

Competitiveness of the Australian beef industry

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Introduction

Australia is a significant livestock producer and a major exporter of livestock, livestock products and livestock genetic material. In 1999-2000 the value of exports of Australian livestock and livestock products was A\$11.2 billion (US\$7.1 billion). Of that value, beef exports were A\$4.7 billion (US\$3 billion), accounting for 63 per cent of Australian beef production (in carcass weight equivalent). Strong international influences are also evident in the domestic market. Beef competes on the domestic market with lamb, pork, chicken and seafood. Only chicken meat is significantly insulated from international markets. The ability to compete on international markets is, therefore, paramount to the industry.

As important as international product markets are to the beef industry, the industry's ability to compete for the resources needed to produce, process and market the product is also vital. Competition for resources has both domestic and international dimensions. The competitiveness of the Australian beef industry depends not only on conditions in product markets and in markets for key inputs but on developments within the industry itself.

Competitiveness

There are many possible definitions of competitiveness (see Petit and Gnaegy 1995; Gopinath, Arnade, Shane and Roe 1997; and Hopkins and Lewis 1996, for example). While the detail and emphasis varies between different approaches, most ideas of competitiveness have two core requirements. First, an industry can only be regarded as being competitive if it can maintain, or expand, a place in international markets. Second, an industry is competitive only if it derives sufficient income from domestic and international markets to allow it to continue to grow.

The idea of competitiveness is related to the economic concept of comparative advantage. Comparative advantage is defined by relative resource endowments. For agriculture, land and climate are particularly important. However, competitiveness requires more than that. To be competitive in international markets any agricultural industry must also have the power to draw capital and other productive resources from domestic and international economies. In particular, continued access to new technology and new ideas and consequent productivity growth is a necessary condition for an industry's competitiveness.

Both international and domestic policies may be important to the competitiveness of an industry. International trade policies affect access to markets, the returns that are obtainable from those markets and the competitiveness of rival exporters. However, direct subsidies or trade barriers that convey price support have a once off impact on competitiveness (Gopinath et al. 1997). Farmers receiving price support are better off than those not receiving the support. Nevertheless, they lose ground over time unless their productivity growth

at least matches that of farmers receiving no support or they receive periodic top ups to their price support.

At a domestic policy level, the macroeconomic and regulatory environment may have a strong influence on aspects of an industry's competitiveness. Macroeconomic policy may have an influence on an industry's competitiveness through both domestic and international channels. Domestically, macroeconomic policy can affect input costs through its influence on factors such as interest rates and inflation. Internationally, macroeconomic policy may affect the real exchange rate.

A wide range of other domestic policies may influence the efficiency of the economy as a whole, and thus any particular industry's access to inputs. Policies that are likely to have strong implications for the beef industry are those that affect transport, communications and processing infrastructure and those that affect the industry's access to knowledge and innovation.

For the beef industry the most obvious primary resource endowment is that of grazing land. Within the overall land constraint, competition from crop, other livestock and non-agricultural enterprises is important. To be able to compete with other industries over time the beef industry must either increase its on-farm productivity, at least as fast as that of other industries, or increase product prices. Greater efficiency off the farm may also increase product prices. In other words, productivity increases in the processing, transport and marketing of beef products are important.

In the following discussion, the Australian beef industry is taken to be competitive as long as it grows in real value (an approach that is roughly in accord with the more formal definition given by Gopinath et al.). Any growth in the Australian industry occurs without subsidy. (However, an industry that grew purely as a result of increasing subsidies would be competitive according to the Gopinath et al. definition.) The primary points of discussion concern the industry's ability to compete for resources with other domestic industries and the market and regulatory environment in major buying and competing countries.

Beef production systems

The grazing of beef cattle occurs in most regions of Australia, except for the arid central area of Western Australia, on properties with a diversity of enterprises. Australian beef and veal production takes place in two major production systems — the northern pastoral zone, where the year is marked by wet and dry seasons, and the high rainfall and wheat–sheep zones in southern Australia.

In the northern pastoral zone, cattle are run extensively on large holdings, grazing native pastures at low stocking densities. Tropical breeds, which are better adapted to the harsh

conditions in the north, dominate. Given the vast size of properties in the north, and the fact that cattle grazing is the only broadacre activity carried out, average herd sizes per farm are generally higher in this zone than in other regions in Australia.

In the south, cattle are produced on smaller holdings, grazing largely on improved pastures. With the greater availability of pasture, stocking rates tend to be higher. However, because properties are generally smaller, herd sizes are smaller and hence the number of cattle turned off is lower than in the northern cattle production system. Temperate breeds, either British or continental European, dominate. Beef production, especially in the wheat–sheep zone, is often carried out alongside other broadacre farming activities such as sheep grazing (for wool and/or sheep meat) and cropping.

