Cost Competitiveness of the Canadian Pork Processing Industry

A Report Prepared By

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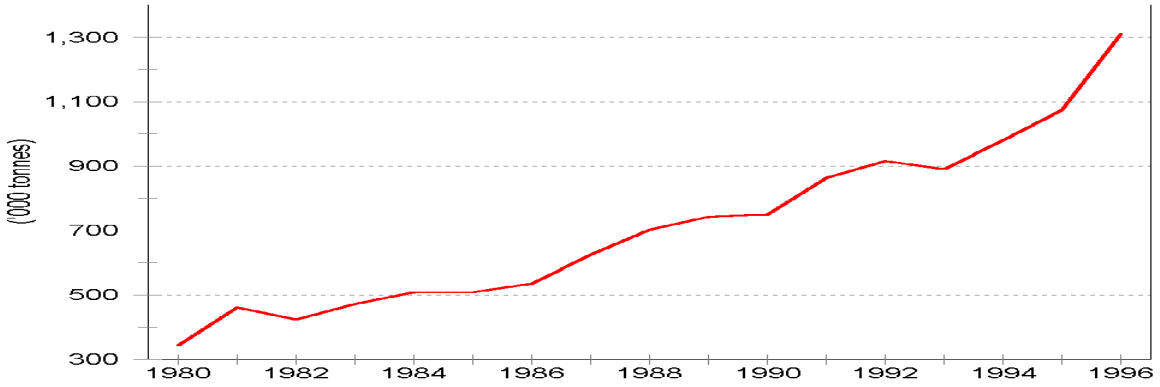
1.0 Situation

The Canadian pork processing industry is at one of those crossroads that come along occasionally in history. There are several important elements of the current situation:

1. Because of falling trade barriers and rising incomes in Asia, imports of pork are exploding (Figure 1.1).
2. Several major competitor nations (Taiwan, Denmark and Holland) are reaching the limits of their production potential, and are finding it difficult to compete for the growing export market.
3. Regulatory changes in Canada and declining transportation costs have provided competitive cost advantage for Canada in hog production, especially in Western Canada.

Figure 1.1 Asian Pork Imports, 1980-1996



Canada's resource base makes it ideally situated to benefit from the emerging trade

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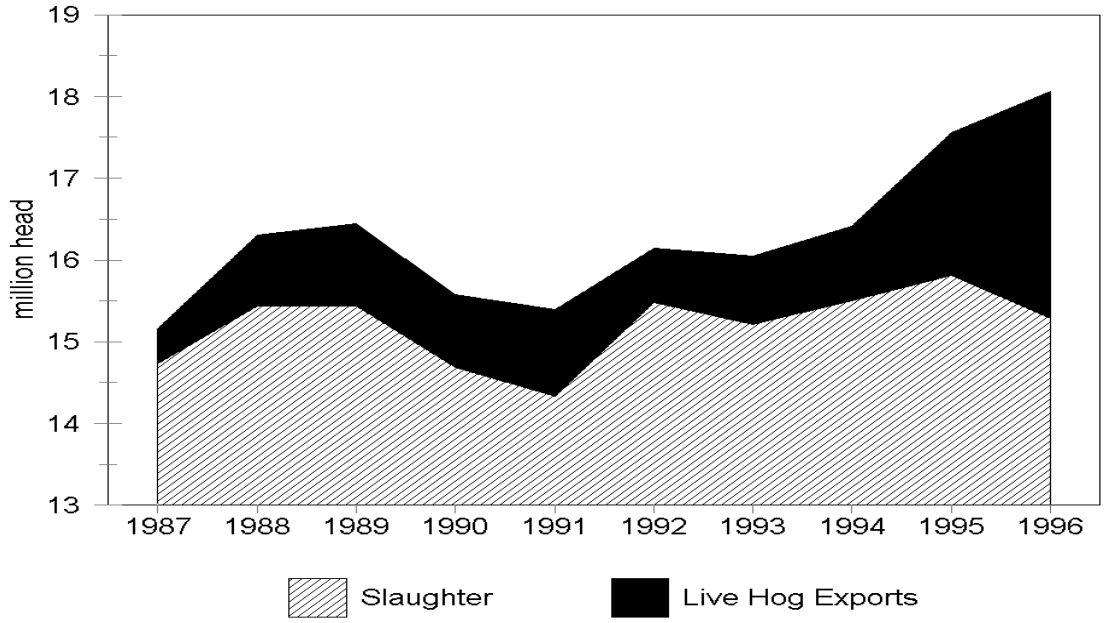
opportunities with Asia. The upper part of Figure1.2 shows that growth has already begun in hog production. The bulk of this growth has been in Western Canada. All evidence indicates that production growth will continue for the foreseeable future.

While Canadian exports of pork have increased, they have not grown in proportion to either the export opportunity, or to domestic hog production. This is an indication that Canadian pork processors are not as competitive as they might otherwise be. A very clear indication of the problem can be seen by returning to Figure 1.2, where the lower portion of the graph indicates the portion of hogs raised in Canada that are slaughtered in Canada. Figure 1.3 shows the percentage of domestic hog production that is slaughtered in Canada; the domestic processing industry's share of domestic hog production has been declining steadily over the past few years. Three million of the 18 million hogs produced in Canada last year were exported to the US, instead of being processed in Canada.

