be fresh, and hence, tastier and more nutritious despite its toughness. Similar results are reported by CIE (1995). In addition, the demand for fresh/chilled beef has increased from 2 tonnes in 1985 to 5 832

Table 5 Beef imports into Taiwan by type and by source of supply, 1997

	Fresh/chilled beef		Frozen beef	
	Volume (tonnes)	Unit value ($US/kg)	Volume (tonnes)	Unit value ($US/kg)
Australia	3313	3.18	30056	2.46
NZ	466	3.35	12998	3.42
USA	1962	6.79	12354	4.29
Canada	85	4.64	1213	4.75

Source: *Agricultural Trade Statistics of the Republic of China*, Council of Agriculture, various issues

tonnes in 1997 (see table 6). In percentage terms, this represents an increase from a negligible amount to 9.3 per cent of total beef imports. Demand for fresh/chilled beef can be expected to rise further as consumers become more affluent and accustomed to Western and alternative styles of eating beef. This has been observed in Japan (Reynolds *et al.* 1994), where it was reported that 71 per cent of total beef and veal imports were in chilled form (AMLC 1995). The diversity in price and product form presented in table 5 combined with the increasing demand for fresh products strongly suggest that there are opportunities for niche marketing which aims at meeting specific requirements of well-defined market segments. In the following section, market shares of major beef suppliers to Taiwan are analysed based on an econometric model.

Table 6 Beef imports by type (in tonnes), 1985–97

	Fresh/Chilled	Frozen
1985	2	27345
1986	65	32615
1987	144	32697
1988	203	38146
1989	2092	36387
1990	545	37480
1991	857	44048
1992	1545	46639
1993	1813	45719
1994	2140	49854
1995	2137	53109
1996	3403	45651
1997	5832	56635

Source: *Agricultural Trade Statistics of the Republic of China*, Council of Agriculture, various issues

4. Data source

The data used for the empirical model are based on monthly data on volumes and total import values for frozen beef imports from Australia, the United States and New Zealand and average personal earnings. Data on imports are obtained from *Monthly Statistics of the Republic of China*, Directorate-General of Budget, Accounting and Statistics, *Taiwan Agricultural Yearbook*, Taiwan Provincial Government and *Agricultural Trade Statistics of Republic of China*, Council of Agriculture. The most recent data are available from June 1990 to August 1997, providing a total of 87 observations.

5. Empirical model

Beef import share for an individual supplier in Taiwan is specified as:

$$S_{it} = \alpha_i + \Sigma_j \gamma_{ij} P_{jt} + \beta_i Y_t + \Sigma_k \omega_{ik} D_k + \varepsilon_{it}, \qquad (1)$$

where:

S_{it} = volume share of supply source i at time t; where i = Australia, New Zealand or the United States, and t = 1 (June 1990), 2 (July 1990), . . . , 87 (August 1997);

P_{jt} = average unit import value (or CIF prices) of frozen beef from source j at time t, normalised by the average unit import value of frozen beef sourced from Australia; where j = New Zealand or the United States;

Y_t = monthly earnings at time t, normalised by the average unit import value of Australian frozen beef;

D_k = a set of monthly dummy variables using December as the base category, where k = 1 January, 2 (February), . . . , 11 (November); and

ε_{it} = white noise error term which may be contemporaneously correlated.

Note that homogeneity conditions have been imposed on equation 1 where all prices and monthly income were normalised by Australian prices. Equation 1 proposes that the market share of each supply source depends on relative prices of imported beef, consumer income and seasonality. Also, it is assumed that imported frozen beef is separable from domestically produced fresh beef, under a multi-stage utility maximisation process, as discussed in Deaton and Muellbauer (1980a, pp. 127–34) and that frozen beef from different sources can be differentiated by source of origin and are potential substitutes, as discussed in Armington (1969).