The markets targeted by beef producers vary across the two production systems. A relatively high proportion of specialist beef properties in northern Australia produce slaughter cattle for the US manufacturing beef market. Further, a large number of cattle turned off by northern properties are store cattle for southern markets or feeder cattle for the feedlot sector. A significant number of properties in the Northern Territory and northern and central Queensland now also turn off cattle targeted at the live export trade. Properties in southern Australia generally sell younger cattle for slaughter to supply beef to domestic markets and to Korea and Japan. Store cattle are also produced for feedlots and cull cow slaughter produces beef for the US manufacturing beef market.

The beef industry in Australia has achieved significant production gains in the past two decades, with production increasing relative to the size of the national herd. While the size of the national cattle herd in 1999 was slightly lower than the size of the herd in 1979, the volume of beef produced increased by about 13 per cent over the same period, largely as a result of higher turnoff weights. This increase in production does not include the live cattle trade, which was negligible in the 1980s and had expanded to 845 000 head (11 per cent of total turnoff) in 1999.

Feedlots

While pasture feeding dominates the industry, the use of feedlots as a means of finishing cattle for specific markets developed dramatically from the mid-1980s to the present. Feedlot production exists in both the north and south, close to grain growing areas. This sector provides high quality marbled product aimed primarily at Japanese consumers, with some shorter fed beef also suitable for the domestic market. The domestic market currently accounts for around 38 per cent of cattle on feed (Australian Lot Feeders' Association 2000).

As at 30 June 2000, Australia had around 673 000 cattle on feed. Around half of these cattle on feed were located in the northern industry. The lotfeeding industry has expanded

over the past year in response to favorable commodity prices, and the lower cost of feed following good growing conditions and an abundant feed grains harvest. As a result, utilisation of feedlot capacity has increased to 80 per cent in June 2000 from 69 per cent in June 1999. Feedlot turnoff has grown over the past decade from only 5 per cent of total adult cattle slaughter in 1990 to 22 per cent in 1999 (figure 1).

The majority of growth is apparent in small sized feedlots, with numbers increasing by 18 per cent on feedlots with a capacity of less than 1000 head over the past year (July 1999 to June 2000). Medium sized feedlots (1000–10 000 head) increased their numbers on feed by 12 per cent over the year.

In Australia, cattle are placed in feedlots at around 12–14 months of age, with the period of feeding varying depending on the market being targeted. Production can range from between 60 and 70 days on feed for the domestic market, which prefers leaner beef, to up to 300 days on feed to produce the highly marbled beef preferred by the Japanese market.

Live cattle

The live export market sources cattle from both northern and southern production systems in Australia. The close proximity to South East Asian markets and the suitability of *Bos indicus* cattle to the markets of North Africa has resulted in enormous growth of this industry in northern Australia. This region, covering the Northern Territory and the north western regions of Queensland and Western Australia, supplies 75–80 per cent of the live cattle trade.

Live cattle exports increased rapidly in the mid-1990s (figure 2), encouraged by a growing Asian feedlot industry. The economic downturn in several South East Asian countries in 1998 dramatically reduced live cattle demand from the region, especially from the largest market, Indonesia. Some of the effects of the downturn in demand from South East Asia