Figure 1.2 Total Canadian Hog Production, 1987-1996

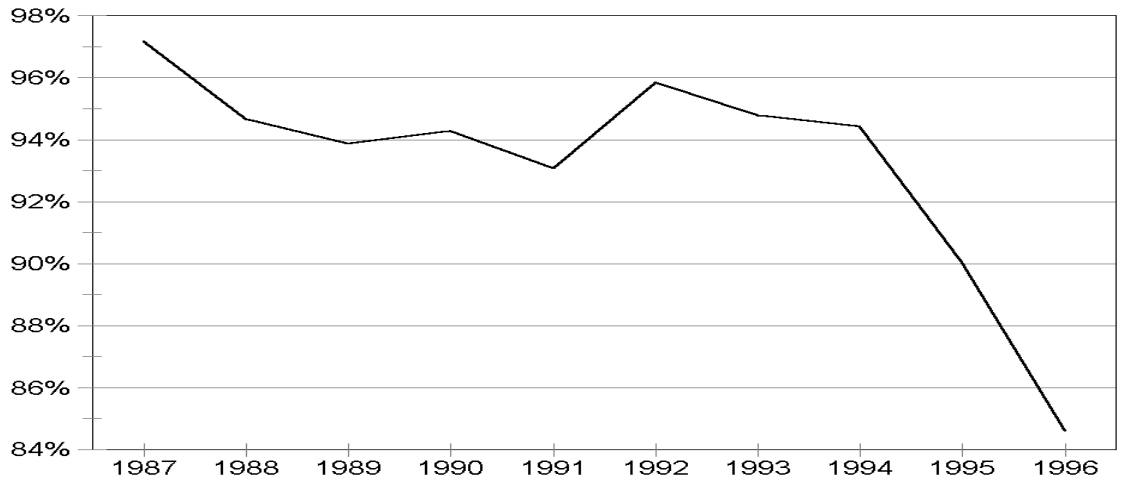


What this means is that Canadian pork processors are finding it increasingly difficult to compete with their American counterparts for the hogs raised in Canada: those raised in Canada but not slaughtered in Canada are being exported to the United States. If Canadian packers were more competitive, then Canadian exports of pork would increase. This would be a positive development for Canada for a number of reasons:

1. More foreign exchange earnings would be generated.
2. More employment would be generated within Canada. As will be seen later,

the meat processing industry employs almost 35,000 people in Canada already. The Asian export markets require fresh and frozen product that undergoes a great deal of work - deboning, trimming, cutting to precise specifications. Therefore, this business offers a great deal of potential employment to the Canadian economy.

Figure 1.3 Share of Canadian Hog Production Slaughtered in Canada, 1987-1996



The intent of this report is to further investigate the evidence on Canada's lack of competitiveness in pork processing, and to initiate discussion on how that competitiveness can be enhanced. To accomplish this, the report proceeds in three stages. In the first, an overview of the US and Canadian red meat processing industries is presented to give a picture of the relative structure and economic performance of the two industries. The second focuses on factors affecting cost competitiveness from previous research, and specifically on recent events in the pork processing industries of Canada and the United States, and their implications for cost competitiveness. In the third stage, a spreadsheet analysis is reported which addresses the potential impact on costs for a processing plant of various changes in its operations.

There are three important factors about the approach used in this study that should be explained. First, comparisons are between Canada and the United States. Canada competes in the world market with pork processors from the US and European countries. Our emphasis is on Canada and the United States because the available evidence in a forthcoming publication by Hayenga at Iowa State is that both the costs of producing hogs and the costs of processing are much higher in Europe than in North America. While there are some differences of product quality, especially in Denmark, which give European

product an advantage in world markets, it is also fairly clear that some of the advantage results from European export subsidies. Therefore, the industries are not directly comparable.

Another aspect of this study that needs to be explained is that most of the emphasis is on operational efficiencies in pork processing. We certainly subscribe to the notion that the entire supply chain is important. The Centre is working on a related study of farm level efficiencies in Canada relative to competing countries that will be available in a few weeks.

Finally, the end of the supply chain, i.e. marketing are important aspects of potential competitive advantage or disadvantage. As we have indicated in other reports, our perception is that Canada is blessed with a few of the best international export marketers in the world. Therefore, the scope of the study is limited to the operation aspects of the plants.

2.0 Canada/US Processing Industry Comparisons

The red meat processing industry transforms live cattle and live hogs into fresh and processed products. Fresh products are those such as steaks, chops and roasts that appear in grocery stores and in food service distribution. Processed products are those such as bacon, ham and sausage which have been either cooked and/or have other flavors or ingredients added to them. Most large modern meat processing plants specialize either in beef or pork. Unfortunately, the data sources on which we rely for this section of the report do not separate the two. Therefore, this section focuses on the red meat processing industry in general.

It is interesting to note that there has been very substantial capital adjustment over the past decade in the beef component of Canada's industry as new investment in Canada by US-based multi-nationals has allowed a few plants to benefit from significant economies of size. Therefore, the structural differences, and most likely the differences in performance between the US and Canadian industries, occur more because of pork than beef.

The processing industry has two major components: primary and further processing. Primary processing includes slaughter and fabrication. Fabrication in turn refers to those activities included in transforming carcasses into primal and sub-primal cuts. Further processing includes additional preparation of fresh products, for example preparation for case ready retail cuts, or prepared products such as cooking and smoking of ham, sausage or cold cuts. These distinctions will be addressed from time to time in the discussion. It is generally true that further processing is more profitable than primary processing.

