

The US Cattle Cycle and the Australian Beef Industry

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In this paper, the US cattle cycle is described and its impacts on Australia are evaluated. A longer version of the paper, complete with graphs and references, is available at www.agribusiness.asn.au/Review/2002v10/Griffith/Griffith/htm.

Introduction

While Australia is the largest beef exporter contributing some 25% of total beef traded in 2001, its pricing power is limited. Several factors create this situation. Firstly, Australia had only 2.6% of the world's cattle population and current beef exports represented only 2.7% of total world beef production in 2001. In contrast, the US had 9.4% of the world's cattle inventory and produced around 12,000 Kt of beef (carcase weight equivalent) in 2001, or over 6 times as much as Australia. As a result small percentage changes in the US beef industry are comparatively large in the context of the Australian industry.

How does the US beef industry influence the Australian beef industry?

Secondly, Australia's beef exports are centred on two major markets, Japan and the US, representing 34% and 42% of total export volumes respectively in 2001. Exports to Japan include both grass-fed and grain-fed product, while exports to the US are predominantly lean manufacturing grade beef from the northern herd. The remaining 24% of Australia's exports going to over 50 other countries. These markets are highly competitive.

Thirdly, increasing exports of beef from the US compete with Australia in Pacific Rim export markets, mainly Japan and Korea. This is particularly so in the higher quality grain-fed segments. The US is now the second largest exporter; although USDA expects US beef exports to decline during 2002.

Thus the US is both a major market for Australian beef and a major competitor in third country markets. Monitoring of the US beef industry requires an appreciation and understanding of the US cattle cycle that is a central element of that industry.

US cattle cycles have been studied extensively with data on the US cattle inventory being kept from as early as 1875. Mathews et al (1999) provides a thorough review. A famous paper in the economics literature by Rosen, Murphy and Scheinkman called the US cattle cycle "...among the most periodic time series in economics".

These cattle cycles have been characterised by a cycle length of about 10 years, with individual cycles varying from 8 to 13 years. Two major components are identified in the cattle cycle - an expansion phase and a liquidation phase. 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. In more recent cycles, the liquidation phase has tended to shorten.

Figure 1 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, before 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 of 103.5 million head. USDA reports that the US cattle population at 31 January 2002 had fallen to 96.7 million head, 7% below the 1996 peak.

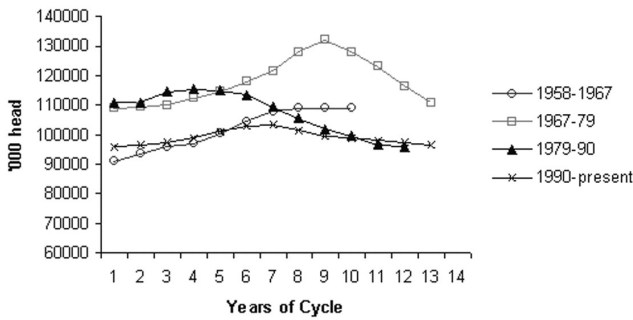


Figure 1. Duration of US cattle cycles since 1958

Two points arise from this graph. First, the four cycles differ substantially in terms of length, amplitude and shape, reflecting the different external influences on the US beef industry during these different time periods (see below). However there seems to have been a general flattening out of the cycle during the more recent periods. This pattern seems also to hold in US cattle prices (see Figure 2 below).

Second, the fact that US cattle numbers *changed* by some 20 million head during the 1980s emphasises the relative sizes of the US and Australian beef industries. Even the relatively small *change* of about 8 million head during the 1990s is large compared with our herd.

The cyclical nature of the US 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. 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 the industry enters the liquidation phase. 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. One aspect of this cyclical pattern that economists tend to focus on is the “myopic” or shortsighted view of cattle producers – they forget what they did about 10 years ago (at a similar stage of the cycle), and what the inevitable consequences were when the cycle turned around. If cattle producers remembered what happened in the past they might well make decisions that dampen down this cyclical behaviour. There seems to be some evidence of this occurring in the last cycle shown in Figure 1.