Figure 1: Feedlot turnoff and prices

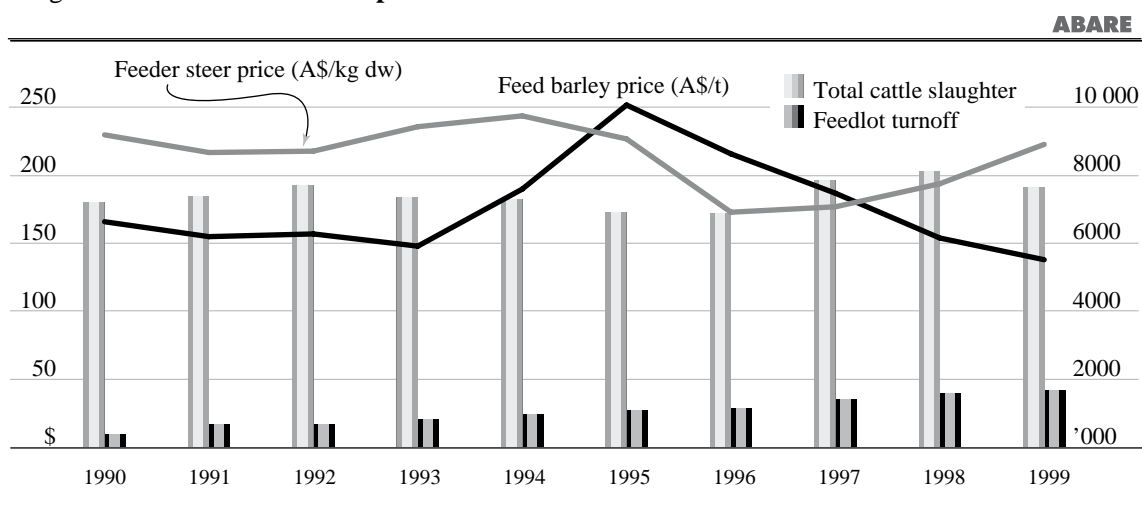
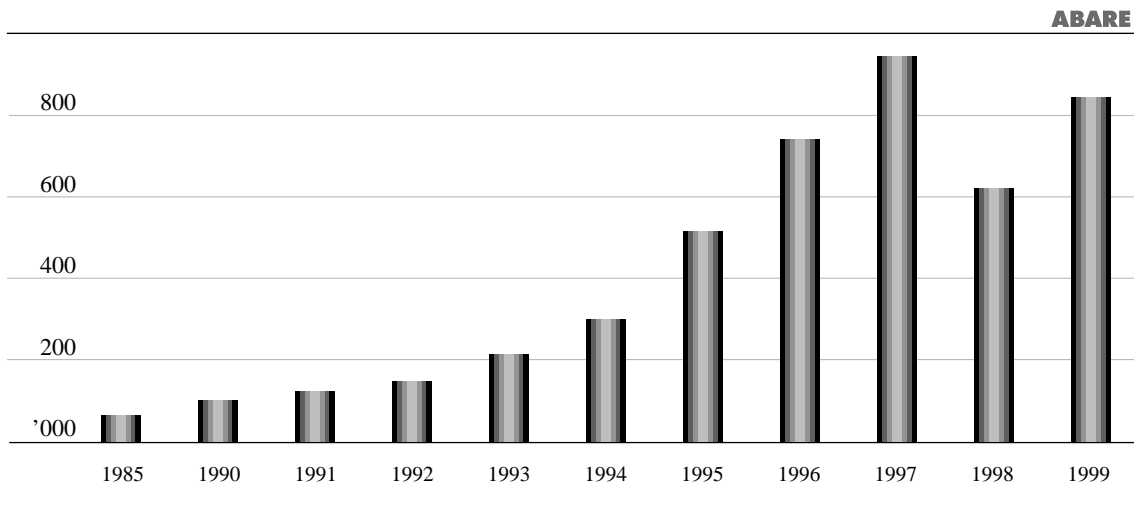


Figure 2: Live cattle exports from Australia



were offset by improved demand for live cattle in the North African and Middle Eastern markets and cheaper freight costs. Market recovery in South East Asia in 1999 was led by Indonesia and the Philippines, with live cattle exports returning almost to their pre-Asian economic downturn levels.

The policy environment

The policies of the Australian government and the governments of other beef producing and consuming nations affect the competitiveness of the Australian beef industry. In particular, trade policies in major exporting and importing countries have significant effects on market access and product prices. Australia has no price support or other beef industry specific support arrangements. However, the industry's competitiveness is influenced by government programs of microeconomic reform, broad macroeconomic policy and government arrangements designed to facilitate beef industry research, promotion and marketing.

Trade policies

Protective trade devices imposed by both importers and exporters affect market access, product prices and the competitiveness of all countries in the world beef market. The protectionist policies of the European Union, United States, Japan and Korea have dominated the Australian beef industry's concerns over the years. However, protective tariffs, quotas and other devices apply more generally across beef markets. For example, most of the countries to which Australia exports live cattle impose tariffs or some other border devices.

Access to the European Union's beef market is severely restricted, with Australia having access to a quota of merely 7000 tonnes of high quality beef. In addition, EU beef production is heavily supported and exports are subsidised. However, Australia's competitive-

ness with other major exporters is potentially most influenced by trade developments in Asian and Pacific markets. Against the tide of protection there have been some gains in those regions. As a result of the Uruguay Round Agreement on Agriculture, access to the US beef import market was improved when the Meat Import Law quotas set at 301 600 tonnes in 1994 for Australia were replaced with a 378 000 tonne tariff rate quota. The stepwise opening of the Japanese market and reductions in import tariffs in Japan enabled expansion of the market for Australian grass fed beef and the development of a market for Australian grain fed beef. As well, recent changes in the Philippines' tariff and quota arrangements have been important, particularly the removal of the high tariff for live cattle over 300 kilograms.

A tariff rate quota has restricted the flow of imports to Canada since it was enacted in 1995. Imports exceeding this quota can enter the market through the small non country specific segment of global quota or the supplementary import scheme — a global maximum quota of 114 000 tonnes. Australia has a country specific allocation of 35 000 tonnes, but this represents a significant competitive constraint in some years.

While Korea has opened its market to some extent in recent years, distribution controls constrain demand for imported beef in that market. These constraints include controls on the number of retailers that can sell imported beef, separate distribution channels for imported and domestic beef, markup taxes and other impositions not placed on domestic beef. A WTO panel ruled in July that Korea's beef distribution system discriminates against imported beef. However, South Korea is expected to appeal against the WTO panel's decision so the situation is unlikely to be resolved in the short term.