2.1 The Industry

Table 2.1 contains comparisons of the level of sales and value-added for the two countries' industries, as well as the number of establishments (plants). For the financial data, we compare 1994 and 1995 for the two countries and an average for 1980 to 1990 for the sake of comparison (George Morris Centre, 1993). All financial data are expressed in Canadian dollars using annual average exchange rates. The 1980 to 1990 information is expressed in 1989 dollars; 1994 and 1995 data are not deflated. All of the data are obtained from Statistics Canada and the US Department of Commerce. To the best of our knowledge, except where indicated, the data are obtained from comparable sources and with comparable definitions.

Table 2.1. General Sales Descriptors for the Red Meat Industry

	Canada			United States		
	Average 1980-1990	1994	1995	Average 1980-1990	1994	1995
Sales Revenue (C$ million)	10,582	9,543	9,637	65,645	67,428	69,589
Value Added (C$ million)	1,751	1,967	2,100	8,118	11,161	11,371
Number of Plants	524	454	457	1,638	1,264*	N/A

* U.S. Census Bureau, Survey of Manufacturers 1992

Not surprisingly, the US industry is considerably larger than the Canadian industry. Canada produces roughly 16 million hogs and 4 million cattle per year, while the US produces 92 million hogs and 37 million cattle. The US is estimated to have about three times as many federally inspected processing plants. Total sales revenue by meat processing firms in the United States are about seven times higher than sales in Canada during 1994 and 1995 compared to about 6.5 times higher during the 1980's. So, the US had growth in revenue, while Canada's fell.

Value-added is the difference between the value of the industry's sales and its costs of raw materials, including live animals, packaging and fuel. It represents what is left over to pay for labour, capital, other inputs to the processing industry and profits. Canada's processing industry generated about $2 billion a year in value-added during 1994 and 1995, while the US industry generated over $11 billion per year. Again, the US industry had more growth (more than 30%) than Canada (about 11%) from the 1980's to 1994/95.

Table 2.2 contains additional information about the industries. Canada's red meat processing industry employed about 27,000 people in production jobs - ie, those who are involved with the production process - in 1994 and 1995 compared to about 105,000 in the United States. The second row of the table indicates the number of paid hours that production workers were employed during each of the two years. The third row shows the

amount of expenditure by processing firms on production workers' wages. This indicates that there were about $800 mil. spent in Canada and about $3 bill. spent in the United States in each of the two years. The final row of Table 2.2 has the expenditure by processing firms on salaries. Salaried workers are those involved in administration, marketing and management in the firms.

These data indicate the importance to Canada of this industry. It generates almost $10 bill. a year in sales revenue, pays salaries and wages of about a $1 bill. per year and employs over 30,000 people, when salaried people are factored in. This compares to about 50,000 employed by the automobile industry. It is by far the largest component of the food processing industry and is larger than most other industries in Canada. By implication, it pays almost $8 bill. per year to farmers for their cattle and hogs, and to packaging companies and utilities for their packaging products and fuel. It is an integral part of the Canadian economy and, as indicated in Section 1.0, has the opportunity to increase its importance over the next several years.

Table 2.2. General Labor Descriptors for the Red Meat Industry

	Canada			United States		
	Average 1980-1990	1994	1995	Average 1980-1990	1994	1995
Number of Production workers	25,601	26,548	27,248	102,527	102,200	108,100
Production Hours (million hours)		55	56		228	243
Production Wages (C$ million)	696	770	805	2,604	2,784	3,203
Salaries (C$ million)	253	220	254	789	688	777
Total Number of Employees		31,940	33,270		160,740	172,570
Total Payroll (C$ million)	949	990	1,060	3,393	3,472	3,979

2.2 Performance Indicators

Table 2.3 contains a number of performance indicators generated from the basic financial and human resource information presented above. These indicators show the relationship between value-added and sales, as well as value added and employees' wages and salaries. We use value-added as a measure of productivity because it is the

best indicator of the contribution of the processing industry and its resources. One could use sales, but sales include the cost of raw materials which, in this industry are very significant, and they rise and fall with market conditions. Since the industry transforms live animals into finished products, we perceive that value-added is much more reflective of the industry's contribution.[2]

Table 2.3. Performance Indicators for the Red Meat Industry

	Canada			United States		
	Average 1980-1990	1994	1995	Average 1980-1990	1994	1995
Profitability Ratios						
Value Added per dollar of Sales ($)	0.17	0.21	0.22	0.13	0.17	0.16
Value Added per dollar of Wages ($)	2.48	2.55	2.61	3.10	4.01	3.55
Value Added per dollar of Salaries ($)	6.84	8.94	8.26	10.36	16.22	14.63
Productivity Ratios						
Value Added per Production Worker (C$ 000)	67.5	74.2	77.1	80.36	109.21	105.19

The first ratio is value-added per dollar of sales: a ratio of .21 means that $.21 of every dollar of sales is value added. The ratios indicate that the Canadian industry has been more successful in generating value-added as a component of sales than has the US industry. This is likely because Canada has a higher proportion of pork in its product mix and because it has been more export oriented. Both of these factors increase the intensity of processing and add more value. Note also, that both Canada and the US increased their ability to add value as a percentage of sales since the 1980s. This is likely due to an increasing array of products that are now prepared by the processing industries but that in the past were prepared in homes or in retail outlets. It may also reflect new products that have been developed by the industries. One very important aspect of change in the red meat processing industry over the past decade is relocation of work from retailers to processors, especially in "case ready" preparation. This is likely a major factor that contributed to the increased ratio of value-added to sales.

The ratios of value added per worker and per dollar of expenditure on wages and salaries indicate the productivity of labour and administrative workers ($2.55 of value added is generated from each dollar of expenditure on wages). In all cases, labour productivity is lower in Canada than in the United States.

