



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

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

*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.*

Competition and Exit in Meat Processing: A Queensland Case Study.

John Rolfe

Central Queensland University

P.O. Box 197, Emerald, 4720.

Ph. 07 49 822 904

Fax 07 49 822031

Email j.rolfe@cqu.edu.au

Russ Reynolds

Queensland Department of Primary Industries

GPO Box 46, Brisbane Qld 4001

Ph.. 07 3239 0511

Fax 07 3221 4049

Email reynolr@dpi.qld.gov.au

Abstract.

Queensland is the largest meat producing state in Australia, has the largest processing capacity and is the major meat exporting state. The processing sector is under substantial pressure for change, with current utilisation rates of 70% or below being sub-economic. There are a number of possible reasons for the decline in the profitability of this sector, including the loss of supplies through the live cattle trade, increased physical capacity and throughput, changed industrial relations and a move to enterprise bargaining agreements, and the impost and structure of government regulation.

Of particular interest is the extent to which low utilisation rates, in spite of the current high slaughter, are the result of competitive forces within the processing industry. The development of excess capacity is predictable behaviour in a declining industry where survivor firms position themselves for increased market share. As well, intense competition on price may also be a facet of competitive behaviour designed to hasten the exit of rival firms. However, given the magnitude of redundancy costs it is rational for firms to remain operating while just breaking even, or as long as creditors allow when they are making losses. Paradoxically, fewer, but more efficient producers would reduce processing costs and may increase prices paid for livestock.

In October 1998, the Queensland Government committed \$20 million to the restructuring of the processing sector to achieve viability and sustainability goals. Determining the effective focus of restructuring will require a clear understanding of competitive forces within the processing sector, and the extent to which over capacity is exogenous to the sector.

KEY WORDS: meat processing, over capacity, declining industries, exit models.

Paper presented to the 42nd annual conference of the Australian Agricultural and Resource Economics Association, Christchurch, January 20-22, 1999.

1.0 Introduction.

In October 1998, the Queensland Government announced a three year development initiative aimed at boosting viability and sustainability in the meat processing industry. An initial \$20 million has been allocated to the initiative, which is focused on job creation through encouraging developments in the area of value adding and down-stream processing. The initiative follows an inquiry in 1997/98 by the Queensland Meat Processing Consultative Committee (MPCC) which made a number of recommendations about facilitating change in the meat processing industry (MPCC 1998).

Underlying these activities has been a period of economic hardship in the processing industry. This is manifest in the low utilisation rates of plants in the 96/97 period, together with some recent plant closures through economic circumstances. Because the industry is characterised by low margins and high volume turnover, profitability and high capacity utilisation are closely related (Morrison 1997). Generally utilisation rates of around 80% are regarded in the industry as being desirable and profitable, while utilisation rates of around 60% tend to be unprofitable (Rolfe 1988)¹.

While the symptom of over capacity is clearly distinguishable in recent years, the underlying causes are more difficult to determine. For convenience, these causes may be summarised into four broad groups.

In the first are loss of supply issues, where available supply may be reduced through factors such as drought, cyclical run downs in the state herd numbers, competition from interstate processors, and the export of live cattle to south-east Asian and other markets. This latter factor has been widely perceived as having a major influence on utilisation rates, particularly for northern Queensland abattoirs.

In the second group are factors that change the capacity of meat processing plants. These would include factors such as the construction of new capacity, the introduction of new technology and management skills, and changes in the productivity and supply of labour. Ongoing reforms of industrial relations in Australia have meant that this latter factor has also been a major contributor to over capacity issues in meat processing.

In the third group are institutional and other factors which limit the operation of normal market adjustment mechanisms to rationalise the meat processing industry. Here the structure of Workcover premiums, redundancy commitments, and uncertainty about the future of government-owned plants might all operate to impede exit.

In the fourth group are the strategic behaviour actions of market participants. In some cases the construction of new capacity and improvements in technology can give a firm a competitive advantage in the market place. In a declining industry, the acquisition of over capacity may be a logical action in response to expectations about 'lumpy' exits and changed market share. As well, the expansion of capacity may be a strategic short-term action designed to hasten the exit of competing firms and achieve industry rationalisation in the longer term.

In determining the appropriate policy towards industry rationalisation, the Government also has to consider factors such as:

¹ Seasonal variations in supply mean that 100% utilisation rates are impractical. Rolfe (1988) summarises a variety of evidence about the impact of different throughput rates on costs and profitability, and concludes that, depending on the works, a rise in utilisation rates from 60% to 80% might be associated with cost efficiencies of between \$1.55 and \$12 per head.

- the competitive forces driving industry change,
- the efficiency of current institutional and trading mechanisms,
- the impact of change on employment and regional economies, and
- the necessary encouragement of industry development and reinvigoration.

The key issue of interest is why over capacity continues to rise in the face of financial difficulties, and whether it is the outcome of market forces or structural inefficiencies. Future exits from the meat processing industry appear likely to favour the larger plants and companies that can best achieve scale economies, but raise questions about whether effective competition will diminish.

To explore these issues, and to determine the appropriateness of government support for changes in the meat processing industry, this paper is organised as follows. In the next section, an overview of the meat industry in Queensland is presented, together with a brief history of plant closures during the past fifteen years. In section three, some theory is reviewed regarding exit models and competitive behaviour in declining industries. Institutional impacts on firm's economic viability and hence competition for livestock is then explored. This sets the scene for reviewing the current underlying causes of over capacity in the meat processing industry. Supply issues are reviewed in section five, while utilisation issues are reviewed in section six. Discussion and analysis follow in section seven, and conclusions are presented in section eight.

2.0 The meat processing industry in Queensland.

Over 40% of Australia's beef herd is located in Queensland. Numbers have increased since 1995², partly as a result of better seasonal conditions (see Table 1). The focus of the beef industry in Queensland is primarily on export markets, and approximately 80% of product is exported to countries such as Japan, the United States, South Korea and Taiwan. In contrast, the focus of production in southern states tends to be on the domestic market, which accounts for approximately half of the national production. While there are some inefficiencies and price levelling activities, pricing between domestic and export markets is generally efficient (Chang and Griffith 1998). This is because there is a high degree of substitutability of meat between different markets, because many carcasses are broken up into specific cuts for different markets, and because there is effective competition for cattle across large geographical areas.

