



***The World's Largest Open Access Agricultural & Applied Economics Digital Library***

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from AgEcon Search may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

*No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.*

## *Outlook for the Australian beef industry*

Garry Griffith and Andrew Alford

**Contributed paper to the Australian Agricultural and Resource Economics Society Annual Conference, Sydney University, January 22-25, 2000**

*Copyright 2000 by [author(s)]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.*

## *Outlook for the Australian beef industry*

Garry Griffith and Andrew Alford  
NSW Agriculture and Beef Quality CRC

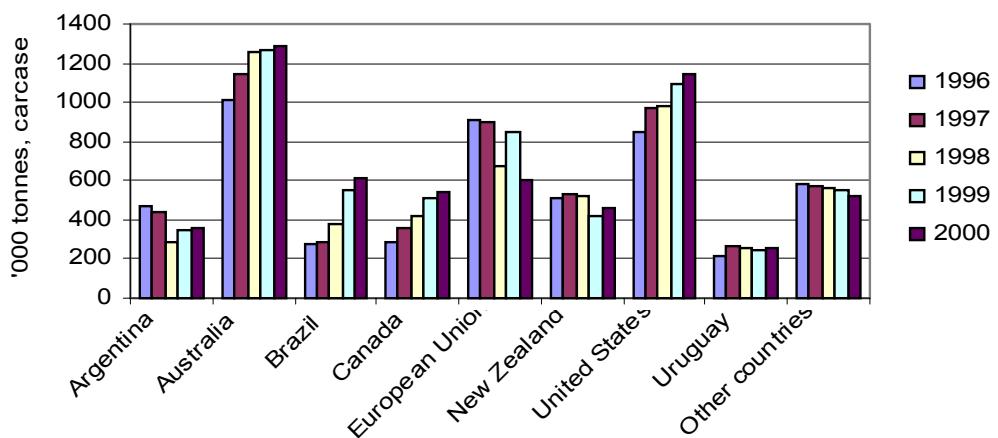
### **1. Introduction**

All signs are positive for the Australian beef industry in the short term, but how long will it last and what can you do to protect yourself against the inevitable? In this paper the longer-term future of the beef market is canvassed, with a particular focus on the impact of the US on the Australian industry.

### **2. Why is the US beef industry so influential upon the Australian beef industry?**

While Australia is the largest beef exporter in the world contributing some 22% of total beef traded in 2000 (USDA, 2001), its pricing power is limited. Several factors create this situation. Firstly, Australia has only 2.6% of the world's cattle population and current beef exports represent only 3.4% of total world beef production. In contrast, the United States has 9.7% of the world's cattle inventory and produces 12,300 Kt (carcass weight equivalent) or over 6 times as much as Australia (USDA, 2001). As a result small percentage changes in the US beef industry are comparatively large in the context of the Australian industry.

Secondly, Australia's beef exports are centred on two major markets, Japan and the US, representing 38% and 36% of total export volumes respectively in 2000, with the remainder of Australia's exports going to over 50 other countries (MLA, 2000). These markets are highly competitive and therefore pricing power is limited. A further factor contributing to the influential position of the US beef industry upon Australia is the increasing exports of beef from the US to compete with Australia in export markets such as Japan and Korea. Figure 1 shows the recent trends of beef and veal exports of selected countries.



**Figure 1. Beef and veal exports of selected countries since 1996**

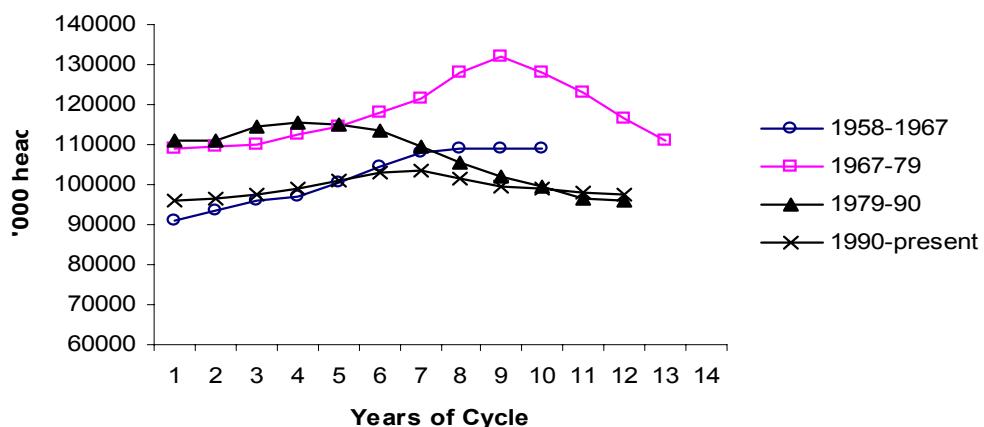
Source: USDA (2001).