A primary effect of trade restrictions is to reduce the competitiveness of beef exporting industries. By limiting world prices and market size, such restrictions reduce exporters' returns and thus their ability to compete for resources. Protection may also influence the relative competitiveness of different exporters. For example, protection of the US domestic market may provide US exporters to Japan with a competitive edge by raising the total enterprise returns achievable from servicing the US and Japanese markets.

Domestic policies

Domestic policies may influence the competitiveness of the beef industry in a wide range of ways. The most important policy impacts are likely to be those on the infrastructure that the beef industry uses to process, transport and market its products.

In 1995 Australian governments agreed to implement a coordinated program of micro-economic reform known as National Competition Policy. The reform package is wide ranging, with key elements involving reform of government utilities and modification of regulations across a wide range of areas of the economy. The regulatory changes have

been designed to increase competition in a number of industries, and ensure business access to infrastructure facilities. The policy adds to and incorporates earlier government commitments to reform gas, electricity, water and road transport.

The Industry Commission (1999) estimated the regional impact of National Competition Reforms. For most of the regions in which beef production is concentrated, the Commission estimated increases in income and employment as a result of the reforms. Although the aggregate implications of reform for the beef industry are unclear, there are two areas in which the industry should benefit. Road transport reform should deliver benefits both to cattle production enterprises and to processors. Reform of the telecommunications industry has the potential to deliver benefits in terms of better choice and a wider and more efficiently delivered selection of services such as marketing and the purchase of inputs.

Outside National Competition Policy, labor market reform is likely to be particularly important in meat processing. Historical evidence suggests that the Australian meat processing sector has been far less productive than international best practice (Booz-Allen and Hamilton 1993; Industry Commission 1994). The potential for improvement arose from a number of sources, but central to those was a combination of low capacity utilisation and poor labor productivity. Wages and work conditions in Australian abattoirs have been managed through a web of labor awards and a complex tally system of payment. The system has evolved in response to the often erratic nature of employment in the sector. However, a primary effect of the system is to limit capacity utilisation and labor productivity improvements. Under the system the marginal cost of labor often rises very rapidly and there is difficulty negotiating new approaches to work. The Industry Commission estimated potential cost savings of up to 18 per cent from making more effective use of abattoir capacity and reforming labor operations and capacity utilisation.

It is possible that some of that potential efficiency may have been realised already, with consolidation of the industry since the Commission's report. A recent decision by the Australian Industrial Relations Commission (2000) may allow more of the gains to be realised. That decision allows staff and owners of an abattoir to negotiate mutually beneficial work and incentive pay arrangements outside the tally system. At least in principle, the potential now exists to arrange abattoir operations in a way that will maximise efficiency.

Perhaps the strongest argument for ensuring that there is an appropriate microeconomic policy environment arises from some of the potential limitations that the Australian processing industry faces. The pastoral beef industry is spread thinly over a large area. Over much of that area rainfall is highly variable and unpredictable. Seasonal variability results in fluctuations in both the quantity and quality of available livestock. At least some Australian abattoirs will always have to operate with less than full capacity utilisation in many seasons

(Sheales and Geldard 1988). Development of a substantial feedlotting sector may have reduced the problem, but not eliminated it.

Australia does not have price support or other major support structures for the beef industry or its main domestic competitors. However, the Commonwealth government facilitates the marketing, promotion, industry coordination and research activities of Meat and Livestock Australia (MLA) by collecting transactions taxes and other fees from industry participants. The government also provides matching funding for research commissioned by the MLA. The rationale for government involvement in research is to provide coordination for economically worthwhile activities that would not be carried out by individual small operators and to fund research that has a broader set of beneficiaries than participants in the beef industry.

Much of the effect of government policy, along with economywide market developments, is reflected in changes in the real exchange rate. Such changes may have a strong influence on the competitiveness of a particular industry. For example, the real US dollar value of the Australian dollar declined by around 23 per cent over the past decade, tipping the scales in favor of Australian beef producers against their US competitors in the Japanese market. While real exchange rates can be important to competitiveness, there is no case for manipulating economic policy to favor any industry or sector. Nor is it possible to forecast future developments with any degree of certainty.

International market aspects of competitiveness

Traditionally, Australia's export markets have been dominated by Japan and the United States. Other notable buyers of Australian beef include Canada, Korea, Chinese Taipei and South East Asia. Several nations in Europe and the Middle East comprise the remaining export destinations.

Current competitive developments

South America

Australia is facing increasing competition from South American exporters in some major markets such as Canada, Chinese Taipei and Korea. Argentina and Uruguay were forced to reorient their export trade when Brazil suffered its currency crisis early in 1999. The 30 per cent devaluation of the Brazilian real early in 1999 led to a drop in domestic beef demand and a flood of lower priced more competitive Brazilian beef entering many other South American markets, previously dominated by Argentine and Uruguayan product. Brazil has also been able to satisfy more of its own domestic demand, further reducing imports of Argentine and Uruguayan beef. Historically Brazil was the principal export destination for Uruguayan beef.