² Cattle numbers peaked in Australia in 1976 at 33.4 million head, but declined rapidly after that point. However, meat production has remained high as a result of improved turn-off rates and feeding practices, and the overall decline in production has been slight.

Table 1. Total Meat Cattle Numbers³

Year	Meat Cattle in Australia (million)	Meat Cattle in Queensland (million)	Queensland's share of herd (%)
1987/88	19.3	8.5	44.13
1988/89	19.9	8.7	43.65
1989/90	20.7	9.2	44.42
1990/91	21.2	9.6	45.1
1991/92	21.4	9.7	45.37
1992/93	21.6	9.6	44.5
1993/94	23.1	9.7	41.84
1994/95	23.0	9.7	42.14
1995/96	23.6	9.9	42.12
1996/97	23.8	10.1	43.25
1997/98	23.7	10.4	43.94

(Source: updated from Reynolds and Sangster 1998a, compiled from ABS data)

Total cattle numbers in Queensland are not a very accurate indication of supply for four important reasons. First, supply is influenced by seasonal conditions and the extent to which cropping and feedlotting is used to improve the condition and weight of slaughter cattle. Second, herd dynamics mean that the proportion of females in slaughter are proportionally lower in a build-up phase, and therefore that cyclical supply cycles exist. Third, there are often significant inter-state movements of cattle, for slaughter, fattening (store) and live export purposes, which may impact on supplies in both the short and medium term. Fourth, supplies of slaughter cattle may differ across regions. Queensland is typically categorised into southern, central and northern regions for this reason.

Table 2. Cattle slaughterings in Queensland

Year	Total Slaughterings (million)	Percentage Female	Percent of total Qld herd
1987/88	2.54	39.8	29.8
1988/89	2.27	33.8	26.1
1989/90	2.40	32.5	26.1
1990/91	2.66	34.8	27.7
1991/92	2.87	38.9	29.4
1992/93	2.94	36.4	30.5
1993/94	2.85	36.1	29.5
1994/95	2.65	35.0	27.3
1995/96	2.57	34.5	25.8
1996/97	2.60	40.1	25.8
1997/98	3.11	44.2	29.9

(Source: updated from Reynolds and Sangster 1998a)

Some of these factors can be noted from Table 2, where total slaughterings were very high in the 1991-1993 drought years. As well, it is notable that slaughterings have been lower in the 1995-1997 period as cattle producers have opted to 'store cattle on grass' rather than sell them in depressed market conditions. However, in response to depressed prices for beef in the last three years, producers have begun to slaughter higher numbers of females. This

³ There are approximately 3 million dairy cattle in Australia, which are excluded from these figures. The dairy industry in Queensland is small, and accounts for only 3% of total cattle numbers in Queensland.

indicates that despite the better seasonal conditions the herd is currently in liquidation with a cyclical reduction in numbers likely to continue into the early part of the next decade⁴.

Over the past 15 years, some fifteen export plants have closed in Queensland, representing a significant rationalisation of capacity (see Table 3). The Borthwicks-owned meatworks in Bowen was the last export plant to close (in 1996-97), but another three smaller domestic plants closed in the last two years..

Table 3. Meatworks closed in the past 16 years.

Location	Owner	Export	Date Closed	Nominal Capacity (000's per 50 weeks)
Mareeba	AMH	Yes	1984	80
Cape River (Pentland)	AMH	Yes	1986	112
Mt Isa	AMH	Yes	1986	56
Queerah (Cairns)	AMH	Yes	1986	110
Ross River	Smorgans	Yes	1995	120
Bowen	(Nippon)	Yes	1997	150
Total for north region				574
Rockhampton	Fitzroy River Meats		1997	15
Total for central region				
Colmslie (Brisbane)	Borthwicks	Yes	1982	160
Bremer R. (Ipswich)	AMH	Yes	1985	160
Oxley (Ipswich)	Huttons	Yes	1992	100
Doboy (Ipswich)	KR Darling D.		1992	60
Willowburn	KR Darling D.	Yes	1992	60
Roma	Morex	Yes	1995	115
Maryborough	Morex	Yes	1995	80
Bromelton	AMH	Yes	1996	218
Bundaberg	QAC	Yes	1997	25
Landsborough	Sunland	no	1998	15
Total for south region				1008
Total for state				1582

(source: Adapted from Reynolds and Sangster 1998b and updated).

Large cattle numbers and slaughter rates in the late 1970s prompted a significant expansion in processing capacity in Queensland, with an increase in capacity of 32% between 1975 and 1982 (Rolfe 1988). The plants then faced work practices characterised by single shifts and a tight 'tally' system. Most of this expansion was met through the construction of new plant, which was also needed to meet export standards in many of the overseas markets⁵.

⁴ It would require a turnaround in demand as well as perhaps transfer into the industry by current woolgrowers to arrest this trend in the short term.

⁵ This is particularly important since it is a number of these plants that are now at the close of their economic life and will require a significant capital injection just to continue to meet the even more demanding export standards of today. The investment demands are even greater if the plants are to be competitive on costs.

When a cyclical downturn in slaughter numbers occurred in the early 1980s, it became clear that significant rationalisation would need to occur. An Industry Commission inquiry in 1983 recommended that market forces rather than government intervention be allowed to drive such rationalisation, although the Livestock and Meat Authority of Queensland had a temporary ban on issuing new export licences, effectively preventing new entrants into the processing industry.

The plant closures of the late 1980s were in response to these rationalisation pressures. However, most of the plants closed were the older, inefficient plants that had reached the end of their operating life (Reynolds and Sangster 1998b), and plants that were unable to compete in an era of improved transport systems for livestock (Rolfe 1988). As such, these closures can be viewed as rational operating decisions by the processing companies wishing to concentrate their operations in their more efficient plant

By the 1990's though, plant closures tended to be forced by financial losses rather than operating inefficiencies. In 1992, Huttons closed their Oxley works in Brisbane, and in 1995 Morex went into liquidation and closed works at Roma and Maryborough. A number of crises have occurred with overseas markets, particularly associated with chemical residues in meat, and the BSE and E Coli scares in Europe and Japan respectively have depressed overseas demand. At the same time that there have been downturns in export demand, leading to lower prices and even tighter processing margins. Low throughput and utilisation rates have reduced operating efficiencies from 1994 to 1997. Since 1997, higher throughput has masked to a degree the economic pressures. Overall though, profitability in the processing sector has been low in recent years, perhaps very close to zero (Morrison 1997).