For these reasons the US beef industry is a critical factor influencing the Australian beef industry and therefore must be taken into account by Australian beef producers and industry players in any strategic planning activities. As such, monitoring of the US industry requires an appreciation and understanding of the US beef cycle that is a central element of the US beef industry.

### 3. What is the US Beef Cycle?

US cattle cycles have been studied extensively with data on the US cattle inventory being kept from the mid-1800's. These cattle cycles have been characterised by a cycle length of about 10 years, with individual cycles varying from 8 to 13 years (Mathews, Hahn, Nelson, Duewer and Gustafson, 1999; Mundlak and Huang, 1996). Two major components are identified in the cattle cycle - an expansion phase and a liquidation phase (Tomek and Robinson, 1990). As expected the expansion phase of the cycle tends to be more regular than the liquidation phase since expansion in the herd size is constrained biologically by the time it takes to rear heifers to expand the breeding herd. Typically this expansion phase ranges from 6 to 8 years and the liquidation phase ranges from 3 to 8 years (McCoy and Sarhan, 1988). During more recent cycles, the liquidation phase has tended to shorten.

Figure 2 illustrates the duration of the four most recent US cattle cycles. Cattle cycles are defined to start from the low point in the cattle inventory. For example, the most recently completed cycle began in 1979 with the US cattle inventory reaching a low of 110.8 million head, then expanding to a peak of 115.4 million head in 1982. Then followed a liquidation phase, which resulted in the cattle population reaching a low of 95.8 million head in 1990. The current cycle commenced at this time after which herd rebuilding recommenced with a peak in cattle numbers in 1996.



**Figure 2. Duration of U.S. cattle cycles since 1958**

Source: USDA (2000); McCoy and Sarhan (1988).

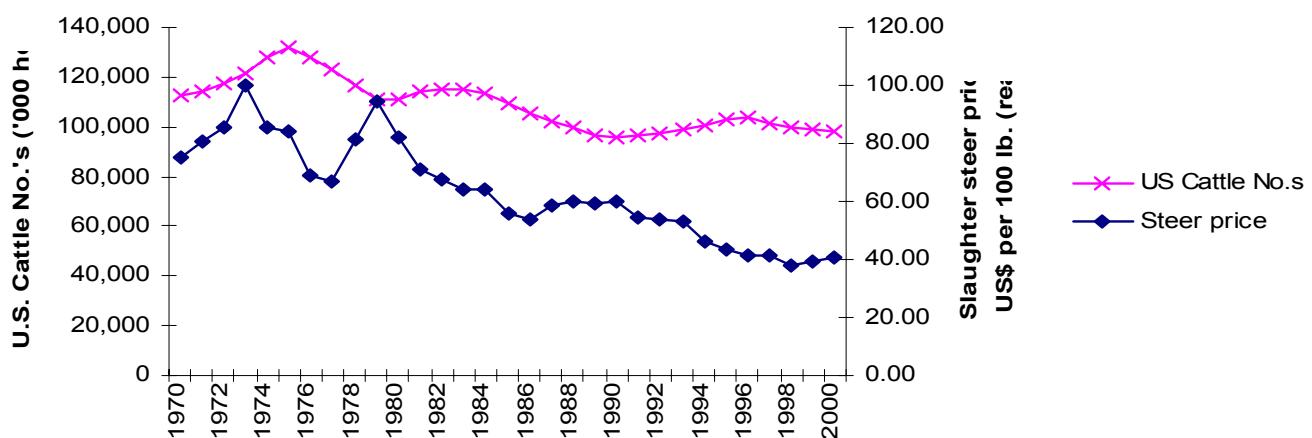
The cyclical nature of the beef industry is explained in part by the way in which producers form expectations about future prices and profits and the adjustment time that is required due to the biological constraints of beef production systems. As cattle prices rise producers form opinions about current and future profitability and decide between withholding heifers from slaughter to increase their breeding herd capacity, and increasing slaughters to benefit from current prices. Figure 3 shows the inverse correlation between US beef prices and the total cattle inventory. There appears a tendency for producers to sell more stock when prices are high and hold on to stock when prices are low (Mathews *et al*, 1999). It appears that generally cattle slaughterings lag price turning points by about two years (McCoy and Sarhan, 1988). Obviously producers are constrained by biological factors to respond quickly to price signals.

