AN EVALUATION OF

HOG MARKETING SYSTEMS IN CANADA

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A large number of stakeholders in the hog-pork sector in Canada provided some of their valuable time to discuss the issues with members of the study team. Their helpfulness in this regard is gratefully acknowledged. Although it was not possible to include all their comments in the final report, it is hoped that all are fairly represented. A list of people interviewed appears in Appendix B of this report.

Executive Summary

Production of hogs and pork in Canada has grown impressively over the last two decades. In the early 1970s, Canada was roughly self-sufficient in pork with small exports in some years balanced by small imports in others. Net exports grew rapidly from 1978 to 1984, after which time they have remained high but relatively stagnant.

Although many Canadian hog producers have invested heavily in modernizing and enlarging their operations, others have abandoned theirs and total hog output in Canada has not changed much over the past ten years. The Canadian hog-pork sector faces many challenges at the present time:

- new multilateral trade agreements including the new World Trade Organization,

NAFTA and possible extensions of NAFTA to other South American countries;

- competitive threat from industrialization of hog and pork production in the U.S.;

- domination by Taiwan of exports to the high priced Japanese market as well as

international competition from Denmark and other Northern European countries;

- removal of most forms of government support of this and other agricultural sectors

in Canada;

- high capital requirements for expansion of breeding herds and packing plants;

- pressures from urban residents to reduce smells, not permit groundwater

contamination, ensure safe and humane treatment of animals and maintain zero tolerance of drug residues in meat.

Canadian hogs have been sold through single desk selling agencies since the early 1970s in most provinces. These agencies were given exclusive authority to negotiate prices with packers on the basis of grading grids in each province, pool returns to producers and provide a number of other services. The provincial hog marketing agencies have formed an umbrella group called the Canadian Pork Council which provides a number of services for producers across the country, including helping to defend Canadian interests in numerous trade actions launched by the U.S.

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Recently, the Canadian Pork Council joined with the Canadian Meat Council to form Canada Pork International which promotes Canadian pork in foreign countries.

Several controversies about the Canadian hog marketing system have arisen in all provinces recently.

- mistrust has developed between provincial hog marketing agencies and packers;

- some have argued that centralized selling agencies for hogs reduce the ability of

the Canadian hog-pork sector to compete internationally in an increasingly free trading world;

- previous studies on the Canadian hog marketing system have not led to a

consensus about its possible effects on pricing efficiency;

- provincial markets in Canada have become increasingly linked to U.S. prices by

formula and some have wondered what long-term consequences for the Canadian hog-pork sector may result from these arrangements;

- packers and some large producers in some provinces have argued for a dual

marketing system where producers could by-pass the central selling agencies;

- a number of provinces have conducted major reviews of their hog-pork sectors

with the objective of developing strategic plans for expansion.

The study team conducted an exhaustive evaluation of the hog marketing system in all regions of Canada. Stakeholders from all parts of the hog-pork sector (producers, representatives of provincial hog marketing agencies and Canadian Pork Council, executive officers of packing plants, pork trading companies) were interviewed to determine their views on the hog marketing system. Previous studies and reports were scrutinized. Pertinent data from government and private agencies were gathered. A review was made of the U.S. situation so comparisons could be drawn with what has happened there.

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Data, interview responses and pertinent literature were organized into a framework where objective criteria about the efficiency and effectiveness of the Canadian hog marketing system could be evaluated. A large number of findings are reported in the study, the most important of which are listed below.

- Provincial hog marketing agencies help ensure market access for producers. They provide equitable protection against price variation through pooling and right of access to all producers. However, the maintenance of a central desk system normally requires restrictions on the rights of individual producers and packers to enter into business agreements and contracts.

- Hog marketing and pricing policies are generally neutral, designed to treat all packers in a province equally. However, occasional claims of unfairness do arise.

- The present marketing system was originally set up because of serious concerns about the income distribution between producers and packers. The system was intended to give producers more economic power and reduce total costs of marketing.

- Canada has made a significant investment in export market development for the pork sector over the years, with a great deal of success. The Canadian hog-pork sector grew from a situation where production and consumption were more or less in balance in the 1970s into a major international force with sales to over 50 countries. Despite stagnation in export sales since 1987 (principally due to countervail actions by the U.S.), exports have improved somewhat since 1991. Moreover, due to considerable sales efforts, the proportion of Canadian pork exports going to the U.S. has decreased in recent years.

- There appears to be strong demand for Canadian pork products. However, Canadian packers, processors and provincial hog marketing agencies have been frustrated by the stagnation in growth of Canadian hog numbers in recent years. Ontario and the Atlantic provinces have experienced a significant reduction in hog numbers since the late 1980s, while in other parts of Canada there has been modest (Quebec) to significant (prairie provinces) growth. Competing countries,

particularly the U.S., Denmark, China and Taiwan have expanded production more rapidly than has Canada.

- Virtually all packers in Canada would like to receive more hogs of constant

specified qualities. Although Canada's hog marketing system has delivered high quality products overall, packers feel that deliveries of hogs of uneven weights and qualities impair their abilities to reduce average costs. These should be resolvable under the grading and pricing system, but, apparently, they continue to reduce market effectiveness.

- Some packers argued for more flexible marketing arrangements which they

thought would stimulate hog production. Producers and their provincial marketing agency representatives, who also would like to see production increase, have explored several ideas to encourage increased production.

- Although some plant rationalization has occurred in the hog slaughtering and pork

processing sectors, many small plants operating at less than full capacity still exist. Since growth in hog numbers has been stagnant in recent years, existing packers and potential investors have been reluctant to make major new investments.

- Many hog producers have made large investments in larger and more modern

facilities, manure disposal systems and improved quality breeding stock.

- Available data suggest that under the Canadian hog marketing system, domestic

consumers have been assured of a growing and stable supply of pork.

- There was general agreement among stakeholders that pork was well-positioned

and priced in the Canadian market, relative to other meats. Canadian pork purchased at retail now has a much higher edible content with leaner meat and fewer bones. The price of pork has fallen relative to the all-good Consumer Price Index, indicating that pork has become a consistently better consumer value over time.

- Producer prices and margins have trended downward over the same time period

that production and hog/pork exports generally grew in Canada. Canadian prices have followed closely prices in the U.S. signifying that efficiency of Canadian hog production has kept pace with increases in efficiency that have occurred in the U.S. over this time period. Variation also appears somewhat reduced, but a four year cycle in producer prices is evident. Overall, the Canadian hog marketing system appears to have allowed more efficient hog production.

- The information available from cutout tests implies that significant progress has

been made by the industry in improving the value of hog carcasses. Significantly, this progress is directly related to evolving consumer demand for leaner pork. This has led to substantial improvements in the composition of carcasses, such as less overall fat, less kidney fat and a relatively greater proportion of the carcass in higher-valued cuts.

- Canadian pork is widely regarded as being among the world leaders in terms of

quality. High levels of quality will be very important in the continued success of the Canadian hog-pork sector.

- Canadian hog production has become more productive in terms of farrowing and

feeding efficiency. Canada compares favourably in competitiveness to other countries.

- One of the most important contributions of provincial hog marketing agencies in

enhancing the performance of the hog marketing system is the equity guaranteed to all producers by central desk selling. This has been an important factor contributing to the continued presence of small family farms in hog production.

- Traditional viewpoints about market structure and pricing have given way to new

ideas of global competitiveness where free trade agreements create open access to markets on a worldwide basis. In these new concepts, size and industry concentration within a national economy can be exploited in order to penetrate foreign markets and withstand competition on a global scale.

- In meetings with stakeholders, competition was viewed primarily on an

international basis but also on a regional basis. These perspectives seem to correspond closely with the new emerging concepts of industry coordination and

global competitiveness.

- Beef and chicken compete for the consumers' meat purchases with pork. This

means that the hog-pork sector cannot take their market segment for granted. There is widespread belief (or hope) that genetic improvements in pork will improve pork's position in the market place.

The hog marketing system has been the source of much debate in Canada. The vast majority of hog producers across the country give it strong support. All packers think that centralized assembly and orderly deliveries of hogs decreases their unit costs as well as decreases the overall marketing margin. However, many packers complain that the system comes between them and the producers and, as a result, frustrates their efforts to reward specific producers for timely deliveries of hogs of specified quality.

The type of system changes that might be required to meet the U.S. competition in the future include:

- development of specific price, delivery and quality arrangements, but within the

context of single-desk selling;

- continued evolution of provincial hog marketing agencies from primarily pricing

activities to "full-service" raw input supply coordination, i.e., replicating the coordination function of the vertically integrated firm;

- development of more specific quality control tools, particularly to target export

markets;

- more focused and commercially-oriented research with an emphasis on genetic

improvement.

All provincial hog marketing agencies have shown willingness and determination to adapt to changing conditions and to better serve the producers' long term interest, including:

- risk management through contracting in Manitoba;
- sponsorship of research;
- offering specialized delivery contracts for producers in some provinces;
- generic pork promotional activities and consumer education to increase demand

for pork;

- inter-provincial coordination and cooperation;
- periodic evaluation of Canada's grading system to better reflect consumers desires

to hog producers;

- helping to define safe and healthful production practices for hogs;
- attempting to reduce drug residues and other harmful contaminants in pork.

Several packers have developed new specialized products and some firms have established significant capabilities for innovation in penetrating export markets.

Provincial and federal governments have assisted the hog-pork sector to become more competitive by funding production-related research, grading and inspection services, organizing trade missions and actively pursuing access to foreign markets.

The future of Canada's hog-pork sector depends on its ability to compete with pork producers in other countries, particularly the U.S., Denmark, Netherlands, Taiwan and China. Although some stagnation has occurred in recent years, the sector has experienced rapid growth and a large degree of export success. The different regions of Canada have many advantages for continued growth of the hog-pork sector, including:

- plentiful supply of low cost feed grains;
- fewer environmental restrictions than in most competing countries;
- highly skilled, ambitious producers who are very knowledgeable about all aspects

of the hog-pork sector;

- one of the best grading systems in the world;
- genetics that result in lean meat in the breeding herd,
- government-funded, production-oriented research.

A major benefit of a mandatory single-desk marketing system is that it transmits consistent signals to all producers. If hog marketing evolves to a large number of special arrangements then it simply becomes a set of privately negotiated delivery contracts and most of the reasons for single desk selling and a mandatory grading system disappear.