There are currently 19 export certified works in Queensland, of which 15 primarily process beef (see Table 4). There are a further 10 major domestic abattoirs, and approximately 87 slaughterhouses, mostly located in regional centres.

At the same time that plant closures have been occurring, there has been a steady increase in throughput and utilisation of existing plants, particularly in southern Queensland. Between 1996 and 1998, plant capacity increased more than 21 percent, from 3.537 million to 4,290 million head, mainly due to increases at Dinmore, Oakey and Murgon. This reflects a long term trend, as can be shown from Table 5.

Significant additional capacity has come on-stream each year in the past decade as a result of plant re-building, removal of production bottlenecks, improved technologies, changed work practices, and more rarely, new plant construction. In particular, there has been a decrease in slaughter numbers since 1992/93 (when supplies were boosted by drought turn-off and feedlotting), occurring concurrently with the steady increase in processing capacity.

The higher utilisation rates between 1991/92 and 1994/95 may be viewed as short-term phenomena caused by drought conditions and some plant closures⁶. Utilisation rates are particularly low in southern Queensland, but have remained more stable in central and northern Queensland (Reynolds and Sangster 1998b). In 1997/98 the high slaughter levels associated with the herd liquidation have boosted utilisation rates and stalled, at least temporarily, the expected rationalisation.

Table 4. Current Meatworks in Queensland.

⁶ The exit of significant capacity, as was associated with the closure of the Huttons/KR Darling Downs plants in 1992, can significantly impact capacity utilisation (+5%) and hence profitability in remaining plants.

<i>Location</i>	<i>Owner</i>	<i>Export</i>	<i>Nominal Capacity (000's per 50 weeks)</i>
Stuart (Townsville)	AMH	Yes	250
Bohle (Townsville)	QAC		50
Innisfail	CMG	Yes	125
Tolga	Byrnes		37
<i>Total for north region</i>			462
Mackay	Borthwicks (Nippon)	Yes	162
Rockhampton	AMH	Yes	162
Rockhampton	CMG	Yes	300
Biloela	Tey's	Yes	137
<i>Total for central region</i>			761
Dinmore (Ipswich)	AMH	Yes	625
Beef City (Twba)	AMH	Yes	150
Cannon Hill	QAC	Yes	225
Ipswich	QAC		63
Toowoomba	QAC		30
Coominya	AFC	Yes	100
Gympie	Nolans		40
Kingaroy	Swickers		30
Murgon	South Burnett Co	Yes	225
Beenleigh	Tey's	Yes	200
Warwick	Hart	Yes	100
Grantham	Stockyard/NAP	Yes	125
Killarney	Hancocks		70
Pittsworth	Flood		30
Kilcoy	Kennedy	Yes	125
Oakey	Nippon	Yes	250
<i>Total for South Region</i>			2388
<i>Total for State</i>			3,611

(source: Adapted and updated from Reynolds and Sangster 1998b).

Table 5. Processing capacity and utilisation in Queensland.

Year	Total Slaughterings	Estimated capacity	New capacity added	Capacity lost from closure of meatworks	Capacity utilisation
	(000's)	(000's)	(000's)	(000's)	(%)
1987/88	2,536	3,187	94		79.6
1988/89	2,271	3,286	99		69.1
1989/90	2,399	3,389	103		70.8
1990/91	2,657	3,489	99		76.2
1991/92	2,865	3,590	100		79.8
1992/93	2,935	3,470	100	220	84.6
1993/94	2,853	3,570	130		79.9
1994/95	2,647	3,625	80	195	73.0
1995/96	2,566	3,537	250	338	72.6
1996/97	2,603	3,836	481	175	67.9
1997/98	3,114	4290	484	30	72.6

(Source: Updated from Reynolds and Sangster 1998b)

A severe downturn in world markets in 1996 placed great financial pressure across the beef industry in Australia. This pressure coincided with a fall in utilisation rates to what are generally regarded within the industry as unsustainable levels. Continuation of low capacity utilisation rates, and therefore higher unit costs and lower profitability, would imply that further plant closures may occur (Reynolds and Sangster 1998b). Plant closures generally have significant economic and employment impacts in regional economies, generating political pressure for remedial actions. For these and other reasons, the Queensland Government has taken a keen interest in helping the meat processing industry move towards a solid financial base.

Broad questions about why utilisation rates have fallen so low are more difficult to address. Plant closures over the past ten years have occurred in the context of a general increase in herd numbers (Table 1) but an overall consistent level of slaughter cattle numbers (Table 2). Falls in utilisation levels can thus be mostly attributed to increases in capacity rather than to decreases in supply numbers. This raises the question of why these increases in capacity have been made in a situation of existing over supply in meat processing. Some theoretical background to answer this question is presented in the next section.

3.0 Industry Exit Models

The meat processing industry can be characterised as a manufacturing industry with large plant size and a limited number of operators. Such oligopolies can be fiercely competitive because the limited number of participants generally have high quality information about their competitors, and generally have strong incentives to behave in strategic ways. These outcomes may also apply to declining industries, where surviving firms have a strong interest in predicting the exit of competitors. Because exits tend to be lumpy in terms of industry capacity, each exit may have substantial implications for the capacity, throughput and profitability of surviving industries (King 1998).

Consider an industry where a decline in demand or changes in technology factors has led to large oversupply in capacity. Industries with high fixed costs relative to variable costs tend to respond only slowly to changes in profitability. In some cases firms may suffer losses for several years without exit, although failure to cover variable costs is normally associated with

closure. Many firms in declining industries have substantial choice about strategic behaviour and exit points.

Industry participants often have good knowledge about the relative efficiency of their competitors, allowing them to predict the order of exit (King 1998). Once an exit occurs, then surviving firms can increase market share. Where the exits are 'lumpy', then the resulting change in market share may have substantial implications for turnover and profitability.

Firms wishing to position themselves for the exit of a competitor will want to have excess capacity available, either through the increase of existing capacity, or through the delaying of plant redundancies. Other ways of positioning might include the mothballing of excess plant for re-use at a later date and preliminary moves to acquire the plant of the exiting firm (King 1998).