It is further assumed that all prices and monthly income are exogenous. The price exogeneity assumption is justified on the basis that total beef imports into Taiwan are small relative to total beef exports from each of the supply sources, either individually or jointly. Specifically, in 1995, the volume

of beef exported to Taiwan accounted for only 4.1, 1.8 and 4.1 per cent of total beef exports by Australia, the United States and New Zealand, respectively (ABARE 1998). In total, the amount exported to Taiwan averaged around 3 per cent of the total exports by the three major suppliers. Therefore, changes in beef demand in Taiwan are not expected to have an impact on import prices.

The system of equations was estimated using the Cochrane-Orcutt procedure provided in Shazam (White 1997) to account for autocorrelation of order one, AR(1). Since all the share equations have the same set of variables on the right-hand side, there is no efficiency gain from systems estimation. Therefore, each market share equation was estimated individually. Since monthly data were used in the analysis, dynamic effects (mainly lagged response to changes), and the possibility of AR(12) were tested but rejected. Further, because of concerns over non-stationarity of the data, unit root tests were applied to the series based on augmented Dicky–Fuller and Phillips-Perron procedures. The results indicate clearly that the data are stationary, except for monthly income. Stationarity of the data was also confirmed by visual inspection of the data.

Despite desirable properties associated with flexible demand systems, such as the Almost Ideal Demand System (AIDS) or the linear approximation of AIDS (LA/AIDS) proposed by Deaton and Muellbauer (1980b), preliminary analyses indicated that the model presented in equation 1 is appropriate for examining the beef market in Taiwan. That is, despite being simple, the model yields more reasonable results in terms of goodness-of-fit, signs and magnitude of the estimated coefficients, as compared with the LA/AIDS and the Armington models (see Alston *et al.* 1990 for a discussion of these models). Another advantage of using volume share, as opposed to cost share as in AIDS, is that it is a common measure of market share and competitive market position in marketing literature.

6. Estimated results

The estimated results based on equation 1 are presented in table 7. First, the estimated regression equations explain between 71 and 85 per cent of the variations in market shares. Second, most of the estimated price coefficients have the expected signs. That is, estimated own-price coefficients are negative while estimated cross-price coefficients are positive. The former results are consistent with the law of demand while the latter indicates that imported beefs from different sources are indeed substitutes. Moreover, the estimated price coefficients are highly significant statistically at the 1 per cent level or lower, except the US price in the New Zealand share equation and the New

Table 7 Estimated results, June 1990–August 1997

	Australia	New Zealand	USA
paus[a]	−13.18	7.96	5.87
	(−3.64)[b]	(2.41)[b]	(2.66)[b]
pnz/paus	6.22	−8.17	1.59
	(2.02)	(−2.79)	(0.84)
pusa/paus	6.96	0.21	−7.46
	(3.17)	(0.11)	(−5.66)
income/paus	−0.0035	0.0015	0.0021
	(−11.41)	(6.36)	(12.37)
d1	−4.18	6.04	−1.88
	(−2.06)	(3.00)	(−1.49)
d2	−11.57	13.25	−1.69
	(−4.75)	(5.81)	(−1.13)
d3	−11.65	13.37	−1.71
	(−4.54)	(5.75)	(−1.09)
d4	−12.21	14.62	−2.31
	(−4.65)	(6.26)	(1.45)
d5	−10.85	12.36	−1.47
	(−4.17)	(5.34)	(−0.93)
d6	−9.05	13.36	−4.34
	(−3.60)	(5.99)	(−2.86)
d7	−11.45	15.11	−3.70
	(−4.55)	(6.76)	(2.43)
d8	−11.32	15.95	−4.71
	(−4.53)	(7.15)	(−3.11)
d9	−9.06	12.54	−3.38
	(−3.63)	(5.53)	(−2.26)
d10	−4.96	6.87	−1.89
	(−2.06)	(3.04)	(−1.28)
d11	1.89	0.79	−2.65
	(0.94)	(0.39)	(−2.11)
constant	85.13	7.61	8.07
	(13.70)	(1.40)	(2.15)
Estimated Rho	0.41	0.24	0.36
	(4.15)	(2.31)	(3.64)
Adjusted R^2	0.85	0.71	0.83

Notes:
[a] Coefficients associated with Australian prices are recovered from homogeneity conditions imposed on the market share equations.
[b] The figures in parentheses are t-statistics.
[c] Explanatory variables in the first column are defined as follows:
　paus, pnz, and pusa are unit values of frozen beef sourced from Australia, New Zealand and the United States, respectively; income is monthly earnings; Di = a set of monthly dummy variables using December as the base period; $i = 1, 2, \ldots, 11$.

