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Evaluating the Export Growth Strategy of the Australian Pork Industry

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Abstract

Small size, dependence on domestic feed-grain and the generic nature of pork would suggest poor export prospects for Australia's pig and pigmeat industries against leading export countries in North America and Europe. The federal government challenged the industry to do just that when it began opening the domestic pigmeat market to imports in 1990.

The 1998 pig industry crisis converted industry and government from protagonists to partners in a concerted export growth strategy. The Federal Government commenced a $24 million Business Grants Program for the Pork Industry, including processing investment incentive grants and assistance to improve competitiveness through alliance formation. Industry formed an Export Marketing Group (EMG), transformed in April, 1999, into a processor alliance, the Confederation of Australian Pork Exporters (CAPE). CAPE quickly defined the industry's export marketing target to achieve 20 percent of farmed pigmeat production as exports by 2002.

After very slow export progress until the late-nineties, 'lucky breaks' arising from pig industry disease outbreaks in Asia have led to better export opportunity in Japan and a trade alliance for pork exports to Singapore. From minimal in 1998, Australia now supplies more than 50 percent of Singapore's fresh pork requirement with Airpork, airfreighted, chilled pork.

The paper:

- Outlines the growth of pork imports and exports in the transition from protected domestic industry to open market, with government assisted restructuring;
- Presents a value chain analysis of the Australian pork industry, explaining the apparent anomaly of simultaneous growth in pork exports and imports where domestic aggregate pork production and consumption are approximately equal;
- Provides an explanation for the deviation between assessment of poor prospects and actual export performance.

A qualitative evaluation of the growth prospects for pork exports from Australia in both the short-term and the longer-term is presented with consideration of key strengths, including Australia's favourable environment for minimal-disease pig farming, product differentiation and freight logistics, weaknesses in small size and domestic feed-grain dependence and threats from imports.

Recent spectacular pork export success fits comfortably with modern trade theory, where factor endowment, economies of scale and product differentiation are all relevant to explaining intra-industry trade and the development of niche markets.

"When there is a split in the path ahead always take the hardest route." Paraphrased quote from Nepalese proverb cited in the film, Himalaya, 1999 (released in Australia in December, 2000).

Contents

Figures and Tables

1. Introduction

The aim of this paper is to evaluate the progress and prospects of Australia's pig and pigmeat industries on the world market. Prior to 1990, the industries were comfortable in the protection afforded by disease prevention quarantine regulations. The decade since has seen:

- Progressive opening of the domestic market to pork imports;
- Delayed linkage of the domestic pork market with the world market, and
- Government assistance to pig and pigmeat processing industries in their pursuit of export markets.

The paper:

- overviews federal government pork industry policy during the past decade;
- examines the progress of Australia's pork industry in its exploitation of unexpected export market opportunities in Asia;
- evaluates the null hypothesis that Australia's pork industry has a very limited role to play in the international market due to competitive disadvantages.

2. Australia's Pork Trade Policy and Prospects

2.1 Pork Trade Policy: 1990-2000

In 1990, when the Federal Government began opening the market to imports, the Australian pork industry believed that it had been forced onto a very hard route, exposed to unfair competition against industries aided by generous government assistance. Prior to 1990, the industry had enjoyed effective protection of the domestic market against uncooked pork imports, via Australian Quarantine and Inspection Service (AQIS) blanket quarantine based on potential disease threats. A progressive relaxation and re-assessment of pig meat import protocols commenced in July, 1990, and continues (AFFA, 2001).

The government's ‘choice' was driven by a mixture of philosophy and necessity: philosophy as a member of the Cairns free trade group within the World Trade Organisation (WTO) and necessity as a member of WTO and the legal requirement to comply with new sanitary and phytosanitary (SPS) rules. The alternative of non-compliance risked retaliatory trade sanctions for other primary industries and would have undermined Australia's membership of the Cairns Group free trade bloc within the WTO. Through several inquiries during the nineties the pork industry tested WTO rules for trade in agricultural products, initially launching anti-dumping cases against Canadian imports in 1993 and 1995 (Industry Commission, 1995).

In 1998, when domestic pork prices collapsed, amidst low world prices and rising imports, the government responded with another two inquiries. Firstly, a Rural Adjustment Scheme Advisory Committee (RASAC) inquiry into whether the situation met the criteria of the Rural Adjustment Scheme's Exceptional Circumstances. When that inquiry concluded in the negative, a Productivity Commission (PC) Pig and

Pigmeat Industries: Safeguard Actions Against Imports inquiry was instigated; a precedent WTO safeguards case in Australia (Productivity Commission, 1998b).

The pork industry fought a lone battle during these inquiries as the peak farmer body, the National Farmers Federation (NFF), held its hand in the trade interests of its more powerful affiliates and other primary industries. The looming federal election in late 1998 appeared to hasten the government's mid-year initiation of a $24 million industry adjustment package (see Appendix 1). During the election, the industry tested the government's patience with its spoiling role in marginal electorates (McKenzie, 1998).

This saga of pig and pigmeat industries 'anti-dumping/unfair trade' inquiries deflected the energies of both industry and government in any progress along the difficult export growth path. In November, 1998, the PC concluded that:

- the collapse in pork prices was due to an increase in imports from a depressed world market;
- the local industry had linked with the world market through a collapse of a voluntary agreement among processors and wholesalers, and
- although a tariff would be a justified safeguard action against imports it was not the best route to the future for the industry.

The PC report was not contested by government or industry. Griffith and Chang (2000), report on their econometric support to the PC about the influence of Canadian imports on domestic pigmeat prices:

"…the story seems to be that when imports were first allowed, volumes were small and rather irregular and there was little consistent impact on the domestic market. However, as the trade became established, volumes grew and became more regular. As imports became regarded as an established source of supply, the domestic market had to adjust to the presence of imports and prices fluctuated as import quantities varied. These adjustments often took several months.

As imports continue to increase, it is likely that the domestic market will continue to be affected. In addition, imports are now allowed from other suppliers and further approvals are being sought. However, the safety net of greater pigmeat exports has recently come into play and it is hoped that this will likely take some of the adjustment pressure off the domestic market. Unfortunately, these data are not yet available in sufficient quantities to allow that to be shown in statistical analyses like that described above.

So, in answer to the question posed in the title to this paper, yes, Canadian pork imports do influence NSW pigmeat prices. This evidence was the basis of the Productivity Commission's finding that safeguard measures can be justified under the WTO criteria (PC, 1998, p. xxxi)."

The credible and instructive conclusions of the PC inquiry, the re-election of the Coalition government and recovery in pork prices enabled full focus on the industry/government export strategy. A more detailed review of the PC report and the significance of the period for industry adjustment and trade development policy is provided by Ronan (1999).