Both Argentina and Uruguay are now actively seeking other markets for their product. Both countries filled their quota to the United States for the first time (limited to only 20 000 tonnes each) and have increased exports to Canada. However, Argentine exports to the United States have been temporarily suspended as a result of the discovery in Argentina of ten Paraguayan cattle carrying the foot and mouth disease virus. As a precautionary measure, exports of fresh beef to North America have been halted for the time being. However, since the situation did not constitute an actual outbreak of foot and mouth disease, the suspension of exports is not expected to be long lasting.

Once Brazil is granted foot and mouth disease free status, it too expects to begin exporting fresh beef to the United States and Japan. Brazil has the world's largest commercial beef cattle herd and would represent a formidable competitive force. It is expected that Brazil would be granted a US quota of 20 000 tonnes, as granted to Argentina and Uruguay. Japan, however, restricts access to its beef market via a tariff.

In the Canadian market, Uruguay and Argentina appear to be offering beef at prices lower than Australia and New Zealand and gaining market share. This is really a case of transferring product that they would like to export to the United States (but cannot because of quota restrictions) onto the Canadian market at a much lower price than their competitors. Uruguayan and Argentine exports to Canada were just over 17 000 tonnes in 1999 and 13 000 tonnes in the first half of 2000, taking market share at the expense of Australia (Meat and Livestock Australia 2000).

From Australia's perspective these export statistics are of interest — Argentina's exports to Canada have increased greatly, while exports to many European and neighboring South American countries have fallen from last year. Exports to Chinese Taipei and the Philippines have also grown rapidly this year. In contrast, Australian exports to these two countries were down 30 per cent and 43 per cent for the eight months to August 2000.

Uruguay has been suffering a severe drought for most of this year, causing an increase in cattle slaughter and beef production. With world export demand strong, and Uruguay making noticeable inroads in export markets such as Canada, Korea and Japan, this may lead to sharp increases in beef exports. The current expansion is likely to come at a cost. The drought, combined with the lower cattle prices (resulting from the fall in import demand from other South American countries), could lead to further reduction in the Uruguay herd — eroding future supply capacity. Consequently, the increased competition faced by Australian exporters should ease once the drought breaks.

Import market developments

Japan

Since the early 1990s, Australia's reliance on the United States as an export market decreased substantially as the industry increased its focus on Asia. In 1993 Japan eclipsed the United States as Australia's principal export destination and has grown in importance since. Exports to Japan were 313 265 tonnes (shipped weight) in 1999. In the eight months to August 2000 exports to Japan, at 216 302 tonnes, had risen by 9 per cent above their level in the corresponding period a year earlier.

Since 1994, market conditions have become more difficult because of the Asian economic downturn; increased competition from the United States; and food safety scares that resulted in unwarranted unfavorable publicity over imported beef. To address these conditions, Australian marketing campaigns in Japan have linked quality and value for money. The appreciation of the yen against the Australian dollar has been significant since the end of the Asian currency upheavals, reducing the cost of Australian beef in the Japanese market and helping to lift Australian export prices. Record prices were set in November 1999, as demand rose in response to millennium celebration buying. The Japanese import tariff fell a further 1.9 percentage points on 1 April to 38.5 per cent. This was the final tariff reduction scheduled under the Uruguay Round Agreement on Agriculture.

The recession in Japan, and subsequent decreased purchasing power of the Japanese consumer, provided an opportunity for Australian beef to gain market share as demand shifted away from grain fed beef to lower priced grass fed beef. With economic activity and, hence, incomes improving, there should be some movement toward the higher value grain fed product.

United States

The combined effects in July and August 2000 of the large gap between US domestic and export beef prices, improving demand from the food processing and catering industries and tight beef supplies resulted in Australian beef exports to the United States reaching their highest level since December 1992. Shipments to the United States for the year to August 2000 are currently 21 per cent higher than for the same period last year.

The gap between Australian and US domestic 90CL beef prices increased to US26c/lb in early July. While this gap narrowed somewhat in August, it appears that end users are using more imported product. The average price for 90CL cow beef at the beginning of September was US88c/lb, while the average price for 95CL bull beef was US97c/lb, down respectively by US3c/lb and US7c/lb from September 1999 prices. In Australian dollar (free alongside ship) terms, however, cow beef at A305c/kg was A22c/kg higher than at the same time last year and bull beef, at A326c/kg, was A18c/kg higher.

Canada

Canada is Australia's fourth largest beef export market. In 1999, 43 318 tonnes were exported at a total value of A\$148 million. Canada imports beef to correct an imbalance in its own production system which produces an excess of fat trimmings and a deficit of lean trim. In a situation similar to that occurring in the United States, a large proportion of imported lean beef is blended with local fat trimmings to make hamburger mince.