This is an issue where stakeholders seem to share a lot of common ground and have demonstrated a capacity to cooperate. Flexibility to changing market conditions is critical and opportunities for profitable trade should not be lost because of inflexibilities in the system. Stakeholders in the hog-pork sector appear confident that they can meet these challenges. Any required changes can be developed internally and should not be imposed by outsiders.

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I. **Introduction**

The development of an effective marketing system is a major concern for Canadian hog producers. With the virtual demise of terminal markets in Canada in the late 1960s and the emergence and eventual dominance of direct sales, producers had reason to question the efficiency of their marketing system. It is a natural worry that market power can be exercised when only one or two packers purchase most of the hogs in the province by private treaty, thereby concealing prices. Concern among producers about the competitive nature of hog markets was a primary factor underlying the development of alternative hog marketing systems.

Canadian hog producers in different provinces adopted a variety of marketing alternatives, most of which focused on techniques which could improve their bargaining position and thus restore the competitive environment through countervailing power. The most popular of these was the development of single desk, compulsory hog marketing agencies. Although these marketing agencies were not given authority to exercise supply control, they changed the balance of power in each province by acting as central selling cooperatives which attempted to "enforce greater competition" (Gilson and Saint-Louis, 1986).

Several different pricing mechanisms were instituted by different provincial hog marketing agencies. At times, hog producers in some provinces believed prices they received were lower than prices in other provinces by more than the cost of transportation. This led to various formula pricing arrangements in many provinces, mostly tied to the Ontario market where prices generally were the highest in Canada. Over time, the formulas came to be based more and more on U.S. prices. This development warrants analysis and close attention because of its possible long-term effects on the Canadian hog production and pork processing sectors.

New developments in world commerce have created opportunities for Canada's hog-pork sector: the North America Free Trade Agreement (NAFTA) and successful completion of the Uruguay Round of GATT negotiations have reduced trade barriers around the world, a welcome development for an export oriented sector of Canadian agriculture. These same forces, however, make the Canadian hog-pork sector more vulnerable to increased competition from producers in other countries. Very large-scale, integrated hog-pork operations that have developed recently in the U.S. have not gone unnoticed in Canada. Other countries too, have developed very cost

efficient hog-pork sectors that have shown they can compete well in export markets: Denmark, Netherlands, Taiwan.

The need to compete in a North American market place and remain competitive in the U.S. market requires an evaluation of Canada's present hog marketing system to determine if it is effective and efficient. This is of paramount importance since an effective marketing system is a necessary condition if Canada is to maximize its potential from the hog-pork sector. Despite considerable success in the past, most observers believe there is still considerable potential for growth in the Canadian hog-pork sector, but international competitiveness will be closely linked to the dynamics of slaughter hog supplies, pork processing capacity and efficiency (Ward and Faminow, 1992).

The major objective of this study is to evaluate the hog marketing system in Canada. Does the marketing system:

- Assure Canadians an abundant supply of pork at reasonable prices?
- Stimulate efficient production and distribution of pork products that reflect the

preferences of consumers?

- Work to increase productivity at the producer level?
- Distribute opportunities and rewards equitably among producers and between

producers and packers?

- Assist the Canadian hog-pork sector to gain access to national and international

markets?

- Encourage growth and expansion in the pork processing sector?
- Provide growing investment and employment opportunities for Canadians?
- Provide an environment where producers and packing firms behave competitively

and allow pork to compete well with substitute products?

Various performance indicators are used to evaluate these marketing goals. The performance indicators are developed from many sources including comprehensive interviews with stakeholders in the hog-pork sector across the country (producers, officials of provincial hog marketing agencies, representatives of major packers, international marketers of meat) and many types of secondary data. This evaluation is conducted and discussed in Chapter IV of this report.

To provide perspective on the Canadian hog-pork sector, Chapter II contains a summary of Canadian hog and pork production as well as exports over the past two decades. The Chapter also contains a discussion of the various bodies that market hogs in Canada, including the umbrella groups, Canadian Pork Council and Canada Pork International. The Chapter ends with a discussion of the major controversies in the marketing of hogs in Canada, including centralized selling, pricing efficiency, competitiveness of the Canadian hog-pork sector and recent marketing developments.

The U.S. situation is reviewed in Chapter III. A review of the similarities and differences among Canadian and U.S. hog marketing systems provides useful background information in the analyses of marketing structures in Canada. Economic forces that have played a major role in changing the structure of the U.S. hog-pork sector are discussed. In addition, markets and pricing systems for finished, feeder and breeding hogs are reviewed.

The final Chapter explores the opportunities and challenges facing the Canadian hog-pork

sector as the twentieth century comes to an end. Vertical and horizontal integration provide obvious opportunities, but they may not be necessary or even desirable in the Canadian hog-pork sector. These and non-integrated but large-scale production and processing operations are discussed in this Chapter. Improved carcass evaluation criteria have been the focus of nearly continuous attention in Canada as producers have tried to stay ahead of the competition. The evolving role of provincial hog marketing agencies is discussed in terms of opportunities in the hog-pork sector. Recent environmental challenges to Canadian producers and their attempts to counter them are discussed. Major competitive challenges to Canadian producers are reviewed within the perspective of Canada's long term abilities to compete. The report concludes with an examination of the opportunities for the hog-pork sector in all regions of Canada.

II. **Overview of Canadian Hog Marketing System**

1. Background on the Canadian Hog Industry

This section provides a brief overview of hog and meat production, processing and trade in Canada.

a. Hog Production

Hog production in Canada is heavily concentrated in four provinces, although some hogs are produced in all the provinces (Table II.1). In 1993 over 4.7 million hogs were produced in Quebec, almost 32% of the Canadian total. Ontario contributed 26.7% (4 million), Alberta 15.9% (2.4 million) and Manitoba 13.5% (2 million). Saskatchewan contributed an additional 7% (1 million) of Canada's hogs with British Columbia and the Atlantic Provinces accounting for the last 5.4% (0.8 million) of hogs produced. Quebec's production has risen sharply over the last two decades, up from about 1.4 million head in 1971 (17 percent of the Canadian 8.1 million head produced) to present levels.

The Canadian hog-pork sector has shown impressive growth over time. Throughout the 1970s Canada roughly fluctuated around a self-sufficiency basis. Early in the 1970s Canada had a small exportable surplus which, by the early 1980s had grown into sizable exports. Canadian per capita consumption and production data developed for the Special Measures Committee for Hogs and Pork (Sparks Companies, 1993a) show the following:

- from 1970 to 1974 there was a small net exportable surplus in Canada averaging

about one kilogram per capita;

- after three years of net imports (1975 - 1977) the per capita exportable surplus

began growing, reaching 4.4 kilograms per capita in 1979;

- by 1984 the exportable surplus had surpassed 13.6 kilograms per capita;

- since then the exportable surplus has remained high, averaging 15.3 kilograms per

capita.

This impressive growth can be seen more clearly from Figure II.1 which shows annual Canadian hog production for selected years. Rapid production growth occurred throughout the late 1970s. Since the early 1980s, slaughter hog production has stabilized at about 15 million head per year.

Hog production in the three prairie provinces of Alberta, Manitoba and Saskatchewan tends to be oriented more towards the export of live hogs than is the case in the eastern provinces. Eastern Canada utilizes a much larger proportion of it's hog production in local processing and consumption. In the case of Quebec, the hog-pork sector is export oriented, but in terms of value-added pork products not live animals.

The size structure of hog production has changed dramatically over the last several decades. For example, the data shown in Figures II.2, II.3, II.4 and II.5 illustrate the dramatic reductions in the number of hog farms that coincided with production increases. Specific points to be noted from the figures include:

- the total number of hog farms in Canada has fallen four-fold between 1971 and

1991, with all producing provinces experiencing dramatic declines in farm numbers;

- the hog inventory has increased so that the average number of pigs per farm in

Canada has increased even more sharply, from 66 to 345 hogs;

- although all provinces experienced large increases in the number of hogs per farm,

the increase was by far the largest in Quebec (a ten-fold increase);

- similarly, marketings per farm increased dramatically, with the largest growth in

Quebec.

As a result of restructuring, there is a very unequal distribution of farms and animals by farm size class. Figures II.6 and II.7 show farm numbers and hog inventories for two extremes, small farms (with less than 273 animals) and large farms (greater than 2,652 animals). The two figures lead to the following observations:

- in all provinces the smallest farm size accounts for a large proportion of farms but

mostly small proportions of animals;

- the difference in the distribution of farms and animals is uneven across provinces,

Quebec has the least proportion of farms in the smallest size groups (37.1 %) while

British Columbia has the highest proportion (89.2)-- most provinces are near the Canadian average of 70.2%;

- although there is considerable variation, in most provinces the smallest farms

account for 15% or less of hog inventories;

- large farms account for less than 2% of farms in all provinces except Manitoba

(3.4%) and Quebec (4.8%);

- the largest farms in all provinces account for a disproportionate share of hog

inventories, ranging from 12.2% in Ontario to 44.7% in Manitoba;

- a general rule of thumb that can be used is that the largest 20% of farms produce

80% or more of the hogs in most provinces.

b. Meat Production

Hogs are normally processed within the province of production, in a contiguous province, or in neighbouring U.S. states. Economic input supply areas do not correspond exactly to political boundaries. Hogs are often shipped from one province to another for slaughter and processing. Canadian hogs are also shipped, sometimes relatively long distances, into the U.S. where meat packing costs are believed to be significantly lower. Major U.S. hog slaughtering plants are primarily concentrated in two locations: (1) Iowa and along Iowa's fringes in Minnesota, South Dakota, Nebraska and Illinois; (2) the eastern Midwest states of Michigan, Indiana, Kentucky and Ohio. A significant share of U.S. slaughter occurs in huge processing plants with a daily capacity over 10,000 hogs, exceeding the weekly capacity of most Canadian plants. According to Sparks Companies, Inc. (1993a; 1993b) only one Canadian plant, the Fearmans plant in Burlington with a weekly capacity of 45,000 hogs, produces in the same general size class.

Given the significant economies of scale in meat processing, this creates a serious competitive challenge to the Canadian hog slaughtering sector (Ward and Faminow, 1992).