Although the pig industry's succession of claims of unfair competition and damage from pigmeat imports were largely vindicated by the 1998 PC report it could be inferred that the industry was not confident about its chances of success in an export strategy when its best market, the domestic market, was being penetrated by product from Canada and Denmark. Local industry believed that government assistance to the pork industry in those countries was significant, placing their imports at an unfair advantage (Brechin, 1998). The best export efforts of the Export Marketing Group, and Australia's leading exporters, Bunge Meat Industries (BMI), and Chisholm Manufacturing, had made little progress in Japan or elsewhere to that point.

2.2 Export Growth Strategy: 20 Percent by 2002

In April, 1999, the Confederation of Australian Pork Exporters (CAPE) was created with National Pork Industry Development Program funds, replacing the Export Marketing Group. CAPE soon articulated a stretch target for the industry to achieve 20 percent of farmed pigmeat production as exports by 2002.

2.3 Evaluation

2.3.1 Poor Pork Export Prospects!

After the injection of public funds into the pork industry in 1998, freelance economist, Dr Alistair Watson, turned his attention to the pork industry's export prospects (Watson, 1999). The title of Watson's paper, Pigs!, effectively conveys the sentiments of the author with respect to the strategy of taxpayer funds for pork export market development. The timing of the assistance, just prior to an election, is relevant but was not deemed sufficient by the industry to dissuade it from a marginal seats campaign during the election! The reasons for Watson's undisguised scepticism about the value of allocating public funds to the pork industry's export effort merit elaboration as they contain the seeds of a null hypothesis for our evaluation of Australia's pork export prospects.

Watson expressed doubt as to whether pork had sufficient differentiating features for imports and exports to coexist in the Australian market:

"For most agricultural products, it defies commonsense that exports could coexist with imports of the same product – generally described as intra-industry trade" .

Watson concurred with the Productivity Commission that differing consumer demand for various pigmeat cuts within countries leads to a world trade in cuts, with premiums and discounts to achieve within country carcase balance. So, the popularity of spare ribs in Canada generates a surplus of pork legs for export to Australia, where pork legs are very popular. While quality products will usually find a market, the outlook generally for Australian pork exports, according to Watson, is likely to be limited to participation by a few firms on a spasmodic basis:

“The quality of Australian pigmeat and the excellent animal health standards of the Australian pig industry also ensure that some Australian producers and processors will be able to compete on export markets from time to time.”

Watson appears to have a ‘bob each way' here. The general thesis is that Australia has little chance of export success against the major exporting countries. However, the case was qualified by the concession that Australia's quality pork products will occasionally be competitive! This begs the question: How much pork would need to be exported to negate the main thrust by Watson that taxpayer funds in favour of the pig industry have been misallocated? Further, that the expenditure will be wasted because the export exercise has little chance of success.

Watson's critique concluded that the Australian pork industry had little chance of success in third markets against the world's leading exporting countries (in North America, and Europe). Lack of competitiveness, particularly in relation to feed-grain costs, was central to Watson's doubt about Australia's pork export potential:

“It is most unlikely that that the Australian (pork) industry in aggregate can compete in third markets with North American producers with access to lower cost raw materials and less competition from other meats on their domestic markets.”

“…the best that can be hoped for is that some Australian producers and processors will be competitive on export markets in non-drought periods.”

“…Australian firms in intensive livestock industries are unable to manage price risks effectively because of ‘single desk' or export monopoly powers of the (grains) boards.”

Watson's scepticism about the prospects of the Australian pork industry on the world market begs an evaluation of the strategy and its outcomes, albeit at an early stage. If Watson is correct, then the best efforts of the industry are likely to come to little. What would be required for Watson's assessment to be incorrect? Does the Australian pork industry have real export prospects beyond the kick-start provided by government in the Business Grants Program?

2.3.2 A Null Hypothesis

From Watson's critique we define the elements of a null hypothesis for Australian pork exports as follows:

- that pork is a relatively undifferentiated product;
- that the Australian pork industry produces quality products, but is mainly uncompetitive in the international market;
- at best, only a minority of firms in the Australian pork industry will be capable of exporting competitively and only some of the time.

In sum, the null hypothesis is that the prospects for sustainable growth of exports by the Australian pork industry are poor.[4]

In the following sections the Australian pork industry's export performance and outlook will be tested against this null hypothesis, based on Watson's analysis, that, at best, exporting will be engaged in by a minority of producers and processors, that it will be risky and unreliable.

3. Exporting Pork: The Hard Route

3.1 1990 - 1997: One Percent Progress!

Until May 1997, Australia's pigmeat exports had spent the decade averaging around 600 tonnes per month, with four main customers: Germany, New Zealand, Russia and France. These countries accepted over 90 percent of Australia's exported pigmeat. Most trade with Germany and France was in feral pork and Russian trade was in low-grade, frozen product averaging less than A$2 per kilogram. During this period, about 40 percent of pigmeat leaving Australia was feral. Hence, farmed pigmeat exports averaged about 360 tonnes per month. Considering that some exported products were offal, the weight of which is not included in Australian pigmeat production figures, exports represented around one percent of Australian farmed production for the period 1990 to 1997.

3.2 1997: Lucky Break # 1- Japan

Japan became Australia's most important export market in mid-1997, following the diagnosis of Foot and Mouth Disease (FMD) in the Taiwan pig population. Taiwan was the world's third major exporter of pork prior to the FMD outbreak, supplying 70 percent of Japan's imported pork. The following year FMD also appeared in South Korea, another major supplier to Japan. The Japanese were quick to cease dealing with Taiwan (and later, South Korea), and Australia's share of their market rose from about 50 tonnes per month to the current level of more than ten times that amount (Figure 1).

The quality of Australian pork is highly valued by the Japanese. Jamieson (2000) refers to the following attributes of Australian pork in the

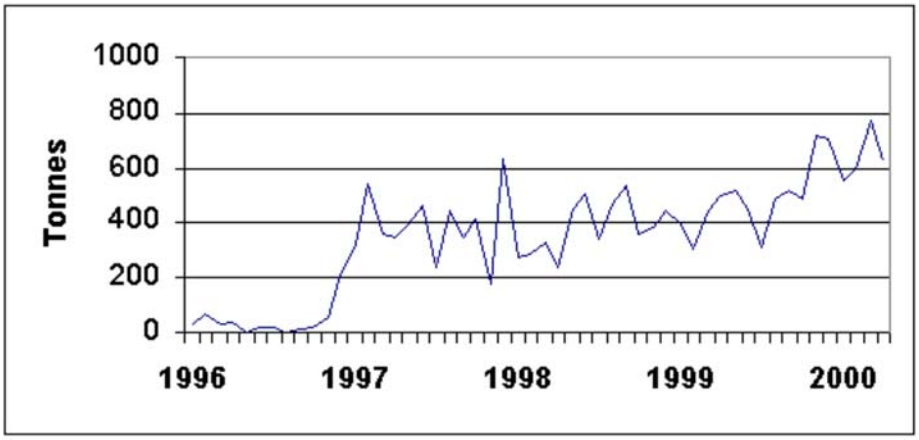
Japanese market:

- ‘Clean and green' image;
- Consumer appeal of pork with bright meat and snow white fat;
- Quality and flavour similar to Japanese domestic pork;
- High quality feed grains (barley and wheat), with no genetic modification;
- Strict hygiene and safety systems (Hazard Analysis Critical Control Point (HACCP));
- Government inspection by AQIS;
- No hormonal or antibiotic residues (National Residue Scheme), and
- Specific Pathogen Free (SPF) herds.