Figure 2 shows the strong inverse correlation between beef prices and the total cattle inventory in the US, over the last three cycles. It appears that generally cattle slaughtering lags price turning points by about two years. Obviously producers are constrained by biological factors to respond quickly to price signals.

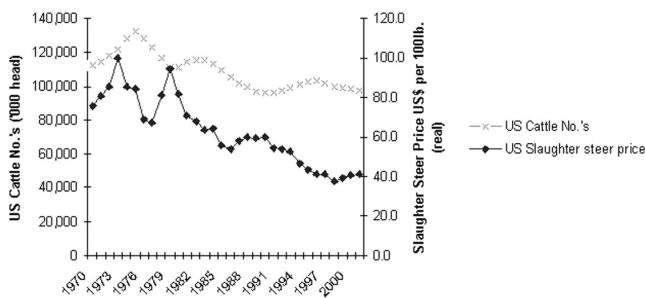


Figure 2. The relationship between cattle prices and US cattle inventory, 1970-2001
* Cattle prices are represented by the slaughter steer price, Choice 204, Nebraska Direct, 1100-1300 lb. Prices are deflated using 1983/84 = 100.

Factors that influence the timing and scale of the US cattle cycle include not only the biological constraints of the production system, but also external factors. Such factors include weather, grain exports and prices, consumer demand and government programs. Researchers have also 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; improved production technologies that

have increased beef production per head, so that fewer cattle are required to produce a particular quantity of beef; and the greater “industrialisation” of the beef industry, which leads to a greater proportion of fixed costs in total costs and more inelastic responses to price changes.

A number of indicators have been identified to monitor the US cattle cycle and to determine when a turning point might be signalled. A detailed explanation of these factors is outlined in texts like McCoy and Sarhan (1988) and Lesser (1993). Two of the main indicators are the ratio of annual cow slaughter to January 1 total cow numbers, and the steer-corn price ratio. The 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 has been partly responsible for the lower annual herd expansion rates of the last two cycles (1.2%) compared to the expansion rates in previous cycles' (4%).

The net result of these various influences operating in the US market, and consequently in third country markets, is that US cattle prices and Australian cattle prices move closely together. This is shown in Figure 3, where the correlation coefficient between the two price series (which are not corrected for exchange rate movements) is $(r=0.67)$.



Evidence of the influence of the US beef industry on Australia

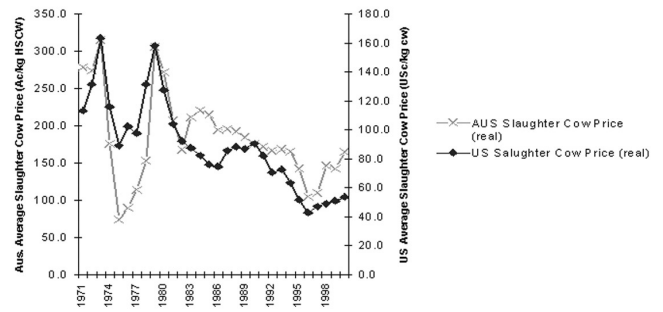


Figure 3. US and Australian saleyard cattle prices

*Australian cattle prices are represented by the average price for steers (300-320 and 320-400 kg). Australian prices are deflated using 1989/90 = 100. US cattle prices are represented by the slaughter steer price, Choice 2-4, Nebraska Direct, 1100-1300 lb. US prices are deflated using 1983/84 = 100.