Canadian slaughtering plants are spread across the country, generally conforming to hog production. Ontario (88,000 head per week) and Quebec (118,000 head per week, half of this from Olymel and Co.) have the greatest slaughter capacity in Canada. Manitoba (52,000 per week) and Alberta (47,000 per week) are next, followed by Saskatchewan (23,000 per week), British Columbia (14,200 per week) and the Atlantic provinces (19,000 per week). Industry rationalization in Canada has occurred and most recent observers expect additional rationalization in subsequent years.

c. Trade in Hogs and Porc

Almost all Canadian live hog exports are to the United States. Note that export data include slaughter hogs and all other types such as wieners. Normally, Western Canada accounts for about three quarters of all Canadian live hog exports. Manitoba experienced a steadily growing share between 1989 and 1992. Few live hogs are shipped out of Quebec, but exports from Ontario are significant and have steadily increased over the last few years. Exports from Ontario remain well below the very high levels from the mid-1980s (for example, in each of 1984 and 1985 over 500 thousand slaughter hogs alone were exported from Ontario to the U.S.).

Overall, the value of exports of live hogs and pork cuts remained relatively flat through the late 1980s until the early 1990s (Faminow and Kraft). This was the time period when countervail duties were imposed by the U.S. on Canadian hog and pork imports (discussed later). However, modest growth in pork exports has occurred since 1991 due partly to the weakness of the Canadian dollar, free trade agreements (COSTA/NAFTA), and increased promotional activities (Figure II.8). Expressed in constant dollar terms, total exports of fresh and frozen cuts of pork drifted down from $575 million in 1988 to $475 million projected for 1994; (other value-added and processed products, plus offal are excluded from Figure II.8). More comprehensive data provided to the study team show increased sales of more highly valued processed items in recent years. The total value of exports of pork and pork products increased from $595 million in 1991 to $791 million in 1994 (Agriculture Canada, 1995). Although most sales are to the United States, the proportion going to this market has decreased from 77.5 percent in 1988 to 71.8 percent in 1994 (Agriculture Canada 1995).

2. **Canadian Hog Marketing Institutions**

Since the early 1970s most slaughter hogs in Canada have been sold through provincial marketing agencies which act as central desk selling agents for hog producers within each province. These marketing agencies have long historical roots and often provide a broader list of services than generally acknowledged. The provincial marketing agencies cooperated in the establishment of the Canadian Pork Council in 1967, an umbrella group whose clear motivation is to further the interests of all hog producers in Canada. Then, in 1991, the Canadian Pork Council joined forces with the Canadian Meat Council to form Canada Pork International, a body designed to promote exports of Canadian pork to foreign countries.

a. Provincial Hog Marketing Agencies in Canada

The first Canadian hog marketing agency was established in Ontario in 1946. The creation and subsequent development of provincial marketing agencies for slaughter hogs in Canada were primarily stimulated by concerns about competition in the market place. Throughout the 1960s a growing number of producers began to believe that the procedures for marketing and pricing slaughter hogs were non-competitive. Packing industry concentration was thought at the time to limit the price negotiation process and benefit packers, at the expense of hog producers, by lowering prices of hogs.

As a consequence of these market and price concerns, marketing agencies were established in all provinces with the general mandate of improving the bargaining power of producers. At the present time, all provinces except Newfoundland have provincially legislated hog

marketing agencies with exclusive bargaining authority on behalf of hog producers:

l) British Columbia Hog Marketing Commission

2) Alberta Pork Producers Development Corporation 3) Saskatchewan Pork International

4) Manitoba Pork Est.
5) Ontario Pork

6) Federation des Producteurs de Porc du Quebec 7) New Brunswick Hog Marketing Board

8) Pork Nova Scotia
9) Prince Edward Island Hog Commodity Marketing Board

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Marketing procedures have varied significantly over time and from province to province. All hog marketing agencies were created with the primary purpose of marketing slaughter hogs from their province, but have developed specific marketing systems and services to suit the conditions in their own provinces.

Marketing agencies in Alberta and Manitoba took the perspective that they could discipline the market and make it more competitive by introducing electronic marketing systems such as already existed in Ontario. Other provinces such as Saskatchewan developed integrated marketing and pricing systems based upon formulas and negotiation with packers. No common pricing systems were employed in Quebec before 1989 at which time an auction system was established; formula pricing began there in January 1994.

Provision of central desk selling is the primary service offered by all hog marketing agencies. On behalf of producers, they negotiate sales and prices with meat slaughterers and packers. Although some small processors in some provinces have been exempted from the single-desk sales system and can purchase hogs directly from producers, the hog marketing agencies handle the vast majority of all transactions in each province.

Normally, central desk selling entails several standard functions including product assembly and delivery to packers, product pricing and final payment settlement. There are a variety of specific differences, but all marketing agencies perform these functions in one way or the other. Marketing agencies essentially determine the pricing mechanism for exchange of slaughter hogs in each province through their position as the sole seller of hogs in each province. Thus, they play an important role in the price formation process.

Each of the provincial marketing agencies has established grading grids on which price negotiations are conducted. The grids are based on weight classes and estimated lean yield proportions of each carcass, with a number of demerit conditions that reduce its value. Although an Index = 100 carcass is the midpoint of each provincial grid, the conditions necessary for such a carcass varies province-by-province. Furthermore, grading grids in each province are changed periodically, making comparisons of prices across provinces somewhat difficult.

Prices are negotiated between each of the provincial hog marketing agencies and major packers within each province. Increasingly, these prices have been based on formulas that reflect U.S.

(mid-west) prices and shipping costs from each province. Prices in Ontario and Quebec generally are the highest in the country because the major consumption centres are located there.

In addition to their primary function of daily marketing of hogs, the provincially structured hog marketing bodies provide a wide array of services to producers, including:

- Pool returns to producers. In most cases, prices received during each week are pooled; all producers who delivered during that week then receive the same price for equivalent index hogs. This service has wide producer support because it reduces their price risk.

- Operate assembly yards. Many of the provincial marketing agencies operate assembly yards where hogs are sorted and arranged for transport to the packing plants. This service reduces the total marketing costs and, since it tends to even the flow of hogs to market, is appreciated by packers.

- Provide in-transit insurance. Several of the agencies provide shipping insurance for producers and free accounting services for truckers and assemblers.

- Operate a settlement system. The packers pay the marketing agencies for all hogs purchased; the marketing agencies pay the producers (after pooling the returns for a period of time, usually a week). Although an extra step in settlement is involved over the packers paying the producers directly, this probably doesn't add much to the overall costs of settlement. Invariably, the packers like the system since it simplifies their accounting activities. Producers also like it because their payments are guaranteed by the marketing agencies.

- Provide market information services. Provincial hog marketing agencies use several methods to provide up-to-date market information to producers. These include 24 hour toll-free phone lines, FAX services and periodical newsletters.

- Promote and advertise pork. Each of the hog marketing agencies conducts generic promotion campaigns to try to stimulate demand for pork. Advertising takes various forms, including retail promotions, features in chain restaurants, development of brochures that provide consumer information and participation in professional

conferences. Ontario spends more than $0.50 per hog on product promotion; Alberta spends about $0.30 per head.

- Support research projects. Hog producers realize that research is important for the

future success of their industry and, as a result, have set aside funds for research on problems they face. Most provincial marketing agencies have research committees that develop criteria and priorities for research funding.

- Lobby governments and industry. The hog marketing agencies provide effective

voices for the industry on issues like environmental matters, animal care, land use, grading systems, stabilization programs and international disputes (though the latter issue has been handled primarily by the Canadian Pork Council).

- Publish newsletters. Each marketing agency publishes a newsletter and

commentary for members, usually on a monthly basis. The Alberta Pork Producers Development Corporation, in conjunction with the other four western Marketing agencies, publishes news stories and commentary on the hog industry in the Western Hog Journal four times per year.

- Represent producers at national and international levels. Members of the

Canadian Pork Council and Canada Pork International (described below) are drawn from directors of provincial hog marketing agencies.

The provincial hog marketing agencies have experimented with a-range of innovative marketing and pricing systems in efforts to assist their producers. There continues to be diversity in market structure, services and price determination across provinces. No two marketing agencies have identical marketing systems or philosophies, although all do share some commonalities. A system that is appropriate for a major hog producer and processor with significant export sales like Quebec, may not be suitable for smaller producers like the Maritime provinces and British Columbia.

The B.C. Hog Marketing Commission operates as a central desk selling agent. Hogs are priced on a formula. Producers ship directly to packers. Prices in British Columbia (a hog deficit

province) range from $.01 per kilogram under the Alberta price to $.11 above, depending on location and current conditions in the market.

The Alberta Pork Producers Development Corporation has experimented with a number of sales arrangements and has also vertically integrated into the packing industry. In 1969 the Alberta hog marketing agency began selling all hogs in the province through a remote teletype auction system. Since then, it has tried negotiated direct sales to buyers and processors and an advanced procedure of bid and acceptance on the teletype exchange. Recently, it has

adopted a formula based on other Canadian and U.S. prices and uses this formula within the bid/acceptance procedure.

The SPI Marketing Group in Saskatchewan provides single desk selling for all hogs, except those going to small slaughtering facilities. SPI operates a trucking firm in Saskatoon, a slaughter facility in Moose Jaw and a customs clearing facility. In addition, SPI has engaged in special contract slaughter arrangements with U.S. packers. Recently, SPI attempted to change marketing regulations to permit Saskatchewan producers to market hogs outside the central desk system, but later altered its position to allow marketing only within existing regulations.

Manitoba Pork Est. also operated a Dutch Clock auction, in a dedicated room located in its headquarters. Recently, the Dutch auction has been dropped in favour of a formula pricing arrangement where prices are set on the basis of an average market price in the U. S. Prices paid to producers are determined by these prices pooled on a weekly basis and adjusted for marketing charges. Producers are given the option of setting forward prices up to 12 months in advance through the Forward Price Contracting Program initiated in February 1995. Producers can enter into a firm contract to deliver an agreed number of hogs in à designated month and at a predetermined price. Forward contracting prices are based upon live hog futures prices on the Chicago Mercantile Exchange, which are adjusted to reflect Manitoba formula price and market characteristics. Currently, Manitoba Pork, in conjunction with local packers, is investigating the feasibility of establishing a large scale state-of-the-art hog slaughtering facility in Manitoba.