Australia's exports for 1999 exceeded its country specific allocation. In 2000, Australian beef exports to Canada are under pressure, with increasing market competition from South America resulting in a significant drop in export tonnages. While competition from Argentina and Uruguay is having a major impact on this market from Australia's perspective, tight domestic supplies and attractive returns from markets such as the United States are also influencing the availability of product for Canada. Australia's exports to Canada for the eight months to August were 22 328 tonnes, down 28 per cent when compared with the corresponding period in 1999 when Australia exceeded its quota.

Korea

Shipments to Korea for the year to August 2000 were 18 per cent below those during the same period last year. It appears that demand for Australian product in this market has been dampened by relatively large imported beef stocks, lower wholesale prices and increased competition from the United States and, to a lesser extent, from New Zealand and South America. Also contributing to lower demand for imported beef is increased domestic pork supply as pork exports to Japan remain suspended following outbreaks of foot and mouth disease in March and April.

In an effort to allow for a more diverse range of import sources, in mid-1999 the Korean government approved Uruguay as a beef supplier. Previously, countries approved to supply Korea included Australia, the United States, Canada, New Zealand, Sweden, Denmark, Japan, Taiwan, Finland, Mexico and the Netherlands. Of these, the United States, Australia, Canada and New Zealand currently hold 99 per cent of the market.

Competitiveness in input markets

As discussed earlier, the beef industry's access to land and other resources depends in part on its rate of productivity growth relative to that of competing enterprises. For Australian beef producers, two sets of competing enterprises are important: those that compete for land and those that compete for domestically sourced grain and other feedstuffs.

Productivity growth in competing broadacre enterprises

Table 1 contains estimates of total factor productivity for major broadacre industries for the period 1977-78 to 1998-99 (Knopke 2000, p. 271), along with rates of return for farms

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Table 1: Terms of trade, productivity growth and rate of return for Australian farms

	Annual rate of change 1977-78 to 1998-99				1999-2000
	Prices received	Prices paid	Terms of trade	Productivity	Rate of return
	%	%	%	%	%
Crop farms					
Wheat and other crops	2.5	5.5	-3.1	3.6	2.9
Mixed crops-livestock	2.4	5.4	-2.9	2.6	0.6
Livestock specialists					
Sheep	2.7	5.2	-2.4	0.6	-1.3
Beef	3.1	5.1	-2.1	2.1	1.2
Sheep-beef	2.9	5.1	-2.2	1.4	-1.1
All broadacre farms	2.3	5.3	-2.9	2.6	0.8

in those industries in 1999-2000 (ABARE 2000a). The dominant features of productivity change for the period are the rapid growth on crop farms and the very low growth on sheep farms. While the fall in real product prices has been much greater for grains than for livestock products (table 2), higher productivity growth has allowed the crop farmers to achieve higher rates of return. For beef producers a lower rate of decline in real prices compensated to some extent for lower productivity growth. However, for sheep producers the relatively low productivity growth dominated.

The greatest competition for land resources among the enterprises represented in table 1 is that between sheep and crops and, to a lesser extent, that between sheep and beef. As illustrated in table 2, the rapid relative increase in crop productivity has encouraged expan-

Table 2: Farm commodity prices and production

		Seven year average		Change between seven year periods
		1977-78 to 1983-84	1993-94 to 1999-2000	
%				
Prices (in 1999-2000 dollars)				
Wheat	\$/t	367	214	-41.8
Wool	c/kg	586	388	-33.9
Beef	c/kg	287	224	-22.1
Production				
Grain	kt	19 770	33 394	68.9
Wool	kt	702	719	2.5
Beef	kt	1 764	2 013	14.1
Crop areas and livestock numbers				
Grain	'000 ha	15 730	18 006	14.5
Sheep	million	131.3	120.3	-8.3
Beef cattle	million	23.7	23.1	-2.5

sion of plantings and production largely at the expense of the sheep industry. There is a degree of competition between crops and beef in some of the cropping areas, but those areas only account for a small proportion of Australia's beef cattle.

The majority of beef cattle in south eastern Australia are produced on farms in the high rainfall areas to the east and south of the wheat–sheep zone. Competition for land resources in the high rainfall areas comes from a wide range of both agricultural and other enterprises. For a large proportion of the area, one choice is between sheep and cattle enterprises. Given a continuation of the recent productivity trends, beef enterprises are likely to be able to compete effectively for land against sheep in those areas. Still, it is worth noting that recent improvement in wool prices and prospects is expected to result in some expansion of the sheep flock over the next few years.

Over much of the south eastern high rainfall area, agriculture competes with urban and semiurban, infrastructure, tourism and recreation, water catchment and forestry uses of land. Agriculture also competes for water with domestic, commercial and industrial sectors and environmental flow. In this context it is worth noting one of the results of Knopke, Strappazon and Mullen's (1995) estimates of productivity growth in broadacre agriculture. The authors found a large difference in productivity growth between large and small farms. Sheep and beef farms in the high rainfall zone account for a disproportionate number of the small farms. Some of these farms may be most vulnerable to land competition from nonfarming activities. While small beef farms are numerous they account for a very small proportion of total production. Slow productivity growth on such farms, or their departure from the industry is not likely to affect the industry's competitiveness greatly.