Zealand price in the US share equation. These exceptions indicate that substitution between US and New Zealand beef is statistically weak.

All estimated income coefficients are highly significant statistically. They are all positive except for Australian beef. This means that while US beef

and New Zealand beef are considered normal goods, Australian beef is considered an inferior good.

Seasonality also appears to be strong in the estimated market shares. In particular, the modelling results show that Australia's market share is statistically significantly lower in the rest of the year (except November) as compared to December. The opposite is true for New Zealand's market share. The results for the United States are somewhat mixed in the sense that not all the coefficients associated with seasonality dummies are statistically significant. Moreover, US market shares in the first half of the year (January–May) are not statistically different from December, but market shares in the second half of the year (June–November) are lower than in December. Since meat consumption in Taiwan is highest in winter months (CIE 1995), the seasonal pattern found here seems to indicate that when demand is high, additional supply is likely to come from Australia and the United States. The strong demand periods, however, do not coincide with the production cycles in either Australia or New Zealand. Production seasonality in Australia is most profound in Queensland where the peak occurs during the dry months of June to September when cattle can be rounded up (Industry Commission 1994, pp. 14–18). By comparison, beef production in New Zealand peaks between January and June (NZMPB 1997). Therefore, there is no strong link between production and export demand.

Estimated share demand elasticities, which are evaluated at the sample means based on the estimated coefficients presented in table 7, are presented in table 8. These elasticities are defined as the percentage change in market share with respect to a 1 per cent increase in either prices or income. Note that although we are using market shares as the dependent variable, the estimated coefficients or elasticities would have the same signs as those derived from using quantity demanded as the dependent variable. In fact, the calculated elasticities would be the same if we are prepared to accept the assumption that consumer income or the price of individual supplier does not have an impact on total quantity imported.

Table 8 Estimated share demand elasticities

	Australian price	New Zealand price	US price	Monthly income
Australian share	−0.57**	0.14**	0.22**	−0.54**
NZ share	1.04**	−0.54**	0.02	0.68**
US share	1.26**	0.17	−1.16**	1.57**

Note: ** indicates that the associated estimated coefficients are statistically significant at 1 per cent or lower.

In general, prices and income changes strongly affect (statistically) market shares for imported beef from various sources. However, the relative impacts as indicated by the calculated elasticities are mixed (see table 8). One finding is that, while Australia's and New Zealand's market shares are in general inelastic with respect to price and income changes, the US market share is elastic with respect to both own-price and income. Specifically, a 1 per cent increase in the US beef price would result in 1.16 per cent decrease in the US market share. By comparison, a 1 per cent increase in the own-price would result in 0.57 and 0.54 per cent decreases, respectively, in Australia's and New Zealand's market shares. The income elasticities were estimated to be 1.57 for US beef and 0.68 for New Zealand beef. These results are consistent with the findings of Hwang (1993) and Yang and Koo (1994) that demand for the higher quality beef was income elastic while the demand for beef of lower quality was income inelastic. In particular, Hwang (1993) found the income elasticities for beef in Taiwan to be 2.58 for high quality beef and 0.32 for lower quality beef. Yang and Koo (1994) reported income elasticities for beef in Japan of 2.87 for US beef and 0.87 for Australian beef.

However, the estimated income elasticity for Australia beef in this study was different from previous studies in that it was estimated to be -0.54. A negative income elasticity implies that Australian beef is seen as an inferior good and hence, as income increases, the demand for Australian beef falls. This result can be explained by the fact that most of Australia's frozen beef sales to Taiwan are lower priced beef cuts, such as shin shank, rib fingers and intercostals, and demand for these products tends to fall as consumer income increases (CIE 1995; NZMPB 1997). Moreover, these items are normally sold through wet markets, and patronage for those markets has decreased gradually as more consumers prefer to shop at modern super-markets and hypermarkets.