For a long period of time Ontario Pork offered hogs from assembly yards scattered across the province through its electronic Dutch auction teletype exchange. Producers were paid on an f.o.b. assembly-yard basis for those hogs marketed through the agency. Recently, Ontario meat packers

have **been given the option** of contracting directly with producers though all hogs still must go through the **marketing agency.**

Prior to 1989, there was no common pricing mechanism in Quebec; producers were selling directly to packers and processors. Packers had agreements with individual producers with different premia paid in attempts to secure steady supplies of hogs to the plants. Since March 1989, all hogs in Quebec have been sold by the Federation of Quebec Hog Producers (FPPQ). From March 1989 until January 1994, all hogs were sold through an auction with several methods used to determine the opening price each morning. Since January 1994, the FPPQ has operated a single desk market system for about three-quarters of the hogs in the province whereby hogs are allocated to different plants and priced at U.S. Ievels minus a shrink discount; (in early 1995, about 90 percent of the Quebec hogs were allocated directly at U.S. prices less $1.50 per kilogram; however, the second largest processor in the province has challenged this arrangement in the courts). The remainder of the hogs are sold by auction.

The marketing agencies in the three Atlantic provinces of Nova Scotia, Prince Edward Island and New Brunswick all sell to packers on the basis of formula prices based on average Ontario prices. Although the formula differs for each province, the basic calculation is similar

in each; the Ontario average price plus a price premium. In Nova Scotia and New Brunswick, the past week average price in Ontario is used, while in Prince Edward Island the current price is used. Typically, producers also receive some form of transportation assistance.

The hog marketing agencies finance their activities through the collection of a service charge on each hog sold. This levy varies by province but is in the range of $1.25 to $3.25 per hog sold. The amount collected obviously affects the kinds of activities that each agency can do.

The hog marketing agencies are democratic organizations controlled by producers in each province. Each province is divided into districts with delegates and directors elected by hog producers in each district. Each producer has a single vote regardless of the number of hogs sold. The directors employ a general manager and office staff to run the affairs of the agency.

b. Canadian Pork Council

The Canadian Pork Council (CPC) is the umbrella group of all provincial hog marketing agencies. It maintains an office in Ottawa where it can respond quickly to developments that affect the hog-pork industry in Canada.

The structure of the CPC is based on the nine provincial hog marketing agencies. A formula based upon shares of national production is used to select 19 directors of the CPC. The Executive Committee of the CPC is a smaller decision-making group composed of six directors, one of which represents each of the major regions of hog production in Canada.

The main functions of the CPC are to defend Canadian hog producers' interests in such areas as trade disputes, quality improvements, setting of research priorities, animal health and welfare, food safety and environment. Overall objectives include maintenance of a profitable economic environment for hog production in Canada, promotion of pork as a healthy, lean, nutritious protein food source and maintenance of highly recognized health status of the Canadian swine herd.

A large number of issues have been faced by the CPC in recent years. The CPC has defended Canadian interests through several countervail duty investigations, administrative reviews and subsequent appeals.

Since Canada has become a major exporter of pork, the CPC has become involved in numerous activities to support this effort. The CPC maintains dialogue with U.S. producers by meeting with the U.S. National Pork Producers Council twice per year. The CPC worked closely with and provided advice to officials of the Canadian government during the negotiations of the Uruguay Round of GATT and CUSTA. The CPC, together with the Canada Meat Council, created Canada Pork International (described below) to increase the profile of Canadian pork in export markets. The CPC supported Canada's participation in NAFTA and meets regularly with Mexican producer representatives.

Research is a major concern for the CPC. Each of the provincial hog marketing agencies has a research committee; the CPC provides a forum for the Chairs of each of these provincial committees to meet with scientists and administrators of Agriculture and Agri-Food Canada

research centres to discuss research results and priorities. The CPC participated in a large national carcass cutout project with scientists from Agriculture and Agri-Food Canada to help determine carcass quality and to test alternative grading technologies.

The health status of Canada's hog herd obviously is a major concern. The CPC has lobbied for establishment of national herd health standards and keeps its producer members aware of latest developments in health issues, including pseudorabies in the U.S. and Porcine Respiratory and Reproductive Syndrome (PRRS). In addition, the CPC has been active in encouraging its members to adopt a code of practice for the handling of animals.

Agricultural policy issues are another major concern for the industry and the CPC cooperates actively in discussions relating to these issues. The National Tripartite Stabilization Program has been phased-out and new safety net programs have been proposed. The CPC has strongly promoted programs which protect producers from down-side risk but remain aware of the necessity to devise programs that do not distort production or trade. The CPC has been involved in the federal-provincial Special Measures Committee that studied financial conditions faced by producers across Canada.

c. **Canada Pork International**

This organization is a joint undertaking of the Canadian Pork Council, which represents hog producers, and the Canadian Meat Council, which represents hog slaughtering and pork trading companies. It was created in 1991 with the objectives of promoting Canadian pork in foreign countries, maintaining international market intelligence and working with the Canadian government to resolve access issues related to exports of Canadian pork.

Members of Canada Pork International (CPI) include each of the provincial hog marketing agencies, pork slaughtering plants and pork processors. The non-profit corporation is run by a Board of Directors elected by members. It is located in the same office as the Canadian Pork Council.

Canada Pork International (CPI) maintains an up-to-date list of tariff and non-tariff barriers to trade in pork in countries around the world.

The organization has developed exhibits and promotional materials in several foreign languages, including Spanish and Japanese. CPI has conducted several marketing missions abroad to better understand market requirements for pork in overseas markets. Symbols and trademarks for Canadian pork have been developed and registered in several countries as a means of promoting the Canadian origin of pork products from Canada.

Detailed analyses of market situations, trade impediments and recommended strategies for the Canadian hog-pork industry are maintained for various countries, including Japan, Mexico, Russia and Central/Eastern Europe, Australia, Korea, Caribbean (Puerto Rico, Cuba, Bahamas, Bermuda, Haiti, Dominican Republic), Central and South America (Brazil,

Argentina, Venezuela, Panama), European Union, Asia (Hong Kong, Malaysia, Singapore, China, Philippines, Thailand, Indonesia), New Zealand, United States, Non-EU Western Europe (Switzerland and Sweden) and Africa (South Africa).

3. **Controversies in Canadian hog marketing**

Several marketing controversies have arisen in all hog-pork producing provinces of Canada recently. These have caused debate and a rethinking of hog marketing systems in Canada. To a large extent this debate has been stimulated by Canadian participation in NAFTA and the GATT, and the resulting reviews of competitiveness. In a increasingly free trade environment, all industry stakeholders have wondered about the competitive strengths and weaknesses of the Canadian hog/pork sector and its long-term viability. Considerable attention has focused on hog marketing and pricing, and the implications that current systems have for the long-term health of the sector.

a. Centralized selling

The establishment of provincial marketing agencies and new sales/pricing systems did not eliminate controversy about the market place or lead to stable marketing systems. Perhaps the greatest amount of institutional change and controversy occurred in Alberta where the marketing agency: (1) frequently changed pricing practices; (2) entered directly into the hog slaughtering industry by purchasing a major share of the packing industry in the province; (3) was involved in a protracted court case against all packers in the province alleging price fixing and (4) was involved in controversy with the Alberta Government, including a **proposed takeover of the**

marketing agency. By the early 1990s there were only two packing plants involved in the slaughter of hogs in Alberta, one owned by the hog marketing agency and the other being run by the provincial government.

Similarly, in other provinces, mistrust and controversy between marketing agencies and packers continued to foment, occasionally erupting into the public view. However, over time the nature of the controversy has changed. Whereas controversy in the earlier years of the marketing agency system was often instigated by charges of packer misbehaviour (e.g., in the mid 1980s all hog packers in Alberta were charged with price fixing), recent controversy has focused on the desire of a few producers to market hogs outside of the central desk marketing agencies in their provinces. International competitiveness in an increasingly free-trading world market is now viewed by many as critical to the long term health of the Canadian hog-pork sector. The marketing system of central desk selling has come under attack, with proposals for dual markets that bypass the board system.

Proponents of increased value-added processing and the potential economic benefits that could accrue argue that compulsory marketing agencies reduce the ability of the Canadian hog-pork sector to compete internationally. For example, when marketing agencies sell hogs directly to packers outside Canada it has been alleged by some packers and processors that this shorts local markets, driving up domestic hog prices and reducing the capacity of Canadian firms to compete in export markets for pork and pork products. Marketing agencies

also face increased attack from within the ranks of producers themselves who would like the freedom to market outside of the compulsory marketing system. In some provinces, producers have begun bypassing the central desk system illegally, selling directly to packers in the United States. In other provinces (particularly Ontario), marketing agencies have taken steps to liberalize the system and legalize direct producer-to-packer sales.

To a certain extent a movement away from centralized selling is the result of the radical changes that have occurred in hog farm structure and the growing prominence of very large scale operations in most major producing provinces. Managers of large scale operations, often with links to large feed companies, often feel that they can market hogs more effectively than through the central desk.

Manitoba provides a good case in point. Gilson, Donaghy and Moore (1994) report the 1993 percentage breakdown of Manitoba's hog production as follows: (1) individual farm operations -

27 percent; (2) Hutterite Brethren - 37 percent; and (3) integrated operations (feed company contract and partnership arrangements) - 36 percent. This is a very different farm structure from what existed at the time the hog marketing agency was started in the early 1970s. One anomaly that arises in the Manitoba context is that the Hutterite Brethren produce 37% of the slaughter hogs in the province, own the newest slaughtering plant in the province, but cannot market their own hogs directly to their own plant. This recent report has been controversial and met with widespread criticism from several types of industry stakeholders for advocating a dual marketing system in Manitoba.

b. Pricing efficiency

The effects of marketing agencies on hog prices, pricing efficiency, and marketing costs have been widely studied, particularly in Alberta where controversy has plagued the hog marketing system. Leavitt, Hawkins and Veeman (1983) concluded that the Alberta hog marketing agency had induced cost savings through the introduction of insurance services and assembly yards and increased the operational efficiency of the Alberta hog market by more efficient sales allocation, provision of public data on hog markets and introducing more effective hog identification systems.