However, limitations to the potential market include:

- An inability to provide the large volumes of consistent product that the North Americans and Danes can supply.
- Insufficient integrated (abattoir/boning/packing) processing facilities. Japanese buyers see integrated facilities as paramount to product hygiene and freshness.
- Japanese preference for pork with a higher level of intramuscular fat than current Australian pig genotypes and diets produce.

Figure 1: Exports to Japan since 1995, tonnes / month



Data Source: Pig Research and Development Corporation

During 2000, Japan imported, on average, more than 600 tonnes of Australian pork per month, using the ‘gate-price' system to ensure that it did not undercut the wholesale price of pork produced in Japan. This is less than 1 percent of their imported pigmeat and only about 0.35% of domestic pork consumption. However, the Japanese market represented the great majority of farmed pigmeat exports until the Singapore market opened to Australian pork.

Japan appears to offer the greatest opportunity for Australian pork export growth (Parish, 2000; Smith, 2001). A doubling in share of the Japanese market would be of enormous significance to the Australian industry, even though the volume supplied would still be less than one percent of the market. For Australia to double exports to 0.7 percent of the Japanese market changes needed would include:

· Additional investment and construction of export accredited, single-site, slaughter to packaging plants, and

· Ability to sustain supply of adequate volumes of consistent, high quality and correctly presented cuts, with desired levels of intramuscular fat and excess body fat removed.

3.3 1998: Lucky Break #2 - Singapore

The resurgence in the Australian pig industry since the Canadian import crisis of 1997/98 has been largely due to Australia's new export market in Singapore. In late 1998, a virus was isolated from a piggery worker from the village of Sungai Nipah, in the State of Perak on the Malay Peninsula. The virus, which was given the name ‘Nipah', was first observed affecting pigs, and was spread throughout the peninsula via live pig movements. The human form of the disease was contracted by 265 people working with or around pigs, killing 105 (Nor & Ong, 2000).

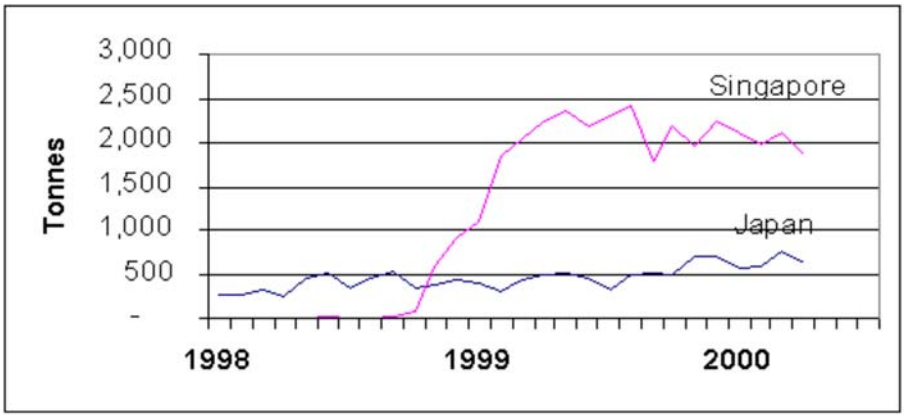
Singapore had been receiving around 3000 live pigs per day from Malaysia, but the emergence of Nipah virus immediately terminated this trade. Of Malaysia's 2.4 million pigs, 1.1 million were destroyed following the Nipah outbreak and de-stocked piggeries are not permitted to restock. The mainly Islamic government is not overly sympathetic to the Chinese-operated pig industry. Geographic restrictions have been imposed on pig production in order to minimise contact between pigs and bat colonies, which were eventually found to have been the source of the virus. For these reasons Singapore is unlikely to resume trade with Malaysia.

In the months prior to the outbreak, the Singaporean government had been dealing with Australia's Pig Research and Development

Corporation (PRDC) in order to align Australia as a potential supplier of pigmeat in the event of the failure of Malaysian supply. Consequently, Singapore and Australia were ready to assume a significant pigmeat trade relationship as soon as the Malaysian industry collapsed (Coates, 2000).

Following the Nipah problem, Australia's share of the Singapore market rose dramatically until about September, 1999, when supply reached a plateau. Singapore is now Australia's major market for pork, taking about two thirds of total monthly exports of around 3000 tonnes (Figure 2).

Figure 2: Exports to Singapore and Japan since 1998, tonnes / month



Data Source: Pig Research and Development Corporation

Singapore's requirement for carcase meat and Australia's proximity to Singapore and ability to supply small volumes on a daily basis are key factors in the trade. Singaporeans have a strong preference for pork to be fresh or chilled; not frozen. North America and Europe are too far away to land chilled pigmeat that still has an acceptable shelf-life. Around 1000 chilled, split carcases are flown from Australia to Singapore each day as ‘Airpork' in the cargo holds of commercial airliners (Economou, 2000). Chilled Airpork from Australia is sold in supermarkets and typically eaten within three or four days of slaughter.

Compared to northern hemisphere product, Australian pork in Asia is valued for:

1. ‘Clean and green' image and the high health status of the national herd. This is our greatest advantage over other pigmeat exporting countries, and is perceived by the Japanese in particular as a unique and highly desirable quality.
2. The white pork fat resulting from our cereal diets is better suited to Asian tastes and cooking methods than the yellow fat of North American maize-fed animals.

Australian pork also has advantages over Asian product:

1. A ‘clean and green' environment with no significant infectious viral diseases.
2. Regularly verified high standards of hygiene that apply to Airpork throughout the supplchain.
3. Hazard Analysis Critical Control Point (HACCP) based quality assurance program (APIQ - Australian Pork Industry Quality Program).

So, Australian pork is differentiated in Asia from northern hemisphere and local product by positive perceptions with respect to production environment, physical appearance and taste.

