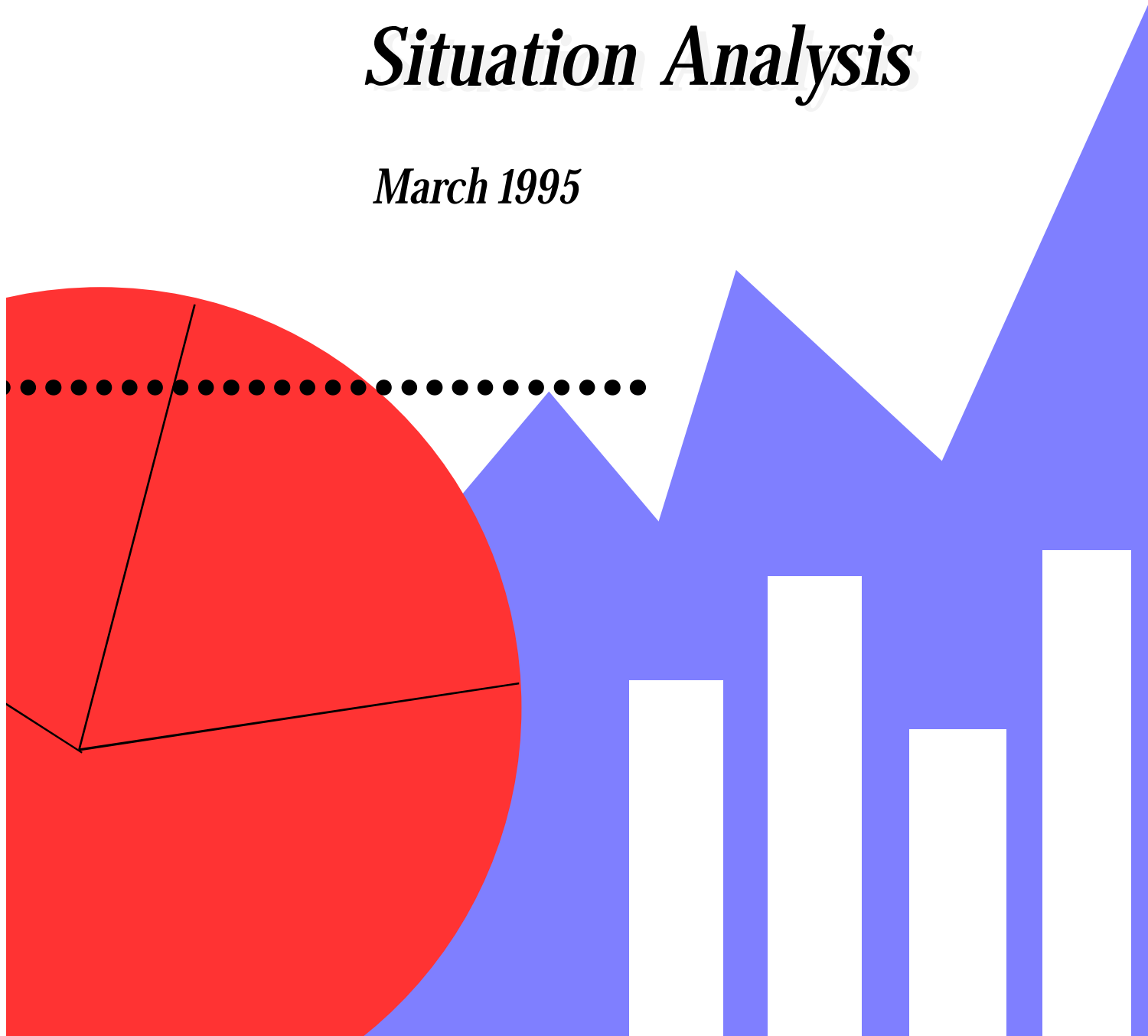




# *NPPC Market Access*

## *Situation Analysis*

*March 1995*



# *Viability of Small U.S. Pork Packing Plants*

## *Feasibility Analysis and Proposal*

by,  
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### **1. Introduction**

This report is addressed to hog producers or producer groups who would like to get into pork packing, and are wondering whether they can make a success of it.

These are likely to be those who survive the present crisis, are committed to hog production, and would prefer to swim rather than to sink as hog prices continue their downward trend in the future. In 1992, SARC'S confidential study *Where is the U.S. Pork Chain Going?* came to the conclusion U.S. hog producers would continue to experience downward price pressure on hog margins - for a long time. To counter this trend, SARC advised those who aimed to stay in the business, to "make plans to sell pork rather than hogs."

At the time SARC could offer little help about whether or how selling pork might be feasible - only that it was necessary.

Most thinking runs counter to this recommendation. A typical U.S. packing plant required the entire production of 100,000-200,000 sows to keep supplied. Even the very largest U.S. producers had not enough hogs in one region to meet this demand.

In other countries, SARC knew typical pork packing operations were not the size of U.S. plants. And they did well. The world trend is towards smaller packing plants, but as the newer U.S. ones were built, they always seemed to be larger.

Contemporary packing wisdom, from both plant operators and builders, claimed modern hog slaughter plants could not hope to compete at fewer than 8,000 hogs per day. In the absence of other information, 100,000+ sows and a \$50 million commitment seemed like a large and risky investment for producers to undertake.

In the past, SARC had often expressed doubts about the economies of large scale packing plants. But in every instance solid evidence was not available to back up these doubts. By 1994, however, the long term prospects for American hog prices left little time for further delay.

Data were assembled and professionals (FJB Systems) were called in to examine packer efficiencies and check out SARC's questions about large vs. small scale plants. Preliminary thinking from this work asks, "Is there a likelihood that smaller packing plants are viable under current U.S. conditions?"

In SARC's business we only aim to be 90%~95% sure that our conclusions are correct. If we spent our budgets covering our reputation we would not fulfil our primary function which is to provide information which is not normally available, and to provoke thought.

By this criterion, these conclusions are strong enough to justify full feasibility studies for producers or groups

controlling as few as 12,000 sows. The body of this report presents evidence on SARC's conclusions. Final chapters offer practical steps and guidelines for groups who wish to proceed to the feasibility stage of their own small scale projects.

Gratitude and deep appreciation are in order for the staff and leadership of the National Pork Producers Council whose financial support and diligent attention have lead to the timely completion of this study.

## ***2. Squeeze on Pork Production Margins***

Although U.S. pork producers have become better and more efficient at producing market quality hogs, most have not been rewarded in proportion to their efforts.

SARC studies, beginning in 1984, document the history of downward price squeeze on U.S. producer margins, and forecast its continuation. All of the prices and trends in this report are given in constant November 1994 Dollars.

### **2.1 Long Term Squeeze**

Hog producers in the U.S., as in all developed countries, have come under increasing price and margin pressure, since the end of the Second World War (Figure 2-1 & 2-2). The two figures use the same data, but they offer different perspectives by covering different time periods.

If we assume that it takes 300lb of corn and 75lb of soybean meal to make one cwt of live hog, then feed ingredients have decreased by 5.6% (\$2.07/cwt of hog) per year between 1979 and 1995. Hog prices over the same period decreased by 4.1% (\$2.56/cwt). This only leaves \$0.49/cwt/year to be accounted for by increased efficiency and pressure on margins. No wonder hog production has been profitable over most of this period.

In the U.S., the Soviet grain purchase in 1973 appears to have destabilized a delicate U.S. pork pricing equilibrium and touched off a long period of increased pressure and steeper price decline.

More recently, specialized hog production has grown rapidly along side traditional multi-purpose farms. This produced parallel production systems and led the U.S. into a structure for over-production of pork.

The hog crisis of the fall of 1994 probably resulted from a normal downturn in the U.S. cycle, amplified by this structural change in ownership of U.S. pork production, and by large production inventories of cattle and poultry.

Specialized producers tend to expand even when prices are low, which:

- ✍ Reduces the amplitude of the cycle.
- ✍ Accentuates long term pressure on prices and costs.

The result is likely to be an average rate of decline of prices and costs even faster than that shown in Figure 2-1 & 2-2.

### **2.2 U.S. Hog Price Cycles and Trends**

Hog price cycles are part of the nature of pork businesses. Professionals operate in a business as it is, not as they would like it to be. The hog cycle cannot be minimised with creative accounting, but cycles can be made to work for you. If you hate the cycle less than others do, this can constitute a competitive advantage.

#### **2.21 Befriending Hog Cycles**

For a hog producer, there are three main ways of getting to hate hog price cycles less than others do:

Figure 2-1

184 [August 1973]

Soviet Grain Purchase

# US Hog Prices 1950-2010

Hog Price in Constant Nov. 1994 Dollars/cwt. Live

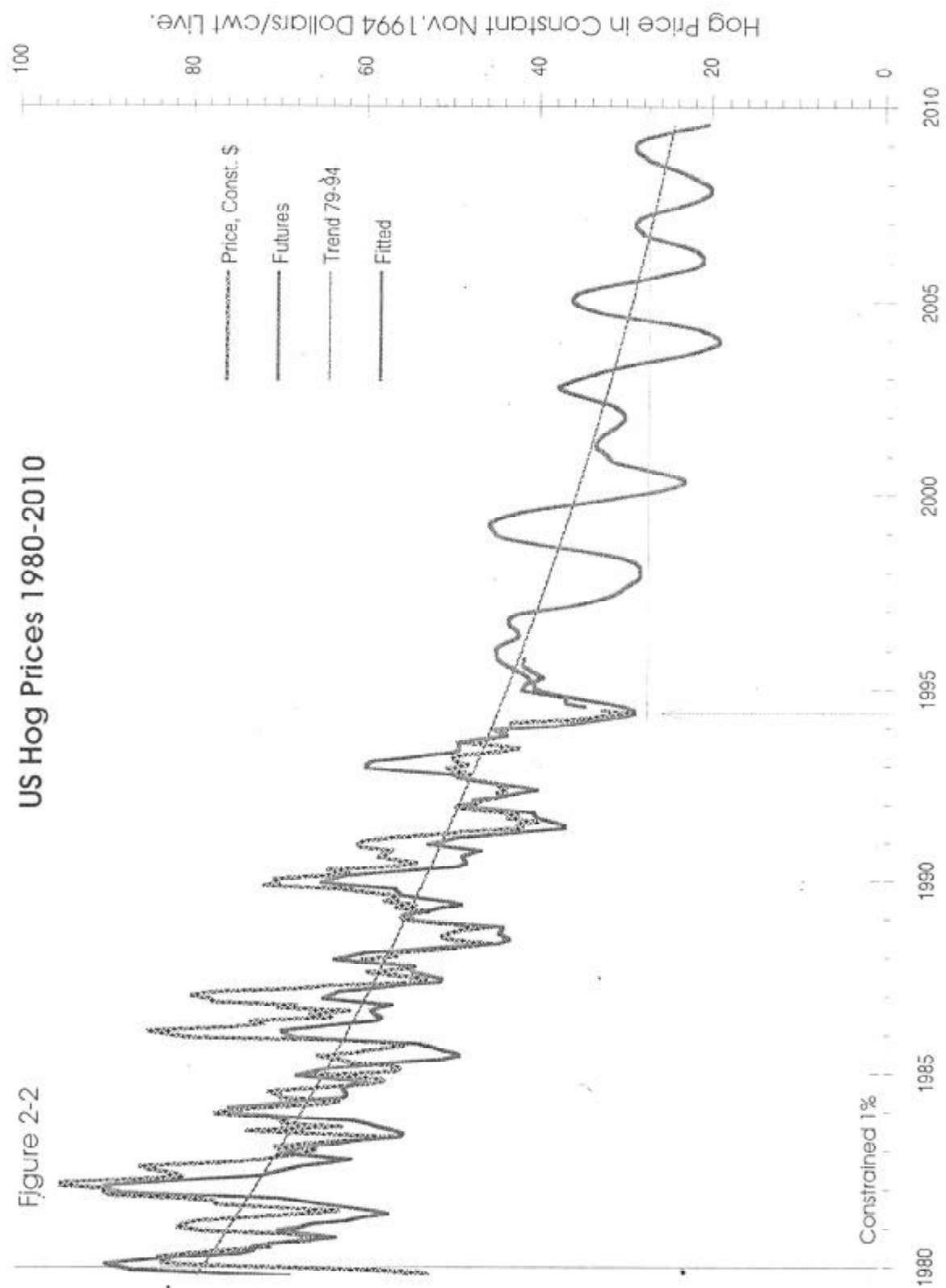
Price, Const. \$  
Futures  
Trend 1950-72  
Jul 1979-Dec 94  
Fitted

Constrained 1%

1950 1960 1970 1980 1990 2000 2010

Figure 2-2

# US Hog Prices 1980-2010



- ✍ Perform better than average, with lower costs, so that the periods of loss are reduced.
- ✍ Organise standby capital so it costs as little as possible during the months when you don't need to use it. Family farms tend to buy a new car when prices are good, and not do so when prices are poor; an efficient system which is not available to corporations.
- ✍ Add value by diversifying downstream.