By holding on to females the number of stock available for slaughter is restricted and this induces price increases up until the expanded breeding herd produces sufficient beef to meet demand. Beyond this point, prices falter and a liquidation phase commences. The duration of this liquidation phase is greatly dependent upon economic factors including consumer demand and price as well as input costs to the beef system (Tomek and Robinson, 1990).

Factors that influence the timing and scale of the US beef cycle include not only endogenous factors, such as the biological constraints of the production system, but also external factors. Such factors include weather, grain exports and prices, consumer demand and government programs. For example, it has been shown that US government cropping policies affect the cattle cycle by causing land to move from pastures to cropping or *vice versa* (Bobst and Davis, 1987). An expansion in grain exports or the

impact of drought on grain prices directly impacts upon the profitability of the grain fed cattle industry (Mathews *et al*, 1999). In this way a particular phase of the cattle cycle is induced to extend or shorten. Despite this, it has been noted that the U.S. beef cattle cycle is amongst the most robust periodic time series in economics (Rosen, Murphy and Scheinkman, 1994).

Apart from these immediate influences, researchers have identified several fundamental or longer-term factors that have shaped recent US cattle cycles. These include the increased market share of competing meat products, particularly poultry, that occurred in the 1970's (Lesser, 1993), and improved production technologies that have increased beef production per head. Because of the increased amount of beef obtained per cow, fewer cattle are required to produce a particular quantity of beef and therefore lower cattle inventories are required to maintain supply (Mathews *et al*, 1999).



**Figure 3. The relationship between cattle prices and U.S. cattle inventory.**

Source: USDA (2000). Cattle prices are represented by the slaughter steer price, Choice 2-4, Nebraska Direct, 1100-1300 lb. Prices are deflated using 1983/84 = 100.

A number of indicators have been identified to monitor the U.S. beef cycle and to determine when a turning point might be signalled. These include;

1. the year of the current cycle;
2. the annual expansion in total cattle numbers;
3. the annual expansion in total cow numbers;
4. the ratio of annual cattle and calf slaughter to January 1 total cattle numbers;
5. the ratio of annual cattle and calf slaughter to previous years calf crop;
6. the ratio of annual cow slaughter to January 1 total cow numbers;
7. the ratio of cow and heifer slaughter to steer slaughter; and
8. the steer-corn price ratio. (Lesser, 1993).

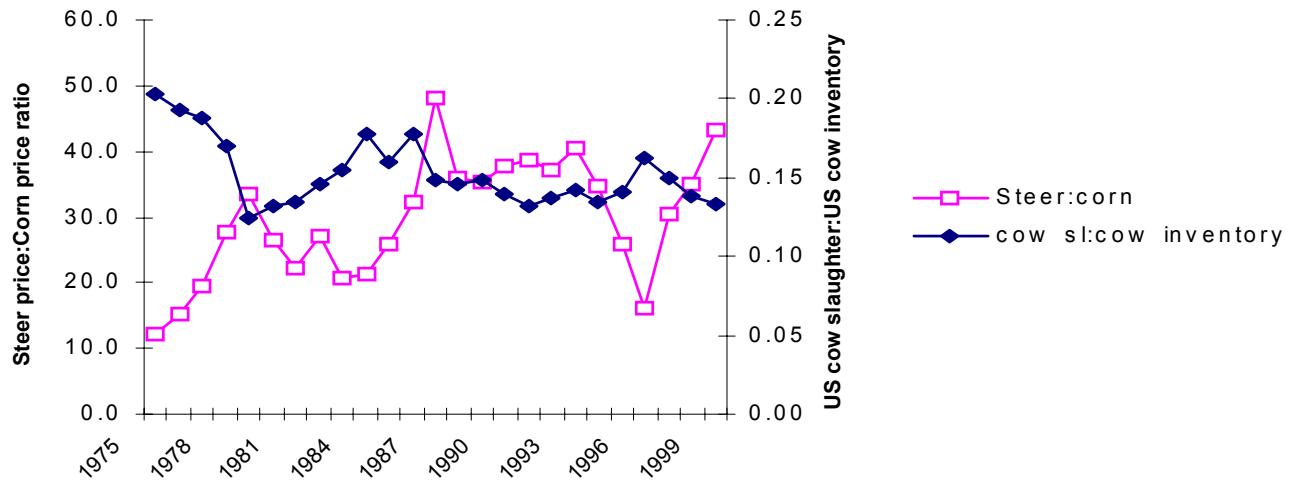
A detailed explanation of these factors and their critical values are outlined in various sources including McCoy and Sarhan (1988) and Lesser (1993).

These various cattle cycle indicators used together effectively measure herd build up and therefore potentially signal price breaks. It has been suggested that the use of such tools by US producers in planning beef production has been partly responsible for the lower annual herd expansion rates (1.2%) of the last two cycles compared to previous cycles' expansion rates (4%) (Mathews *et al*, 1999).