Figure 3: Competitor Comparison of Attributes in the Supply of Chilled Pork to Singapore

	Australia	North America	Europe	Asia
Freshness	a	r	r	a
Price	a	r	r	a
Clean/green	a	r	r	r
Quality	a	r	a	a

Bio safety	a	a	a	r
Quality Assurance	a	a	a	r

Source: CAPE (2000)

Figure 3 provides a summary of the differentiating attributes and competitive advantages of chilled Australian pork in the Singapore market.

Australian Airpork has achieved 90 to 95 percent share of supermarket pigmeat in Singapore in 18 months; a spectacular marketing success. The outlook in Singapore is for market share to increase for several reasons:

1. Singaporeans are expected to resume consumption of about 30 kilograms of pork per capita per year. Following the emergence of Nipah virus consumption dropped by more than half. It is still recovering.
2. Younger generations are progressively showing a preference for supermarket-packed meat over the traditional ‘wet' (open-air) markets favoured by older Singaporeans.
3. The government encourages supermarket shopping as the more hygienic alternative to ‘wet' markets. At the same time it is upgrading the health standards of meat outlets in ‘wet' markets.

In combination, these factors are very encouraging for growth of Australian Airpork in the Singapore market. The optimistic outlook for this market has recently been secured in a long-term pork trade alliance between the Australian and Singaporean Governments, the $4.26 million Singapore Market Alliance (CAPE, 2000). However, for reasons of small market size and slow demographic change the rate of growth in future is likely to be quite slow compared to the fast growth of the past two years.

4. Beyond 2002: Is Export Growth Sustainable?

The previous section shows that the Australian pork industry has a good chance of achieving its objective of 20 percent farmed pigmeat as exports by 2002. But, beyond 2002, is it likely that the industry will be able to sustain this growth? In this section we evaluate the ability of the industry to sustain the targeted level of exports on three criteria:

- Supply capability
- Competitiveness, and
- Market potential.

4.1 Supply Capability

In 1999/00 Australia produced 5.18 million pigs, with 370,000 tonnes of pig meat being available for sale. Figure 4 shows the percentage of pigmeat production that is processed in Australia, and then exported, imported or consumed in Australia.

Australians are currently consuming slightly more pigmeat than what is being produced. In 1999/00, 14 percent of pigmeat production was exported, while the amount of pigmeat imported was equivalent to 19 percent of production. Since pork consumption exceeds production in Australia, export growth can occur in two ways: in parallel with production increase or by backfilling the domestic market with imported product. The market mechanism is the solution, but in a relatively small market with a small number of wholesalers/importers involving shipping freight logistics, prices will be more variable than in a closed market. This is a point that the Productivity Commission observed in their 1998 report (Productivity Commission, 1998b).

Figure 4: Australian pigmeat production, 1999/00, Source: Food for the Future ScoreCard, PIRSA (2000)

Most of the world's leading pigmeat exporters also import pigmeat (Figure 5). Australia, however, was the only country in this group where imports were greater than exports. Van Berkum and van Meijl (2000) point out how it is becoming more common for countries to engage in intra-industry trade and simultaneously export and import processed foods that are close substitutes for each other. Their study reveals that there are varying reasons for intra-industry trade. These include size of country's economies, vertical integration, economies of scale and country proximity.

Figure 5: Pigmeat trade for selected countries: 1997, Source: FAO Country Statistics

Table 1 shows that in 1999/00:

- Australian exports supplied 53 percent of Singapore's pig meat consumption.
- the Singapore market absorbed 59 percent of Australian pigmeat exports.

Australian pigmeat, however, constitutes a very low percentage of other countries pigmeat consumption. For example, Australia supplied Japan with a mere 0.35 percent of its total pig meat consumption in 1999/00.

Table 1: Major importers of Australian pigmeat, 1999/00

Destination	Volume	Price	Value	Total Consumption	Imported from Australia
	Tonnes (Cwt)	$/Kg (Cwt)	$	Tonnes (Cwt)	%
Singapore	25,604	3.65	93,506,483	48,233	53.08%
Japan	7,466	4.83	36,036,685	2,124,800	0.35%
Germany	1,679	4.43	7,441,906	4,714,262	0.04%
New Zealand	2,797	2.37	6,625,728	76,000	3.68%
France	1,107	4.54	5,034,895	2,182,896	0.05%
Hong Kong	1,554	3.07	4,767,142	306,360	0.51%
Netherlands	1,093	3.72	4,069,697	763,129	0.14%
Korea	993	2.23	2,217,531	959,088	0.10%

Source: ABS Trade Statistics.

A logical objective is to increase market share in a major, Asian region importing country. Japan, Hong Kong and Korea are all major importers and are all in proximity to Australia for air freight. An increase in market share to 1 percent of the Japanese market would almost equal the amount of pigmeat currently being exported to Singapore.

4.2 Competitiveness

There are several issues that will determine Australia's ability to increase its market share in countries such as Japan:

(i) The ‘clean and green' image and lack of significant infectious viral diseases, coupled with high standards of hygiene and quality. Mr Nigel Smith of BMI and processor member of the the Pig Research and Development Corporation (PRDC) believes that ‘Australia's disease-free status is unique and should be guarded with a passion' (Smith, 2001).

(ii) Infrastructure quality and capacity along the market chain in Australia and at exports destinations. Establishment of infra-structure to properly handle the arrival, distribution and retail of pigmeat is a factor that has been critical to success in Singapore (Coates, 2000).

(iii) The Australian pig industry also has to be cost competitive along the supply chain, if existing and new export markets are to be sustained.

A recent comparison of Western Canadian and Australian pigmeat production concluded that Canadian producers are able to produce pigmeat at much lower cost than the Australian pig industry (PRDC, 2000). Key findings from that report include:

- The cost disadvantage for Australia versus Canada to produce a pig carcase is $A 0.45/kgDW for best practice operations.
- Australian Best Practice performance lags the Canadian industry by some 25 percent ($A0.38/kgDW) for production and 33 percent (A$0.07/kgDW) for processing.
- Over 70 percent of the production disadvantage can be attributed to a feed cost disadvantage of around $A0.28/kgDW.
- Australia's higher production costs can be attributed partly to smaller herds (hence lower efficiency in the pig industry).
- Australia's higher processing and boning costs can be attributed largely to higher labour costs.

Reference by PRDC (2000) to feed-grain cost disadvantage in Australia compared to Canada merits scrutiny. Table 2 shows average feed costs in Australia and Canada over three years, 1997-99. It shows the variation that has occurred over these years and how comparisons between countries can be misleading. For example, the difference in Canadian and Australian feed costs in 1998 (the year of PRDC analysis) was 47 percent compared to 26 percent in 1997. In 1999, the cost of feed in Australia in Australian dollars was significantly lower than the two previous years, demonstrating the volatility that can occur in feed costs. This example also emphasises the potential for erroneous long-term conclusions based on short-term comparisons with seasonal fluctuations.