Another finding of the analysis is that cross-price effects in the Australian share equation, although statistically significant, are small in magnitude. The corresponding estimated elasticities are 0.14 and 0.22, respectively (first row of table 8). This means that a 1 per cent increase in the price of US (New Zealand) beef will result in 0.14 (0.22) per cent increase in the Australian market share. This means that Australia beef is not seen as a strong substitute for either US or NZ beef. Yang and Koo (1994) also found that US beef and Australian beef are not substitutes for each other because of quality differences.

7. Policy implications

One of the main findings of this analysis is that the beef market in Taiwan can be expected to expand, but only gradually. The slow growth is due to

consumer resistance to eating beef, on one hand, and Taiwan being a near mature market for animal protein, on the other. This means there would be intense competition among suppliers in the Taiwan beef market. Not only does beef have to compete with other meats for consumer dollars and combat unfavourable consumer perceptions, but additional beef sales for any supplier, including Australia, will come only at the expense of other suppliers. This market seems to fit the description of a highly competitive marketing environment, outlined by Reed (1997, pp. 75–6). That is, it is characterised by the existence of equally balanced competitors, slow market growth, lack of differentiation, low buyer loyalty, and over-supply. This competitive situation means that marketing opportunity exists only for those suppliers who have a competitive advantage in providing either superior products or superior value to the consumers (Thompson and Strickland 1998, pp. 178–81). It could also mean lower margins and higher marketing costs for those who do compete in the market. As such, it will be quite a challenge for Australian beef suppliers to increase market share or profitability in the short term without substantial changes in the current market conditions.

Furthermore, Australian beef is found to be a weak substitute for either US beef or New Zealand beef. This means that competing on the basis of price is unlikely to increase Australian beef sales significantly. Finally, while both US and New Zealand beef are found to be normal goods, Australian beef is an inferior good. Given these results, it appears that it is more beneficial for Australian beef producers to develop marketing strategies that focus on non-price competition. These may include: improving product quality and moving up the market and improving consumer perceptions by promotion. As discussed earlier, Australian beef is generally of lower value, lower quality cuts sold mainly through the wet markets. As Taiwanese consumers become increasingly discriminating and quality-conscious, a change in the marketing mix, by moving into supermarkets, providing higher-priced, higher quality products and/or increasing supply of fresh/chilled beef, may be some options by which Australia can improve its market position in Taiwan. The Australian beef industry can also expect to benefit from further trade liberalisation and elimination of differential tariff rates in relation to beef imports.

8. Conclusion

In the past, Australia has been the largest beef supplier to Taiwan. However, its market share has declined in recent years due to strong competition from the United States and New Zealand. The aim of this study was to determine relative competitiveness of these three major suppliers to Taiwan, by

estimating individual market shares based on monthly data from June 1990 to August 1997. The analysis showed that relative beef prices and consumer incomes were important factors influencing suppliers' market shares. Furthermore, Australian beef was considered an inferior good (in the economic sense) and the growth in beef consumption has slowed down in recent years with competition among suppliers expected to intensify in the future.

One of the reasons why Australia was losing its market competitiveness was the perceived poor quality of Australian beef. As Taiwanese consumers become increasingly discriminating and quality-conscious, it is necessary for the Australian beef industry to continually monitor and respond to changing consumers' preferences and adjust its marketing mix accordingly. Moreover, due to limited domestic supply, any increase in beef demand, although slow, will be satisfied by imports. This means that the opportunity exists for beef suppliers, including Australia, to increase sales to Taiwan.

Taiwan is the fifth largest export market for Australian beef and also a growing market for other Australian meats such as mutton, goat and buffalo. Therefore, a better understanding of the market, particularly monitoring changing consumer preferences and identifying target markets, is important in order to increase market shares for beef and other meats in the Taiwan market.

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