Lumpy exits in declining manufacturing industries may therefore produce some counter-intuitive results, even where industry participants are relatively passive market players. Firms may rationally increase plant size, or may maintain high throughput levels at low levels of profitability, if there are potential opportunities for increased market share on the exit of a competitor.

King (1998:226) notes that:

Survivor firms will have an incentive to raise current output, mothball plant, increase inventory holdings and investigate the possibility of merger with failing rivals.

Increased capacity and throughput may lead to decreases in both input and output prices as firm's position themselves for changes in market share. While such pricing behaviour can directly hasten the exit of a competitor, it may not be anti-competitive, in contrast to similar behaviour in a growing industry (King 1998). Instead, such pricing behaviour in a declining industry may a rational consequence of expectations about exit patterns. One outcome of decreased pricing for inputs (livestock) would be that industry participants would suffer low returns over the period before the exiting firms left the industry.

The processing sector in Australia is often responsible for price levelling, where prices are held reasonably constant in the face of rising and falling input procurement costs (Griffith, Green and Duff 1991). While price levelling is important for strategic competition, consumer loyalty and export trade reasons, it has the disadvantage that processors tend to receive lower operating returns in a falling market. In a rising market, price levelling should produce greater returns to processors, so that over a longer time frame, short term profits and losses are balanced out (Chang and Griffith 1998).

The existence of price levelling in the processing sector would help to explain the financial stress felt by the sector since 1996. Declines in world beef prices since 1994 would have reduced profit margins as processors levelled out the price signals in their purchases of cattle and other inputs. The fall in available cattle numbers from 1994 would have increased competition between processors as they tried to maintain throughput, and encouraged price levelling to continue. As plant utilisation rates fell, the proportion of fixed and capital costs rose leading to low profit situations.

Consistent with this evidence that meat processors do not automatically pass on all price signals, there is substantial evidence that increasing concentration in the food processing sector is not associated with increases in market power. Hamilton and Sunding (1997) note that when farm supplies in the United States shift outwards, increased concentration can only occur where market power has diminished⁷.

⁷ Firms with market power, such as associated with supplier loyalty, are less likely to lose supply to

At the same time, there is strong evidence that large scale economies apply in the meat processing sector. Anderson, Murray, Teague and Lindrooth (1998) note that capacity, age, vertical integration and horizontal integration were the most significant explanatory variables in predicting exits from the meat processing industry in the United States. These factors suggest that larger, technically efficient firms with experienced staff are less likely to exit.

Morrison (1997) concludes that scale economy measures in Australian meatworks are large and exist across both the long and short runs. The data reviewed⁸ indicates that productivity gains can be achieved by increasing both labour and throughput, that economic profits are very low, and that labour costs appear very high compared to the United States. The implication is that competitiveness has been maintained by lower material costs for livestock into meatworks, but that international trade was forcing searches for operating efficiencies and scale economies, particularly in the United States.

Exit models clearly have some superficial relevance to the meat processing industry in Queensland. If the industry is in some pattern of long term decline or rationalisation, then the ultimate survivor firms have an interest in positioning themselves to increase market share on the exit of competitors. Such a model would help to explain why processing capacity has continued to rise in the face of declining returns to the industry. Further, the model suggests that increased concentration is being forced by the search for scale efficiencies, and does not indicate the possession or use of market power to generate excess profitability (Morrison 1997). However, before this option is considered further, some other factors that might explain the downturn in the industry are considered in some detail.

4.0 Institutional factors and effective competition.

It is possible that restructuring in the meat processing sector has been delayed by a variety of institutional and political factors. If impediments or disincentives to efficient rationalisation of the industry existed, it would help to explain why significant over capacity existed in the meat processing sector over the long term, and perhaps explain why additional capacity continued to be added.

There are several factors that help to explain these trends. These can be summarised under the categories of public abattoir operations, competition policy, government charges and regulations, redundancy commitments and incentives for bankruptcy. Each of these are discussed in turn.

Queensland Abattoir Corporation.

The Queensland Government currently operates three abattoirs under the Queensland Abattoir Corporation (QAC), and the Government has announced that it will be divesting from involvement in ownership by November 2000. The abattoir in Cannon Hill is export accredited, while the Ipswich and Toowoomba works are only domestic accredited (See Table 4). Of the other two QAC abattoirs, the one in Townsville has been leased to a private operator, and the one in Bundaberg was closed in 1997 because of operating cost losses.

Because the Cannon Hill and Ipswich abattoirs represent almost 8% of the State's processing capacity (Table 4), their potential closure and/or replacement by a private operator is a major factor in the size of the processing sector. This was recognised by the MPCC, which recommended that the Queensland Government make an early, definitive announcement of a

competitors.

⁸ The Australian data reviewed by Morrison relates to the 1970 - 1991 period.

future closure date for the abattoirs. This was a part of the restructuring package, which nominated November 30th 2000 as the target date for Queensland Government to cease ownership of the abattoirs. While this will help to rationalise processing capacity, it is currently unclear whether those abattoirs will be replaced by new facilities proposed by Stanbroke Pastoral Company and the KR Darling Downs.

Competition Policy

The dominant player in the meat processing sector is Australia Meat Holdings (AMH), which holds approximately 33% of total capacity in Queensland and a higher proportion of export licensed capacity. AMH has easily the largest plant in Queensland, at Dinmore in Ipswich.

AMH was formed in 1984 as a consortium through the merger of four meat processing companies. One of the four companies, Elders, bought out the other partners in 1988, but in turn sold AMH to ConAgra (a large United States meat processor) between 1993 and 1996. The formation of AMH was pivotal in rationalising the meat processing sector in Queensland.

Between 1984 and 1986, AMH closed five plants of the eleven initially owned by the consortium. These were mostly in north Queensland, where utilisation rates had fallen to about 32% of total capacity in the 1985/86 year (Rolfe 1988). In 1986, AMH purchased the Mackay and Bowen works from Borthwicks, which added significantly to their capacity, and gave them a dominant section of the market in north Queensland. However, the Trade Practices Commission (TPC) in 1988 forced AMH to divest ownership of the Borthwick's abattoirs, which were later purchased by Nippon Meats (a Japanese company).