[2] Despite this, we also calculated the ratios using sales and none of the inferences that are made about productivity are changed.

Table 2.4 shows the differences in the productivity measures because they express Canada's performance indicators as a percentage of the United States. The first row shows that the Canadian industry has been more successful at generating value-added per dollar of sales than the US industry: by 23% and 37% in 1994 ans 1995. However, whether one uses labour productivity measured as value-added per dollar of expenditure on wages and salaries or value-added per worker, the Canadian industry's ratios suggest that labour productivity is about 30% lower than the US, and Canada has declined relative to the US since the 1980's. This relative decline in Canada's productivity ratios is correlated with the decline in Canada's share of the hog market that was outlined in Section 1.0.

Table 2.4. Competitive Ratios - Canada vs. USA

	Average 1980-1990	1994	1995
Profitability Ratios (%)			
Value Added per dollar of Sales ($)	134	123	137
Value Added per dollar of Wages ($)	80	64	74
Value Added per dollar of Salaries ($)	66	55	56
Productivity Ratios (%)			
Value Added per Plant (C$ 000)	68	49	N/A
Value Added per Production Worker (C$ 000)	84	68	73

These data also show the foundation of the current conflict between labour and management in this industry. Implicit wage rates for production workers (not including benefits, which will be addressed in a later section) based on Table 2.2 average $12.71 per hour in the United States for 1994 and 1995, and $14.20 per hour for Canada[3]. In both cases, the data are expressed in Canadian dollars. This amounts to a 12% higher wage rate for Canada. Data already presented in Table 2.4 indicate that Canada's labour productivity is about 30% lower. Information to be presented later indicate that the labour cost differential is higher in pork plants than in beef processing plants. In addition, Canadian pork plants have higher benefits than do US pork plants. The difference between labour productivity and labour costs rates is an obvious reason for the conflict between labour and management.

[3]These are calculated by dividing total production wages in Table 2.2 by the production hours and averaging the two years.

But labour productivity often has little or nothing to do with the capabilities of workers. It has much to do with the nature of the plant and equipment with which they do their jobs: as a worker, my productivity increases markedly if my old machine that was too small for the job, was worn out, had high repair and maintenance costs, and was technologically outdated, is replaced by a new, modern one that runs three times faster, has much higher capacity, never breaks down and does a better job of producing the product it's meant for. Most likely, if we could measure it in this example, both labour and capital productivity increase.

Capital productivity, unfortunately, is not nearly as easy to measure as labour productivity from data such as those reported here[4]. The interaction between labour and capital productivity is impossible to deal with in this kind of data, even though the importance of the interaction is obvious. Capital productivity is related to technology, economies of size and factors specific to an industry.

That there are differences in capital productivity between the US and Canadian meat processing industries is hinted at by some of the data reported above. Recall that we have included the number of processing plants in the two countries. Dividing the number of workers and value-added by the number of establishments shows that the US industry has more workers per plant by about 30% and about 60% more value-added per plant than do the Canadian plants (Table 2.5).

Table 2.5. General Performance and Competitive Ratios - Canada vs. USA

	Canada			United States		
	Average 1980-1990	1994	1995	Average 1980-1990	1994	1995
Number of Workers per Plant		70	73		127	
Productivity Ratios						
Value Added per Plant (C$ 000)	3,346	4,333	4,595	4,921	8,830	N/A
Competitive Ratios (%)						
Value Added per Plant	68	49	N/A			

It should be noted that the data on number of US plants were not obtained from the Commerce Department but rather from an estimate in a University of Nebraska study. Another study suggested that, in fact, there were considerably fewer plants in the United States in 1994 than did the Nebraska study. If the latter is true, then both the number of workers and value-added per plant in the United States is far higher than in Canada.

Plant size is not a measure of capital investment, but it is certainly an indicator that

[4]There are no adequate data to measure capital productivity.

US plants are larger than Canadian plants and that they produce higher levels of value-added. Therefore, there is reason to expect that capital productivity is higher in the US and that Canada's uncompetitiveness in costs has several causes. The next section contains a more specific analysis of these causes that affect costs in pork processing.

3.0 Cost Drivers in the Pork Processing Industry

There is little "academic" research on cost relationships in the meat processing industry. However two recent studies have relevance to the current project (Ward; Hayenga). They suggest that several factors potentially affect processing costs per unit of product[5]:

1. Economies of size. As plants become larger, throughput increases faster than do inputs and fixed and quasi-fixed costs can be spread over more units of output. This means that the investment per kg of production is lower with larger plants, that a worker can produce more per hour in a larger plant than a smaller one, and that management and administrative expenses can be spread over more units of output.

2. The number of shifts. Moving from one to two shifts also allows fixed costs to be spread over more units of output. The major expenses that can be spread are the buildings, production line equipment and management and overhead expenses. Multiple shifts also require greater investment in cooling equipment and higher maintenance and repair costs. Thus overhead costs per unit are not halved by adding to a second shift.

3. Technology and design of the plant. The technological content of equipment and the efficiency of moving product through the plant can affect the unit cost of processing.

4. Wage rates. Several aspects of meat processing are extremely labour intensive. In a competitive situation, differences in wage rates can affect cost competitiveness.

5. Size of carcass. Processing plants generally are designed to handle units of carcasses and primal cuts. Therefore, the higher the weight of a carcass, the more pounds of pork are produced and the lower the associated overhead cost per kg of product. As will be shown, this is an important factor in US and Canadian comparisons.