## 2.22 Packing Cycle

Many people, including SARC, believed that packing margins were counter-cyclic to hog prices. That is, packers make money when producers lose it, and vice versa. Closer examination reveals this was not true in the U.S. between 1987 and 1994, except for the closing months of 1994. Figure 2-3 shows these data.

## 2.3 Forecasts

Long-term trends are not like cycles or weather forecasts. They don't change overnight. In Figure 2-1, the trend and the cycles over the past 15 years have been extrapolated to show the continuing effect of downward price trends for the next 15 years. We think extrapolation is justified in this case because the growth of specialised hog producers will continue to create pressure towards over production, lower prices, and lower costs of production.

The hog cycle keeps costs and prices in balance in the long run. Extrapolating cycles is not a way of forecasting prices on any particular day, week, or month. The usefulness of Figure 2-1 is that it gives a picture of how bad the worst periods are likely to be and whether it is worth staying in the business.

Pessimistic as this graph may appear, we think it is, in reality, optimistic because it assumes no change in the long-term trend. Whereas we think that the current crisis may be the early symptoms of a steeper turn downwards in U.S. pork margins (Figure 2-4).

## 2.4 Use of Forecasts

The consequences of optimistic planning are worse than those of pessimistic planning. If you plan on optimistic forecasts you may get into a business where the only possible outcome is that you sink. If you plan on the basis of pessimistic forecasts, you may stay out of a business where you could have been successful. On the other hand you may find solutions to problems which would be insoluble if you waited until they were upon you.

Most dangerous of all is to plan on the assumption that today's conditions will last indefinitely. We call this "the Concorde Syndrome." Concorde's costs were estimated to be competitive with those of sub-sonic planes which were *in service* when the go-ahead was decided. By the time Concorde came into service the costs of conventional aircraft had fallen and the Concorde was no longer cost-competitive.

In the pork industry, an example is planning for sow productivity. If a new project underestimates what its sow productivity will be, all that happens is that it has to sell a few of its worst feeder pigs, on which it *may* make less profit per dollar's worth of building space, than for finished hogs. If it overestimates what its sow productivity will be, then either:

- ✍ It has empty finishing pens, or
- ✍ It buys in feeder pigs with the likelihood of wrecking its health status.

Either choice is far more expensive than the opportunity cost of a few extra feeder pigs. If you expect to produce 18 pigs per sow, your buildings and business plan should assume 15.

A new project in 1995 must plan on prices at least as bad as those in Figures 2-1 & 2-2. If you cannot find a way to flourish with these prices, it might be better to forget the whole pork business. The following sections are intended to help producers who stay in the business explore one of the possible ways to flourish.

Figure 2-3

### US Hog Production and Packing Margins, 1987-1994

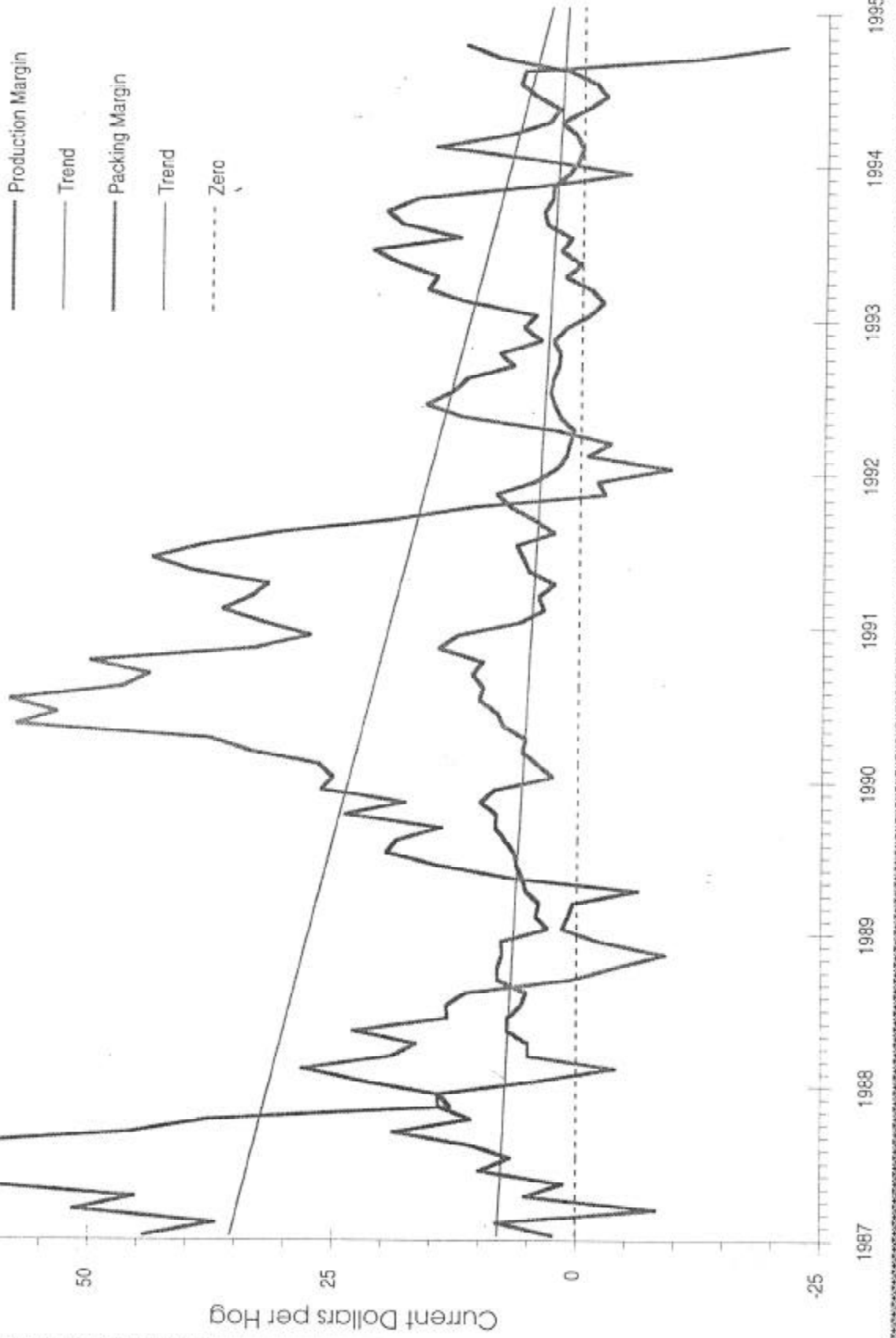
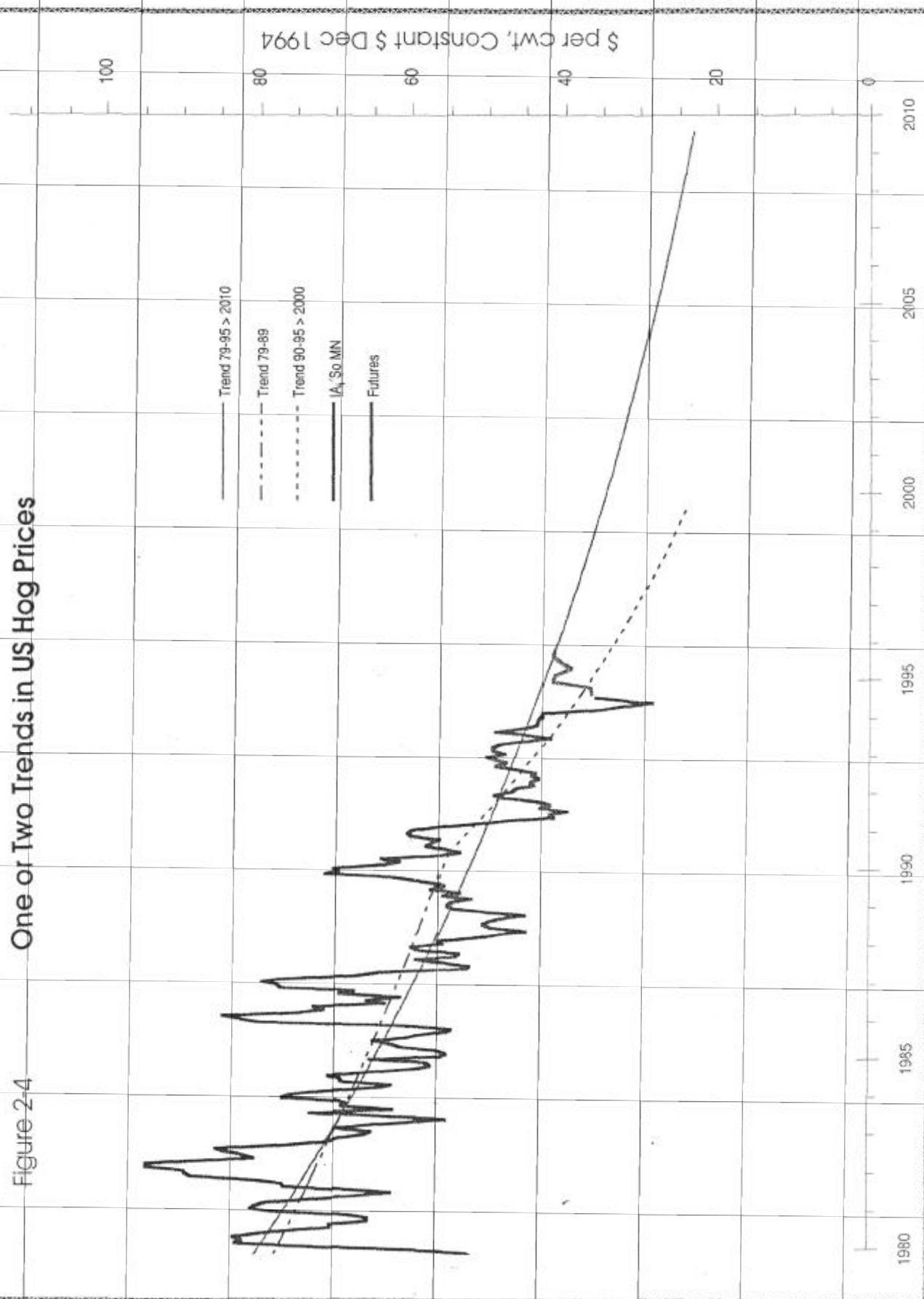


Figure 2-4 One or Two Trends in US Hog Prices





### 3. Alternatives for Hog Producers

The medium-to-long-term outlook for average hog producers, i.e., marketing hogs as a commodity, is not encouraging. Escaping from this situation is difficult; we see only three alternatives, none of them easy:

- ✍ Reduce costs of production
- ✍ Capture someone else's margin
- ✍ Add retrievable value.

#### 3.1 Reduce Costs and Join the Best Third

A common aspect of hog production around the world is the wide variation in cost of production among producers, maybe ten times the variation found among poultry producers. During the fourth quarter of 1994, U.S. hog prices reached a 22-year low. The average Iowa-Southern Minnesota hog price for November was \$28.40.

Almost all hog producers lose money at this price (Figure 3-1). The amount they lose averages \$12/cwt and varies between about \$2 per cwt and \$22 depending on producer costs. The average for the best third of producers is about \$7/cwt loss. This is near the bottom of an exceptionally deep low-price cycle.