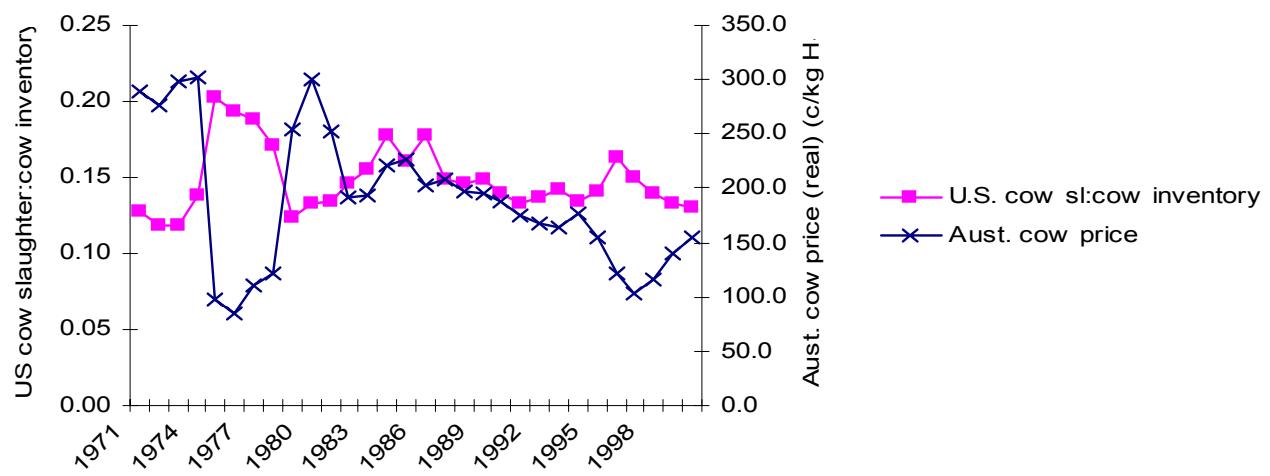
#### 4. The role of the US corn price and US feedlots

As outlined earlier, the grain markets are an important influence upon the US beef industry. Within the US almost all young steers and approximately one-third of heifers are finished in feedlots where the major grain fed is corn (Rosen *et al*, 1994). Therefore the price of corn as a major input to US beef production is an important factor effecting US production and US beef producer profitability. The steer price to corn price ratio has been used as one of the lead indicators of changes in the US cattle

cycle. Typically a steer-corn price ratio of 25 has been a point of equilibrium with a decline in this ratio preceding a drop in beef prices which is followed by a liquidation of the US cattle herd (Lesser, 1993). Figure 4 shows the negative correlation between the “profitability” of US beef production as measured by the steer to corn price ratio; and the build up or liquidation of the US beef herd. A low steer to corn price ratio (indicative of high costs of production) tends to be associated with or precede a high cow slaughter to cow inventory ratio (indicative of herd liquidation). In fact when the cow slaughtering measure is lagged a year, that is the steer to corn price ratio is used as a lead indicator, the correlation between the two ratios is  $-0.70$ .



**Figure 4. The relationship between the US steer price to US corn price ratio and the stage of the US cattle cycle as measured by the cow slaughter to cow inventory.**  
Source: USDA (2000).



**Figure 5. The relationship between the proportion of the US cow herd slaughtered and Australian beef prices.**

Source: ABS (2001); AMLC *Statistical Review* (various issues); MLA (2000); USDA (2000).

Cattle prices are represented by the Australian average price for steers (300-320 and 320-400 kg). Prices are deflated using 1989/90 = 100.

## 5. Evidence of the influence of the US beef industry on Australia

The impact of the US cattle cycle on the Australian industry is evident in the strong links between US prices and prices received by Australian beef producers. For example, in Figure 5 the ratio of US cow slaughterings to total cow inventory is compared to prices received by Australian producers. A strong inverse relationship is clearly evident - high cow slaughterings coincide with low beef prices being paid to Australian producers ( $r = -0.6$ ). An increasing proportion of cows being slaughtered indicates a run down in the breeding herd and a subsequent reduction in beef supply over the next few years. Therefore a high proportion of cow slaughterings normally occurs near the trough in prices; the period of industry pessimism. These cows are used for manufacturing beef, which displaces imports from Australia and New Zealand in the US domestic market and competes with exports from Australia and New Zealand in third country markets.