Since the TPC decision, a further eleven plants have closed in Queensland (see Table 3), including the Borthwick's Bowen plant in 1997. Interestingly, plant closures (notably the Smorgans plant at Townsville in 1995 and the Bowen plant in 1997) together with restructuring and capacity increases have given AMH a similar dominant share of processing capacity in north Queensland (54% of total capacity in 1998) that the TPC was anxious to avoid in 1988 (56% of total capacity with the inclusion of the Bowen works).

In this case, the enforcement of competition policy probably restricted the potential for further rationalisation of the processing sector in north Queensland⁹. If AMH had been allowed to keep the Borthwick's plants, then rationalisation would probably have occurred in a different format, and some of the low utilisation rates of recent years may have been avoided. Here the arguments of King (1998) that competition policy should be sensitive to whether industries are in decline or are in expansion phase appear to be relevant. Merger and takeover activities in declining industries tend to be related to survival opportunities rather than to abuses of market power and thus may be rational and desirable actions in a competitive market situation.

Government charges and regulations.

The MPCC identified some government charges and regulations as barriers towards regulation. The system of payroll tax was identified as a disincentive to further development of value adding activities, while the existence of stamp duty and other 'transaction' costs were identified as a barrier to the amalgamation and rationalisation of enterprises.

⁹ It is notable that since its loss of the Borthwicks Case, AMH has pursued improvements in efficiency through investment in existing facilities (notably Dinmore), closure of some facilities (notably its Fields plant at Ipswich), and industrial relations reform, rather than trying to takeover competitors and rationalising operations.

The operation of Workcover is a major issue for processors, as it has the potential to add up to 10% of payroll costs to the operating costs of abattoir operations (MPCC 1998). One of the difficulties for processors is that premiums are not adjusted fully to past claims, which makes it difficult for firms to minimise Workcover costs.

Improvements in transport and transport infrastructure over the past thirty years have removed a number of competitive barriers to meat processors sourcing livestock. For example, in the mid-1980s, more than 40% of cattle from the northern Queensland region were transferred south for fattening and for slaughter, while more than 50% of the fat cattle turned off from the central Queensland region went to the southern region for slaughter (Rolfe 1988). In some years, abattoirs in southern Queensland have sourced large numbers of cattle from New South Wales and Victoria for slaughter.

This ability to source cattle from large distances gives abattoirs increased opportunity to maintain high utilisation levels, as well as making it possible for scale efficiencies to be realised in large volume plants. An efficient transport network is the key component underlying this change. Continued investment in road infrastructure, together with further efficiencies in rail transport through the national competition policy initiatives seem certain to improve the transport network. This will aid in the further rationalisation of abattoirs to favour the more efficient (and centrally located) works¹⁰.

Redundancies, Incentives for bankruptcy, and effective livestock competition

A particularly large cost facing firms who may wish to consider exiting the meat processing industry is that of redundancy payments for its workforce. In the MPCC report (1998) it is noted that the size of these payments approximates, on average, four years losses for those firms in economic difficulty. This provides the incentive for firms who are in financial difficulties to attempt to hang on in the (often vain) hope that something will happen and they will be able to continue to operate.

Moreover, a firm declared bankrupt cannot by definition be expected to meet redundancy payments. Consequently, meat processing firms contemplating exit face real institutionalised incentives to remain operating¹¹. However, these firms will be unlikely to be able to make substantial capital investments and their costs of production will in all probability be higher than the more efficient producers. It would only be if the lack of investment led to failure to comply with market accreditation that many firms would close.

In an efficiently operating market, it would be expected that the firms achieving scale economies would have lower throughput costs, greater profitability, and hence more purchasing power over livestock. Why then do the lower unit cost plants not source all the cattle at the expense of the higher unit cost plants?

One explanation is that the higher unit cost plants still have some market power, perhaps in relation to export contracts and supplier loyalty. At least in the short term, small premiums for livestock may not be very effective in changing supply patterns. Another explanation is that the lower unit cost plants may be dissuaded by potential complaints about predatory

¹⁰ Most containerised meat exports are shipped through the Port of Brisbane, and the cost of rail containerised meat exports to and from Brisbane from the northern and central regions puts them at a serious cost disadvantage. From the northern region, the rail freight costs per container are around \$800.

¹¹ This may be the explanation why many of the firms that opened their books to the MPCC's special consultant were continuing to operate in spite of needing to draw on family/company reserves and/or the goodwill of creditors.

pricing and other abuses of market power¹². Further, the lower unit cost plants may believe that their more inefficient competitors will exit in any case, and prefer to play a waiting game.

Another likely explanation is that the premiums that the more efficient plants would have to pay to source extra stock to maximise throughput would be higher than the unit cost savings potentially gained. This would occur in the short term where meat processors tend to 'smooth out' market signals (Chang and Griffith 1998), and while the financially weaker firms continued to absorb losses. Restructuring in capital intensive industries will sometimes only occur after long time lags. In the meat industry, it is the cattle producers who will suffer the input cost penalties of processing plants not operating at maximum efficiency.

Paradoxically, the exit of financially challenged firms is likely to lead to higher prices for stock because surviving firms will achieve lower throughput costs. Effective competition for livestock may occur with as few as three and perhaps two major bidders. That is, effective competition may occur so long as there are around three bidders for most lots at auction, or where the producer has around three works to which transport costs allows producers to 'supply direct to works'. Kwoka (1979) and Hay and Morris (1991) note that most of the increases in competition occurs once there are three firms in the market. Carlton and Bishop (1994) consider that studies of various industries seem to indicate that competition works very quickly, with large price effects caused by the entry of a second or third firm, but much lower (and sometimes zero) effects from subsequent entry. This confirms earlier studies of Bresnahan and Reiss (1987, 1990, 1991) which suggest that, in geographically isolated monopolies, duopolies and oligopolies in the US, effective oligopolistic coordination tends to breakdown with 3 or more firms.

5.0 Supply Factors.

One possible reason why over capacity has occurred in the meat processing industry is that the supply of cattle has been reduced. Factors such as drought, cyclical run-downs in the state herd numbers, competition from interstate processors, and the export of live cattle to south-east Asian and other markets may contribute to changes in supply. Here these are analysed in more detail.