SARC foresees the mid-cycle average hog price trend reaching this same low of \$28-29/cwt by the years 2006 or 2007. The hog cycle keeps costs and prices in balance in the long run, so this forecast assumes that costs will decline in parallel due to:

- ✍ Technical progress
- ✍ Survival of the most efficient producers

If so much cost reduction became impossible for technical reasons, such as:

- ✍ An increase in feed prices, and/or
- ✍ The market demanding better muscle quality, and being prepared to pay for it,

then, of course, prices could not decline so fast. However, the pressure on producer margins would be just as great. If pressure is exclusively on prices, then U.S. commodity hogs will risk developing muscle and fat quality problems such as those already observed in Europe or those produced experimentally by very high doses of PST:

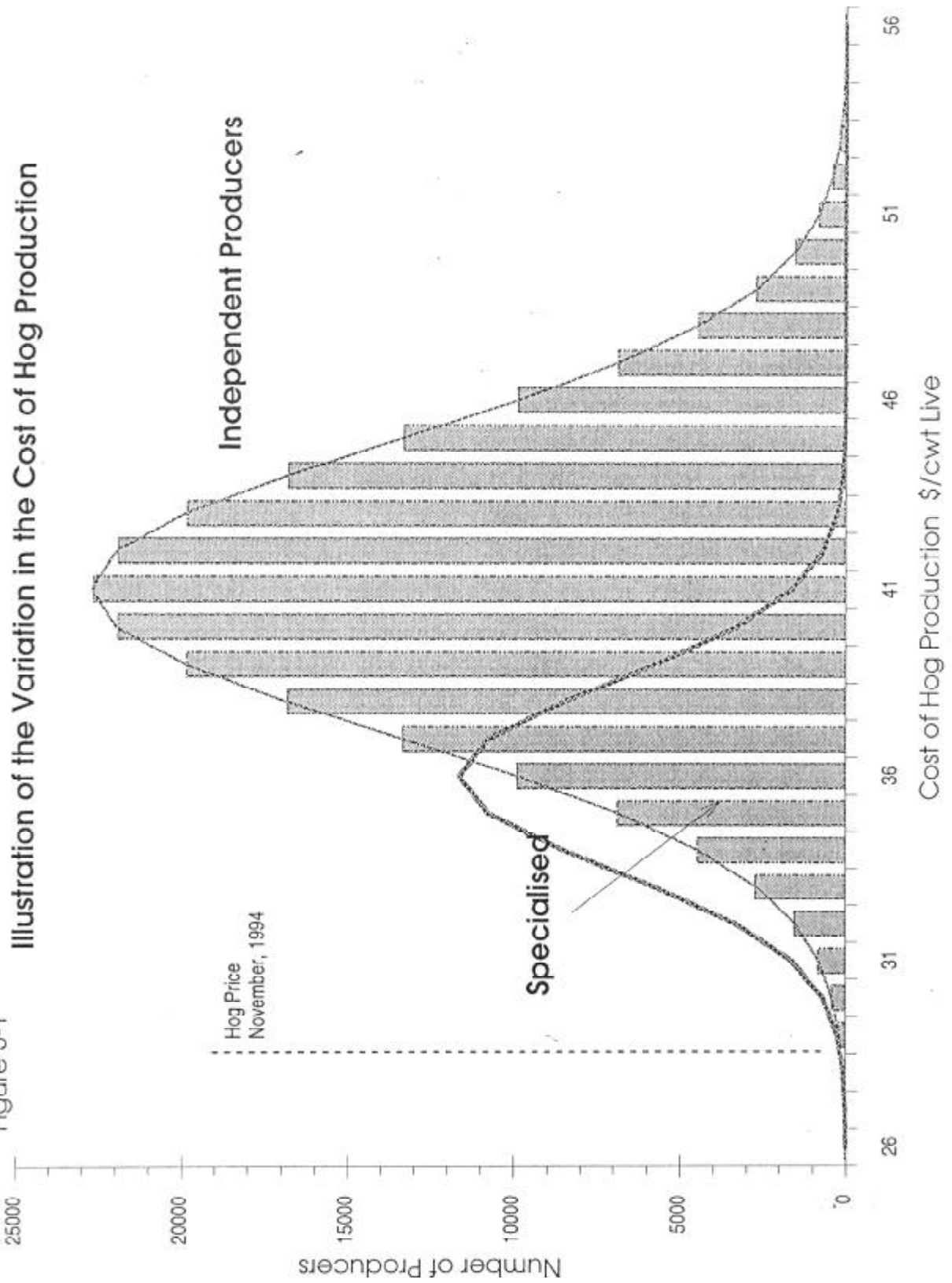
- ✍ Soft fat which separates from the lean. A serious fault since up-market European hams are mostly cooked skin-on. If the fat separates they cannot be sliced.
- ✍ Pale soft meat, independent of the Halothane (PSE) gene, which does not "set" on cooling.
- ✍ Meat near the bone which acquires a pasty consistency during ham cooking.
- ✍ "Honeycomb" fat.
- ✍ Other eating quality problems, which have not yet been observed, will no doubt arise due to intense margin pressures and further cost-cutting.

Poor pork eating quality will not aid U.S. consumer acceptance and will give opportunities for others, perhaps in other countries, to do better. According to Figures 2-1 & 2-2, production at \$41/cwt will break even over the cycle up to about 1997. The best third will average \$5/cwt profit during that time period.

#### 3.2 Quality

Almost everyone in the U.S. speaks of pork quality as meaning leanness or absence of PSE. We believe that both meanings trivialise and over-simplify the concept of quality, especially as regards eating quality. PSE is a defect, and its absence does not imply eating quality, any more than having four wheels rather than three, implies quality in an automobile.

Figure 3-1



Likewise we argue that percent lean concerns the cost of production of lean meat. Higher percent lean does not improve muscle quality or eating quality, and we believe that using the term quality for leanness reinforces the U.S. pork chain in the commodity mentality, from which the most successful organisations will escape.

By quality we mean “eating quality.” Muscle quality is a good approximation to this at present, but this cannot be expected to last long. As scientists formalise the definition of muscle quality, it will move farther away from the experience of pleasure in eating pork - which is the only real business measure that matters.

Each pork operation must develop its own definition of eating quality, according to its markets and the possibilities for measurement which are available. We recommend informal, in-house taste tests every day. In our research on pork eating quality we were surprised to find just how many cheap and easy things can be done to improve pork, and give extra eating quality.

### **3.21 Conformance and Functional Quality**

Pages 2 & 3 of the National Pork Producers Council’s April 1994 *Pork Chain Quality Audit Progress Report*, gives an excellent explanation of the terms conformance quality and functional quality, as commonly used today:

- ✍ Functional quality refers to attributes which the buyer requires and which contribute to the satisfaction provided by the product.
- ✍ Conformance quality is the conformance to specification. It focuses on delivering what was promised every time. It is an essential though negative quality concept which does not lead to progress.

We believe that the trade-off between conformance quality and functional quality is different in the food industry than the manufacturing industry because:

- ✍ An individual’s taste buds react differently on different occasions. Even a perfectly uniform product is not always perceived in the same way.
- ✍ An individual’s opinion of a product is formed over time, over a number of eating experiences.
- ✍ We know that individuals give most weight to exceptional occasions and to negative occasions in averaging their eating impressions.
- ✍ Disasters with bad tasting products must be avoided, but there is a pay-off from a really delicious product, even if this cannot be achieved every time.
- ✍ Producing delicious products is a learning curve which requires:
  - ✍ time.
  - ✍ feedback on how well you did.
  - ✍ encouragement; a feeling of pay-off for every little success.

This used to be the situation of the family butcher. He tried to sell the most delicious meat, and his reputation depended on how well he succeeded on average, and how well he avoided mistakes. As he improved his technique, his reputation, and consequently either his volume, or his prices, or both, increased. We call this a positive quality situation, where every little improvement, even temporary, can be expected to give some pay-off. Conformance quality has a reduced importance in such situations

The French wine industry, in contrast to the California industry, has intentionally, and cold bloodedly, developed unpredictability as a marketing asset. A French comment on a California wine was, “It is good, but it is depressing, because it is always the same.” a niche market should specifically be developed as a positive quality situation, with regular feedback on customer satisfaction.

### **3.22 Bias Against Optimum Quality**

In the U.S. as in other developed countries, there is an increased willingness of consumers to pay for eating quality. Many consumers are prepared to pay higher prices for better eating quality meats. They do not do so

because:

- ✍ with today's commodity products, consumers are not sure that the more expensive meat cuts will be better. Both branding and specialisation of retailers can help to give this assurance.
- ✍ superior quality is bought on reputation. Reputations are expensive and valuable, but do not appear in the balance sheet.
- ✍ some members of a consumer's family may not appreciate the difference.
- ✍ there is a lack of availability and choice of superior products (fresh pork for example) because:
  - ✍ older retailers tend to use the percentage mark-up
  - ✍ system, which penalises good products.
  - ✍ newer retailers enter the market at the lower end of the quality/price
  - ✍ spectrum.
  - ✍ to date no-one has offered them better eating quality and asked them to pay for it.

### 3.3 Create and Capture Added Value

The underlying subject, to which this study is a contribution, is producer integration downstream into packing (as opposed to adding value to hogs). With this approach, SARC believes there is greater potential. At the moment all a hog producer can do to add value to his hogs is to make them leaner. The relation between producers and packers almost guarantees that by the time the producer has achieved leanness, packers will start to want something else.

This has been amply demonstrated by the EU's Europa grading scheme which has put tremendous pressure on leanness. In Europe, many packers already have problems with over-lean hogs. These are described in Section 3.1. As a result, European packers have to pay top price for hogs they cannot use properly.

There are several reasons why producers might consider integrating downstream into packing:

- ✍ to increase total margin by capturing packer margins.
- ✍ to stabilise their hog business by attenuating the effects of the hog cycle.
- ✍ to improve efficiency by improving the flow of accurate information up and down the pork chain (avoiding such problems as over-lean hogs described above).
- ✍ to increase the value to consumers of the products they buy. This is the only way of really adding value to live hogs, as opposed to taking margin from someone else.
- ✍ to capture most of this added value.

#### 3.31 Capture Packer Margins

The best information we have is that integrating downstream only to capture the packing margin will not prove very exciting. Commodity hog packing is a difficult, risky, and low margin business. The reader should not allow packer margins of Fall 1994 to be misleading. Packer instability is amplified by the high rate at which packing turns over its money. SARC would never recommend producers band together to buy out a typical, large scale U.S. packing business only to run it the way it was before.

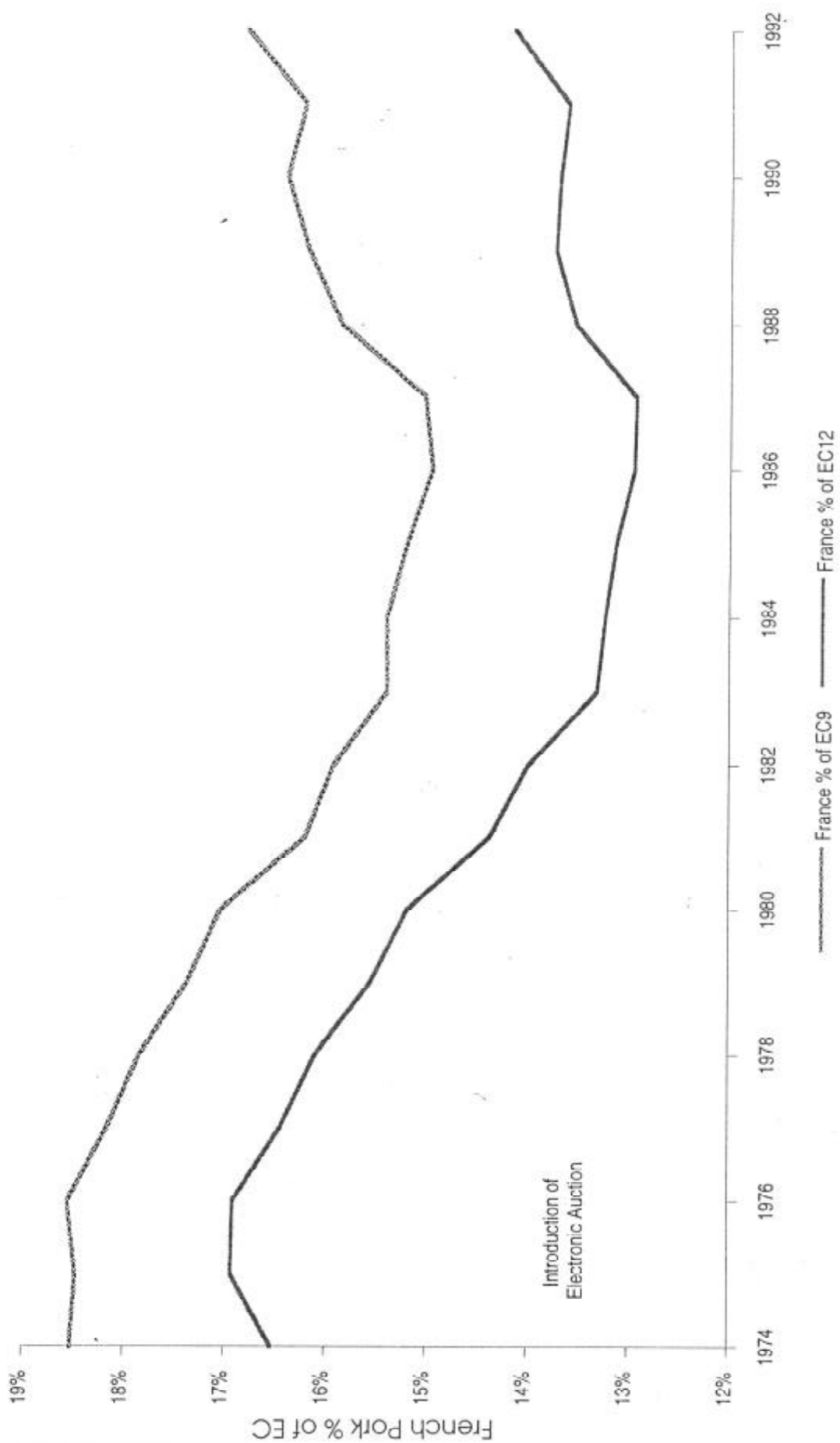
#### 3.32 Reactions to Adversity

There have always been poor relations between farmers and downstream processors (flour millers, packers, etc.). Geoffrey Chaucer's *Canterbury Tales*, from the 14<sup>th</sup> Century, describes them vividly. For over 30 years we have listened to packer bashing sessions by hog producers under pressure in a dozen countries. What has struck us is:

- ✍ how similar they have been, over countries and over time.
- ✍ how personal they have been, attributing evil characteristics and intentions to individuals who were merely surviving in a difficult business.