A second key indicator relating to the US beef cycle and its impact on the Australian industry is the activity in US feedlots. An expansion in the placements on feed and a consequent expansion in fed beef production indicates a build up in herd size. This normally occurs near the peak in prices; the period of industry optimism. This directly affects the Australian industry since US feedlot product provides high quality beef that competes with Australian grainfed beef in key Asian export markets like Japan.

## 5. Given the existence of the US cattle cycle and its influence on Australia, why doesn't it tell the whole story?

While the US cattle cycle has been shown to have a major influence on the Australian beef industry there are a variety of external factors that mask that influence to some extent. Many of these factors are highly unpredictable and thus cause forecasting for the Australian beef industry to be difficult. Many of the following examples of these external factors are in "play" this year.

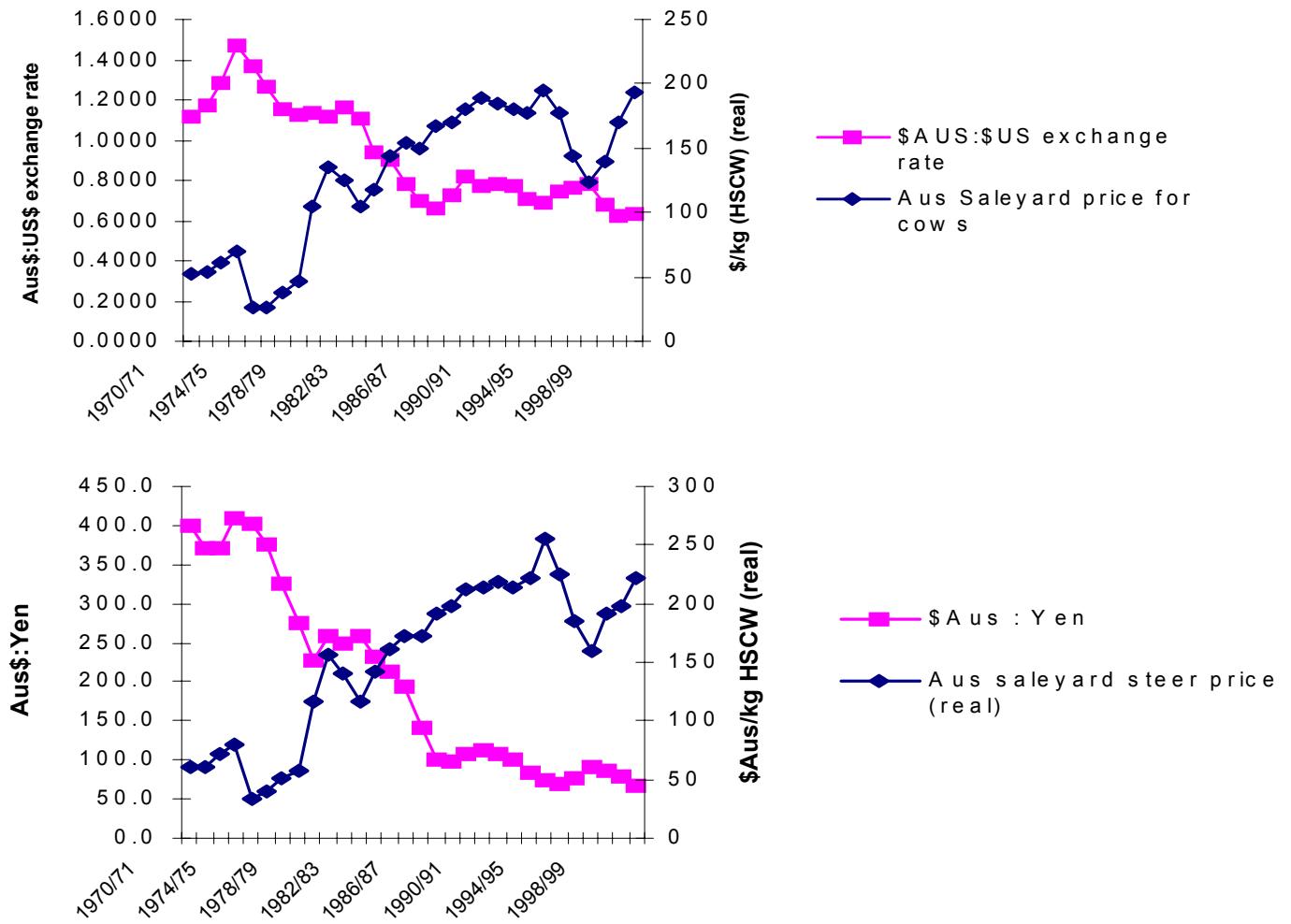
- Health Issues

Consumer confidence and trade opportunities are heavily dependent upon human and animal health considerations. Recent examples of this include BSE and FMD.