The study by Sparks Companies (1993a), Inc. for the Special Measures Committee for Hogs and Pork concluded that Canadian marketing costs were higher than in the U.S. Canadian costs were estimated at $5.78 Cdn. and U.S. costs at $3.55 Cdn., a difference of $2.33. However, their estimate for Canada included a marketing agency administration cost of $1.52, a cost which was assumed to not exist in the U.S. This is a major analytical flaw because, in Canada, marketing agency administration costs substitute for costs that normally would be borne by packers. Although specific cost data for hog procurement in U.S. packing plants is not readily available, it would not be unreasonable to suggest that these costs would account for most of the reported difference between the Canadian and U.S. marketing system costs.

In the case of pricing efficiency for hogs in Canada the empirical evidence is mixed. Various studies have used a variety of techniques to evaluate hog pricing.

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- Leavitt, Hawkins and Veeman (1983) concluded that pricing efficiency may have

declined after development of central desk selling, which seemed to have the effect of decoupling prices from regional supply influences**.**

- Subsequent studies by Adamowicz, Baah and Hawkins (1984) and MacArthur et

al (1985) investigated pricing efficiency in Canada and North America using more complicated empirical methodology**.** These studies reported the existence of lags in price transmission between regions and through the marketing channel that were interpreted as prima facie evidence of inefficient price formation.

- Moschini and Meilke (1987) developed a spatial economic model of North

America livestock markets which included regional price linkage equations. They found that observed price and spatial margin volatility were well explained by the structural model.

- Faminow and Benson (1990) improved on earlier studies of pricing efficiency in

the Canadian hog market by evaluating price linkages and levels in the context of the underlying spatial pricing system. They found evidence of noncompetitive regional price relationships in the period prior to the development of marketing agencies in western Canada. In the period after development of central desk selling, the noncompetitive price relationships disappeared.

- Focusing specifically on the Alberta market, Punyawadee, Boyd and Faminow

(1991) found evidence that price decreases in the outside market were transmitted more rapidly than price increases to producers in= Alberta, suggesting possible noncompetitive pricing asymmetry. After development of the Alberta hog marketing agency, this pricing asymmetry disappeared.

- Benson et al (1994) studied the impact of provincial marketing agencies on price

relations and pricing dynamics in Canada and the United States. The effect of formation of compulsory marketing agencies in the three prairie provinces was to raise price levels relative to Ontario, where a marketing agency had been in place for a considerable period of time, and link prices more closely to those in eastern Canada.

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c. Competitiveness of the Canadian hog-pork sector

The Canadian hog grading system is widely regarded as one of the best in the world and a

primary source of the competitiveness of the Canadian hog-pork sector. Unfortunately, the importance of the Canadian grading system in making comparisons to marketing efficiency in the United States has been widely overlooked. What many observers have failed to properly acknowledge is that the Canadian grading system is a primary source of Canadian competitiveness. Recall that the tremendous growth in the Canadian hog-pork began in the 1970s, after adoption of index grading of hogs.

Some recent studies (e.g., Gilson, Donaghy and Moore, 1994; Sparks Companies, 1992, 1993b) have attached considerable attention to the recent development of integrated operations such as Tyson and Smithfield Foods as a model for the future competitive standard in the North American hog-pork industry. A key feature underlying the benefits of this type of producer-to consumer integration is its' capacity to ensure end-user product quality by direct coordination of genetic selection and management systems. But an important difference between hog marketing in Canada and the United States was overlooked. Most American hogs are sold liveweight, even though packers in the U.S. generally have programs for carcass-weight pricing. This leads to inefficiencies because U.S. hogs are generally fed to excessive levels and genetic selection favours animals which produce higher levels of fat wastage.

Numerous studies in the U.S. have concluded that system efficiency could be greatly enhanced by adoption of carcass-based marketing and pricing of hogs (Meyer and Lang, 1980; Boland, Preckel and Schinckel, 1993; Hayenga et al, 1985). In fact, Boland, Preckel and Schinckel (p. 160, 1993) concluded: "... if packers desire uniform hogs with more lean, they need to employ a carcass merit system that accurately estimates carcass value." The next section of this report provides additional details. Importantly, it appears that the use of carcass evaluation and pricing is increasing in the United States, which may be an additional competitive challenge for Canadian producers.

Thus, the system of premia and discounts based upon carcass characteristics is the primary feature of the Canadian grading system that promotes appropriate quality and efficient production. This is an important source of competitive advantage in Canada. By directly rewarding carcasses with better cutability, the premium/discount pricing system effectively communicates market

preferences to Canadian hog producers. As a result, Canadian producers have made appropriate genetic choices and adopted management systems that tailor finished hogs to final market specifications. In contrast, due to inefficiencies generated by live-weight marketing and pricing, the U.S. hog industry needs vertical coordination in order to manage quality, but in Canada this coordination is accomplished by the grading system and central-desk sales of hogs.

d. Recent Marketing Developments

Three recent marketing developments are of paramount concern to the Canadian hog-pork sector: (1) the extensive adoption of formula pricing arrangements in Canada; (2) heightened interest in dual marketing systems where hogs can by-pass the central desk and (3) considerable attention on the perceived benefits of strategic market planning and production-

to-consumer integration.

Formula pricing. Formula pricing establishes a precise linkage between one market and base-price markets that is defined by the formula. By directly linking markets, formula pricing eliminates some of the bargaining, market interaction, and uncertainty that exists in most commodity markets. Analysts have interpreted imperfect price level correlations and lags in price responses to changed prices in other markets as signs of pricing inefficiencies in the Canadian hog market system (e.g., Adamowicz, Baah and Hawkins, 1984; MacArthur et al, 1985). To the extent that formula pricing systems match price levels more closely and reduce response lags, they might be regarded as more efficient. However, as many economists regard price as the central resource allocation mechanism in market processes, price-tying between markets could also be interpreted negatively because it may prevent regional supply and demand forces from exerting themselves in determining regional price relationships.

A pre-determined formula for pricing hogs also may impose much rigidity in the system since it does not reflect the impacts of variations in exchange rates on processors' margins. Indeed, when the value of the Canadian dollar declines relative to the U.S. dollar, processors' margins expressed in Canadian dollars increase. This would allow processors to pay a higher price for hogs than the U.S. based formula price expressed in Canadian dollars. On the other hand, when the value of the Canadian dollar increases significantly, Canadian processors may not be able to pay as high a price as that received by U.S. producers, and confrontations between processors and producers could occur.

One feature of most production processes is that as they become more industrialized and products more brand specific, there is a tendency to adopt more rigid pricing rules such as formulas and rely less on market processes and daily price negotiation. Furthermore, as Carlton (1986) argued, price rigidity is a widespread feature of modern economies and other processes than prices may operate to ensure efficiency. Thus, as the hog-pork system becomes more industrial, particularly with the growth of more value-added processing and brand identification, then it might be expected that there would be increased reliance upon various formula pricing arrangements. Currently, regional price-tying formulas are used in Canada, but widespread adoption of integrated producer-to-consumer systems would likely encourage vertical pricing formulas as well.

Dual market systems. The use of dual markets has eroded the support for central desk selling, at least in some provinces. In Ontario, the hog marketing agency has allowed producers to contract directly with packers, although sales must go through the hog marketing agency. In Saskatchewan, SPI decided to allow off-board sales but later reversed this decision due to legal technicalities. In other provinces, some industry analysts and producers have called for dual marketing systems (Gilson, Donaghy and Moore, 1994).

The primary potential benefit of a dual market is that it would easily accommodate strategic alliances and contracting for processing system integration. This is seen by some as a way for the Canadian hog-pork sector to stave off the competitive challenge of large integrated pork production systems in the United States and achieve the scale and organizational economies necessary for continued industry growth. Large hog producers in Canada would be able to develop their own strategic alliances, more fully integrate with feed companies and

provide hogs on contract to packers. In this vision of the Canadian hog-pork sector, smaller hog producers likely would continue to use single desk hog marketing agencies, but on a voluntary basis. Some critics of central desk selling argue that individual liberty is critical and the right to market one's hogs as one would like to is ensured by a dual system.

But there remain several unanswered questions about dual marketing systems. First, economies of scale in hog processing are significant and it is believed that, in the long term, the Canadian processing sector will need to rationalize into fewer and much larger plants. In most provinces a single large plant might account for all the available hogs, even after allowing for an optimistic growth in hog numbers. The competitive nature of hog markets would become a very important issue under these conditions because a weakened marketing agency may not be effective in

protecting producer interests. Second, it has not been clearly demonstrated that dual marketing is not simply a euphemism for the destruction of central desk selling for hogs in Canada. The study team believes that clarity and openness of purpose is necessary in order to have reasonable and productive policy debate.

Market outlook. A number of provinces have conducted reviews of their hog-pork sectors over the past several years with the objective of developing a strategic marketing plan for expansion. Four themes tend to arise in most of these studies: (1) a belief that market growth will be significant and that their particular province can share in that growth; (2) the need for conciliatory relations between marketing agencies and packers in order to ensure that sector potential is achieved; (3) a focus on economies of scale and system coordination, with the belief that provincial growth will be enhanced by strategic alliances and planning; and (4) a strong desire for value-added processing. All take a fairly optimistic tone and promote the potential for industry expansion in their specific provinces. Some specific examples drawn from these strategic plans are:

- a study completed for British Columbia recommended that industry expansion

could be achieved best by emulating new integrated production and management processes such as have occurred in North Carolina (Sparks Companies, 1992);

- in Saskatchewan, expansion of pork production is seen to be dependent on

identifying and pursuing specific markets with an integrated strategic marketing plan (Saskatchewan Department of Agriculture and Food, 1993) with the current objective of doubling production;

- Manitoba's strategic plan involves the doubling of production by the turn of the

century and becoming known world-wide as the best quality pork in the world, which would be achieved by developing strategic alliances (Gilson, Donaghy and Moore, 1994);

- Quebec's strategic plan is based on what are believed to be long-term opportunities

for value-added pork products in world markets, which create opportunities for industry expansion (Beaule et al, 1992);

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- Prince Edward Island is specific in its strategic plan, targeting an increase from

current weekly marketings of 3,200 to 4,500 head by 1995 and 8,000 head by the year 2005 (Prince Edward Island Department of Agriculture, 1993).