While beef cattle numbers in Queensland have increased during the past decade (Table 1), slaughter numbers have trended downwards from 1994/1995 to 1996/97 (Table 2). This suggests that while drought may have played an influencing role in the early 90s, it was not a clear influence in the latter years. There is some evidence of herd rebuilding prior to 1997 (low female slaughter rates in Table 2). However, with continued low prices producers have been liquidating stock for the previous eighteen months. As a result, future turn-off numbers are likely to be high as demonstrated by the 1997/98 and the first half of 1998/99 year trends..

These trends indicate that the downturn in the processing sector may be partly a consequence of cyclical variations in cattle supply. The fall in beef prices in 1995, together with an improvement in seasonal conditions, has seen fewer cattle offered on the market. Increased turn-off and slaughter rates are likely at the beginning of the next decade as herd liquidation continues in response to weak world prices.

Cattle supplies to meatworks have also been affected by the live export trade, principally to south-east Asian countries. This increased substantially from 1993/94, as shown in Table 6, although the downturn in the south-east Asian economies has curtailed the trade substantially. A comparison of Table 2 (slaughter numbers) with Table 6 (live exports) shows that the downturn in slaughter numbers since 1994/95 is approximately matched by the increase in

¹² For example, claims of 'predatory pricing' behaviour were levelled against AMH in 1997 and 1998.

live exports. The bulk of live exports have been sourced from northern Queensland. Because cattle exported are younger than cattle offered for slaughter in Queensland, there is a time lag expected between the reduction of live exports and increased offerings of slaughter cattle.

Table 6. Live exports from Queensland.

Year	Total
1987/88	34,550
1988/89	29,571
1989/90	35,867
1990/91	39,328
1991/92	54,425
1992/93	76,037
1993/94	75,828
1994/95	138,558
1995/96	278,927
1996/97	332,870
1997/98	229,666

(source: updated from Reynolds and Sangster 1998a).

This relationship is diffused somewhat when other stock movements are considered. There are substantial numbers of stock transferred between Queensland and New South Wales, and between Queensland and the Northern Territory for drought, management, feedlotting and slaughter purposes. In some years (eg 1996/97 and 1997/98), Queensland meatworks have sourced large numbers of cattle from New South Wales and Victoria, while in other years more slaughter cattle have been sourced from Queensland for New South Wales abattoirs. These movements are summarised in Table 7.

Table 7. Movements of stock from Queensland.

Movement	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
Northern Territory to Qld	103,799	57,721	161,205	100,506	108,780	108,677	125,148
NSW and Vic to Qld	470,639	373,574	694,344	634,665	366,083	515,446	704,649
Qld to Northern Territory	5,893	41,543	57,461	107,411	194,801	196,76	89,229
Qld to New Wales	449,400	803,387	485,515	322,088	426,247	356,363	234,953
<i>Net interstate movement</i>	<i>119,145</i>	<i>-413,635</i>	<i>312,573</i>	<i>305,672</i>	<i>-146,185</i>	<i>71,044</i>	<i>505,615</i>
Live exports from Qld	48,530	34,494	18,367	31,147	84,126	136,154	140,437
<i>Total net movement</i>	<i>70,615</i>	<i>-448,129</i>	<i>294,206</i>	<i>274,525</i>	<i>-230,311</i>	<i>-65,110</i>	<i>365,178</i>

(Source: adapted and updated from MPCC 1998).

These results show that large variations in cattle movements occur. While some of these are caused by drought and weather conditions, as in 1992 when very large numbers of store cattle went south from Queensland into New South Wales, other factors such as demands from feedlotters and processors are also important. Evidence that long-run markets for beef in Australia are relatively efficient (Chang and Griffith 1998) indicates that pricing mechanisms are effective in providing incentives for meatworks, feedlots and fatteners to source cattle from wide geographic regions. Further, as processors take on a second shift they will take increased steps to seek sufficient stock to maintain a capacity utilisation rate commensurate with profitable operation. The very large movement from New South Wales and Victoria into Queensland in the 1997/98 year indicates that processors in Queensland may have some cost advantages over southern competitors.

Two further conclusions can be drawn from the results. First, the link between live exports and abattoir supply shortages is not straightforward when other cattle movements are taken into account. The development of the live export markets is not an adequate explanation of the difficulties in the processing industry. By extension, the collapse of the live export trade in 1997/98 is not likely to be a major boost to the processing industry.

The second conclusion is that processors can face major shifts in cattle supplies depending on weather conditions and other competitive influences. The change in livestock numbers from year to year from interstate and live export movements can be some 20% of state slaughter levels. This volatility in supply is likely to drive wide variations in plant utilisation rates over time.

6.0 Meat Processing Capacity.

Enhanced capacity appears to be the major reason why low utilisation rates exist in the processing industry. There are several reasons why processing capacity continues to be added to the sector. The first of these is that there may be specialist marketing and processing opportunities in establishing new capacity¹³. As well, new capacity is sometimes desirable in order to take advantage of new technology and to meet regulatory and export standards.

Additional capacity can be sometimes generated at relatively low cost at existing plants by improving or rebuilding sections of plant and streamlining operations. Such additions to capacity generally focus on removing bottlenecks (eg improving chiller capacity) in the

¹³ The construction of new facilities by Hart's at Grantham is one example of this.

production line. The expansion of the AMH plant at Dinmore provides an example of this type of capacity building.

The most important factor in recent additions to capacity has been changes in the industrial relations system. Enterprise bargaining agreements have been negotiated for most Queensland meatworks after the first was introduced at the QAC Cannon Hill abattoir in 1993. AMH was the leading company in negotiating agreements, following a protracted dispute and lock-out at its Rockhampton works beginning in late 1994. In 1996 a new enterprise bargaining agreement (EBA) was negotiated and certified by the union which generated significant productivity improvements.

One of the main reasons why production had been so inefficient in the meat processing sector was the existence of the tally system (Ferguson 1998, Morrison 1997). This system gave workers a set amount of money for processing a 'minimum' number of carcasses, additional money for extra carcasses up to a 'maximum' tally level, and then time and a half for further processing.

The levels of the tally system were historically set on the basis of past kills, so that as improvements in technology and management occurred, the tally thresholds were reached more quickly, and penalty rates applied. The system meant that meatworks had an average operating time of only 36 hours because it was generally unprofitable to pay penalty rates. This was because labour forms the bulk of operating costs, accounting for approximately 65 percent of abattoir operating expenses (Ferguson 1998). The tally system was the major reason why meat processing costs in Australia have been approximately double those of our competitors, even though wage rates in Australian abattoirs are only about 20 percent higher than wages in equivalent US positions (Ferguson 1998).