Figure 3-2

# Effect of the CADRAN Electronic Auction on French Pork Production



✍ how unrealistic they have been, ignoring the fact that hog producers and packers are part of a pork chain and depend on one another.

On two occasions we know of, packer bashing has been transformed into action. The examples from Brittany (France) and Alberta (Canada) described below both ended in disaster.

### 3.321 The Cadran Electronic Auction in Brittany (France)

In the early 1970s relations between hog producers and packers in Brittany were particularly bad. Producers, under the leadership of the charismatic Alexis Gourvannec, forced a confrontation which they won hands down in about 1976. They forced the introduction of the Cadran electronic auction and producer-controlled carcass graders in all packing plants. As a result of the Cadran, all but two of the packers went broke at the same time, owing zillions of Francs to producers. Producer organisations had no choice but to take over the failed packers in order to have a market. The short term results of producer ownership varied between bad and disastrous. Pork production had only begun to recover by the end of the eighties (Figure 3-2).

### 3.322 Political and Technical Reactions to Adversity

The trends of history have been going against hog producers and against pure-bred breeders, with increased competition from other countries, other foods, specialised genetics companies, and specialised hog producers. Like seismic creep, this trend leads to crises (earthquakes) in particular countries at particular times. Margins may turn negative, or markets may disappear. When crises arrive, there are two distinct types of reaction:

- ✍ the “political” reaction: “We need subsidies” or “Get the competition outlawed.”
- ✍ the “technical” reaction: “We must get our act together if we want to survive.”

Over the years we have seen several examples of each type of reaction, and have followed developments. The lesson from our observations is loud and clear: *“The political reaction is suicide.”*

The migration South of the U.S. poultry industry is a negative illustration. Traditional poultry producing states lost the industry by passing anti-corporate farming laws. Brittany (France) hog production gives a positive example of what can happen when a political reaction turns into a technical reaction. During the decline which followed the introduction of the Cadran Electronic Auction, from the late 1970s to the mid 1980s, Brittany hog producers behaved like a lot of spoiled children. They were forever demonstrating and going whining to Paris about subsidies and unfair competition from the Dutch. They even let a truckload of feeder pigs loose on a Paris sidewalk, which got them a lot of media attention, but no results.

Then a surprising thing happened. Brittany hog producers grew up. The same hog producers interviewed in 1984 and 1989 had completely changed attitude. The wife of the president of a producer group explained how it happened: “Our numbers were declining and we realised we were losing political clout. If we did not help ourselves, nobody else was going to help us. The idea spread throughout the region, and producers started concentrating on improving their operations.” The results of this change in attitude are clearly visible in Figure 3-2.

### 3.323 Alberta Story

At about the same time as the introduction of the “Cadran,” the Alberta hog producers Pork Marketing Board started suing packers for various bits of chicanery. One of the packers said, “If it is like that, I am getting out,” and he sold the Gainers plant to a real estate developer. There was then a real danger that producers would have nowhere to slaughter their hogs, so:

- ✍ the developer persuaded the provincial government that it should buy the Gainers plant.
- ✍ the Pork Marketing Board took over the Fletcher plant.

It all happened so quickly that the Pork Marketing Board ended up suing itself. We don't have full details, but one of our consultants describes the outcome as follows:

“The Pork Marketing Board got stuck with the Fletcher plant at Red Deer, and the Provincial Government got stuck with the Gainers plant in Edmonton. Producers and government vied to see who could pour the most money down a black hole.”

### **3.33 Stabilise the Hog Business**

From the point of view of average margin, as discussed in Section 2.2, hog production and packing cycles do not cancel each other out as much as most people think. During high price peaks packer margins would add to producer profits, but the packing contribution would be almost negligible as a proportion of what producers otherwise make during good times without going into a new business. During price troughs, packer margins do not offset producer losses in a way that makes the combination business much more attractive. The exception may be the U.S. hog glut of '94 during which packer margins moved up dramatically.

### **3.34 Sell Value Added Products**

Added value is only important if someone pays for it. The only party interested in adding value is one who can capture the payments for this value. The perfect example is U.S. hog producers who improved leanness as soon as they were paid for it. The real challenge, both the advantage and potential downfall, of integrating into packing lies in the opportunity of marketing. By integrating downstream, producers are in position to:

- ✍ improve information about the real value of hogs. improve contact with what consumers want.
- ✍ develop products that people will pay more for.
- ✍ capture the payoffs from improved products and eating quality.

This is what we refer to as “retrievable value.” Producers learn what consumers want. Producers improve products and sell them for what the market will bear. Thus producers benefit in direct proportion to their effort and intelligence in meeting consumer demand. Under the normal U.S. system of pork marketing, producers do not contribute effectively to improved eating quality and value added products for two reasons:

- ✍ no one tells them what consumers really want, or pays them for it.
- ✍ no packer gains competitive advantage, against other packers, from helping producers to improve their hogs.

Where producers have direct contact with retail and food service, it becomes possible for them to adapt to specialised, difficult and high value markets. Revenue generated is all received in-house.

## ***4. Comparison of Large and Small Packing Plants***

This section compares a pork packing plant slaughtering 1,000 hogs per shift with one slaughtering 8,000 per shift. The figures are chosen as an illustration which makes sense in the light of experience. A more detailed comparison will need to look at real projects on real sites in real locations with real shareholders as well as real markets and real customers.

### **4.1 Current Hog and Pork Prices**

The following comparisons require assumptions about the cost of hogs and the value of the pork from a hog. At the time of writing we just experienced an unprecedented fall in hog prices, so that current prices were not representative of the situation we discuss. The approach used in this section is to discuss the long term trend line, not the top or bottom of any price cycle. From this perspective SARC's analysis is only slightly affected by the 1994 crises. All of the prices quoted in this section are in December 1994 dollars. Hog prices and pork values are calculated as follows:

- ✍ an average slaughter hog was assumed to have:
  - ✍ 248 lb live weight.
    - ✍ the carcass yield of 74.5%, leading to:
      - ✍ a head-off carcass weight of 185 lb.
  - ✍ monthly prices and values from 1987 to November 1994 were converted into December 1994 dollars.
  - ✍ exponential trend lines were fitted to the data.
  - ✍ December 1994 values of the trend lines used for calculations are:
    - ✍ liveweight price: \$41.31/cwt = \$102.45/hog.
    - ✍ by-product value: 8.27% = \$8.47/hog.
    - ✍ pork cut-out value: \$64.73/cwt = \$119.59/hog.

<b>Table 4-1a Capital Costs of Small &amp; Large Packing Plants - 1 Shift</b>						
<b>Factory Areas</b>	<b>1000 Hogs per Shift</b>			<b>8000 Hogs per Shift</b>		
	<b>\$/Sq. Foot</b>	<b>Sq. ft</b>	<b>Cost \$'000</b>	<b>\$/Sq. Foot</b>	<b>Sq. ft</b>	<b>Cost \$'000</b>
Holding Pens	43	6 157	265	37	54 250	2 017
Slaughter & Dressing	226	3 348	757	195	56 511	11 030
Inedible Offals	226	3 100	701	195	17 567	3 429
Edible Offals	226	388	88	195	5 683	1 109
Chiller Block	162	4 747	767	139	47 017	6 557
Further Processing	162	9 494	1 534	139	36 942	5 152
Freezing/Cold Storage	153	2 379	363	132	13 121	1 728
Services	186	969	181	161	11 603	1 867
Rendering	474	4 306	2 040	409	21 528	8 805
Amenities & Offices	108	2 207	237	93	24 865	2 310
Amenities for workers with inedible products	108	1 076	116	93	10 333	960
		<b>38 169</b>	<b>7 047</b>		<b>299 420</b>	<b>44 964</b>
Site Works/SF of buildings	\$ 17	38 169	647	\$ 14.6	299 420	4 380
Contingency	10%		769			4 934
<b>Depreciation</b>						
Total Project Cost (\$'000)			8 464			54 279
Of which buildings		45%	3 809	2.5%	40%	21 711
Equipment		55%	4 655	10%	60%	32 567
Depreciation			564			3 800
Interest	10%		846			5 428
Throughput Hogs per Year				250 000		2 000 000
Capital Cost per Hog Slaughtered per Slaughtered per Year				34		27
				+25%		



**Table 4-1b Capital Costs of Small & Large Packing Plants - 2 Shifts**

Factory Areas	1000 Hogs per Shift			8000 Hogs per Shift		
	\$/Sq. Foot	Sq. ft	Cost \$'000	\$/Sq. Foot	Sq. ft	Cost \$'000
Holding Pens	43	6 157	265	37	54 250	2 017
Slaughter & Dressing	226	3 348	757	195	56 511	11 030
Inedible Offals	226	3 100	701	195	17 567	3 429
Edible Offals	226	388	88	195	5 683	1 109
Chiller Block	162	8 545	1 380	139	84 631	11 803
Further Processing	162	9 494	1 534	139	36 942	5 152
Freezing/Cold Storage	153	4 282	653	132	23 618	3 110
Services	186	969	181	161	11 603	1 867
Rendering	474	5 598	2 652	409	27 986	11 447
Amenities & Offices	108	3 311	356	93	37 298	3 465
Amenities for workers with inedible products	108	1 937	208	93	18 600	1 728
		<b>47 128</b>	<b>8 775</b>		<b>374 689</b>	<b>56 156</b>
Site Works/SF of buildings	\$ 17	47 128	799	\$ 14.6	374 689	5 481
Contingency	10%		957			6 164
<b>Depreciation</b>						
Total Project Cost (\$'000)			10 531			67 802
Of which buildings		45%	4 739	2.5%	40%	27 121
Equipment		55%	5 792	10%	60%	40 681
Depreciation			698			4 746
Interest	10%		1 053			6 780
Throughput Hogs per Year				500 000	4 000 000	
Capital Cost per Hog Slaughtered per				21		17
Slaughtered per Year				+24%		

Charts were developed in British Pound Sterling in metric weights and measures. Rounding and conversion to Dollars and conventional US weights and measures has slightly increased rounding error.

## 4.2 Capital Costs

There are clearly advantages of scale in the construction of packing plants:

- ✍ site works have a cost per site and a cost per acre. They are correspondingly more expensive for a small plant.
- ✍ fixed costs per site are quite high for all construction work. We have assumed a 14% discount for the larger plant.

There is a secondary saving for a small plant because automation often cannot be justified:

- ✍ the cost of expensive machines is saved.
- ✍ space to house them need not be built.

**Table 4-2 Capital for Producing vs. Packing a Hog**

	<b>Sows /Sow</b>	<b>Nursery /Pig</b>	<b>Finishing /Hogs</b>	<b>Hog Production Total</b>	<b>Packing Large</b>	<b>Packing Small</b>
Investment \$	950	100	120		54.28	8.46
Pigs/Year	17	7	2.5		2 million	250 000
Capital \$/Hog (1)	56	14	48	118	27	34

(1) in units of Dollars/Year

Tables 4-1a and 4-1b give an idea of how the comparison might work in practice. The exact totals would vary from one project to another, it is the comparison which is important.

We conclude that the capital cost per hog slaughtered is 25% higher for the smaller plant. Investment in packing of \$27 and \$34 per hog compares with \$90-\$ 120 for hog production in a large efficient unit in new buildings.

### 4.3 Operating Costs

The main economies of scale in running a large packing plant are:

- ✍ labour.
- ✍ interest and depreciation.
- ✍ use of by-products.

There is a dis-economy of scale in live hog transport. The radius of procurement would be about 2.8 times as far for a plant eight times as large, assuming equal hog densities (Section 4.34).

#### 4.31 Labour

Table 4-3 gives a breakdown estimate of labour requirements and costs for the two plants. In summary:

- ✍ the small plant needs about one-third more hours worked per hog slaughtered than the large plant.
- ✍ wage rates in small plants are an estimated 11% lower than in large plants.
- ✍ staff costs work out 21-26% higher in the small plant, or \$2.34-\$2.53 per hog (\$0.94-\$1.02 per cwt).

#### 4.32 Interest and Depreciation

The difference in interest plus depreciation works out at \$1.01 per hog (\$0.41 per cwt) for a one shift plant, and \$0.62 (\$0.25) hog for two shift plants (Table 4-1).