MLA (2001a) identified food safety as a significant factor in beef consumption in Korea, where in the first four months of 2001 beef consumption declined by 9% to 117000 tonnes. This has been directly attributed to Korean consumer concerns regarding BSE and FMD in Europe and the weaker Korean economy (MLA, 2001a). Similarly, the BSE scare in Europe caused a 27% drop in beef consumption across the European Union in the last quarter of 2000 (ABARE, 2001). Likewise the occurrence of FMD in the beef exporting countries of Argentina, Uruguay and Brazil in 2001 (MLA, 2001a) will have an impact of beef markets and therefore mask to some extent the impact of the US beef cycle upon the Australian beef industry.

- Exchange Rates

Various industry analysts have highlighted the advantage of a low Australian dollar against the currencies of our major beef export destinations. For example between 1996 and 2000 the Australian dollar depreciated against the US dollar by approximately 30%. As a consequence Australian cow prices increased by approximately 35% on a c/kg dressed weight basis (MLA, 2000). In 2000 the Australian dollar depreciated 15% against the yen making Australian beef very competitive in Japan. Exports to this destination rose 4% in 2000 while the value of beef exports to Japan were 12% higher than in 1999 (ABARE, 2001). This depreciation against the US dollar and the Japanese yen has continued into 2001. The following graphs highlight the impact of a depreciating Australian dollar against the US dollar and the Japanese yen and the corresponding value of beef cows and steers in terms of Australian saleyard prices.

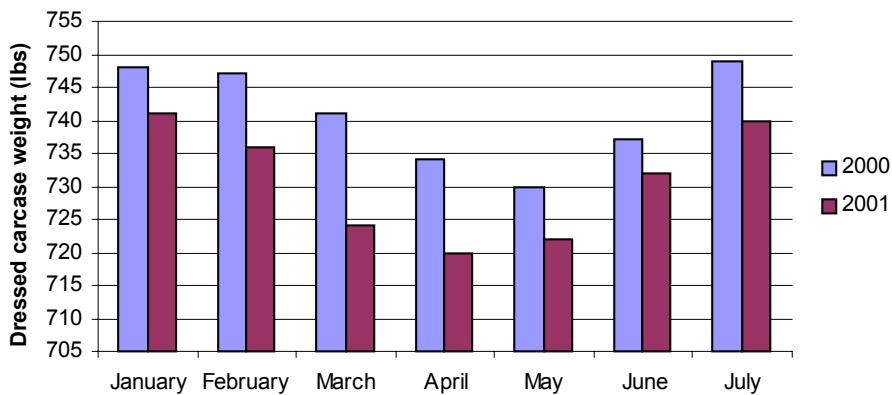


**Figure 6. The inverse relationship between Australian exchange rates (Australian:US and Australian:Japanese) and Australian cattle saleyard prices**

Source: Reserve Bank of Australia (2001); MLA (various issues); AMLC (various issues).  
Note: saleyard prices are in 1990/91 dollars

- Climatic Influences

Climatic factors in Australia or other countries such as the US obviously impact upon the profitability of the Australian beef industry. For example, during the early part of 2001 the US experienced unusually severe winter conditions that resulted in a significant decline in US feedlot productivity. Cattle in feedlots used extra energy for maintenance causing a significant impact on marketings from feedlots over this period, particularly in carcass weights (Figure 7). It has been estimated that these severe conditions resulted in a 6% to 7% decline in US beef production in the first quarter of 2001 (Kay, 2001).



**Figure 7. Comparison of the average dressed carcase weights of US cattle during the first six months of 2000 and 2001.**

Source: USDA (2001, various issues).

- General Economic and Political Considerations

The economic conditions of Australia and the countries that import Australian beef have a significant influence upon the Australian beef industry. For example, the deterioration in Asian economies during 1997 and 1998 resulted in significant falls in Australian beef exports to those nations (ABARE, 2000). In the case of Australian live cattle trade, cattle exported to Indonesia fell by 90% between 1997 and 1998 as a consequence of the downturn in the Indonesian economy.

Trade restrictions also provide another external factor that may partially mitigate the effect of the US cattle cycle upon the Australian beef industry. For example, Korea has agreed to remove a variety of trade restrictions effecting beef imports over 2001. MLA (2001a) predicts that the longer-term outlook for Australian beef exports to Korea is positive with the potential for beef imports to reach 320,000 tonnes by 2005, compared with 200,000 tonnes in 2000. Australia held 30% market share of Korean beef imports in 2000 (MLA, 2001a).