Hayenga et al. (1998) show that feed prices are affected by changing yields, fertiliser, machinery costs and changing government programs

and policy. Hence, care and qualification is needed in comparison of feed and other pig production costs between seasons within the same country. Clearly the difficulties, and hence potential for error, are greater with international comparison; a point confirmed in personal communication with FarmStats consultant on the PRDC project, Mr Gordon Cleary (Cleary, 2000).

Table 2: A$ Feed Cost / Kg DW for Canada and Australia, 1997-1999

	Canada	Australia
1997	0.99	1.25
1998	0.85	1.25
1999	NA	0.99

Source : Pig Research and Development Corporation (2000)

The ProAnd/FarmStats value chain comparison (PRDC, 2000) concludes that Australian pig production costs are higher than Canadian production costs, but confidence in the conclusion is qualified by reference to data difficulties. Australia's costs are also calculated to be considerably lower than European and Japanese producers. Table 3 includes some estimates of costs from other studies that supports Australia's ability to compete with other exporting countries from a cost perspective.

Table 3: Estimates of the cost of pig production in various countries (A$/kg DW)

	Boddington	Campbell	Loius
Canada	1.41	1.31	1.39
USA	1.52	1.46	1.75
Australia	1.69	1.89	NA
Netherlands	3.54	1.97	NA
Denmark	NA	2.04	NA
UK	2.52	2.05	2.89
Japan	5.27	NA	6.04

Source: Boddington 1994, Campbell 1995 and Loius 1994, In Industry Commission (1995) p94.

Other disadvantages for the Australian pig industry, identified in the PRDC report (PRDC, 2000) are principally associated with economies of scale. These are unlikely to be addressed in either production or processing without a significant increase in the size of the Australian pig herd and the volume of pigmeat production (Marlow, 2000).

If Australia is to follow the path of increased exports, some important lessons can be learnt to enable a more competitive pig industry to emerge. Hayenga et al. (1998) state that:

- “In producing pork for the export market, one cannot simply look at the primary cost components in producing a pig (feed, buildings and labour), the technology employed and related production efficiency, but they may be quite important.
- The economies of size in pig production and the likely size distribution and cost distribution in the industry certainly affect the amount which the industry would be willing to produce at each price level.
- Location of pig production and feed surplus areas in each country could also have an impact.
- Changing environmental constraints ….. play an important role in affecting supply response.
- Genetics change slowly and seem fairly mobile across boundaries.”

Purdue Cooperative Extension (PCE) Services (1995) detailed cost analysis of four different size enterprises, highlighting the presence of

economies of scale in pig production. Table 4 shows that there could be a marked cost advantage in a 1200 sow piggery compared to a 150 sow unit.

Table 4: 1995 $A Costs of USA Pork Production Systems($/ kg LW)

	1200 Sow High Tech	600 Sow High Tech	300 Sow High Tech	150 Sow High Tech
Total Variable	0.76	0.76	0.80	0.80
Total Fixed	0.42	0.47	0.51	0.59
Total Costs	1.08	1.13	1.31	1.39

Source: Purdue Cooperative Extension Service, 1995.

This analysis assumes that there is no difference between the feed price for each size piggery. The large differences identified, however, are in fixed costs. This includes major differences in building and equipment costs per kilogram of pig meat sold. Three explanations for the economies of scale were provided:

- The ability to buy larger quantities of material and equipment at lower prices.
- Lower cost per unit for larger buildings.
- Greater throughput of animals, resulting in more output per dollar of investment.

Labour cost is another major difference identified in the PCE analysis. Labour cost is lower in the larger piggeries because of the higher level of technology. Larger size also allows each person to be more efficient with their time.

Changed work arrangements in Australian abattoirs have made a significant difference to meat processing competitiveness (Productivity Commission, 1998a).

South Australian mid-North pig farmer, Mr Greg Ludvigsen, believes that there are additional economies of scale advantages that are not taken into account in the PCE analysis (Ludvigsen, 2000). These include:

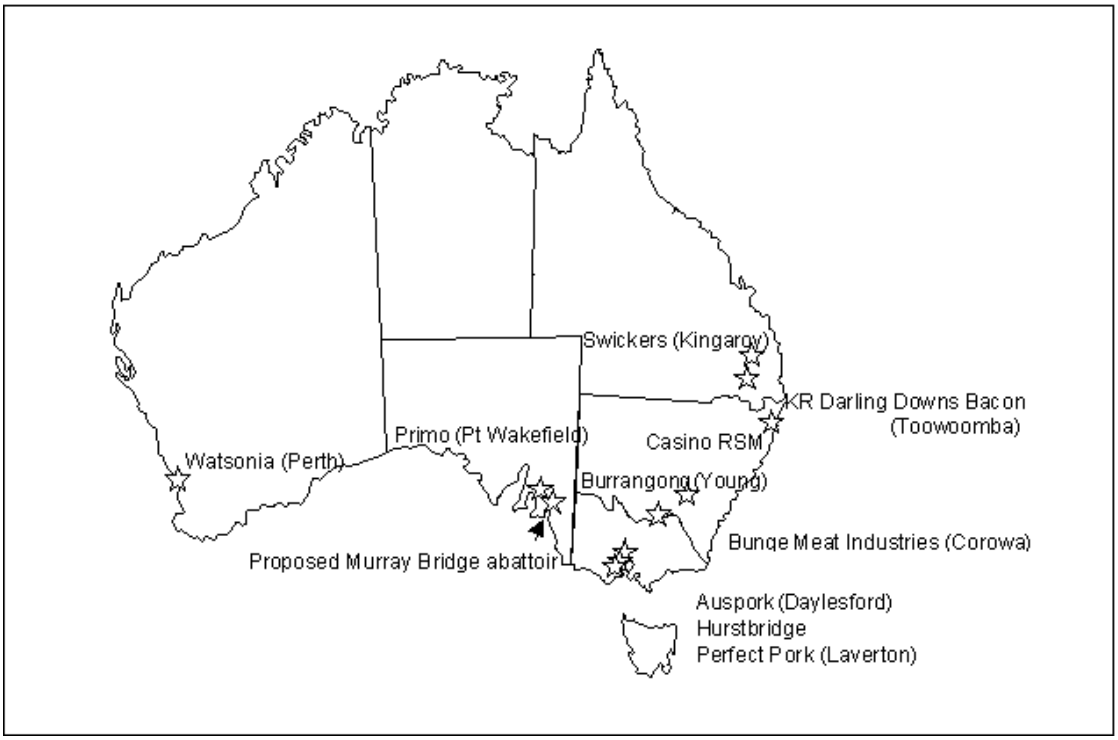
- Significant discounts in feed as quantity ordered increases.
- Cheaper transport costs due to the ability to supply full truck loads of pigs for internal and external transport.
- The ability to improve genetics with larger operations.
- Premium price paid for evenness and guarantee of quality, quantity and continuity of supply.
- Possible sale of electricity from methane gas ejected from effluent tanks. (Piggeries need to be very large before this becomes a feasible alternative).