The tally system provided a powerful brake on efficient operation of meatworks, as well as being a major disincentive for capital investment. It effectively set not only the rates of pay, but also the rate of productivity. Any new investment which improved productivity simply meant that workers would reach the 'minimum' tally in a shorter time period.

The new enterprise bargaining agreements set in most Queensland abattoirs removed the tally system and introduced increases in production levels, multiple shifts, reduced penalty and shift loadings, longer working days, and increased wage rates (Reynolds and Sangster 1998b). The MPCC report highlights that individual firms have advised that the new EBA's resulted in at least a 30% and up to a 45% increase in effective capacity. To realise the potential firms need first to get the new flexible EBA and then only to recruit and train a second shift and often to supply new chiller facilities. The effective doubling of throughput leads to more than a forty percent reduction in unit costs.

The gains from even modest productivity reforms are quite large. Ferguson (1994) reports that a 4 percent rise in efficiency would give AMH a net gain of \$62 million over the next decade, while an industry wide improvement would yield a \$404 million net gain. Among the main beneficiaries of improved productivity are likely to be livestock producers, who currently only receive slightly over half of the returns that US producers receive for an equivalent animal (Ferguson 1998).

The new agreements in Queensland have seen changes in work practices and the introduction of processing shifts at many abattoirs. As a result, the hours of operation and throughput of livestock have increased dramatically. Increased processing capacity has been gained for little or modest amounts of capital and infrastructure. The large increases in capacity in Queensland works in 1995/96, 1996/97 and 1997/98 (Table 5) are principally the result of improved productivity from EBA's. This improvement is likely to continue further as

processing hours are extended further in some works and additional infrastructure (eg chiller capacity) is built to allow increased throughput.

Employment in the meat processing industry has risen slightly since the introduction of the EBA's (Reynolds and Sangster 1998b). Job losses from some plant closures appear to have been compensated for by the introduction of double shifts and increased value adding activities in survivor firms. However, further rationalisation of the industry would be likely to involve significant job losses (Reynolds and Sangster 1998b).

Increases in capacity are predicted to continue as adjustments for labour reforms continue to flow through, and as increased scale returns are sought. In particular, increased plant capacity at the two largest Queensland plants, AMH Dinmore plant in Brisbane and the CMG Lakes Creek plant in Rockhampton, are likely to occur as scale efficiencies are pursued¹⁴. Reynolds and Sangster (1998b) estimated that when projected capacity improvements were taken into account, and estimates of future slaughterings were made, substantial over capacity would continue to exist. Their estimates are presented in Table 8.

Table 8. Projected capacity in Queensland meat processing.

Year	Total Slaughterings (000's)	Estimated Capacity (000's)	Capacity added (000's)	Capacity lost (000's)	Capacity utilisation rate
1987/88	2,5336	3,187	94		79.6
1988/89	2,270	3,286	99		69.1
1989/90	2,399	3,389	103		70.8
1990/91	2,657	3,489	99		76.2
1991/92	2,865	3,590	100		79.8
1992/93	2,935	3,470	100	220	84.6
1993/94	2,853	3,570	130		79.9
1994/95	2,647	3,625	80	195	73.0
1995/96	2,566	3,537	250	338	72.6
1996/97	2,603	3,836	481	175	67.9
1997/98	3,114	4,290	484	30	72.6
1998/99	3,100	(4429) [4079]	138	(0) [349]	(70.0) [76.0]
1999/2000	3,050	(4357) [3910]	150	(222) [319]	(70.0) [78.0]
2000/2001	3,000	(4286) [3750]	150	(221) [310]	(70.0) [80.0]
2001/2002	2,750	(3929) [3438]	140	(497) [453]	(70.0) [80.0]
2002/2003	2,600	(3714) [3250]	130	702) [630]	(70.0) [80.0]

(Source: updated from Reynolds and Sangster 1998b).

Note: Estimates in () represent the effect of minimal closures in abattoirs, if only 70% capacity utilisation is achieved (total closure of 1,642,000 head of capacity, or 38% of 1997/98 capacity over the next 5 years).

Estimates in [] represent the effect of increasing capacity utilisation to 80% (total closure of 2,061,000 head of capacity, or 48% of 1997/98 capacity over the next 5 years).

If the industry maintained its high 1997/98 throughput and capacity continued to expand at the rate outlined in Table 8, then utilisation would fall to 62% by the year 2002/03¹⁵. Such rates would be unsustainable, and some plant closures would be inevitable. The potential for

¹⁴ Scale efficiencies are available at a plant operational level, at a marketing level into specialised export markets, and at a downstream processing level.

¹⁵ These figures are sensitive to estimates about total slaughter levels. If slaughterings are higher because of changes in live export patterns, turn-off rates or supply from southern states, then utilisation rates will improve. An additional 250,000 slaughter cattle in 2001/02 would increase average utilisation rates above 67%.

plant closures is summarised in Table 8, where between 1,642,000 and 2,061,000 head of capacity may need to close by the year 2002/3 if the industry is to achieve economic profitability.

The impact of plant closures would not be uniform across Queensland. Most plant closures are likely to occur in regional areas in southern Queensland. More than ten plants may be potentially at risk in this region under a major rationalisation scenario (Reynolds and Sangster 1998b). In comparison, the northern and central regions appear likely to lose only one or two plants from each region. Across Queensland, a total of up to 20 plant closures and some 6000 jobs have been identified as being at risk over the next five years if a major rationalisation was needed to return the industry to strong profitability.

With such a rationalisation likely, it might be argued that new investment would cease and hence the need for rationalisation would be sharply reduced. However, existing survivor plants will continue to invest in the search for greater efficiencies in order to first catch up and then keep pace with overseas competitors. Consequently, if supply of stock both in Queensland and from other States is limited, new investment likely, and capacity utilisation unable to fall too far least profitability be cut and firms go out of business; then some considerable rationalisation seems inevitable. With jobs a high political priority, then some circuit breaker needs to be found. A principal option identified in Queensland is to seek greater value adding within Queensland's beef industry, and the Meat Processing Initiative was framed to reflect this priority.