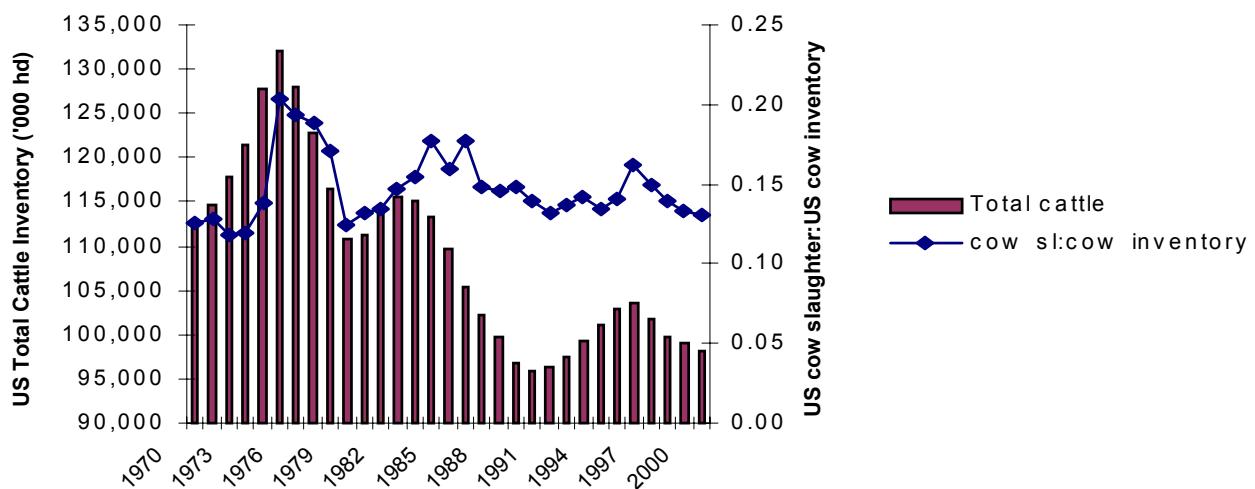
These various external factors interact to partially mitigate the influence of the US beef cycle upon the Australian beef industry. The examples of current factors that are impact upon the beef market make forecasting of the current US beef cycle and its impact on the Australian beef industry difficult.

## 6. Outlook

The current US beef cycle commenced from an inventory low in 1990 (95.8 million head) to peak at the start of 1996 with 103.5 million head. In that same year drought occurred through key beef regions of the US (Mathews *et al*, 1999), and subsequently cattle numbers have fallen approximately 6% to 97.3 million head at the commencement of 2001. At the same time beef prices have increased by approximately 30% over this period.

In response to higher prices, US beef production has increased over 5% since 1996. This was achieved mainly through higher average dressed weights, which increased 9.4% over the period, since the total number of cattle slaughtered was relatively stable. These higher slaughter weights have been attained in part by a 10.9% increase in net placements in feedlots.

Meanwhile US cow slaughterings have decreased significantly from 7,274,000 head in 1996 to 5,604,000 head in 2000, but heifer slaughterings increased over the period as producers have taken advantage of the higher beef prices. Market analysts in the US and in Australia have been anticipating an easing in heifer slaughter numbers which would indicate a move towards a herd build up phase (MLA, 2001b) and would signal the start of a new cattle cycle.



**Figure 8. Annual US cattle numbers compared to the annual cow slaughter to cow inventory ratio in the US.**

Source: USDA (2001).

The USDA in its July 2001 *Livestock, Dairy and Poultry Situation and Outlook* have described the background to the current US beef industry situation. During 2000 drought covered many of the cow-calf production areas of the US with drought continuing into the winter over the Pacific Northwest and Southwest Texas. Along with the severe winter and dry conditions in spring this year hay stocks are depleted. As a result producers have tended to sell calves early including heifers to maintain the breeding herd and attracted by the relatively good feeder cattle prices. The impact of high cow slaughterings ratio on subsequent year's total cattle numbers over the last three cattle cycles is illustrated in Figure 8.

Since the start of 2001, cattle numbers have fallen further with the July 1 cattle inventory down a half million head compared with July 2000. High levels of yearling heifers in feedlots indicate that herd rebuilding has not yet commenced (USDA, 2001a). If herd rebuilding were to commence this year then heifers from this year's crop will not calve until 2003, enabling cattle inventories and beef production to begin to expand in 2004. This is an example where drought conditions appear to have extended the current cattle cycle.

## 7. Conclusions

It is evident from the previous discussion that while the US cattle cycle is contributing to the broad direction of the Australian beef industry, various external factors such as local seasonal conditions and exchange rates, create short-term alterations to the impact of the US cycle upon the local industry. However it is important to appreciate that the US cattle cycle is still a critical component in both Australian and US market analyses such as those undertaken by MLA and the USDA.