[5]The most important cost is the cost of raw material - i.e. of hogs. The discussion here is meant to focus on the factors in the manufacturing process that affect costs.

In addition to those identified in the studies, we would add that in the current case "regulatory costs" may also be important because the Canadian government charges a fee for service for the provision of the food inspection service that it requires be carried out in meat processing plants. Moreover, it is also expected that the ability or inability to operate a plant at full capacity has a substantial effect on unit costs. Other than raw material costs, most pork processing costs are fixed or quasi-fixed. This is obvious for plant and equipment: their costs are incurred whether the plant operates at full capacity or is closed. However, union contracts require that employees be guaranteed (usually) 37 hours of work per week[6]. Within limits, this means that people are paid whether the plant operates at full capacity or, say, half capacity. In the latter case it is easy to see why unit costs are affected by capacity utilization. If total fixed costs are $200,000 for a week, and the plant has capacity of 50,000 head per week, then the fixed cost per head is $4 when the plant operates at full capacity. But if it only operates at one-half capacity, then fixed costs are $8 per head.

3.1 Structural Differences Between the US and Canadian Pork Processing Industries

If these factors are important, we need to know how well the Canadian industry stacks up on some of them. We have considerable evidence on three of them: plant size, number of shifts and wage rates. Table 3.1 contains data from the US National Pork Producers Council that provides estimates of the weekly (based on five days) slaughter capacity of the plants owned by the top 16 US pork processing companies. It also contains George Morris Centre estimates of the weekly capacities of most Canadian processors.

What stands out in this table is the difference in scale between the industries in the two countries. Only three of the 37 US plants have smaller capacities than Canada's largest plant. Thirteen US plants are at least twice the capacity of Canada's largest. Moreover, the majority of US plants are double shifted. None are double shifted in Canada.

Plant capacity is approximated by line speed, the number of carcasses a plant's production line can process in an hour. This is dictated by the speed at which production lines can be operated. The US industry has undergone a substantial transformation in this area over the past decade as a number of new plants have been built that have extremely high line speeds. Current technology allows plants to operate at line speeds of up to 1300 carcasses per hour. Many of the newest plants have this type of capability, and many of them are located in the upper mid-west states (Michigan, Iowa, Indiana, Minnesota, South

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[6] A persistent problem with less throughput than is planned will lead to layoffs. This is why we use the term quasi-fixed costs is used in the text. They are fixed over some relatively short period of time, but can be affected over the longer run.

Dakota, Nebraska), where they compete directly with Canadian plants for Canadian hogs. At the same time, a number of Canadian plants have experienced considerable investment, but none has yet been built to the scale of several US plants.

Table 3.1. Estimated Weekly Slaughter Capacity (1996)[1]

Canada			United States (Top 16 Companies)		
Province	**Plant**	**Capacity**	**Company**	**Plant**	**Capacity**
BC			IBP	Waterloo, IA	85,000
	Britco	4,000		Logansport, IN	75,000
				Storm Lake, IA	67,000
Alberta				Col.Junction, IA	65,000
	Fletchers	25,000		Madison, NE	37,500
	Gainers	20,000		Council Bluffs, IA	36,500
Sask.				Perry, IA	33,500
	Intercontinental	20,000	**Smithfield/ Morrell**	Tar Heel, NC	120,000
	Moose Jaw Packers	6,000		Smithfield, VA	47,500
Manitoba				Gwaltney@Smithfield	44,000
	Burns	14,000		Wilson, NC	10,000
	JM Schneider	18,000		Sioux Falls, SD	75,000
	Springhill Farms	12,500		Sioux City, IA	75,000
	Forgan	4,000	**Swift**	Worthington, MN	78,500
Ontario				Marshalltown, IA	78,500
	Maple Leaf Pork	32,000		Louisville, KY	40,000
	Quality Meat Packers	25,000	**Excel/ Tyson**	Beardstown, IL	80,000
	Conestoga	2,000		Ottumwa, IA	50,000
	J.M.Schneider[2]	20,000		Marshall, MO	59,000
Quebec			Hormel	Austin, MN	80,000
	Olymel-Valley Junction	27,000		Fremont, NE	58,500
	Olymel-St.Valerien	21,000		Rochelle, IL	35,000
	Olymel-Princelville	13,000	**Farmland**	Crete, NE	41,500
	Olymel – Total	61,000		Denison, IA	37,500
				Monmouth, IL	35,000
	Brochu	20,000		Dubuque, IA	55,000
	Du Breton	11,000	**Thorn Apple Valley**	Detroit, MI	70,000
	Trahan	6,000	**Indiana Packers**	Delphi, IN	65,000
	St Alexander	5,500	**Seaboard**	Guymon, OK	40,000
	Laurentide	5,000	**Lundys**	Clinton, NC	40,000
	Agromex	5,000	**Sara Lee**	West Point, MS	32,500
	Jolibel	3,500		Newburn, TN	7,500
Atlantic			Dakota Pork	Huron, SD	38,000
	GPM (Maple Leaf) (PEI)	5,000	**Hatfield**	Hatfield, PA	35,000
	Hub (NB)	5,000	**Clougherty**	Vernon, CA	30,000
	Larsen (NS)	5,000	**Iowa Pack**	Des Moines, IA	30,000
	Antigonish (NS)	300	**Premium Std.**	Milan, MO	25,000
Total Capacity		325,600	**Total Capacity**		1,912,500

1 - There are additional plants, especially provincially registered, whose capacities are not known.
2 - This plant closed in late 1996.