At the margin, two other developments may influence beef supply. The first is the deregulation of the dairy industry that occurred on 1 July 2000. Removal of the price distinction between milk for the fresh market and milk for manufacturing, and the associated regulations, is likely to lead to changes in the location and structure of the dairy industry. The changes may free up some land for beef production on the one hand, but reduce beef production on dairy farms in some regions on the other hand. The second development is the possible rapid expansion of plantations, mainly for pulpwood supplies. Burns, Walker and Hansard (1999) provide estimates of the areas of agricultural land on which plantations may be competitive under a range of market and policy scenarios. A high proportion of the area assessed as being most suitable for plantation development is also suitable for grass fed beef production. However, the upper bound on the area likely to be suited to new plantations is around 1 million hectares. That would probably affect little more than 1–2 per cent of the current cattle herd.

Around half the cattle herd is located in northern Australia, where there is little competition for land resources from alternative agricultural enterprises. Growth in productivity affects competitiveness in international markets directly. However, it matters less for the

industry's ability to maintain its domestic resource base. It is worth noting that most of these cattle are on the large farms that Knopke, Strappazon and Mullen found to have the highest productivity growth rates.

Feedlot cattle and other intensive livestock industries

The turnoff of cattle from feedlots increased from 0.38 million in 1990 to 1.66 million in 1999 (figure 1). Feed for feedlots is sourced from the same pool of domestically produced feed as that used by the pig, poultry and dairy industries. Total domestic production of feed grains and feed from oilseeds and pulses was 16 million tonnes in 1999-2000. Approximately 50 per cent was used for feed, with the remainder going to export markets.

Most components of the intensive livestock industry have grown rapidly in recent years. From 1990-91 to 1999-2000 pork and chicken production increased by 13 per cent and 49 per cent respectively (Gleeson, Brittle and Shaw 2000). As noted above, there was a more than fourfold increase in feedlot turnoff over the same period. Use of grains, pulses and oilseed meals in the dairy industry also expanded rapidly. High domestic demand for feed, coupled with climatically driven fluctuations in feed production, can lead to shortages in domestic feed supply.

Hafi and Rodriguez (2000) have projected total domestic feed availability, use and flows between Australian regions under a number of production scenarios. They project domestic use of feed to be well below production, for an average season, until 2004. However, they also illustrate that a drought induced reduction in crop size could cause regional shortages and higher feed prices. For example, they estimate that a 36 per cent fall in crop production centred on the eastern states would induce price increases of 14 per cent and 11 per cent for a feedlot cattle ration and a grower pig ration, respectively. A 36 per cent fall from the average crop is consistent with the effects of the 1994-95 drought. A production cut of that order of magnitude is not uncommon.

The Hafi and Rodriguez projections are based on the assumption that Australia does not import feed grains. Grain imports are restricted under quarantine arrangements designed to limit crop disease and weed incursions. In times of domestic grain shortage, some imports may be allowed, but transport of unprocessed grain to the grain growing regions in which most feedlots are located is still precluded. Arrangements were made for imports of some US corn in 1995 for use in poultry industry sectors outside the main grain growing areas. Such imports do relieve the overall tightness of supply. However, even unrestricted imports during shortages of domestically sourced grain can drive prices from normal export parity levels to import parity. Given Australia's distance from other major grain growing regions and international transport costs, the price difference can be significant.

Hafi and Rodriguez's projections are based on ABARE's 1999 commodity projections (Toyne, de Jager and O'Rourke 1999). Those projections are for further increases of 10 per cent for pork and 12 per cent poultry to 2003-04. The number of cattle on feed is forecast to peak at 0.58 million at the end of 2002, equating to a turnoff of around 1.80 million for the year. In most respects, those projections are close to the more recent ABARE projections to 2004-05 (Gleeson, Brittle and Shaw 2000). The main difference is an expectation in the 2000 projections of a slower turnaround in US beef production than that projected in 1999. Increased competition from US beef on the Japanese market for grain fed beef was the reason for suggesting that Australian feedlot turnoff would peak in 2002. Lesser competition may encourage continued growth in Australian feedlot turnoff.

Over the longer term there may be strong prospects for continued growth in most components of the intensive livestock industry. There is no reason to suggest that the strong growth in chicken consumption, driven by a combination of relative price competitiveness and preference change, is likely to slacken. The Australian industry is insulated from direct import competition by phytosanitary barriers, so it can continue to meet domestic demand. Evidence suggests that the Australian pig industry is competitive and will continue to grow. Since 1996 the industry has continued to increase production and exports while being exposed to imports of a broad range of products. The industry has been substantially rationalised since the Industry Commission (1995) cited evidence that at least the most efficient Australian pig farms were operating at internationally competitive costs by the early 1990s. Between 1990 and 1998 production increased by 8 per cent (ABARE 1999) from 5 per cent fewer breeding sows on 52 per cent fewer farms (Meo and Cleary 2000). In real 1998-99 dollar terms, Meo and Cleary's estimate of total production cost of \$1.44 per kilogram sold in 1998-99 is 10 per cent below Cleary and Ransley's (1993) estimate for 1991-92.