The evidence available indicates that the US industry is very close to the end of the current cycle that commenced in 1990. Thus the expectation is that cow and heifer slaughter rates will start to fall, the breeding herd will expand and prices will start to ease as greater beef begins to flow onto the market in the next two to three years.

In terms of implications for the Australian industry and industry advisors, it would seem prudent that any planning at farm or industry level should take account of the cyclical nature of the beef industry. In practical terms this might mean farmers considering investment in the beef industry should incorporate development budgets that reflect cyclical prices over time frames equivalent to the US cattle cycle of 10 years on average. Farm business plans should be robust enough to withstand

expected price troughs created by these cycles. Further, the US cattle cycle has implications for farmers who attempt to anticipate beef price booms through opportunistic or short-term beef production. These principles are also relevant to industry planners.

## REFERENCES

AUSTRALIAN BUREAU OF STATISTICS (2001). *Consumer Price Index, Australia*. Catalogue No. 6401.0. [Online] Available: <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/NT00000D46/>

AUSTRALIAN MEAT AND LIVE-STOCK CORPORATION (various issues). *Statistical Review*. AMLC, Sydney.

BOBSC, B.W. AND DAVIS, J.T. (1987). Beef Cow Numbers, Crop Acreage, and Crop Policy. *American Journal of Agricultural Economics*, **69**, pp. 771-776.

KAY, S. (2001). The New U.S. Beef Industry (and its impact on New Zealand beef farmers). A presentation to New Zealand beef producers, May 21-24, 2001.

LESSER, W.H. (1993). *Marketing Livestock and Meat*. Food Products Press, Binghamton NY.

MATHEWS, K.H.JR, HAHN, W.F., NELSON, K.E., DUEWER, L.A. and GUSTAFSON, R.A. (1999). *U.S. Beef Industry: Cattle Cycles, Price Spreads, and Packer Concentration*. Market and Trade Economics Division, Economics Research Service, U.S. Department of Agriculture. Technical Bulletin No. 1874.

MCCOY, J.H. and SARHAN, M.E. (1988). *Livestock and Meat Marketing*. Third Edition, Van Nostrand Reinhold Co., New York.

MEAT & LIVESTOCK AUSTRALIA (various issues). *Statistical Review*. Meat & Livestock Australia Limited, Marketing Information Services.

MEAT & LIVESTOCK AUSTRALIA (2000). *Statistical Review July 1999-June 2000*. Meat & Livestock Australia Limited, Marketing Information Services.

MEAT & LIVESTOCK AUSTRALIA (2001a). *Market Briefs – Korea*; March 2001. Meat & Livestock Australia Limited, Marketing Information Services.

MEAT & LIVESTOCK AUSTRALIA (2001b). *Market Briefs – North America*; March 2001. Meat & Livestock Australia Limited, Marketing Information Services.

MUNDLAK, Y. and HUANG, H. (1996). International Comparisons of Cattle Cycles. *American Journal of Agricultural Economics*, **78** (4), pp.855-868.

RESERVE BANK OF AUSTRALIA (2001). *Exchange Rates and Reserve Bank Foreign Exchange Operations*; Occasional Paper No.13. Reserve Bank of Australia. [Online] Available: <http://www.rba.gov.au/statistics/OP13-UPD.xls> and <http://www.rba.gov.au/statistics/ocerdisk.xls> .

ROSEN, S., MURPHY, K.M. and SCHEINKMAN, J.A. (1994). Cattle Cycles. *Journal of Political Economy*, **102** (3) pp. 468-492.

TOMEK, W.G. and ROBINSON, K.L. (1990). *Agricultural Product Prices*. Third edition; Cornell University Press, Ithaca.

U.S. DEPARTMENT OF AGRICULTURE (2001a). *Livestock and Poultry: World Market and Trade*. Foreign Agricultural Service. Circular Series DL&P 1-01 (July). [Online] Available: <http://www.fas.usda.gov/dlp/circular/2001/01-03LP/beef.html>.

U.S. DEPARTMENT OF AGRICULTURE (2001b). *Livestock and Poultry: World Market and Trade*. Foreign Agricultural Service. Circular Series DL&P 1-01 (various issues). [Online] Available: <http://www.fas.usda.gov/dlp/circular/2001/01-03LP/beef.html>.

U.S. DEPARTMENT OF AGRICULTURE (2000). *Red Meat Yearbook (94006)*. Economic Research Service. [Online] Available: <http://www.ers.usda.gov/data/sdp/view.asp?f=livestock/94006/>