Note that if one assumes seven hours per shift, the theoretical upper limit for a week of operation on a single shift for a plant with line speeds of 1200-1300 per hour is 40,000 - 45,000. With this knowledge, the contrast between the US and Canada in Table 3.1 is even more dramatic. Canada's highest capacity plant is at 30,000 hogs per week. The number of plants in the US with more than 45,000 head capacity gives some idea of the extent of double shifting.

Two additional factors create a structural difference between the US and Canada. Both affect labour costs. First, the US industry went through a period in the late 1980's and early 1990's during which wage rates were cut substantially. In many cases this was done through Chapter 11 bankruptcy proceedings, which allowed labour contracts to be renegotiated. As a result real and, in many cases, nominal wage rates declined in the packing industry.

The second factor is work rules. Canada's health care system generally confers a competitive advantage over the US because health care costs are lower in Canada, which affects costs such as workers compensation and the like (GMC, KPMG). However, Canadian labour contracts tend to offset this advantage with work rules that result in higher costs in Canada. Two examples illustrate. First, as indicated above, contracts guarantee a certain number of hours of work per week. However, US contracts allow for a number of weeks' exceptions, thereby making labour costs lower during weeks that have seasonally low runs of hogs. Second, work rules force Canadian processors to pay over time to have a weekend run, and stop it from hiring additional people to staff such an undertaking at full time wage rates. The effect is to increase the effective cost of labour in Canadian contracts to levels higher than in US contracts.

To get an idea of the magnitude of these differences, we were able to obtain estimates of wage rates and benefits for a sample of US and Canadian plants. The data and their sources are confidential but they appear to be reliable and representative. Using an exchange rate of C$ 1 = US$ .73, the average total wage cost for US plants is about C$16.80 per hour, while for Canadian plants it is about $21.80. Benefits average 32-33% in the US and 37-38% in Canada.

These rates are higher than those discussed in the previous section. There are four reasons for the differences between these and the data reported in Section 2.0. First, those in section 2.0 did not include benefits. Adding 38% to the Canadian wage rate and 32% to the US moves the earlier numbers to $19.60 for Canada and $16.78 for the US. Second, they were for earlier years. Third, they represent the total industry, including small local plants, while these are for large, usually unionized plants. Fourth, and most importantly, the earlier data include both beef and pork plants. Labour rates are lower in most Canadian beef processing plants. What is important is that both sources of information indicate wages are substantially higher in Canada.

Two things should be noted about this comparison. First, there is wide variation in the data for both countries on both wages and benefits. Hence they are simply averages. Second, they are not strictly comparable because the US data are actual costs: therefore they include start rate, job rate and over time. The Canadian data represent job rates and, therefore, do not include start and over time rates. Actual costs may be different depending upon the amount of turnover, the rapidity of movement from start to job rates and the amount of over time. Agrimetrics data released last week report a wage differential of C$22.65/hr in Canadian plants and C$16/hr in US plants.

Even with the foregoing caveats it is clear that there are differences in wage costs between the two industries. The relative effects of these and the other factors on total processing costs will be addressed in the next section. However, it is important to note that there are other differences associated with the two countries and their wage rates. One is that it appears the US industry has a considerable problem with acquiring and retaining labour. This has been the subject of some (likely over dramatized) US television coverage, but also has been reported to us in interviews with US processors. At least one major US processor incurs additional costs associated with training, housing and the like in its attempt to attract and retain workers. Second, the Canadian industry faces a different labour market, especially in Western Canada, than did the US in the late 1980's and early 1990's. Much of the restructuring in the US was done during a period of recession and the US industry has a supply of “green card” holding labour from Mexico that is not available in Canada. Much of the potential growth in Canada’s pork processing industry is likely to be in Western Canada where economic growth is the fastest in the country and unemployment rates are the lowest. What this means is that the Canadian industry faces a difficult dilemma: it is competing with the US internationally for the product market, but competing domestically for labour with other industries.

Two additional structural differences between the US and Canadian industries need to be underlined. The first has already been pointed out. Canadian meat inspection is legislated by the federal government for consumer protection and delivered by the federal government. Despite the fact that this is a benefit to consumers and assists in promoting Canada’s ability to export, as well as the fact that World Trade Organization rules deem food inspection to be a cost that governments can pay without trade penalties, Canada has chosen to pursue cost recovery in this area. At present, this increases the relative cost of processing for Canadian processors by from $.20 - .25 per hog.

The second is the fact that Canadian hogs are slaughtered at lower weights than US hogs. Currently, US hogs average around 260 lbs (118 kg) live weight and Canadian hogs average 235 - 240 lbs (106.5 - 109 kg). On a carcass basis, this means that the average Canadian hog slaughtered in Canada has 15 - 20 lbs (about 8 kg) less pork than the average carcass in the US. Since plants are set up to process carcasses, this means that a Canadian plant with capacity of 20,000 - 30,000 hogs per week produces 16,000 - 24,000 kg per week less pork because Canadian hogs are smaller. Therefore, the cost per kg is higher.

It should be noted, that most Canadian operations are attempting to increase weights, but the issue is not as simple as simply raising them to heavier weights. As hogs get larger, they have a tendency to get fatter and consumer quality falls. Consumers do not want fat. Moreover, as carcasses increase in amount of fat, processing costs may actually rise because more is spent on trimming, while the trim has much less value than the lean meat. Therefore, weights are being increased gradually by altering genetics and feeding programs to maintain carcass quality. We can estimate the effect of weight differences on the cost of processing (and do in the following section), but what we do not know is whether Canadian processors receive a premium for lower fat content that offsets the additional cost. Our impression is that they do not.