**Table 4 –3 Staffing of Large and Small Packing Plants**

	1000 Hogs / Shift Number of Staff			8000 Hogs / Shift Number of Staff			Comments on Large Plant
	One Shift	Two Shifts	Wage Rate	One Shift	Two Shifts	Wage Rate	
Hogs per Day	1000	2000		8000	16000		
Holding Pens	6	12	8.04	16	32	9.21	Automation of holding pens
Slaughter	3	6	9.27	10	20	10.20	Automation & economies of scale
Scalding, Dehairing, Singeing & Polishing	3	6	9.00	8	16	10.32	Economies of scale
Dressing	18	36	9.23	59	118	9.83	Economies of scale
Offals	8	16	7.58	60	120	9.44	Few economies of scale
Chillers	3	6	7.83	3	6	8.96	Automated Conveyors
Boning Room	55	110	9.12	409	818	9.70	Few economies of scale
Packing & Palletizing Area	10	20	7.57	45	90	8.92	Economies of scale
Freezing, Cold Storage & Dispatch	6	8	7.90	37	49	9.29	Some economies of scale
Sevices	17	21	9.03	92	101	11.24	Some economies of scale
Total Direct Labour	129	241		739	1370		Automation & economies of scale
Average Wage Rate	8.77	8.77		9.81	9.73		
Non Direct Labour	14	18	12.17	107	115	12.94	
TOTAL	143	259		846	1485		
Total per 1000 Hogs	143	130		106	93		
	+35%	+40%					
Total Wages per day	10,414	18,661		69,083	118,592		
Average Wage Rate	9.10	9.01		10.21	9.98		
	-10.8%	-9.8%					
Benefits +31.7%	2.88	2.85		3.23	3.16		
Total Staff Cost per Hog	13.71	12.29		11.37	9.76		
	+21%	+26%					
Sales <small>Pork Cut-out &amp; By-product Value (Table 4-4)</small>	131.2	131.2		128.1	128.1		
Staff Cost % of Sales	10.5%	9.4%		8.9%	7.6%		
Hogs per person per year	1748	1931		2364	2694		
	-26%	-28%					

### 4.33 By-Products

Table 4-4 gives an estimate of this advantage based on SARC standards for by-product values as a percent of carcass value.

Table 4-4		By-Product Value Loss by a Small Packer		
	SARC Standard Value (% of Hog Price) Large Packer	Estimated Value (% of Hog Price) Small Packer	Difference as (% of Hog Price)	
Blood	0.29%	0.14%	0.14%	
Head	3.83%	3.83%	0.00%	
Edible Red Offals	1.42%	0.85%	0.57%	
Petfood Red Offals	0.26%	0.26%	0.00%	
Glands	0.19%	0.11%	0.08%	
Stomach	0.27%	0.23%	0.04%	
Intestines	1.31%	0.65%	0.65%	
Other White Offals	0.17%	0.17%	0.00%	
Fat & Scrap	0.53%	0.48%	0.05%	
<b>Total</b>	<b>8.27%</b>	<b>6.73%</b>	<b>1.54%</b>	

The overall difference is 1.54% of the hog price, or \$1.57 per hog (\$0.63 per cwt). No doubt this difference could be reduced by innovation in the local situation. The big items are:

- ✍ **blood**, 0.14%, \$0.15 per hog. Equipment for spray drying blood is too expensive to be justified on a small scale, and specialised companies are not usually interested in collecting small quantities of blood. Niche markets do exist for small quantities of blood depending on the degree of hygiene, for example:
  - ✍ pharmaceutical companies require small quantities, but it must be very clean. The cleanest blood is obtained using hollow knives for sticking the hogs. This is possible with slow chain speeds, but not at 8,000 a day.
  - ✍ liquid blood is an excellent protein source for growing hogs. It is difficult to overcome the technical problems and disease risks except in an integrated organisation.

Ring drying is cheap and effective. The problem with it, is that the nutritional value of the blood meal cannot be determined by analysis, and it depends critically on the temperature. The market price is therefore for a bad product. It is not worth the trouble to produce a good product, unless it is to be used in-house.

- ✍ **edible red offals** (variety meats: hearts, livers, kidneys). 0.57%, \$0.58 per hog. Europeans, especially the French, consume more variety meats than Americans, and prices are correspondingly higher. The big U.S. companies export their variety meats, a market which is more difficult for smaller companies.
- ✍ **intestines** (casings), 0.65%, \$0.67 per hog. Intestines can be:
  - ✍ rendered down for meat and bone meal.
  - ✍ cleaned and graded and used for sausage casings.
  - ✍ cleaned and salted and sold to specialised companies. The Danish company DAT Schaub buys casings in the USA.

A small packing plant would surely produce its own fresh trimming sausage. It could obtain added value by using its own “natural casings.” Work on intestines is difficult to manage. It is specialised and difficult, and it carries a low social status. DAT Schaub workers serve a three year, in-house, apprenticeship. Finding and serving added value outlets may not be worth the management input in a small plant.

#### 4.34 Collection and Transport

A packing plant slaughtering 8,000 per day has a procurement area for buying hogs which is 2.8 times the radius for a plant slaughtering 1,000 a day. Hogs, on average, have to be transported 2.8 times as far with higher costs and more stress. Some practical points are:

- ✍ a small packer can more easily buy selectively. The cost per hog of increasing his radius of procurement is less than for a large packer.
- ✍ some large packers run buying stations, which are both expensive and stressful for the hogs.

Some transportation costs can be avoided by smaller plants.

#### 4.35 Total Economies of Scale

Tables 4-5a & 4-5b summarise the comparison between large and small packers. The estimated total economies of scale per hog are thus:

	<b>1 Shift</b>	<b>2 Shifts</b>
staff costs	\$2.34	\$2.53
interest & depreciation	\$1.01	\$0.62
by-products	\$1.57	\$1.57
<b>Total</b>	<b>\$4.93</b>	<b>\$4.72</b>

which correspond to \$1.99 and \$1.90 per cwt live. A new plant usually has trouble obtaining full price for its products, until its markets have stabilised. The effects of this will be included in the business plans.

Some producer-driven beef packing plants have failed because they were unable to sell all of the cuts. We do not see this as a major danger for pork because:

- ✍ pork can be made into processed products, whereas there are very few for beef.
- ✍ pork can be frozen without losing its quality for most processed products.
- ✍ pork cuts can be downgraded and easily sold for a lower price.
- ✍ for emulsified products (hot dogs, bologna), the protein (lean) is worth money
- ✍ whatever its physical form.

**Table 4-5a Single Shift Margin: Large vs Small Packers**

	Large Packer		Small Packer		Difference
	\$/Hog	% of Sales	\$/Hog	% of Sales	\$/Hog
<b>Hog Producer Price [1]</b>	102.45	79.97%	102.45	77.93%	0.00
<b>Wages</b>	8.64	+6.74%	10.41	+7.92%	1.78
<b>Benefits</b> +31.7%	2.73	+2.13%	3.30	+2.51%	0.56
<b>Total Staff Costs</b>	11.37	+8.88%	13.71	+10.43%	2.34
<b>Depreciation and Interest</b>	4.61	+3.60%	5.63	+4.28%	1.01
<b>All Other Costs</b>	8.39	+6.55%	8.39	+6.38%	0.00
<b>(Services, Packaging etc)</b>					
<b>Total Packing Cost</b>	24.37	+19.03%	27.73	+21.09%	3.36
<b>Pork Value [2]</b>	119.63	+93.39%	124.56	+94.75%	<b>4.93</b>
<b>By-Product Value</b>	8.47	8.27%	6.90	6.73%	-1.57
<b>Sales</b>	128.10	+100.00%	131.46	+100.00%	3.36
<b>Margin per Hog</b>	25.65	+20.03%	29.01	+22.07%	3.36
<b>Net Margin</b>	1.28	+1.00%	1.28	+0.97%	0.00
<b>Pork Value per cwt</b> 1.85	64.75		67.42		<b>2.67</b>

[1] January 1995 value of 1987-1994 trend

[2] Required for packer to make 1% net margin

**Table 4-5b Two Shift Margin: Large vs Small Packers**

	Large Packer		Small Packer		Difference
	\$/Hog	% of Sales	\$/Hog	% of Sales	\$/Hog
<b>Hog Producer Price [1]</b>	102.45	82.12%	102.45	80.10%	0.00
<b>Wages</b>	7.41	+5.79%	9.33	+7.10%	1.92
<b>Benefits</b> +31.7%	2.35	+1.83%	2.95	+2.25%	0.61
<b>Total Staff Costs</b>	9.76	+7.62%	12.29	+9.35%	2.53
<b>Depreciation and Interest</b>	2.88	+2.25%	3.50	+2.66%	0.62
<b>All Other Costs</b>	8.39	+6.55%	8.39	+6.38%	0.00
<b>(Services, Packaging etc)</b>					
<b>Total Packing Cost</b>	21.03	+16.42%	24.18	+18.39%	3.15
<b>Pork Value [2]</b>	116.29	+90.78%	121.01	+92.05%	<b>4.72</b>
<b>By-Product Value</b>	8.47	8.27%	6.90	6.73%	-1.57
<b>Sales</b>	124.76	+97.39%	127.91	+97.30%	3.15
<b>Margin per Hog</b>	22.31	+17.42%	25.46	+19.37%	3.15
<b>Net Margin</b>	1.28	+1.00%	1.28	+0.98%	0.00
<b>Pork Value per cwt</b> 1.85	62.94		66.50		<b>2.55</b>

## 5. Qualitative Considerations

We believe we have demonstrated that it is desirable for hog production organisations to integrate downstream into packing. In the next two sections we make a preliminary investigation into whether it is feasible. The important question is “Will these unquantified factors override the quantified large packer advantage of to \$2 per cwt live or not?” Each project must make its own judgement in the light of its particular circumstances. We believe that in some cases the answer will be “yes” in terms of costs. The real challenge is the marketing.

### 5.1 Automation & Robotics

Automation is a two edged sword, and cannot be classified under either “bigger is better” or “small is beautiful.” We feel intuitively that there is something wrong about automating the handling of pork. This is probably because:

- ✍ pork is a delicate material, easily damaged or downgraded.
- ✍ variation in hogs will never be eliminated, so that preparation of fresh pork will always be a question of producing standard products from variable material.

Trained people get so good at choosing the right cuts to make that it will be decades before robots can compete on the yield and eating quality of the product. Automation is usually justified on the basis of the cost of doing a given job today. Many factors are overlooked, or not included, in this comparison. When correctly analysed, almost all of the factors argue against automation:

- ✍ automation must justify itself over the whole period until the equipment is amortised, not just when it is installed.
- ✍ the need to keep equipment which has not been amortised reduces flexibility in a rapidly changing industry.
- ✍ automation is a cheaper way of doing what it can do. The cost of adapting the job to automated equipment is frequently not included in the comparison.
- ✍ if an automated process breaks down, the whole process stops. Engineering staff capable of reducing breakdowns and repairing them quickly are difficult to find and expensive to recruit.
- ✍ one hears, “If we automate this operation we will need a more uniform product.” Most hog producers, themselves, have little idea of the cost of attempting to produce a uniform product on the farm; most packers have *no* idea of this cost, and do not care much since they do not expect to pay for it.

SARC has not been able to make accurate estimates of the cost of standardisation, but we have some indications:

- ✍ automatic evisceration is under development. This would require such uniform weights that all-in all-out finishing would become impossible in most cases. SARC estimates that this aspect alone would increase the production cost of hogs by up to ten percent depending on the systems and on the proportion of hogs which are all-in all-out today. Ten percent is:
  - ✍ half the total cost of packing hogs today.
  - ✍ many times the total cost of evisceration.
  - ✍ even more times the apparent saving from automation.
  - ✍ When 80% of Danish hogs were used for Wiltshire bacon there was no choice but to tailor the hogs on the farm. Denmark Inc. could do this better than anyone else, which was a competitive advantage. Wiltshire Bacon is cured in whole sides, and is sold rind on. There is no potential for trimming or for sorting of cuts to be cured. As the Wiltshire Bacon market declined there came a point where sides with the necessary characteristics could be found by sorting. It was cheaper to do this, and the tight specifications for Danish hog producers were relaxed.

A vicious cycle of automation seems to develop:

- ✍ large scale operations employ many people;
- ✍ more employees means worse labour relations;
- ✍ labour with poor labour relations is expensive;
- ✍ replace labour with automation where possible;
- ✍ more automation requires and justifies a larger scale;
- ✍ a larger scale employs more people on jobs other than those which are automated;
- ✍ therefore we must automate these other jobs.

We do not know whether this process has gone so far that reducing automation would give a competitive advantage. What we do know is that any competitive disadvantage would be slight.

## **5.2 Bigger Is Better**

Economies of scale in packing do exist. The main ones are discussed below.

### **5.21 Site works**

Site works are cheaper for a large plant, though large sites may be more expensive per acre. Higher standards of pollution and odour control may also be required. These were included in Tables 4.1a and 4.1b.

### **5.22 By-product Treatment**

The advantages to be gained from large-scale high-tech treatment of by-products was one of the factors which enabled IBP to acquire its dominant position in U.S. beef and pork packing. Smaller plants cannot justify all of the necessary equipment. The opportunity cost of this is estimated in section 4.33.