The PCE analysis is only one example suggesting that there are economies of scale in pig production. Boubaker and Abner (2000) found in their analysis in Missouri that economies of scale are present in pig production (see Appendix 2). Economies of scale and the importance of technical efficiency both help explain why the number of pig operations in USA fell by 8 percent per annum between 1985 (390,000) and 1996 (157,000).

Boubaker (2000) describe economies of scale as simply “the bigger, the better” in economic terms. Economies of scale are defined as the reduction in the average cost of a product over the long run due to a higher output level. Economies of scale can be either internal or external. The former arise from expansion in individual firms, whereas the latter arise from expansion in the industry.”

Economies of scale are also present in pig processing (Brink et al., 1997). Expansion of existing pig abattoirs and building of new processing facilities is supportive of the existence of economies of scale in Australia (Figure 6).

Figure 6: Export Licensed Pig Abattoirs



New market opportunities in Asia, coupled with Pork Processing Grants (PPG) have lifted investment in pork processing infrastructure.

Development of Australian pig meat processing plants include:

- A significant redevelopment of the KR Darling Downs plant at Toowoomba is currently under way. The plant will substantially increase the previous capacity of 250,000 pigs per annum.
- In November, 1999, Danpork announced plans to develop a 10,000 sow piggery with a processing works at Warwick in Queensland with a capacity of 800,000 pigs per annum. The project is yet to proceed.
- Expansion of the Bunge Meat Industries (BMI) plant at Corowa will see a significant increase in capacity from its 450,000 pigs per annum to 950,000 per annum. Chilling facilities have been increased enabling a multi-shift operation to be established (see Appendix 4).
- Plans by Watsonia Abattoir (a subsidiary of George Watson Pty Ltd, which is a subsidiary of Pacific Foods), previously) to increase production and processing capability at Perth in Western Australia from 550,000 head per annum to 1,000,000 head per annum.
- Parallel development of a 10,000 sow piggery by Hurstbridge Abattoir, near Murray Bridge in South Australia, and an integrated abattoir/boning facility at Flagstaff (Murray Bridge Bacon) with eventual capacity of 20,000 pigs per week.
- Expansion and exporting by Primo Smallgoods at Port Wakefield Abattoir in South Australia.

Increased processing capacity at single species, integrated, pork export plant developments will enable Australia to expand supply to Japan and other Asian markets in the immediate future and for the long-term.

4.3 Market Potential

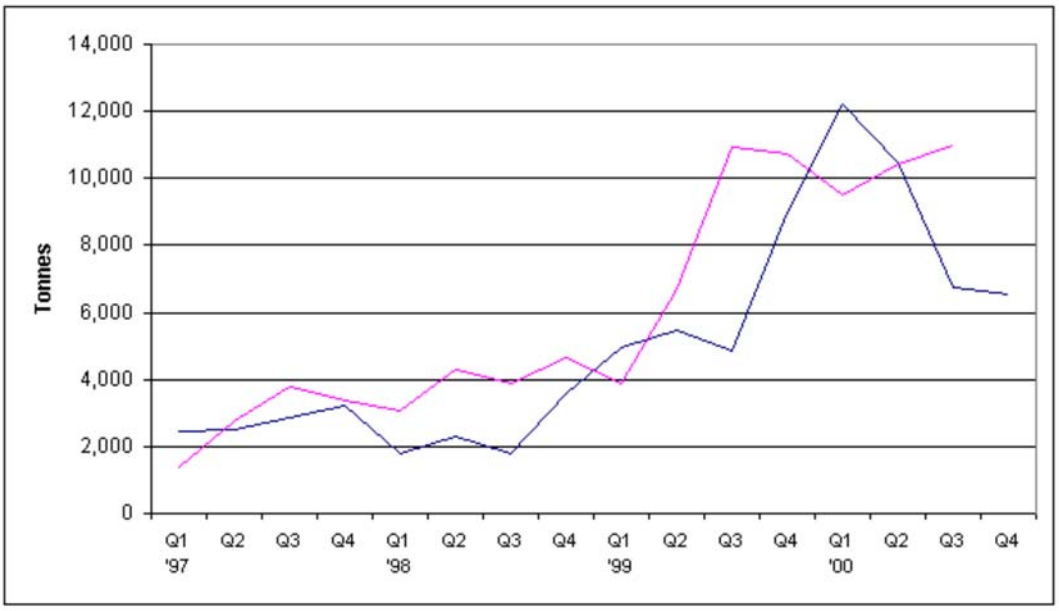
Pigmeat is the world's major source of farmed animal protein and is particularly popular in non-Islamic Asian countries. Domestic pig industries in Asia, Europe and North America are all coming under pressure due to proximity of piggeries and abattoirs to people, environmental pollution and damaging viral diseases (Swine Odour Task Force, 1995; Stith & Warrrick , 1995; European Society of Agricultural Engineers, 1998).

In the short to medium term it is quite likely that the markets established for Australian pork in Asia will be maintained, though the never-ending Japanese recession is a negative in the country identified as the next-best opportunity to further develop (Anon; 2001). Given the extra production that will result from current industry expansion, current minor markets in other Asian countries such as Taiwan, South Korea and Hong Kong may present as opportunities (see Appendix 3).

Edwards (2000), outlines a number of changes that the industry needs to address to produce optimal quality carcases and cuts for export to Asian markets:

- Producers need to address Asian distaste for hormonal boar taint and eliminate it by physical and/or chemical castration.
- Processors need to skin carcases or trim cuts so that intramuscular fat can be increased without presenting large amounts of fat on the periphery of the meat to the consumer.

Figure 7: Australian monthly volumes of imported and farmed exported Pigmeat, 1995 - October 2000



The industry appears to be delicately poised, with imported pigmeat matching export volumes (Figure 3). Prices are currently good, and less Danish and Canadian pigmeat is being imported than was the case early in 2000. However, a strengthening Australian dollar would reverse gains in competitiveness, increase price incentive to import and depress domestic demand and prices at the margin. This push-pull process has few hands on the levers in the small wholesale sector of the industry and the market may overshoot or undershoot as occurred in 1996 (high prices) and 1998 (low prices) (Productivity Commission, 1998b).