4.0 Quantifying the Cost Effects of The Structural Differences

In this section we estimate the effects on processing costs of the factors discussed in the previous section. This is approached in two different ways. First, we use the information in the publication by Hayenga to get a first approximation of the effects of multiple shifts and of wage rate differentials on the cost of processing. Second, using information provided by Maple Leaf Foods, we conducted a spreadsheet analysis that provides a more detailed estimate of the effects of these factors as well as others discussed in Section 3.

4.1 Using the Hayenga Estimates

Hayenga's data indicate that the range of total variable costs per head for pork slaughter plants in the US was US$20-25, with an average of US$22. Fixed costs per head were US$3-10 with an average of US$6. When Hayenga investigated the effect of double shifting on these plants, he found that variable costs were reduced on average by $2.00 per head and fixed costs by $3.00. Extending this to the Canadian situation, we can approximate the effect of double shifting by first converting to Canadian funds and then to a Canadian carcass basis. As above, we use an exchange rate of US$.73 and we assume a Canadian carcass weight of 86 kg. Using these assumptions, we estimate that the savings on a 100 kg. basis for a Canadian packer would be in the neighborhood of $7.97 per 100 kg of product by moving to a double shifted plant. It should be noted that there is a mixture of plant sizes in Hayenga's data. Therefore, it is not possible to separate out the effects at different sizes.

It is also possible to use Hayenga's information to make a first approximation of the effect of wage rate differentials. Hayenga argues that approximately 50% of the variable cost (US$16-25 per hog) is labour cost, and that 60% of the labour cost is associated with slaughter and processing. We disagree with this breakdown: our experience is that production labour represents a substantially higher portion of costs. The data in Section 2.0 of this report suggests that production workers represent about 80% of employment in the red meat processing industry. Therefore, we find it difficult to believe that production

labour costs are the same as the cost of all other labour in a plant. Therefore, we assume that 40% of the total variable cost is associated with production labour in US plants. The Agrimetrics information says Canadian wage costs are 40% higher than the US.

Using Hayenga's model, we estimate that, on a per 100 kg of product basis, a 40% differential in wage rates makes from C$4.08 to $6.37 difference in total processing cost.

These estimates based on Hayenga's work serve as a basis to compare the results reported below from our spreadsheet analysis.

4.2 Results of the Spreadsheet Analysis

Maple Leaf Foods provided estimates of the requirements in terms of labour, utilities, capital costs, maintenance and management under Canadian conditions for plants with single shift capacities of 20,000, 30,000 and 45,000 hogs per week. They also provided information on the differential costs associated with double shifting each size of plant.

We then calculated total cost per kilogram of pork under a number of scenarios. These include the effects of double shifting, a 40% differential in wage costs, and the effect of heavier hogs.

In order to preserve the confidentiality of the data, results are presented in terms of the effects on manufacturing cost per 100 kgs of product - ie. none of the individual items and none of the total costs are shown. Only changes are shown from base situations.

It is important to note that the data used in the analysis represent plants that do a large amount of further processing. As Hayenga points out in his study, further processing is extremely labour intensive and (we would add) it does not benefit from economies of size to the same extent as primary processing. Therefore, the plants in our spreadsheet analysis very likely represent a more intensive level of further processing than those in Hayenga's sample (as we have suggested is the case for the Canadian industry in general).

Results are presented in Table 4.1. They show the following[7]:

1. Increasing plant size from a capacity of 20,000/week to 30,000/wk or 40,000/week would reduce manufacturing costs by $7.05 and $8.74/100 kg

[7]The numbers do not reflect the "average" cost difference between Canada and the US, but between the smallest plant and the structures in the other scenarios. We do not know what the averages are. These data show the potential effects on costs if a plant were to make the adjustments in each scenario.

from the 20,000/wk plant.

2. Double shifting further reduces costs, but the estimated reduction is less than was the case with Hayenga's data. This reflects the higher degree of further processing in our spreadsheet analysis compared to Hayenga's model and, therefore relatively less overhead to spread across greater output.

3. It is interesting to note that the effects of moving to higher capacities and to double shifting are additive. Therefore the total savings by moving from a 20,000 head/week single shift operation to a 45,000 head/week double shift operation is $12.31/hundred kg.

4. Wage costs have a strong effect. The 40% reduction reduces manufacturing costs by from $8.10 to $6.90, depending upon the size of plant. This is in line with the results using Hayenga's model.

5. The difference between the United States and Canada in carcass weight has a substantial effect on costs per 100 kg. of output. In estimating this, we assume the average live weight of a Canadian hog is 237 lbs. and of a US hog is 260 lbs. We assume a dressing percentage of 80% and therefore that plant output is lower by about 8 kg. per carcass in Canada. Spreading the manufacturing costs over more kilograms of output increases manufacturing costs by about $3.00 per 100 kg of product and it has a greater effect in small plants than in large plants.

Table 4.1 Effects on Total Manufacturing Costs of Several Differences in Structure

Factor	**Cost Savings (Increases) from Base/100kg.**		
	20,000/wk.	**30,000/wk.**	**45,000/wk.**
Plant Size		$7.50	$8.74
Two Shifts	$6.14	4.55	3.57
40% Wage Cost	8.10	6.90	7.26
Size/Carcass	3.74	3.06	2.91

5.0 Summary, Conclusions and Implications

This study indicates that the Canadian pork processing industry has a growing

opportunity in world markets, both because of growing demand in Asia and growing supply of raw material in Canada. However, it has not kept pace with the opportunity and has lost market share in terms of domestic hog production.