### **5.23 Containers of Single Products or Single Muscles**

Some packers boast that they can supply container loads of a single ham muscle. In practice they seldom do so, because of the difficulty in finding buyers for container loads of the other ham muscles. A lowering of the Japanese gate price by GATT over six years will allow the U.S. to send loads of CC (centre-cut) loins or tenderloins. These are the products for which the U.S. is most competitive, since they are undervalued on the home market. A CC loin weighs 8 lb., so a 50 ton container will take loins from 6,000 hogs. To meet Japanese standards they would need to be selected from at least 10,000 hogs over two days. Only large packers or associations of smaller packers can hope to compete in this lucrative market.

## **5.3 Small Is Beautiful**

The main dis-economy of large scale packing is that it locks operators into a commodity mode from which it is difficult to escape in any case. The commodity mode is generally less profitable than the marketing mode. Dis-economies come under six main headings:

- ✍ labour relations. operating costs. eating quality.
- ✍ service.
- ✍ procurement.
- ✍ difficulty of vertical integration.

### **5.31 Labour Relations**

It is fashionable for management gurus to say that having the workforce on the company's side is a necessary condition for competing with the Japanese. In fact this was true even before it became fashionable to say so.



Henry Ford paid twice the going rate for his workers, and reckoned he saved the difference in lower replacement of small tools. Some other advantages of a co-operative workforce are:

- ✍ **quality.** Motivated workers do something about substandard product, even if it is not specifically part of their job.
- ✍ **process improvement.** According to Deming, “profound understanding” is necessary. Shop floor workers often have the best understanding, but need acceptance, encouragement, and motivation to express their understanding in words and actions.
- ✍ **flatter hierarchies.** Willing employees need less supervision. This enables flatter hierarchies, lower costs, and better communication with management.
- ✍ **lower pay. Unhappy workers** tend to focus their dissatisfaction on pay, an unending process of confrontation, since higher pay does not reduce their dissatisfaction with their work
- ✍ **fewer mix-ups.** Everyday incidents can turn into crises if the people on the spot do not look for solutions.

SARC’s interest in this subject for meat plants began during research in Europe in 1980. General questions about the state of the packing and processing industries got similar replies in three countries, France, Germany and the UK: “Some are doing well and some are not, and it isn’t the biggest which are doing the best.” This similarity rang a bell, since the three countries have different styles of industry.

Part of the research budget was spent tracking down people who had managed different sizes of meat plants, and interviewing them. One of the interviewees said, “As a plant expands, somewhere between 400 and 500 people you feel you are beginning to lose the personal touch and the family atmosphere.” Another said, “We had this plant with 1,200 people and our labour relations were terrible. We split it up into three units of 400 people with separate management and separate entrances. Labour relations improved a lot, but they were not as good as you would get in an independent unit of 400 people.”

Strangely enough, one of the keys to understanding the question came from a civil servant in London, who said: “When someone is cutting or deboning meat, a fraction of an inch changes both the quality and the cost of the product. You cannot control people, and need their goodwill to be efficient. This means they must feel they are working for a person rather than for a company.” We believe these interviews were sufficient to establish a working rule:

*It is difficult or impossible to run an efficient meat plant with more than 400 people.*

There was one exception - the Bigeard company in Brittany (France). It had 700 people and seemed to be very efficient. It is run by a father and son, both of whom have outstanding personalities. We mentioned this rule to some people from a chemical company and they replied: “It may be true of meat plants, but it is also true of head offices. When our European head office got up to 500 people, the working atmosphere fell apart. We hived off marketing to another site, got the number down to 350, and the working atmosphere came back again.”

This was the European situation, and in 1984 we started to research the pork chain in the U.S. We came across packing plants with thousands of people and atrocious labour relations. We were told that foremen carried guns in some cases. The fascinating question was: “Are the poor labour relations in U.S. packing plants an extrapolation of the curve observed in Europe, or are they a different phenomenon?” In other words what are, or would be, the labour relations in a smaller U.S. plant or a huge European plant?

Over the years we have discussed this with dozens of people, on both sides of the Atlantic, who are in a position to give informed opinions. The answer is loud and clear: ***It is the same curve. The 400 rule applies as much in the U.S. as it does in Europe.***

### 5.32 Operating Costs

Unit costs of large packing plants are increased by:

- ✍ poor labour relations, as we have seen above.
- ✍ blast chillers. Whatever their pro's and con's, blast chillers are expensive, and are mainly required for stress-prone hogs, or those which have been badly handled before stunning.
- ✍ inability to take advantage of vertical organisation. Murphy Farms could keep a monster plant full, if all its hogs were produced in the same place, which they are not. We suspect that large scale vertical integration for pork is too complex to be managed efficiently in most cases.
- ✍ driving up the regional hog price (Section 5.33).
- ✍ increased cost of hygiene due to the density of biological material.
- ✍ long processing time from stunning to finished product which increases unit inventory costs.
- ✍ administration. New Zealand lamb slaughterers who have changed from very large to small plants have found that one of the major savings is a reduction in bureaucracy. There is currently a crisis in New Zealand packing. It is the mega-plants, not the small ones, which are going bankrupt.

### 5.33 Procurement

The demand for hogs is strongly negative and inelastic. A small drop in supply leads to a large increase in price. Large packers tend to buy so many hogs that they push local prices up. In the past, U.S. packers have bought tactical loads from Canada to keep local prices down. In addition, their procurement is less efficient:

- ✍ collecting hogs over a wide area is expensive, especially when it involves buying stations.
- ✍ selective buying is difficult. If producers of unprofitable hogs (PSE prone hogs for example) are avoided, the procurement area is even wider.
- ✍ extra stress. More transport means more stress and increased meat quality problems.
- ✍ damage to hogs and pork due to rapid handling of large numbers. According to our interpretation of the NPPC's April 1994 progress report on its *Pork Chain Quality Audit*, quality costs of about \$2 a hog can be attributed to poor handling in transport and holding pens.

A key feature of a small packer program is likely to be avoiding the necessity for rapid cooling. This involves:

- ✍ good conditions in transport, holding pens and the run up to the restrainer. avoiding PSE prone hogs.
- ✍ special attention to hygiene.

All of these are easier to achieve with modest numbers and relaxed movement of hogs.

### 5.34 Quality

Quality problems of large packing plants can be due to:

- ✍ poor hog handling in transport and unloading.
- ✍ stress during the run-up to the restrainer. Hogs cannot walk comfortably at 1,000 an hour. In large operations they have to walk further as well as faster.
- ✍ lack of flexibility. Nuances in the cooling, for example, can have a disproportionate effect on eating quality.
- ✍ inability to use electrical stimulation which improves meat tenderness, but is difficult to implement at 8,000 an hour.
- ✍ poor information flow. Producers do not get the information they need to solve those quality problems which are under their control; excitable pigs for example.
- ✍ difficulty in meeting the highest hygiene standards. Volume favors the development of micro flora.
- ✍ lack of traceability:
  - ✍ accurate profit and loss accounts per batch cannot be drawn up. Buyers are handicapped, and producers cannot get the information they need to improve their hogs.

- ✍ problems of abscesses, for example, cannot be traced back to the source and eliminated. Abscesses and injection site blemishes were estimated to cost \$0.47 per hog in the NPPC *Pork Chain Quality Audit*.

### 5.35 Products and Service

Some large U.S. packers do an excellent job of providing the service which they provide. Deliveries arrive on time, and correspond to the order placed. Surprise products or in the invoice are rare. However, if you want:

- ✍ matured pork,
- ✍ identity preserved pork,
- ✍ 'natural' pork,
- ✍ antibiotic free pork,
- ✍ pork from trichina free farms,
- ✍ outdoor reared pork,
- ✍ pork from happy hogs,
- ✍ pork from Berkshire hogs,
- ✍ portion control,
- ✍ special or ethnic cuts,
- ✍ selected pieces,
- ✍ warm, freshly killed pork (where legal),
- ✍ top eating quality,
- ✍ exceptional levels of hygiene, or
- ✍ any other qualities or type of product or service,

*large scale U.S. pork packers cannot supply these demands at a reasonable price, and generally will not meet them at any price.* Some relatively small have supplied some of these services profitably are:

- ✍ Iowa Quality Meats: portion control for food service.
- ✍ Northwest Iowa Pork: special cuts for the Japanese market.
- ✍ Sioux Preme: extra high quality carcass dissection for producer
- ✍ A Los Angeles company which specialised in warm pork for the ethnic Chinese market (plus a few German butchers).

### 5.36 Sales Prices

Few would dispute that higher prices can be obtained when products can be adapted to the needs of particular clients. The questions are how much higher, and at what cost? When large packers do have the right products they tend to sell so much pork that they drive prices down. Distress selling on Fridays is one form of this problem.

### 5.37 Local, Non-corporate Image

One hog provides enough pork for 2.6 Americans for one year. A 1,000 a shift, two shift plant can kill 500,000 hogs a year, enough for 1.3 million Americans. There are a couple dozen U.S. cities with population of over 3 million, say 6 million, including the surrounding suburbs and dormitory towns. 1.3 million people represent 22% of the market in such an agglomeration (in the unlikely event that there were no other customers).

In our experience, small regional retailers of pork do not like to buy from the largest packers. There sometimes seems to be a spirit of solidarity: "We small guys must stick together to foil the corporations." Most of them would show a preference for a small local packer, particularly if his quality and personal service were better.

*We believe that it is important, almost essential, for a small packer to be situated within some miles of a large city, even if this means that the live hogs have to travel a long way.*

### 5.38 Vertical Integration

In this report, “integration” covers anything which is different from arm’s length confrontational relationships (seller and buyer) between links in the pork chain. “Full integration” means that two or more links in the chain have the same owner, and are run as a single business. The critical vertical integration in pork chains is packing. A test of validity is as follows:

- ✍ does the flow of market information back to production improve?
- ✍ whatever the type of vertical co-ordination, the key question is: “Do you know which loin came from which hog?”

There are two basic ways of achieving vertical information flow:

- ✍ electronic tags, which carry the danger that someone may find one on his plate.
- ✍ rigidly controlled meat flow, with frequent weighings so that mistakes can be corrected by computer analysis.

SARC believes that the second is the best, but it might be difficult to introduce into existing plants.

#### 5.381 Vertical Integration Dangers

Vertical integration has great potential for improving profitability, but it doesn’t work automatically. It has to be made to work. Some typical difficulties which have to be overcome are:

- ✍ **deciding who has control.** If there is no single overall boss, the responsibility is diffused, with departmental heads not being responsible for anything precise, and passing the buck from one to another.
- ✍ **overall optimisation must actually happen.** Real integration may fail to occur due to mental inertia, or to an attempt to solve the problem of diffuse responsibility by making departments into profit centres with freedom to trade outside.
- ✍ **transfer prices.** If the prices of internal transfers are negotiable, then departmental heads who are best at negotiating tend to achieve the best financial results. The most effective solution we have come across was described to us by the son of the founder of a successful Italian vertically integrated pork, poultry and trout operation, who said: “*My father decides the transfer prices every week, and there is no appeal.*” A better solution is to structure the business so that transfer prices are not needed (Section 5.39).
- ✍ **hiring mistakes.** A hog production organisation which diversifies downstream needs to hire people. It may decide to hire a CEO, which is a difficult and risky operation. Choosing a CEO from within the organisation is also risky, and in addition there is the risk of mistakes when he hires the knowledge which he lacks.

#### 5.382 Vertical Integration Rules

When we look around the world, vertical integration in meat has not been very successful:

- ✍ it has been most successful when initiated by producers or feed companies.
- ✍ it has been fairly successful when initiated by retailers.
- ✍ it has always failed when initiated by packers. Some of the recent U.S. initiatives may be successful, but we will believe it when we see it. The reasons for packer failure appear to be:
  - ✍ packers cannot improve the product, they can sort and trim (they can avoid spoiling it, but they generally don’t).