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 modify 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 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 has 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 117,000 tonnes. This has been directly attributed to Korean consumer concerns regarding BSE and FMD in Europe and the weaker Korean economy. Similarly, the BSE scare in Europe caused a 27% drop in beef consumption across the European Union in the last quarter of 2000. Likewise the occurrence of FMD in the beef exporting countries of Argentina, Uruguay and Brazil in 2001 will have an impact of beef markets and therefore mask to some extent the impact of the US cattle 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 2001 the Australian dollar depreciated against the US dollar by approximately 30%. Against the backdrop of a 30% rise in US domestic beef prices, the consequence of the exchange rate change was that Australian cow prices increased by approximately 80% on a c/kg dressed weight basis to late 2001. As another example, 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. This depreciation against the yen continued into 2001. The following graph highlights the impact of a depreciating Australian dollar against the US dollar and the corresponding value of beef cows in terms of Australian saleyard prices. The same effect is shown in Figure 3, where the

Why doesn't the US cattle cycle tell the whole story?

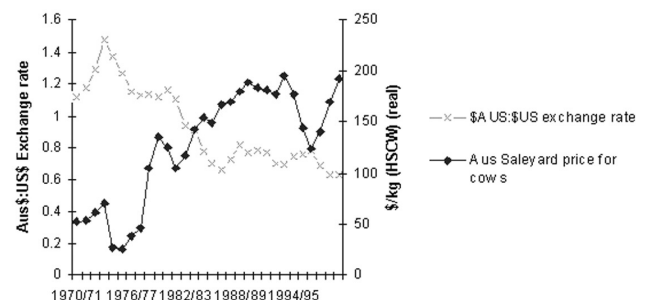


Figure 4. The relationships between Australian exchange rates and Australian cattle saleyard prices.

*Note: saleyard prices are in 1990/91 dollars

influence of the exchange rate has clearly been to exacerbate the rises and falls in cattle prices in Australia compared to what has happened in the US market.

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, the severe drought in eastern Australia during the early 1980s clearly had a disruptive influence on the relationships portrayed in Figure 3 and has again this year. 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 marketing's from feedlots over this period, particularly in carcase weights. 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.

Industrialisation patterns

A point made above was the greater "industrialisation" of the US beef industry (which leads to a greater proportion of fixed costs in total costs and more inelastic responses to price changes) as a possible explanation of the general flattening out of the US cycle during more recent periods. This pattern has also occurred in Australia. The feedlot sector has expanded rapidly in the last decade and recent research has shown that feedlot supply elasticities are much more inelastic than earlier studies have found. Also, more output now comes from larger, specialist producers. In 1999/2000, almost two-thirds of the Australian beef herd was carried in the larger, specialist properties in northern Australia, compared with less than 40 per cent in the early 1970s. Difference in the patterns of "industrialisation" between Australia and the US is another factor influencing the impact of the US cattle cycle on us.

General economic and political considerations

Economic conditions in Australia and the countries that import Australian beef have a significant influence upon the Australian beef industry.

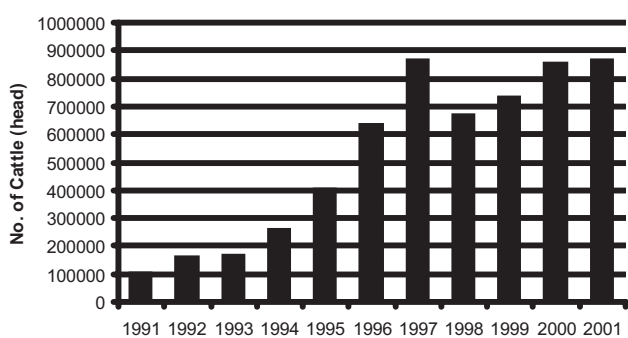


Figure 5. Australian live cattle exports, 1991-2001

Over the last decade, live cattle exports from Australia and particularly the northern beef industry have increased from 98,000 head in 1990/91 to 858,814 head in 2000/01 (Figure 5). This has occurred as a consequence of growing demand for beef in Asia. In 2000/01 some 63% of live cattle exports were to Asian countries most notably Philippines, Indonesia and Malaysia. In response to shrinking cattle populations in these countries governments have encouraged live cattle imports so as to maintain some component of the beef production chain within their domestic economies. The growth of the live cattle trade has reduced to some extent the dependence of the Northern herd on the US market, although it is reasonable to assume that the price of live cattle still reflect the price of beef on world markets.