7.0 Discussion and conclusions.

The problems of over capacity and low profitability in meat processing in Queensland appears to be the result of a number of factors. While some, particularly those relating to the supply of cattle, are exogenous to the processing industry, many others are endogenous. Among the questions of interest are whether processors have generated over capacity problems through strategic behaviour initiatives, what plants might exit through projected rationalisation over the next few years, and whether exit from the processing industry will automatically lead to increases in market power for surviving firms.

The construction of over capacity in the meat processing industry may be a strategic response to large variations in the supply of cattle, particularly stemming from climatic variations and supplies from southern states, and also to expectations about the future exit of competitors. However, there is little evidence that cost savings from scale efficiencies are being used to price competitor works out of the market for livestock, indicating that strategic behaviour is tending to be passive rather than aggressive.

It appears that the two dominant reasons why capacity expansion has occurred, and will continue, is that industrial relations reform in Australia has prompted major efficiency gains in the meat processing industry, and abattoirs are continuing to reduce their operating costs by searching for scale efficiencies. This is against the base of rapid expansion in the late 1970's, which generated a capacity that could only have continued to be sustainable given continuing restrictive work practices of the type in operation until around 1996.

The search for scale efficiencies has been driven by a number of factors. First, meat processing plants enjoy substantial cost savings from large scale operations (Morrison 1998). Second, the trend towards globalisation and increased export competition has put increased pressure on meat processors to match the cost efficiencies of their overseas competitors. (It is no accident that the initial focus of labour reforms have been in Queensland, where processors are competing in export markets and have little ability to pass costs on to end-users). Third,

the process of microeconomic reform in Australia has improved the efficiency of the transport sector, making it easier for centrally located plants to source large numbers of livestock over wide geographical areas.

The rapid increase in capacity as a result of reforms in the labour market seems set to continue because of the large efficiencies and cost savings available. As a direct consequence, profitability can only return to the industry if significant rationalisation occurs. At the projected rate of capacity increase, up to twenty plants would have to close in Queensland over the next five years to return the industry to profitability. The actual number to close may be lower than this because firms may choose to operate at sub-economic profit levels and because the competitiveness of Queensland plants may improve relative to southern processors. While the current liquidation phase continues, pressures for rationalisation will be muted, but once slaughter numbers move into another cyclical lull, the pressure for rationalisation will be extreme.

While the effects of capacity rationalisation may be softened by moves to increase downstream processing and value adding initiatives (key recommendations of the MPCC), the overall effect of rationalisation will be to capitalise on production efficiencies. One benefit of rationalisation will be the increased ability of processors to pay more for livestock inputs. Substantial concentration in the industry may be expected over the longer term, but this should not be taken as an automatic loss of market competition or efficiency. Instead, it can be viewed as a logical outcome of globalisation, labour market and micro-economic reform in Australia. The challenge for government will be to encourage rationalisation in ways that maintain effective competition within the sector and encourage investment and further development in downstream processing.

References.

- Anderson, D.W., Murray, B.C., Teague, J.L. and Lindrooth, R.C. 1998 "Exit from the Meat Packing Industry: A Microdata Analysis", *American Journal of Agricultural Economics*, 80(1):96-106.
- Bresnahan, T. and Reiss, P., 1987, "Do Entry Conditions Vary Across Markets", *Brookings Papers on Economic Activity*, 3: 833-871.
- Bresnahan, T. and Reiss, P., 1990, "Entry in Monopoly Markets", *Review of Economic Studies*, 57(4): 531-553.
- Bresnahan, T. and Reiss, P., 1991, "Entry and Competition in Concentrated Markets", *Journal of Political Economy*, 99(5), October, 977-1009.
- Carlton, W., and Bishop, W., 1994, "Merger Policy and Market Definition Under the EC Merger Regulation", in Hawk, B., (ed), *Antitrust in a Global Economy*, Fordham Corporate Law Institute, Irvington on Hudson, 409-443.
- Chang, H-S, and Griffith, G.R. 1998 "Examining long-run relationships between Australian beef prices", *Australian Journal of Agricultural and Resource Economics*, 42(4):369-387.
- Condon, J. 1998 "\$20m plan to revitalise abattoirs", *Queensland Country Life*, 29th of October, p. 9.

- Ferguson, J. 1998 "Agriculture: A case study in industrial relations reform", *Australian Journal of Agricultural and Resource Economics*, 42(3):321-332.
- Griffith, G.R., Green, W. and Duff, G.L. 1991 "Another look at price levelling and price averaging in the Sydney meat market", *Review of Marketing and Agricultural Economics*, 59(2):189-201.
- Hamilton, S.F. and Sunding, D.L. 1997 "The Effect of Farm Supply Shifts on Concentration and Market Power in the Food Processing Industry", *American Journal of Agricultural Economics*, 79(2):524-531.
- Hay, D.A. and Morris, D.J., 1991, *Industrial Economics and Organisation – Theory and Evidence*, Oxford University Press, New York.
- King, S.P. 1998 "The Behaviour of Declining Industries", *The Economic Record*, 7(226):217-230.
- KPMG, 1998 *The Queensland Meat Processing Industry: A Strategic Perspective*, "Queensland Meat Inc.", A Report to the Meat Processing Consultative Committee, Department of Primary Industries, Brisbane.
- Kwoka, J., 1979 "The Effect of Market Share Distribution on Industry Performance", *Review of Economics and Statistics*, 61: 101-109.
- Meat Processing Consultative Committee (MPCC), 1998 *Meat Processing Industry at the Crossroads: Options for Actions*, Department of Primary Industries, Brisbane.
- Morrison, C.J. 1997 "Economic Performance, Cost Economies and Pricing Behaviour in the US and Australian Meat Products Industries", *Australian Journal of Agricultural and Resource Economics*, 41(3):361-383.
- Reynolds, R. and Sangster, R. 1998a *Queensland Trends No 1. Cattle Supply: Demographics, Slaughter and Live Exports*, Department of Primary Industries, Brisbane.
- Reynolds, R. and Sangster, R. 1998b *Queensland Trends No 2. Meat Processing: Establishments, Capacity Utilisation and Employment*, Department of Primary Industries, Brisbane.
- Rolfe, J.C. 1988 *Trade Practices Commission versus Australia Meat Holdings: A Search for Economic Evidence*, unpublished Honours thesis, Department of Economics, University of Queensland.