- ✍ packers have a strong commodity mentality, and are poor at marketing.
- ✍ if you take away the engineering and the problems of unstable prices, *pork packing is much easier than hog production.*

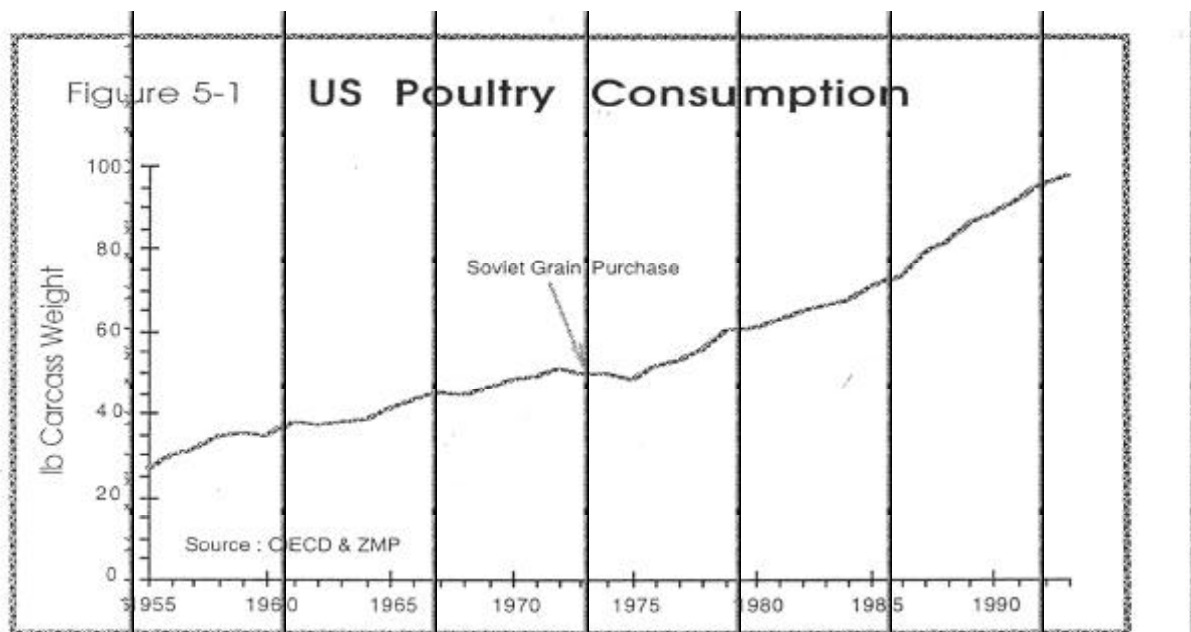
SARC's rules for successful vertical integration are as follows:

- ✍ vertical integration should not use transfer values.
- ✍ there should be:
  - ✍ a single profit centre.
  - ✍ service functions (toll-fee, custom).
- ✍ profit centres should have a large added value and a *creative function*. Transformation functions should be cost centres.
- ✍ feed and packing are both essentially transformation functions.
- ✍ the success of a co-operative project is likely to be in inverse proportion to its democracy. It is essential there be a manager who is authorised to manage.

In conclusion, we believe that the profit centre should be hog production, with feed and packing, like transport, as toll fee service functions. Hog production would therefore be responsible for sales and marketing.

#### 5.4 Poultry Story

Many wrong conclusions about pork have been drawn from analogies with poultry, genetics being the most dramatic example. SARC feels that there are important lessons to be learned. These will be briefly described here. Until about 1945 poultry was a luxury meat. Just after the war, modern genetics and nutrition started



to be employed in its production, and the price dropped dramatically. Quality also dropped since the poultry was often spin-chilled and frozen, but this was not immediately perceived by consumers. Poultry has a psychological handicap for consumers. A roast chicken or a chicken leg looks more like piece of a dead animal than does a pork roast or a pork chop.

Nevertheless, apart from a minor hiccup in 1973 & 1974 at the time of the Soviet grain purchase, U.S. poultry consumption has continued to increase steadily (Figure5-1) by:

- 3.5% per year from 1955 to 1972 (unfortunately we do not have earlier figures)
- 3.9% per year from 1975 to 1993.

Lower price alone has not been sufficient to maintain such phenomenal growth. The main driving force has been creative marketing. Whenever poultry consumption has begun to show signs of saturation, the industry has come up with new marketing strategies and products, which have given it new momentum. The main categories are:

- ✍ fresh and chilled poultry to replace the soggy frozen product.
- ✍ cuts. This was a major breakthrough in convenience. No other country geared up to produce them, so the U.S. had a virtual monopoly of world trade in poultry cuts at least until the mid 1980s.
- ✍ poultry processed products. Success was mixed because these products compete with pork on its home ground. Successful products have tended to be of high quality and more expensive than the equivalent pork product. The net effect has been positive. lipophobia. The poultry industry did not invent “fear of fat,” that was the life insurance industry; but poultry wasted no time jumping on the bandwagon.
- ✍ a positive relation with food service. KFC and McNuggets (both fat) have materially increased the consumption of poultry.
- ✍ breaded and battered products, also fat. More convenient than cuts and less obviously a piece of a dead animal.
- ✍ ready meals, even more convenient, and even less obviously a piece of a dead animal.

This series of product and marketing triumphs, sustained over 40 years, takes some explaining. Our explanation, for what it is worth, is as follows.

The poultry chain has been more marketing oriented than is the pork chain. Product differentiation has been one of its basic tenants. Another essential difference from pork is that poultry production and packing are simpler and easier than pork production and packing:

- ✍ poultry production has about 1 % variation between companies in technical performance, compared to 20% for hog production.
- ✍ mass produced poultry can be made uniform without sacrificing the advantages of all-in, all-out (and we can never find the chicken we want in the supermarket, because they are all the same weight). The Danes have come closest to producing uniform hogs, but they were still variable. They dropped the extreme standardisation as soon as they could, because of the expense.
- ✍ a chicken only gives rise to half a dozen basic products, compared to dozens for a hog.

The effect of this simplicity is that huge companies, able to influence national markets, have been able to manage vertically integrated poultry businesses. We believe that similar advantages from vertical integration will come for pork, but not on the same scale. We fear that some current U.S. projects will come to grief. In conclusion, vertical integration must come to pork, but it will only succeed on a smaller scale and with less automation than is seen in poultry.

## **5.5 Comparison of Hog Production and Pork Production**

If we conclude from sections 4.1 and 5. that a 1,000 a day packer can survive and compete as a packer, this brings us to the key question of the synergy between hog production and hog packing. In the section on costs we have not allowed for the marketing advantages and the dangers of vertical integration which are discussed in Section 5. Quantifiable advantages which we see from vertical integration are:

- ✍ savings in sales costs for producers and buying cost for packers. We have not allowed for this, since we have assumed that the staff saved would be replaced by those responsible for liaison between hog production and packing. We believe these would offset each other.
- ✍ level throughput. Fluctuating throughput is a factor in the problems which plague the U.S. packing industry. Most packers pay level delivery bonuses to reduce this problem.
- ✍ optimum slaughter weight policies (Section 5.51).

### 5.51 Slaughter Weights

Sort loss is imposed by packers on the grounds that packers need to produce a uniform product for sale. This argument is evidently false for two reasons:

- ✍ if it were true, the best weight range for standardising trimmed cuts would be lower for gilts than for barrows.
- ✍ the weight range would be lower for lean hogs than for fat hogs, though the opposite is the case hogs are variable anyway. Restricting the live weight range hardly makes any difference to the variability in the weight of trimmed cuts. European work indicates that reducing the live weight range from 190-250 lb to 200-240 lb, would only reduce the standard deviation of the weight of trimmed cuts (within sexes) by 13%. Over the two sexes the effect would be proportionately less.

All-in all-out finishing on pre-planned dates saves up to 10% of finishing costs, about 7% of hog costs, which is over \$7 per hog on the prices we are using in this example. This has to be set off against:

- ✍ the proportion of hogs which can be finished all-out with present slaughter weight policy.
- ✍ costs to the packing function of more variable slaughter weights. Most of those costs which are claimed evaporate on detailed examination. Whatever the slaughter weight range, packers are faced with the problem of marketing a variable product. There is little difference in cost between sorting one way and sorting another, particularly where automation is low in any case.

### 5.52 Synergy Between Hog Production and Packing Price Cycles

As we saw in Section 2.22, many people, including SARC, believed that packing margins are counter cyclic to hog prices (i.e., packers make money when hog producers lose it, and vice versa). An analysis of the margins in the U.S. from 1987 to 1994 reveals that this was not so, except for the closing months of 1994. A small correlation between producer and packer margins (+0.24) is positive, due only to the fact that both decrease with time. When the overall trends are removed, the correlation is effectively zero (+0.06), meaning that production and packing margins are independent of one another.

This lack of synergy is disappointing, but not disastrous. The main difference is that a seller of hogs can do little or nothing when prices fall, whereas a seller of pork can take marketing action, for example he can:

- ✍ change products.
- ✍ change markets.
- ✍ target niche markets and difficult customers.
- ✍ bring a personal touch to existing markets.
- ✍ make direct sales to consumers:
  - ✍ local deliveries
  - ✍ market stalls
  - ✍ farm gate sales
  - ✍ mail order
- ✍ rent freezer storage units (or even refrigerated boats as Canadian producers did in the 1970s).

#### 5.521 Difficult Niche Markets

The Bigeard Company is referred to twice in other parts of this report:

- ✍ in Section 5.31 it is reported as successfully defying a rule which appears to apply to everyone else.
- ✍ it was one of the two packers which survived the massacre described in section 3.321.

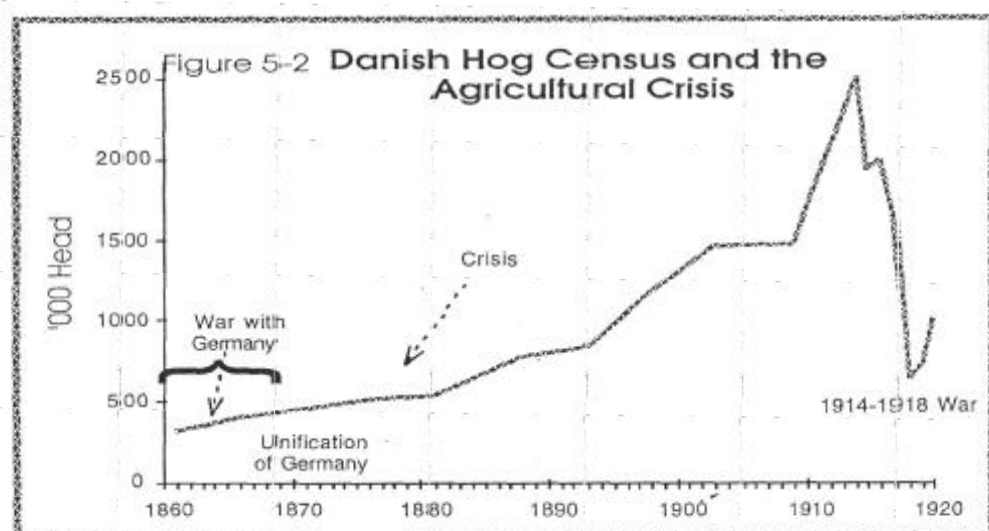
Old man (Lucien) Bigeard might be called a meat thinker. He said to Alister Pease in a key interview in 1980: "I didn't like the fluctuating margins, and I thought for a long time what I could do about it. I then went round

France looking for the further processors with the toughest and most awkward specs, and organised myself to meet them. Nobody else can meet these specs, so my customers have to come to me. I charge them formula prices based on the hog price.”

We asked a friend who bought Bigeard hams for drying what he thought of this, and he replied: “Bigeard is expensive, but if you order hams with a minimum pH of 5.7 you know that the pH has actually been measured on all of the hams, and not a single one below 5.7 will be in a delivery. We get so much less rotting on the bone during drying with his hams, that we can easily justify the extra price.”

### 5.522 Exporting Out of Trouble

The classic example of hog producers exporting their way out of trouble comes from Denmark in the 1870s. German unification was achieved by Bismarck in 1871 after successful wars against Denmark, Austria and France. He decided to devote as much of the GNP as he dared to building up the armed forces, thus lowering the purchasing power of the population. Danish hog producers had sent their hogs live to Germany, which had become an enemy in a financial crisis. They suddenly found themselves without a market - the ultimate nightmare for any hog producer. At the same time, the export grain markets, the mainstay of Danish trade, were taken over by cheaper supplies from Russia and the USA. The Danish account of their reaction is as follows. “The solution of this crisis had three components:



- ✍ changing the orientation of agricultural production from live hogs and grain to pork, bacon and butter.
- ✍ growth of demand in the industrialised society of the UK for imported foodstuffs.
- ✍ the co-operative movement and its effect on export marketing.

The co-operative slaughterers, processors, and dairies made their products standard commodities in the export market. So persistent was the British demand for Danish bacon that this became the single most important Danish export commodity. In Denmark, ‘pig slaughterhouse’ became synonymous with ‘bacon factory’.”

The changeover period must have been painful for many producers in Denmark, but it was accomplished in a short period and shows up as barely a kink in the growth of Danish hog production (Figure 5-2).

This was the ultimate “technical reaction” and the Danes continue to profit from the lessons learned to this day.



## 6. Conclusions

SARC & FJB Systems estimate that the capital requirement of a 1,000 a shift plant is 25% higher than that of an 8,000 a shift plant. A 1,000 a shift plant costs about \$8.5 million for one shift and \$10.5 million for two shifts. We believe that the extra costs of a small plant can be estimated realistically. The advantages of small plants are mainly opportunities, which require initiative and action to turn them into money. We therefore present them qualitatively. The extra costs, per cwt live, are estimated as:

	1 Shift	2 Shifts
staff costs	\$0.94	\$1.02
interest & depreciation	\$0.41	\$0.25
by-products	\$0.63	\$0.63
<b>Total</b>	<b>\$1.98</b>	<b>\$1.90</b>

A small plant therefore has about \$2 per cwt to offset with its advantages. SARC believes that these are:

- ✍ Labour Relations → willing workers → better quality, less waste, fewer mix-ups, better suggestions for process improvement.
- ✍ Reduced Automation → better quality, more flexibility.
- ✍ Better Procurement → reduced mileage, no buying stations, easier to select the most desirable hogs, easier to use hogs which nobody else wants.
- ✍ Quality → less stress, electrical stimulation easier, more hand working.
- ✍ Products and Service → small scale and hand working allow products to be adapted to particular requirements, the personal touch in sales and after sales service.
- ✍ Vertical Integration → difficult to manage, but with a great potential for economies and better products due to overall optimisation.
- ✍ Local, with a non-corporate image → it is easier for a small local company to give service to small customers. Small retailers know this.