Our objectives in this study are to measure the industry's lack of competitiveness, indicate the reasons for it, and show the impact of various factors on cost competitiveness.

The analysis starts with overview data on the red meat processing industries of Canada and the US. These data show that the Canadian industry lags the US in both labour and capital productivity, while Canadian wage rates are higher. From a cost perspective, it appears that there is a major difference in Canada's plant scale and technology. Canada's relative performance has been declining in recent years and this decline has been associated with a decline in Canada's share of the processing market.

A review of the recent economic literature on livestock processing costs indicates that the factors expected to affect costs are scale and quality of plant and equipment, number of shifts, wage costs, capacity utilization and size of animals.

The analysis then uses information on Canada's pork processing industry which indicates that it has relatively small plants, many of which are old, with relatively old technology. They all operate on one shift, while many US plants operate on two shifts. Canadian wage costs appear to be 40% higher than the US, and Canadian hogs are slaughtered at approximately 8 kgs. lower carcass weight than in the US. We rely on aggregate estimates by Hayenga for US pork processing plants to obtain a first approximation of the effects of wage costs and double shifting on total processing costs. We also had available from Maple Leaf Foods detailed estimates of resource requirements for three alternative plant sizes and multiple shifts which were used in a spreadsheet analysis to estimate the effects on manufacturing costs of the structural differences between Canada and the US.

5.1 Conclusions

There are several conclusions from this analysis:

1. Many Canadian pork processing plants are at a serious cost disadvantage for several reasons. The extent of the disadvantage and the sources depend in large part on the plant. For small plants, it is likely that cost disadvantages result from dis-economies of size, single shift operations, higher Canadian wage costs and smaller Canadian carcasses. Overall, no one factor is a silver bullet that will fix the situation.

   However, it is important to note that individual situations and individual decisions make a major difference. In Maple Leaf's case, their major plant has higher capacity than the mid-size plant in the spread sheet analysis. For

it, wage costs and single shifting costs are more important than dis-economies of size.

Similarly, an individual company has control over scale and shifts, and can work with their suppliers to overcome the carcass size problem. If an existing Canadian company has the will to make the investments required to change these, it remains in a cost squeeze because of wage costs. This squeeze is real because a rival who is not in the Canadian market may be able to undertake the same investment, negotiate a substantially lower wage cost and squeeze the Canadian company. This appears to be exactly what happened in the Canadian beef processing industry. More will be said about this below, but wage costs take on aspects of a silver bullet because they are not directly controlled by the company.

2. The results using Hayenga's model and our spreadsheet both show that Canadian costs are higher because Canadian plants are operated on a single shift, and because of wage cost differentials.For many of the smaller plants, an apparently major factor affecting manufacturing cost is that the Canadian industry has not taken advantage of economies of size and the technology that goes with size. Plant size appears to have as large or larger effect on total processing costs as either double shifting or wage costs.

3. The effects on unit costs in Canada of lighter hogs is quite substantial.

Cumulatively, these factors add up to $20/100 kg. higher cost than is attainable with modern plants and equipment, lower wage costs, and larger animals from the smallest single shift plant to the largest double shift plant. To put this into perspective, it represents in excess of 10% of the current price of hogs in the market place. At current market prices, realizing the full reduction in potential cost savings would be roughly equivalent to obtaining about one in nine hogs free.

5.2 Implications

The most obvious implication of this analysis is that if substantial adjustments are not made in Canada's pork processing industry, it will clearly lose the extraordinary opportunity that is presently available to it because of freer trade and the rapid economic growth that is occurring in a number of Asian countries. If the Canadian pork processing industry does not make the necessary adjustments, then processing of Canadian hogs will be done in the US, or non-Canadian companies will invest in Canadian processing at lower wage rates, as occurred in the beef processing industry where Canadian firms were replaced by modern plants controlled by foreign based companies.

The nature of the adjustments that need to be made is fairly clear from the analysis. New investment is needed in multi-shift processing plants to enhance Canadian

productivity. Moreover, efforts to increase the size of animal in the Canadian market clearly need to continue, at least from a processing cost perspective.

This leaves the thorny issue of wage costs to be addressed. They are clearly higher in Canada, both for wage rates and benefits. And they contribute to higher total processing costs. For a company willing to make the required investment decisions, wage costs are extremely important. This is not a standard labour-management issue over wages. It is far more complex and more fundamental.

From the management side, the issue is about the opportunities and risks involved in leading the Canadian pork industry into an international leadership position. The opportunities for export growth and the opportunities for cost competitiveness from investing in a new plant and equipment are clear. The risk is that an existing company may invest several tens of millions of dollars in a processing plant in a location that obliges the company to pay current wage costs and then have to face competition from a new entrant without the same labour cost. For example, should a US company invest in a similar plant and negotiate a labour contract at a rate similar to the US, then the Canadian company would be at a significant disadvantage.

Using numbers from this study, it is possible to estimate the order of magnitude. Assume the companies build plants with 45,000 head single shift capacity. This amounts to 2.34 million head per year. If the average hog weighs 86 kg and the Canadian company has a $7/100 kg cost disadvantage, then the disadvantage is $14.7 mil. per year.

From the labour perspective, the issue is that accepting lower wages means giving up hard won gains. Not accepting them may mean losing job opportunities if the investment is not made. Alternately, it may mean that non-Canadian interests will invest in the industry and initiate labour contracts at significantly lower wage costs.

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