A growing livestock industry's ability to source sufficient feed from the domestic grain market depends on a number of things. Two primary factors are the overall size and structure of the grains industry. Ultimately the grains industry faces an arable land constraint. Since the mid-1990s, the industry appears to have been operating close to that constraint. A strong competitive advantage in producing high quality wheat and malting barley sets a further limit to expansion of feed grains planting. Against the area constraint, yield increases have been important in recent years. For example, wheat and barley yields in the 1990s were 30 per cent higher than in the 1980s (Knopke, O'Donnell and Shepherd 2000, p. 12).

Another important factor is the relativity between yield increases in the cropping industry and feed conversion efficiency growth in the livestock industries. For pigs, estimates from Cleary and Ransley and Meo and Cleary indicate an annual decline in feed requirement per unit of output (grower liveweight conversion) of around 0.7 per cent. At that rate of improvement in feed utilisation the pig industry could continue to grow at its annual

1990s rate of a little over 1 per cent with only a very small increase in feed use. No reliable information is available for feed conversion on poultry and feedlot operations. However, an increase in feed conversion efficiency similar to that in the pig industry would have done little to lower the rate of increase in feed use in these industries over the 1990s.

One development that may reduce domestic feed demand is the removal of market milk subsidies in the dairy industry. Until 1 July 2000 dairy farmers in New South Wales, Queensland and Western Australia were paid price premiums to fill fixed production quotas throughout the year for milk directed to the domestic market for fresh milk products. Lembit, Topp, Williamson and Beare (1988) found that the requirement in New South Wales that each quota holder had to fill the quota throughout the year raised the cost of milk production. To maintain quota production through periods of seasonal pasture shortage, farmers have to rely on a variety of supplementary feeds. In 1997-98, supplementary feed used per cow in New South Wales and Queensland, respectively, was around two and three times the amount used in Victoria, the main producing state in which there was no market milk scheme (ABARE 2000b). With the removal of quotas and market milk premiums, producers would be expected to seek least cost ways of producing milk, regardless of the timing of production. The adjustment in production systems may cause a decrease in demand for supplementary feed in the states that had market milk regimes up to June 2000. However, the change in demand would not be large. If all dairy farmers in New South Wales and Queensland lowered their use of supplementary feed to the level on Victorian farms, the feed released would be a little less than 10 per cent of that currently used on feedlots.

A larger intensive livestock industry runs the long term risk of more frequent periods of high feed prices caused by fluctuations in domestic grain production. Hafi and Rodriguez demonstrate that the relative location of livestock and crop industries matters, as does aggregate demand and supply. Local shortages may drive up local prices even when production is well above use in aggregate. Periodic rapid increases in feed prices, however, may constrain development of both the pig and feedlot industry. In particular, such price surges may make it more difficult for producers to guarantee product lines and prices through integration of farm production, processing and marketing.

The likely future changes in feed use in the poultry, pig and dairy industries discussed above amount to an increase of less than 0.5 million tonnes over five years. That increase is small relative to feed exports in most years and relative to the increase in feedlot use over the 1990s. Expansion of feedlots dominated growth in feed use through the 1990s. The main question, then, is how much potential there is for expansion of feedlotting. There is a good chance that the recent growth in throughput from small feedlots is fairly price sensitive. Low feed prices, good beef prices and quite reasonable feeder cattle prices are all likely to have contributed to the expansion. To the extent that this is true, then the forecast that has feedlot production peaking in a few years might turn out to be reasonable.

Conclusions

While a wide range of factors may influence the competitiveness of the Australian beef industry, a few stand out as being particularly important. Developments on Asia Pacific markets are important. The pace of trade policy change will be important, especially in north Asia. US and Canadian trade policies still detract from the Australian industry's competitiveness. The potential for expansion of exports from South America may also influence the relative competitiveness of Australian beef in world markets, and hence the volume and value share of global trade. Brazilian currency devaluation and drought in Uruguay appear to have driven export expansion in the short term. In the longer term the extension of freedom from foot and mouth disease throughout the region will be important.

There are also important domestic influences on the industry's competitiveness. Productivity growth in the industry is important — in the beef industry itself, in competing industries and in meat processing, transport and communications.

In recent times the beef industry has been competitive in terms of its ability to attract and maintain investment and output. Development of markets for live cattle and grain fed beef has played a part in that competitiveness. Rising productivity has helped the industry to at least maintain its domestic resource base. Key questions for future competitiveness concern the extent to which the feedlot sector can expand without reaching the constraint of domestic feed availability and the efficiency gains that are possible in meat processing.

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