There are a number of reasons to be optimistic about the potential for Australian pork in Asian markets:

- The existence of economies of scale and investment in larger piggeries and processing complexes, lifting the potential for pig producers and processors to be cost-competitive, despite a relatively small herd and throughput;
- The potential to modify existing grain import policies to simultaneously satisfy the needs of the grains industry for protection against disease and the needs of the pig and other intensive livestock industries for access to competitively priced feed grain at all times, including drought;
- The existence of product differentiation in pork and the potential to further exploit consumer acceptance of positive discriminating attributes that competitors have difficulty achieving to the same degree (eg minimal-disease herds, well buffered piggeries in a ‘clean' countryside, long shelf-life chilled product).

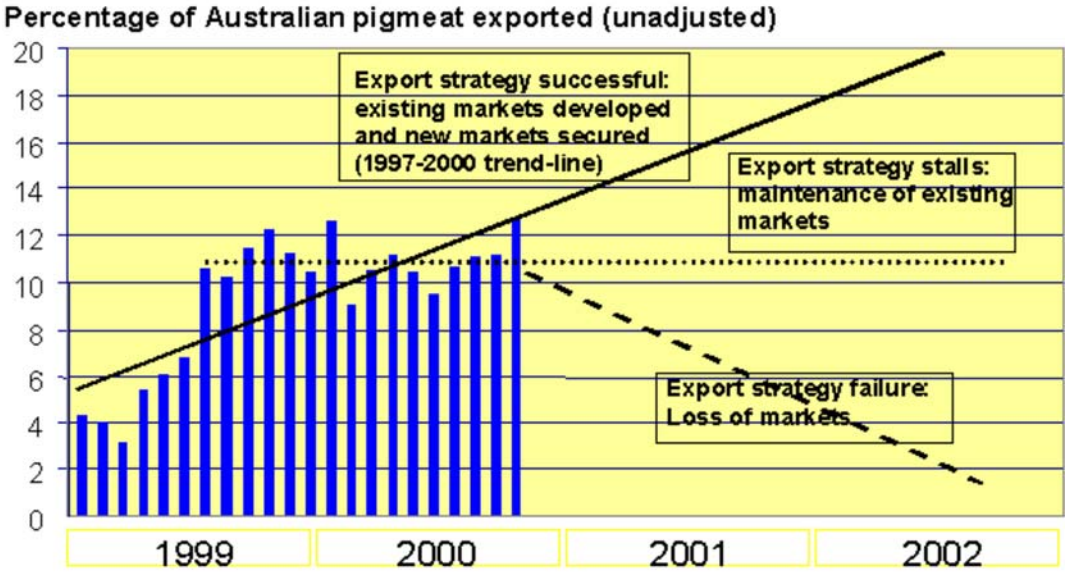
Figure 8 shows three scenarios:

(i) export strategy successful: existing markets developed and new markets secured;

(ii) export strategy stalls: maintenance of existing markets; and

(iii) export strategy failure: loss of markets.

Figure 8: Australian Pork Export Scenarios: 1999 - 2002 and Beyond



5. Conclusions

1. The Australian pork industry has been a slow and somewhat reluctant starter in exporting. WTO compliance dictated Federal Government opening of the Australian market to pork imports in 1990. Linkage of the domestic market to the world market was lagged until 1998 when the gap between domestic and world prices widened and fractured local preference arrangements for Australian product. Industry efforts to increase exports yielded limited results for the first seven years of the decade, achieving a mere 1 percent of farmed pork production as exports by 1997.
2. Cheap imports caused the collapse of domestic pork prices in 1998, creating the imperative for a serious export growth strategy. In 1999, the industry defined the target as 20 percent of farmed production as exports by 2002. With exports currently equivalent to 14 percent of farmed pigmeat production the target appears quite achievable during the next 12 to 24 months.
3. Export success was, and is, no certainty. The diseconomies of a small pork industry without access to world parity priced feed-grain during drought constitute barriers to the success of the strategy. Improved access to the Japanese market in 1998, (following disease outbreak in Taiwan), was followed by quick take-up of the Singapore market in 1999, again the result of disease outbreak in the country of local supply (Malaysia). Neither of these ‘lucky breaks' in the short-term lead to the conclusion that Australia's export growth strategy is a certain winner in the long-term. However, they do represent spectacular success beyond the expectations of industry, government and independent analysts. While the opportunities were “lucky”, capitalising on them was no accident. Both ‘lucky breaks' capitalised on years of industry and government research and development to present Australia as an alternative supplier in both markets.
4. It is possible that the industry could have exploited the fortuitous export opportunities that arose in recent years without the sizeable government adjustment assistance that has been provided since 1998. However, the combination of government assistance, a competitive exchange rate and no drought to affect feed grain supplies and price have contributed to exports hitting 14 percent of domestic production, with more than a year or two to go to achieve the targeted 20 percent.
5. Pork industry leaders share the concerns of agricultural economists, including Watson and the authors, that exchange rates, drought and uncompetitive feed grain prices could provide the conditions to reverse export growth at some point in future. While the Australian Government has little control over exchange rates and none over drought it does have choices in feed grain import policy which would reduce supply and price risk. Without the availability of feed grain from the world market the industry is vulnerable to circumstances similar to the mid-nineties drought when feed grain prices soared, pigmeat prices rose and imports flooded in. So, while there are good reasons for optimism about the pork industry's short-term objective of '20 percent by 2002', there are ongoing threats, some of which could be managed differently to the advantage of the intensive livestock industries in drought. Even with the level of government assistance provided it remains a serious challenge for the Australian pork industry to consolidate in Singapore and expand in Japan and other regional markets.
6. Competitiveness is critical to long-term export success. Recent assessment of lack of competitiveness by the Australian pork industry compared to the Canadian industry are not convincing in the detail, reflecting data difficulties. The industry's export drive appears undaunted by these preliminary and quickly outdated studies. The industry has been blind to Watson's outlook that some producers and some processors will be able to export profitably from time to time. With significant investment in pig production and pork processing infrastructure the industry is orienting to a future where some producers and some processors will be able to export profitably to Asian regional markets on an on-going basis. With sensible change to domestic grain import policy, Australia's pork export growth strategy has a very good chance of success. The reasons for this conclusion are grounded in the quality of the product, the ability to assure the quality of the product and the proximity to Asian markets with a taste for quality pork.
7. While the export route for the Australian pork industry has always had the appearance of a very hard route with uncertain outcomes, the alternative, ‘non-export' route has had the more certain prospect of declining competitiveness, market displacement by imported products and industry shrinkage.

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Appendix 1: Business Grants Program for the Australian Pork Industry

The Government's $24M Integrated Package of Business Assistance Programs for the Australian Pork Industry

The Australian pork industry is facing many new challenges from globalisation, food safety, changed eating habits, technology developments, trade reforms and increased competition, both from other sources of protein and imported pork. However, while there are potential threats to the local industry, there are also new opportunities. New markets are opening in Asia as a consequence of regional economic development, and trade liberalisation through the World Trade Organisation (WTO) and Asia Pacific Economic Council (APEC) is providing opportunities for improved access to export markets.