We conclude that the higher costs of a 1,000 a day packing plant compared to a large plant do not constitute a barrier to hog producers wishing to enter the pork business.

We also conclude that hog producers, producing their own pork on a relatively small scale, have potential marketing advantages easily sufficient to overcome the handicap of \$2/cwt higher costs. Potential is one thing; its realisation is another. The difficulties we foresee are as follows:

- ✍ the difficulties and dangers of starting any new enterprise. Many hog producers have no experience of starting new businesses and will underestimate this aspect.
- ✍ the difficulty of entering any new business activity. It normally takes an individual or an organisation 10-15 years to get really good at a new business. People with the necessary technical knowledge and experience can be hired, but the organisation is vulnerable until the board of directors understands the new business.
- ✍ the difficulty of setting realistic benchmarks in a vertically integrated organisation.
- ✍ cash flow difficulties while the basic markets are being established. These must be built into business plans.
- ✍ the high visibility of the first projects. Existing organisations may try to make them fail.

To sum up, *“If you are scared of the difficulties, you will probably be O.K. If you think we are proposing a formula for easy success, you will more likely lose your shirt.”*

## **7. Business Investigation & Plan**

Readers who are at least partially convinced by the information presented so far, may be wondering what is their next step. We suggest this step is to participate in developing a formal “Business Investigation and Plan.” Much about any new business is unique to the place, participants, products, processes, and markets where the business is located; but many planning elements are similar for any businesses of the same type, and much can be gained from examining more than one set of potential business arrangements at the same time.

This section is a description of SARC’s program to provide business investigation and plans and an invitation for groups who wish to participate in the opportunities SARC sees unfolding in the U.S. pork industry.

### **7.1 Objectives**

SARC’s objective in working with groups who intend to integrate in the U.S. pork industry is to produce fully audited, comprehensive business plans for a competitive, small scale, partially standardized pork production and packing operation. Business plans will be adapted to varied market situations and settings and will be designed for expansion as future opportunities develop. This implies.

- ✍ establishing detailed costs and products from a 1,000-2,000 a day packing and processing plant.
- ✍ developing original ways of reducing any disadvantages.
- ✍ estimating the costs and effectiveness of the dozens of measures which can be taken to improve pork quality.
- ✍ producing a process layout I for packing plants adapted to pork markets as they will develop over the next 10 years.
- ✍ producing business plans including capital and operating costs for proposed plants.
- ✍ investigating market opportunities (for improved products, custom products, identity preserved products, and personal service).
- ✍ exploiting opportunities for vertical organization.

### **7.2 Scope**

The SARC Business Investigation and Plan (project) will cover:

- ✍ cost savings and product improvements for small scale plants, such as:
  - ✍ layout of a standard packing plant, with allowance for desirable future modifications.
  - ✍ transport and hog handling from pen to stunner.
- ✍ specific marketing and business plans for each subscriber, including distribution structure.

### **7.3 Program & Method**

The main program will start by assembling lists of wastage in the current U.S. pork chain, due mainly to:

- ✍ poor information flow, which increases costs. How many hog producers know how genetics affects the weight of head?
- ✍ packing houses being built and operated by people more interested in the engineering challenges, than in marketing effectiveness. This tends to lead to excessive size and automation to the detriment of product quality.
- ✍ failure to take measures to improve eating quality of pork.

Initial item lists will be drawn up from existing SARC experience and reports. They will be extended and checked with desk work, and by interviewing both scientific experts and successful industrial operators. ~JB Systems will then design the process layout and Grandin Livestock Handling Systems Inc. will design the live hog area. In parallel with this, SARC will study the market. PJB Systems and SARC will then draw up a business and marketing plan for the recommended project for each of the subscribers.

## 7.4 Report

The marketing side of the SARC feasibility report will examine

- ✍ products and markets which are generally available to individual projects.
- ✍ case studies of successful U.S. projects.

Proceeding on to develop individual market strategies, in conjunction with clients, is a separate option in the program. Marketing strategies are something which clients often can and frequently want to do themselves for obvious reasons. The focus of a production study needs to be a process layout for a viable alternative pork packing project, with a maximum of options for future expansion and diversification.

### 7.41 Process Layout

A process layout includes a detailed description of the plant and its operation, and how it would work, from the arrival of the hogs to the finished products, including:

- ✍ where the walls will be.
- ✍ where the machines will be.
- ✍ how the pork will flow through the plant.
- ✍ how the plant will work:
  - ✍ minimum stress in unloading, holding pens, and the run up to the restrainer.
  - ✍ maturing of selected vac packed cuts.
  - ✍ preparation of case-ready packs in gas flushed thermoformed trays.
  - ✍ integration of special orders into the system;.
  - ✍ tracing of major cuts from each batch through to the retail packs.
  - ✍ printing of individual labels, including the name of the farm on which the pork was produced (identity preserved).
- ✍ allowance for the possibility of:
  - ✍ expanding to two shifts.
  - ✍ increasing the speed of the line.
  - ✍ varying the chilling speed.
  - ✍ electrical stimulation.
  - ✍ fresh sausage production.
  - ✍ bacon production.
  - ✍ cooked ham production.
- ✍ detailed costs of operation.

### 7.42 The Vertically Integrated System

The report will cover pork production from serving of sows to wholesale of pork and pork products, with the main emphasis on the packing link, including:

- ✍ cost savings and product improvements which can be achieved by coordination of production and packing.
- ✍ estimates of the costs of:
  - ✍ a full engineering design.
  - ✍ cost of construction (managed by FJB Systems if required).
  - ✍ cost of commissioning the plant.
  - ✍ detailed operating costs.
- ✍ marketing of pork from small integrated packers:
  - ✍ present small U.S. operators, and the niches they occupy.
  - ✍ main products, and potential markets.
  - ✍ results of interviews with potential customers.

### 7.43 Business and Marketing Plan

Ultimately a business plan must be individual and specific if it is to be useful to its owners.

In the SARC program, each subscriber, group or organization will receive its own business and marketing plan, showing:

- ✍ cash flow and P&L.
- ✍ marginal costs of changing the capacity.
- ✍ specific local opportunities for added value products.
- ✍ specific local opportunities for premium quality products.
- ✍ marginal costs of options for improving quality or changing products.

### 7.5 Cost and Conditions

Feasibility studies will be better and cheaper if they are done in groups. Much of the work will be common to all studies, and experience from one will benefit the others. SARC, as the author of this study, has already chosen the best associates, from its world wide contacts, for executing these feasibility studies. As a result of the study it is well placed to assemble groups of organisations. We will try to group feasibility studies into threes, as similar as possible. The fee for three studies is \$120,000, or \$40,000 per organisation. The fee for a single study is \$80,000.

## 8. The Team

The project will be conducted jointly by SARC, Grandin Livestock Handling Systems Inc. and FJB Systems. FJB Systems will provide the engineering and operational expertise. Grandin Livestock Handling Systems Inc. will design the unloading, holding and stunning areas, and will describe the rules for hog handling and for training drivers and other personnel handling live hogs. SARC will research the hog production and market aspects. FJB Systems and SARC will work together on the personalised business plan for each subscriber.

### 8.1 SARC

SARC is an independent consultancy operating internationally, whose object is to help improve the effectiveness of pork and other meat chain companies. It has offices and representatives in six countries. SARC'S background and experience include.

- ✍ operational responsibility in genetics, animal feed, veterinary pharmaceuticals, hog production, hog and meat buying, meat packing and processing, meat machinery, food distribution logistics, pricing strategies and retailing.
- ✍ strategic, operational and competitive analyses of meat chains and markets in over 20 countries.

Comparing countries and operators gives unique insights for understanding business operations, and for identifying effective strategies and action. **SARC** has worked with hundreds of companies, in seven languages, at all levels of animal and meat chains. SARC is widely acknowledged as being the world's foremost consultant on pork chain strategies. Recent multi-client studies are:

- ✍ The EC Pork Chain
- ✍ Quality, Innovation & Margins for Fresh Pork
- ✍ Performance of PST Treated Hogs Outside the Experimental Weight Range
- ✍ Reducing Unnecessary Consumer Resistance to Biotechnology
- ✍ Towards More Profitable Hog Packing
- ✍ (competitive advantage in hog buying and allocation)
- ✍ Ham Buying in Italy
- ✍ The French Market for Some Traditional Corsican Food Products

- ✍ Business Plan for a Polish Swine Genetics Operation
- ✍ EU Patent Protection for a New Creep Feed
- ✍ High Volume Swine Production in Three Chinese Provinces
- ✍ Where is the U.S. Pork Chain Going? (an on-going program)

Subscribers to the last named program include the following:

- ✍ Babcock Swine
- ✍ Cargill Swine Products
- ✍ Cyanamid
- ✍ Danish Meat Research Institute
- ✍ Farmland Industries
- ✍ Moorman's
- ✍ Murphy Farms
- ✍ National Pork Producers Council (sponsor)
- ✍ Pig Improvement Company
- ✍ Pitman-Moore

## **8.2 Grandin Livestock Handling Systems Inc.**

Dr. Temple Grandin is Assistant Professor of Livestock Handling and Behavior at Colorado State University. She holds a BA. in Psychology and M.S. & Ph.D. degrees in Animal Science. She is well known to the U.S. pork chain as the most professional consultant on animal handling. Her company, Grandin Livestock Handling Systems Inc., specializes in the following:

- ✍ improving handling procedures to reduce animal stress, sickness, death, loss and injury.
- ✍ consulting with ranchers, hog producers and cattle feeders to improve livestock handling methods and procedures to improve productivity.
- ✍ consulting with all segments of the livestock industry to improve animal welfare.
- ✍ developing handling procedures to reduce stress related meat quality problems such as Pale Soft Exudative (PSE) meat, dark cutting and blood splash.
- ✍ determining causes of bruises and injuries to livestock in feedlots, trucks, auctions, ships and slaughter plants. Making corrections to prevent them.
- ✍ consulting and advising on humane stunning methods in slaughter plants. Reducing eating quality problems caused by improper stunning methods.

Recent assignments have included layout and construction drawings for:

- ✍ hog loading ramps. hog crowd pens.
- ✍ restraining systems for hogs at slaughter plants.
- ✍ auction markets.
- ✍ a hog assembly and shipping yard.
- ✍ hydraulic and pneumatic remote controlled gates.
- ✍ an automatic hog stunning system.
- ✍ an automatic hog sorter.

## **8.3 FJB Systems**

FJB Systems provides technology services for the food industry. It has an almost unique ability to assemble the most capable specialists into project teams. All FJB consultants have many years experience in the design and operation of modern facilities, built to meet EU and USDA requirements. FJB services are suitable for those wishing to enter a completely new industry, where advisors with extensive experience are required to help clients set up new businesses, which will operate effectively and commercially. Some clients already operate within their chosen industry, and require management or engineering help to upgrade plant or improve management practices.

FJB has built and started operations of more than 15 packing plants in 10 countries. It was responsible for the design and project management of J. Sainsbury's 4,000 pig per day state of the art packing and processing plant at Haverhill, UK. FJB has three working rules:

- ✍ maintain strict independence from all suppliers of equipment.
- ✍ standardise as much as possible, so that you know it will work.
- ✍ anyone can build a packing house. The fun is in building it cheaper, while ensuring that production and hygiene standards are maintained.

FJB clients include:

- ✍ Atalanta Corp (USA)
- ✍ Central Queensland Meat Export Co.
- ✍ Cold Storage Commission (Zimbabwe)
- ✍ Conti Trade Services (Switzerland)
- ✍ County Produce Ltd. (UK)
- ✍ Frigorifico Anglo (Argentina)
- ✍ Gisborne Refrigeration Co. (NZ)
- ✍ Haverhill Meat Products (UK)
- ✍ Hong Kong Refrigeration Co.
- ✍ Sainsbury (UK)
- ✍ Kamenka Meat Combinat (Russia)
- ✍ Kenyan Meat Commission
- ✍ Merseyside Food Products (UK)
- ✍ Nelsons (NZ) Ltd.
- ✍ Preston Abattoir Contractors (UK)
- ✍ Riverstone Meat Co. (Australia)
- ✍ Saudi Livestock Transport & Trading Co.
- ✍ Turners (Soham) Ltd. (UK)
- ✍ Union Cold Storage (UK)
- ✍ Union International Ltd (UK)
- ✍ William Low (Scotland)