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m. Overview of U.S. Hog Marketing Systems

1. Market channels and types of markets in the U.S. hog-pork sector

In 1925, about 80 percent of U.S. slaughter hogs were marketed through terminal markets. By 1940, the percentage had fallen to 50 percent, and in 1987 it was only 6.3 percent. The volume at auctions and terminals combined is currently less than ten percent of all U.S. marketings. This decline in terminal markets is due mainly to improvements in infrastructure and reduced transactions costs associated with marketing directly to slaughter plants.

Size of the marketing unit becomes an issue when looking at the cost effectiveness of direct marketing. That is, operations large enough to market in truck load units can capture some efficiency and volume premiums that smaller producers cannot obtain. Until recently, the survey by Gonzales et al (1983) was the best quantitative evidence of linkage between farm size and direct marketing. However, the survey conducted by *Pork '94* in 1993 bears out this linkage. Table III.1 lists the results of that survey for market hogs. The survey involved 1,420 hog farmers from the U.S. *Pork '94* found that 75 percent of the producers marketing over 5,000 head annually marketed directly compared with 56 percent and 31 percent for the 2,000 to 4,999 and 500 to 1,999 head categories, respectively. Clearly, this survey bears out the link between direct marketing and farm size.

The exact distribution among direct marketing, rural buying stations, brokers, order buyers, and contract removals has not been generally recorded. The results of the *Pork '94* survey shed some light on that distribution. Table III.2 contains the distribution of hogs marketed by marketing channel as estimated by the *Pork '94* survey. These values compare closely with those from unpublished results of the Cost and Returns survey of hog farmers conducted in 1992 by the USDA ERS Farm Sector and Financial Analysis Branch (USDA (1992a)). Table III.3 contains the results of that survey. These data reveal several interesting trends.

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- nearly 80 percent of the hogs in the survey were sold directly to the slaughter plant either through direct delivery or a plant operated buying station.

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- the percentage of U.S. hogs sold through terminal markets has significantly

declined since the most recent Packers and Stockyards Statistical Report was published.

- contract removals are a greater percentage of market hog sales than either auctions

or terminal markets (evidence of the growing coordination and integration in the U.S. hog-pork sector).

2. **Structure of the U.S. hog-pork sector**

The traditional production and marketing structure in the U.S. hog-pork **sector could be** characterized as an open market system. While individual direct sales are not readily observable by all market participants, daily price ranges have been reported for hogs and major inputs such as corn and protein supplement. The majority of hogs in the U.S. are raised on family farms which purchase inputs from, and sell hogs to, independent companies. No set agreements exist to control the timing, price, or other significant contingencies associated with these transactions. Considering the vastness of the production and marketing chain for hogs and pork, it is remarkable how successful the open market has been with its very limited direct coordination and passing of information almost exclusively via prices along the chain. However, such a system obviously has lags in communicating consumer wants back to producers.

A variety of research and popular press publications have documented the increasing use of coordinated and integrated business strategies in the U.S. hog-pork sector over the past decade (Hayenga et al (1985), Johnson and Foster, and Rhodes (1990)). Coordination refers to the organization of activities in the production and/or marketing process via contracts, cooperative agreements, or other alliances while the individual entrepreneurial entities maintain their separate ownerships. This is not to say that the parties do not sacrifice at least some degree of control in their decision making processes. In order to be truly a coordinated strategy, participants must agree on some important managerial practices. For example, if a feeder pig producer and a hog finisher decided to coordinate their production into a joint farrow-to-finish venture they would have to agree on a pigflow schedule. This may mean that the feeder pig producer must adjust his/her farrowing schedule or that the finisher may have to build additional space, etc. They must agree on genetics, herd health protocols, nutrition, and the distribution of gross income. It is easy to see that it would be almost impossible to cover all of the contingencies in such an agreement.

That is why contract production is a more common mode of coordination. In the contract scenario, the owner of the buildings (grower) is usually a supplier of capital (facilities) and labor. The owner of the animals (contractor) supplies animals, management expertise, all other inputs, and markets the hogs. The contract scenario greatly reduces the grower's short term price and production risk so that he/she has fewer contingencies to be concerned with. The contract is easier to write to the satisfaction of both parties, and the transactions costs of doing business are reduced.

Integration refers to a similar joining of production and/or marketing activities, but involves the ownership of these activities by a single entity. The most common example is the combining

of the feeder pig production phase with the hog finishing phase to make an integrated farrow-to-finish farm owned by a single producer. However, it would be misleading to leave one with the notion that this is the type of integration involved in the current structural change occurring in the U.S. hog-pork sector. The recent changes are discussed in a later section.

Coordination and integration can occur either horizontally or vertically. Vertical arrangements are ones which link successive stages of the production and/or marketing chain together. Again, the prime example is the joining of feeder pig and market hog production processes. Horizontal arrangements link hog or pork production with some essential activity in another but related sector or industry. An example of a horizontal linkage would be the combination of feed milling/processing and hog production. This is essentially the origin of the large coordinated hog producers in North Carolina. Many began in the poultry or feed business and found that they had excess feed capacity. In order to efficiently utilize that capacity they horizontally integrated into pork production.

a. Current events

Several integration and coordination schemes are being tried in the U.S. Strategic alliances between producers and slaughter firms have begun to spring up all over the U.S.

- Smithfield Foods of North Carolina recently built the largest hog slaughter/processing facility in the world. The set of large North Carolina producers almost completely supplies the Smithfield plant with hogs from a genetics company that Smithfield Foods purchased (NPD Genetics).

- In Missouri, Premium Standard Farms became the only totally integrated pork producer in the U.S. They own all of the hog production facilities, a feed production facility, a new modern slaughtering/processing facility, and the sole U.S. rights to a lean line of genetics imported from Europe.

- Tyson Foods, Inc., the large vertically integrated poultry firm, also has a significant stake in the pork sector. Tyson contracts much of the farm level capital, owns a packing plant, feed processing, and a genetic line.

The linkage between genetics and production has become the most recent trend in vertical integration. The large scale producers in North Carolina have sole U.S. access to NPD breeding stock via their relationship with Smithfield. The traditional center of U.S. pork production is the Midwest. However, the producers in that region have not been as innovative in using alternative business structures as their counterparts in North Carolina and other nontraditional areas of the U.S. In fact, Rhodes (1990) found that over 60 percent of the large U.S. contractors were located in the east coast region while about 10 percent were located in the Midwest in 1989.

Other strategic alliances in the U.S. pork industry continue to be unveiled. Many include unlikely partners. For example, IBP (the largest U.S. hog slaughtering company) recently announced intentions to build a large plant in North Carolina. It is unlikely they would do so

without linkages with the large coordinated producers of that region. The exact form of such alliances is unlikely ever to be known publicly. However, it undoubtedly involves the regular delivery of large volumes of uniform high quality hogs in exchange for price guarantees or premiums. In another case, Michigan Livestock Producers Association, a large producer marketing cooperative active in Michigan, Indiana, and Ohio, has signed a 100 percent supply agreement with Thorn Apple Valley, a Michigan based pork slaughterer/processor. Such an agreement suggests a reversal of the long history of mistrust between producers and meat packers.

b. Drives of structural changes

It is important to understand the motivators of structural change in order to evaluate their impacts on the marketing system. The most significant drivers of structural change in the U.S. pork sector are listed and discussed briefly below.

Technology: A number of new hog production technologies have been implemented successfully in the last decade:

- multi-site production,
- segregated early weaning,
- feed pelleting,
- phased and split sex feeding,
- high lean growth genetics, and
- all-in, all-out pig flows.

The innovative early adopters of these technologies often found that there were additional benefits to coordination. In addition, not all of the technologies are size neutral, and may favor larger farms.

Capital Replacement: Until 1993-94, the last major expansion of hog production facilities in the U.S. was in the 1970's.

- Contract arrangements and other coordinated strategies reduced the per unit burden of capital costs on any one party and made access to capital more available.

Transactions Costs: Transactions costs in the open market system can be quite high. A coordinated or integrated delivery system between a packer and a few large producers (as in North Carolina) reduces these costs for both parties.

- Farmers spend time and energy discovering where-prices are highest on the day

they decide to market.

- Packers suffer high processing costs if too few pigs are delivered to run the plant

at full capacity.

- Information about what consumers desire and how much they are willing to pay

are passed more rapidly along the marketing chain by an integrated system.

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Demand: Both domestic and international consumers clearly desire greater safety guarantees, higher quality, and more convenience in pork products than ever before. In order to consistently meet these demands in a timely and guaranteed fashion, some level of cooperation is essential among the parties in the marketing chain. Clearly, tighter relationships will result in more rapid responses to demand signals giving those alliances a strategic advantage (assuming they did not misread the signals in the first place).

c. Impacts on the pork marketing system

Price Discovery and Access to Markets: Reduction in publicly available price information is one of the potential impacts of coordination and integration between the farm production and slaughter phases. Such direct transfers or contract renewals are often not priced or the prices not publicly known. If a sufficient percentage of U.S. hogs were marketed in such a manner then there would not be enough open market transactions to accurately reveal the price of hogs. This would put independent producers at an even greater disadvantage.

Merit Pricing: Merit pricing refers to a marketing alternative which links the price received by the farmer to some carcass characteristic(s). The changes in consumer demand and the move to greater coordination have been contributors to the increase in carcass quality based merit pricing.

3. **Finished hog markets and pricing systems**

Even with the increases in coordination and interest in meeting a broader consumer demand, live weight selling of hogs dominates the U.S. industry. In a survey of U.S. packing companies, Jekanowski and Akridge found that 36 percent of the hogs marketed in 1992 were marketed on a carcass merit system. The *Pork '94* survey estimates approximately 30 percent. While this is far from the majority, it is interesting to compare it with estimates made in previous years. As recently as 1990, the Packers and Stockyards Administration (USDA, 1992b) estimated that only 11.6 percent of hogs marketed in the U.S. were purchased on a carcass basis. It is worth noting that as long ago as 1940 Shepherd and his coauthors pointed out that live weight pricing systems did not provide incentives for producers to produce leaner hogs.

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Jekanowski and Akridge (1994) defined four types of carcass merit marketing programs:

- Standard Grade and Yield: Backfat and/or some other measures are used along

with subjective measures of quality to arrive at a grade premium. In addition, actual yield is compared with a standard yield to establish a yield premium.