In recognition of these challenges and the need for the pork industry to adjust, the Federal Government, in partnership with industry, has developed a Pork Industry Restructure Strategy (PIRS), comprising strategic studies to guide this process and business grants to assist industry implement change and improve its international competitiveness. The PIRS recognises the importance of ensuring a number of industry-wide business fundamentals are put in place. These include being internationally cost and price competitive and being able to guarantee a consistent-quality product, in sufficient quantities, to meet customer demands. This requires new skills and business practices, better market information and improved infrastructure.

The following strategic studies provide guidance to the pork industry on these fundamentals, identifying key success factors the industry must address to cement its future:

- The Pork Industry Strategic Plan - a joint initiative of the Australian Pork Corporation (APC), Pork Council of Australia (PCA) and Pig Research and Development Corporation (PRDC) provides an overarching direction to the activities of pork industry organisations to facilitate a coordinated approach to industry adjustment over the medium to longer term.
- The Pork Industry Business Plan - funded under the National Pork Industry Development Program (NPIDP), identifies production, processing and marketing barriers to international competitiveness and export market development; identifies strategies and activities to overcome those barriers most effectively and efficiently; and determines industry-development objectives and priorities.
- The Whole-of-Chain Benchmarking Study - a Pig Research and Development Corporation (PRDC) initiative, funded under the NPIDP, which compares the value chain for pork in Australia with Western Canada, providing valuable comparative data for Australian pork enterprises. For further information on this project refer to Project 34, approved NPIDP projects.
- The Study of Asian Markets - funded under the NPIDP through the Confederation of Australian Pork Exporters (CAPE), previously known as the Export Marketing Group. For further information on CAPE refer to Project 33, approved NPIDP projects.

The Federal Government's $24m business grants programs are tailored to help the pork industry tackle the challenges identified in these strategic studies. These business programs comprise:

- $9m National Pork Industry Development Program (NPIDP)/ to assist eligible industry participants improve their competitive advantage and the overall competitiveness of the industry; identify market opportunities and market development; and/or enhance skills and industry infrastructure. The $1.5m National Networks Alliance Program (NNAP) is funded from the NPIDP, managed by the Australian Pork Corporation and provides assistance to facilitate the development of vertical and horizontal coordination in Australian pork production. The Confederation of Australian Pork Exporters (CAPE) is also funded by $2.7m under the NPIDP.
- $2.6m Singapore Pork Market Alliance Program - A new program aimed at increasing exports of Australian pork to the important Singapore market by strengthening supply chains and reminding Singaporean consumers that Australian pork products are produced to the highest possible standards. The Federal Government has provided $2.6 million to the program managed by the Australian Pork Corporation.
- $8m Pigmeat Processing Grants Program (PPGP) which targets projects that improve the international competitiveness of the pork slaughterhouse/boning room and processing sector by funding new capital investments.
- $1m FarmBis Training Initiatives for Pork Producers - Pork Biz to improve business management practices, including business planning, and financial, human, and natural resources management. The Government, in consultation with the PCA, has chosen a consortium of consultants, headed up by Rendell McGuckian - Agricultural and Management Consultants, to deliver a training initiative nationally in pork producing regions from mid 1999. These training programs will be advertised separately. The program has been extended until 31 December 2000.
- Pork Producer Exit Program. - Now concluded, the Federal government assisted 74 pork producers, who were unable to access commercial finance, to exit the industry with grants totalling $3.4m.

Appendix 2: Economies of Scale in Missouri Pig production

Boubaker (2000) use the following model using Maximum Likelihood technique to estimate the production frontier for the Missouri Hog industry.

Ln(output) = ß0 + ß1 ln (animals) + ß2 ln (feed) + ß3 ln(labour) + ß4 ln(space) + ß5 ln(animals)2 + u –v.

The output is measured by the amount of pig meat that is produced. Inputs used in the function are (1) animals - the beginning inventory of pigs in the piggery; (2) labour - number of labour hours employed; (3) feed - quantity of feed used; (4) space - area available per animal. The square of the number of animals was also used in the regression.

Table 1: Regression Estimation Results for the Production Frontier Model

Variable	Parameter	Parameter Estimate	t-Statistic
Constant	$ß_0$	8.46	4.27
Animals	$ß_1$	0.68	5.23
Labour	$ß_2$	0.37	3.02
Feed	$ß_3$	0.29	3.44
Space	$ß_4$	0.18	2.36
Animal Squared	$ß_5$	-0.12	-1.72

Source: Boubaker & Abner (2000).

As seen in Table 1, the parameters are all significant at the 95% confidence interval, with the coefficient of the animals squared being significant at 90% confidence interval. All these coefficients represent the partial output elasticities of pig production. The sum of these output elasticities are greater than 1, suggesting that economies of scale are present for pig production in Missouri.

Appendix 3: Other Potential Markets for Australian Pork

South Korea

An improvement in economic conditions in Korea is expected to result in continued growth in pigmeat consumption.

The ability of domestic producers to meet increased demand is questionable. Korea must import all of its feed requirements, which contributes to relatively high production costs.

Opportunities for exporters are likely to increase in Korea as domestic consumption expands. In the short term, however, additional production should provide competition for imported pigmeat. While the market for frozen imports is highly competitive, chilled pork imports may provide opportunities for Australian exporters.

The Korean pig industry is likely to struggle with cost competitiveness compared to low cost exporters. Live auction prices in Korea have ranged from $A 1.75/kg to A$2.80/kg between 1997 and 1999.

Taiwan

The outbreak of foot and mouth disease (FMD) in Taiwan in March 1997 began a massive restructuring of the Taiwanese pig industry. The number of breeding pigs fell by 45 percent. It is unlikely that this will increase significantly in the future for the following reasons:

- Increasing environmental concerns.
- Competition for land with more viable industries.
- Taiwan's entry into WTO and subsequent liberalisation of pigmeat industry is likely to affect the local industry.
- Little chance of resuming trade with Japan.

Before the outbreak of FMD, approximately 40 percent of production was exported to Japan. The outbreak of FMD instantly ceased the export of pigmeat to Japan.

Pigmeat is the most popular meat in Taiwan with per capita consumption more than double that of Australia (ie 44 kg/capita) Pigmeat consumption stopped immediately following FMD outbreak but gradually picked up as the industry recovered.

As pigmeat consumption increases in Taiwan, there could be opportunities for exports from more competitive pig producing countries.

Footnotes

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[4] We deduce from the paper that Watson would not have been particularly concerned by this prospect if the strategy did not involve public funds; the fact that it involves public funds injects public interest to the strategy and introduces aspects of accountability. On the latter aspect, Watson forecasts an evaluation that will be favourable to the strategy!

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