Economic conditions have however greatly influenced this trade. For example, the deterioration in Asian economies during 1997 and 1998 resulted in significant falls in Australian beef exports to those nations. In the case of the 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 agreed to remove a variety of trade restrictions effecting beef imports over 2001. MLA 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. On the other hand,

Australian exports hit the US quota level last year and are expected to hit the 2002 level even sooner. Industry are currently attempting to develop allocation policies so that exports can be maintained throughout the year, but whichever way they go, prices will be adversely affected.

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

The current US cattle cycle commenced from an inventory low in 1990 (95.8 million head) to peak at the start of 1996 with 103.5 million head. Subsequently cattle numbers have fallen approximately 7% to 96.5 million head by the commencement of 2002. At the same time beef prices have increased by approximately 30% over this period.

Present outlook

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 feedlot net placements.

Meanwhile US cow slaughterings have decreased significantly from 7.274 million head in 1996 to 5.761 million head in 2001, 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 for two years now. This would indicate a move towards a herd build up phase - the start of a new cattle cycle.

However this has not yet happened. The USDA in its recent *Livestock, Dairy and Poultry Situation and Outlook* (27 August 2002) noted that due to the severe 2000 winter and dry conditions in spring 2001, hay stocks were depleted. Attracted by the relatively good feeder cattle prices, the poor feed outlook induced producers to sell calves early including heifers to maintain their breeding herds. Beef production has been higher than expected, prices have been driven lower and both total cattle and cow numbers continued to fall. Current high levels of yearling heifers in feedlots indicate that herd rebuilding has not yet commenced.

If herd rebuilding were to commence this year then heifers from this year's crop will not breed until 2003, enabling cattle inventories and beef production to begin to expand in 2005. This is an example where drought conditions appear to have extended the current cattle cycle, so that the current cycle is expected to be the longest of the last four.

While the US cattle cycle contributes significantly 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.

Conclusions

The evidence available indicates that the US industry is very close to the end of the current cycle that commenced in 1990. The expectation is that cow and heifer slaughter rates will start to fall later this year, the breeding herd will expand, greater quantities of beef will begin to flow onto the market in about three years, and prices will start to ease after that. The change in the cyclical pattern of US prices will flow over into the Australian beef market, as shown in Figure 3. Interested readers can follow USDA analyses of US data as it unfolds in the monthly *Livestock, Dairy and Poultry Situation and Outlook* reports, available on the USDA website at www.ers.usda.gov/ldp/circular/2001/. MLA (eg MLA 2002) and ABARE (eg Riley *et al* 2001) also monitor the US cattle market.

While this downward cyclical pattern can be anticipated and planned for, the worry is that many of the external factors that influence the length and amplitude of the cyclical downturn will not be working to the advantage of the Australian beef industry. The \$AU/\$US exchange rate is rising and is projected to reach approximately \$0.60 by mid 2003. This is about a 20% appreciation, and if it did eventuate, it would place considerable downward pressure on saleyard prices for cattle in Australia, irrespective of any cyclical downturn. As well, interest rates are on the rise and there is a major drought in the eastern states. Both of these factors put pressure on farm profitability and induce a greater turnoff of cattle, again putting downward pressure on saleyard prices. Conversely, growth in the Korean and live cattle markets provides an optimistic note.

In terms of implications for the Australian industry and industry advisers, 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 new or further 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. All cattle producers should remember that saleyard prices in Australia fell about 50% during the last cyclical downturn. However, for every threat there is an opportunity. The relatively regular US cattle cycle has some very positive implications for farmers who are able, and make the effort, to anticipate beef price booms through opportunistic or short-term beef production.

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