- Modified Grade and Yield: Similar to the standard grade and yield system except

that an electronic technology is used to determine the grade.

- Packer Grid: Uses a measure of backfat, loin muscle depth, and/or carcass weight

in a grid the cells of which are premiums and discounts from a set market price.

- Component Pricing: These base payments on the actual weight or yield of selected

cuts. The cuts measured may be the ham and loin, the four lean cuts (ham, loin, picnic, and butt), or the whole set of cuts making up the exsanguinated carcass.

The Jekanowski and Akridge survey provides a breakdown of the animals purchased on a carcass merit basis within the four categories above: Standard Grade and Yield accounted for 20 percent, Modified Grade and Yield accounted for 8 percent, Packer Grids accounted for 68 percent, and Component Pricing accounted for only 4 percent.

Government involvement in the U.S. hog marketing system has been very limited. In 1951, the USDA established a carcass grading system which has been modified only slightly since. The USDA grading system assigns a utility grade for any carcass with lean meat of "unacceptable" quality and either a No. 1, 2, 3, or 4 grade to a carcass with “acceptable" lean meat. The distinction between grades 1, 2, 3, and 4 is based on the expected yield of lean cuts (hams, loins, picnics, and butts) (USDA, 1970). Since the USDA inspector can not directly observe the lean cut yield, a system has been devised which makes predictions based on a visual appraisal of the average backfat depth and carcass weight or length. As defined earlier, such a system would be Standard Grade and Yield. It is perhaps noteworthy that USDA grading is a voluntary activity for US slaughter plants.

The survey by Jekanowski and Akridge shows that an optical probe measure of backfat (and sometimes loin muscle depth) is the most common basis for carcass merit systems. In fact, they

estimate that 76 percent of the slaughter firms with a carcass merit program used an optical probe in 1992. The backfat depths are somewhat correlated with overall carcass lean and used to estimate this important unobservable variable. Clearly, high quality lean meat is the most valuable attribute of the carcass both in terms of consumer demand and processing cost per unit of consumer product. As a consequence, the U.S. slaughter industry has been involved in much experimentation aimed at improving the ability to predict carcass lean content or carcass value. Before focusing on some of the newer technologies we will discuss the limitation of the optical probes.

The accuracy of lean content predictions based on the optical probe backfat measure may be very poor. This is especially true if there is not a method to account for carcass weight, genotype, and sex effects. Sather et al 1989 and Boland et al 1994a&b have shown that there are significant unexplained effects in most electronic based pricing models which are attributable to these attributes. However, the industry continues to use relationships which do

not account for those traits. Also, Berg et al 1994 have shown that there are significant value impacts from operator error in the probe system. Optical probes are also incapable of distinguishing the quality of lean meat. That is, they can not identify the so-called pale, soft, and exudative (PSE) pork. PSE is a serious dilemma since many of the newer high lean genetic lines of pigs carry a stress gene which contributes to the incidence of PSE. Ruler measurements of backfat and loin muscle depth are also used at some plants. This method suffers from similar criticism as the probe except that it is non-invasive and does not leave a hole in the carcass where discoloration of the meat occurs.

Electromagnetic scanning and ultrasound are the two most promising new technologies for evaluating carcass quality. Neither of these is capable of solving the PSE problem, but both may be more accurate in terms of predicting carcass lean. More research has been conducted on the Total Body Electromagnectic Conductivity (TOBEC) system (Forrest et al 1989 and Berg et al 1994) than on ultrasound. However, both are being used somewhat in existing packing plants. The TOBEC has been used on a slow line speed plant to scan the entire carcass. The engineering required to refit the plant is extensive. It was also used temporarily by Indiana Packers Co. (IPC) in their Delphi, Indiana plant to scan half carcasses as they left the chill room. This was unsuccessful primarily due to temperature variation in the carcasses which altered the readings from the scanner. Currently, a smaller version of the TOBEC scanner is being used by a U.S. packer to sort hams and loins based on percent lean. Boland et al 1994b have shown that the TOBEC also requires correction for carcass weight, genotype, and sex. Boland et al 1994a

demonstrated that a model which uses both the probe and the electromagnetic scanner out-performs other competing models in terms of predicting carcass lean or carcass value.

Real time ultrasound appears to have a great potential to correct for the types of errors in measuring backfat and loin muscle area. Real time ultrasound technologies under development would be capable of taking three dimensional readings of the loin muscle area, thus solving some of the problems of the probe due to varying shapes of loin muscle from carcass to carcass.

The component pricing system is the final carcass merit option. One type of component system (Brorsen et al 1991) sums the wholesale value of each cut of the carcass. This is essentially the wholesale value of the carcass. Then a processing cost and a return to the packer's investment are subtracted. The result is the amount the producer receives for the hog. These are used very little in the U.S. hog-pork sector. They are typically used only in coordinated systems involving large producers. However, they have some interesting attributes. Consider the events of October and November 1994 when slaughter hog prices fell below $30 per cwt. in the U.S. Packer margins were at historical highs, but a producer selling on a typical component model would have received between $33 and $42 per cwt., depending on the quality of the hogs. Of course the advantage may swing in the other direction in times when packer margins are small or negative. That is, there are rare occasions when the wholesale value of the disassembled carcass minus the processing fee is below the market price for live hogs. In such a case, the component seller would earn a lower profit than if he/she had sold via a live weight or more traditional carcass merit system. Essentially, this type of component pricing system allows the producers to integrate into the wholesale pork

market by treating the slaughter plant as a custom vendor and marketer who slaughters the hogs for a fee. Such a system could be used in a manner similar to Danish pork cooperatives where producers collectively own the slaughter facility and payments to producers are based on the wholesale value minus the slaughter cost.

Less complex component systems are used more commonly in the U.S. Most pay premiums over live weight prices based on the yield of the lean cuts. These cuts account for over 60 percent of the wholesale value of a typical carcass.

Many plants feel that by requiring carcass merit pricing for all hogs purchased they would not be able to procure enough hogs to operate at a profitable capacity. Thus, producers are given a choice and many have developed sophisticated marketing strategies to capitalize on the variety

of merit pricing alternatives offered by the different slaughter plants. Hogs are commonly sorted on farms to reduce price discounts associated with carcass weight. In addition, many producers with a large enough scale find it profitable to market their barrows and gilts separately, sometimes to separate slaughter plants. The gilts, being somewhat leaner and with lower backfat, will often bring a higher than average price on a carcass merit system. The barrows may fare better on a traditional live weight system.

4. Feeder pig markets

Most of the feeder pigs in the U.S. are moved into finishing barns on the same or different location owned by the same producer. Perhaps the next largest marketing channel for feeder pigs is selling directly to another producer. This usually involves a long term arrangement between the parties, but such sales may also be the result of "word of mouth" or even classified advertisements in newspapers. Perhaps this is why the "Other" category in Table III.3 is the largest marketing channel for feeder pigs. That is, the "other" category is the only one which fits direct sales to other producers and retention. Also, notice that contract removals (feeder pigs that were produced under contract with an integrator-coordinator or another producer who then finishes them elsewhere) account for only four percent. This is much less than the 10 to 15 percent level of contracting generally mentioned in the hog-pork sector press. Table III.3 also demonstrates that auctions still play a significant role in the market for feeder pigs whereas they are fairly insignificant for market hogs. However, there seems to have been a strong decline in the use of auction markets since Crom and Duewer, 1980 collected their data.

The distribution of marketing channel use may vary geographically. For example, in areas where there is a strong auction market this may be the dominant alternative. The *Pork '94* survey also looked at feeder pig marketing channels. Table III.4 shows the results of that survey. Unfortunately, the way the survey results were tabulated it is not possible to extrapolate the relative distribution of feeder pigs marketed via the different channels. That is, the percentages listed in Table III.4 represent the percentage of producers who bought some feeder pigs by that channel and not the percentages of feeder pigs purchased. Thus, some producers fell into multiple categories and this is why the percentages do not add to 100 percent for any given column. It is possible, however, to get a "feel" for the relative importance

of the different marketing channels.

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Direct sales and contract removals have a significant advantage over auctions in both surveys. Auctions appear to come in a distant second. The exposure to other animals and the stress of the auction process take a significant toll on feeder pigs. By directly purchasing animals the buyer can examine the health status of the herd of origin and determine the risk involved in the purchase. Transportation costs may also be lower for a direct sale. The disadvantage of direct sales is the difficulty in establishing a price for the particular quality of animals being sold, but auctions typically operate only one day per week.

Some experimentation with electronic feeder pig auctions occurred in the 1980s. The success of these has been minor and localized. Satellite and electronic auctions accounted for only four percent of the marketings in the USDA-ERS 1994b survey.

5. **Breeding stock markets**

The U.S. hog breeding stock market is on the verge of a major change. Historically, breeding stock were produced by specialized breeders who served producers in their locale. Alternatively, many producers followed a cross breeding program to produce their own replacement gilts on the farm. Some of these producers purchased pure bred stock from dealers located all over the world. The new challenges of carcass quality, rates of gain, and fecundity in the sow have been met by large genetics companies such as Pig Improvement Co. (PIC) and Newsham Hybrids, Inc., to name a couple. The base of these companies' genetics are European. They have made a significant impact on the hog-pork sector and continue to bring their expertise to bear on new problems as they arise. The paper by Walburger and Foster (1994) quantifies the significant importance of hog carcass quality traits (loin eye area and backfat depth) in the boar purchase decision.

The only recent data about breeding stock marketing channels is from the 1993 survey commissioned by *Pork '94.* Table III.5 shows the results of that survey and also shows the movement away from purebred stock. Estimates of the relative importance of purebreds, local dealers, and corporate suppliers in the early 1980s is documented in Hayenga et al 1981.

The impacts of the corporate breeding stock suppliers is evident. In the past, the market for pure bred stock was strong, and much of the breeding stock was sold at auctions and by direct sales between producers. With the entrance of the new genetics companies, there is no longer a need

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to resort to auction sales. These companies sell directly to their customers and also provide recommendations on breeding programs to make the most out of the animals purchased. They have been especially successful in marketing to the extremely large producers.

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IV. **Evaluating Performance of Canadian Hog-Pork Sector**

Evaluation of market performance is difficult and controversial. It is difficult because the many indicators that might be used to measure performance for a complex system like that for hogs and pork are difficult to define and measure. Performance evaluation is also controversial because it necessarily involves normative judgements on the wide range of objectives and performance indicators that are appropriate.

To assist in the evaluation, a questionnaire was developed (Appendix A) and used to solicit opinions of various stakeholders across the country: representatives of meat packers, provincial marketing agencies and producers. A list of those questioned is in Appendix B. The questionnaire included questions on services provided by companies and organizations, market system design, price determination, pork market outlook and public policy.

A framework was developed to give some structure to the comments provided by the respondents and to increase its objectivity. This framework involves a set of performance objectives designed to reflect a wide range of potential societal goals. It was adapted from methods originally developed by Jesse (1978) and later extended by Martin (1980). The advantages of this approach are: (1) it provides a way of organizing the wide range of information necessary to assess market performance and (2) information is arranged and provided to policy makers without imposing normative judgements of the analysts.

The evaluation is made on the basis of quantifiable measures of specific performance indicators for each objective as well as comments from the respondents.

Table IV.1 summarizes the framework used in the evaluation. Eight objectives are listed in the table, each with specific performance indicators. For example, the first objective (to assure an abundant supply of pork products to domestic consumers at economical prices) has two indicators (level and stability of available supply; and level and stability of consumer prices). Each indicator has a number of measures which can be quantified to greater or lesser degrees, plus an indication of the particular survey questions that most apply to the objective. The list of objectives, indicators and measures taken together provides a rather exhaustive summary of important considerations that can be used by policy makers for the evaluation of market performance in the hog-pork sector of Canada.

The evaluation was conducted under each of the eight objectives which are listed below as separate headings and discussed in turn. Under each objective, the performance indicators were evaluated on the basis of appropriate quantifiable measures (according to data availability) and correlated with comments from the discussions with stakeholders in the hog-pork sector.

Objective 1. Domestic supplies

The first performance objective is: To assure an abundant supply of pork products to domestic consumers at economical prices. Two indicators are used to evaluate the performance of the Canadian hog-pork sector in achieving this objective: (1) level and stability of available supply and (2) level and stability of consumer prices. In other words, has the marketing system

ensured a stable and equitably-priced supply of pork products?

Indicator Ia. Level and stability of supply

Figures IV.1, IV.2a,b, and IV.3a,b provide quantitative indicators of the level and stability of domestic supply. Canadian production, supply and use of pork between 1970 and 1993 are shown in Figure IV.1. It is readily apparent that the rapid expansion in Canadian pork production during the late 1970s led to a large surplus of pork supplies over domestic consumption. The inescapable conclusion is that over the last 15-year period, more than adequate pork supplies have been available for domestic consumers.

The trend in pork supply in Canada clearly has been upward, though the extent of the upward movement depends on the time period being examined. Figure IV.2a shows domestic supply from 1970-93, with a single trendline drawn through the data (R2 of 0.85 and a statistically significant positive slope coefficient). In Figure IV.2b, the time period was broken into three intervals. From 1970-77, domestic supply was stagnant with a slight downward trend. From 197780, domestic supply increased greatly. Since 1980, domestic supply has continued to increase but at a slower rate (all dummy and slope shifters are statistically significant with an R2Of 0.97).

To get a measure of the stability of domestic supplies, differences between actual supply and the supply calculated from the linear trend equation were plotted. If a single period trendline is used to calculate supplies, it appears that not only has available supply trended upward, but it has been more stable, as indicated by the lower levels of variation from 1982 onward Figure IV.3a).

However, if a piece-wise linear trend is drawn through the data, then it appears that production variability from the trend lines has been fairly constant throughout the period (Figure IV.3b).

The available data suggest that under the Canadian hog marketing system, domestic consumers have been assured of an abundant and growing supply of pork. Although fluctuations continue to occur in domestic supplies, instability has not increased with the growth in the industry.

Indicator Ib. Level and stability of consumer prices

Consumer price information for pork is available only in indexed form. In addition, a composite price index for pork is available only since 1979, a fairly short time period. As a result, price indices for pork loin and shoulder cuts were used as proxies for pork in general. When compared to the composite pork index, these cuts followed very similar trends over time, so it is believed that they are reasonable proxies. Figure IV.4 compares pork and shoulder price indices to the Consumer Price Index (CPI) for food from 1970 through 1993. In general, pork price indices fluctuate around the CPI (statistical tests corroborate the observation of greater variance in pork prices), but follow it quite closely. Prior to the early 1980s, the pork price indices generally were above the CPI indicating that pork prices were relatively high. Since 1982, the pork indices typically have been below the CPI, indicating low relative prices for pork.

Figure IV.5 shows price indices for pork loin, pork shoulder and chicken, relative to the CPI for all goods (food and non-food). Over time these price indices have fallen, reflecting a downward trend in pork and chicken prices relative to all goods measured in the CPI. Moreover, in the early part of the time series, relative pork prices generally were above relative chicken prices; in the latter part of the time series, this was reversed. This reflects the exploitation of superior genetics to increase the lean content of hogs allowing the hog-pork sector to become more competitive relative to chicken. Other meat indices (pork cuts and beef cuts) display a similar trend, but are not reported to avoid clutter.

Industry stakeholders reported mixed feelings with regard to pricing and competitiveness of pork. For example, representatives of the directors and management of one provincial marketing agency felt that pricing of pork at the wholesale level was 'competitive' but at the retail level it was questionable whether or not prices were set competitively because of the market power of a few large retailers. However, packers reported that because the pork market was open and

uncontrolled, pricing was competitive even though the retail sector was concentrated. Relative to other meats, pork was thought to be competitively well-positioned in terms of price and **quality.**

Although there were some mixed responses from industry stakeholders, there was a consensus that pork was wet/-positioned and priced in the Canadian market, relative to other meats. The data also suggests that consumer level pork prices are well in line with the prices of other meat and food products. The pace of pork has fallen relative to the all-good CPI, indicating that pork has become a consistently better consumer value over time.

Objective 2. Efficient production and distribution

Another goal for the marketing system is: To stimulate and facilitate the efficient production and distribution of that combination of products or related services which best reflect the preferences of consumers and the real relative cost of production. Evaluation of this objective helps to determine the degree of productive and allocative efficiency in the system. There are five general indicators for this objective.

A large number of pork processors and most provincial marketing agencies reported to the study team that a primary strength of the current system for marketing hogs was the single focus and linkage between packers and producers that was provided by the marketing agencies. Because packers effectively can limit their dealings to one organization, they do not need to use scarce resources to assure adequate supplies of hogs for processing. Furthermore, the single seller can and does take responsibility for the food safety of the live hogs sold. There seemed to be a consensus among stakeholders interviewed by the study team that the single-desk system was a major source of efficiency. Stakeholders felt that the single-desk system reduced transactions costs and helped ensure an efficient distribution of product. However, the single-desk mechanism was simultaneously viewed by some packers as a potential weakness as well, because the funneling of information through one body (the marketing agency) could lead to difficulties in communicating important information to

producers. Similar transactions cost arguments have been used to explain the increased vertical coordination between production and slaughter in the U.S. hog-pork sector, as discussed in Chapter III.

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Indicator 2a. Level and stability of producer prices

Stakeholders were asked if they thought that the pricing of pork, pork products and hogs in Canada was competitive. There are significantly different perspectives in the industry. With respect to hogs, one viewpoint holds that pricing is competitive because it is based on U.S. prices. This viewpoint interprets "competitive" strictly in terms of the ability to price directly off U.S. price levels. However, there are disagreements about the competitiveness of hog markets in the U.S. as well. A second viewpoint was that domestic prices are set arbitrarily and not on a competitive basis because interprovincial barriers to trade deny equal access to raw product. The lack of "fair" access to hogs was regarded as a key system failure by some packers, even if they were generally complimentary about other features of Canadian hog marketing systems.

Figures IV.6 and IV.7 show producer price trends for Manitoba and Ontario, taken as proxies for Western and Eastern Canada. Prices are in constant dollars per hundredweight. In both cases the linear trends fitted to the data were similar: R2s were above 0.60 and the negative slopes were statistically significant. A four-year price cycle since 1978 is clearly evident in the variations around the trend, but variation appears somewhat less pronounced over the last decade of the data.

Figure IV.8 shows producer price cost margins, expressed in constant $/cwt. for Ontario and Manitoba. Production costs were taken from the cost of production report for the National Tripartite Stabilization Program for hogs. These are generated from a model and should not be interpreted as exact production costs. Nevertheless, they can be used to make inferences regarding relative price-cost margins *over time.* Margins for Ontario and Manitoba tend to track each other closely as expected. Margins trend downward over time, reflecting the general downward trend in constant producer prices. Trend lines fitted to both margins (not shown) had significant negative slopes. Note also the oscillation corresponding to the hog price cycles.

Producer prices and margins have trended downward over the same time period that production and hog/pork exports generally grew in Canada This signifies clearly the increased efficiency of Canadian hog production over this time period. Variation also appears somewhat reduced, but a four-year cycle in producer prices is clearly evident in the data Overall, the Canadian hog marketing system appears to have allowed more efficient hog production.

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Indicator 2b. Price spreads

When asked whether relative price relationships existed among Canadian regional markets, many packers reported that they did not believe prices reflected regional supply and demand conditions. Some packers reported that this was because they cannot compete all the time

for hog supplies in all provincial markets. Some emphasized that producer prices are determined through formulas linked to an external reference market, while wholesale and retail pork prices are driven by both local and external market conditions.

Figure IV.9 shows the Ontario - Manitoba producer price difference (in constant dollars). Note the dramatic readjustment that occurred in 1977 and the subsequent slight downward trend in the price difference between the two provinces. Whereas, between 1970 and 1976 the price difference was about $10 per cwt., it has drifted down from $4 per cwt. in 1977-1978 to $2 per

· cwt. or less in 1993. Note also that in 1979 and 1986 prices in Ontario and Manitoba were

essentially equivalent.

Considerable controversy about regional price spreads erupted in Canada during the 1970s. The abrupt narrowing of the price spread between eastern and western Canada has been attributed to the following factors (Gilson and Saint-Louis, 1986): (1) Quebec moved from a deficit to a surplus in terms of production versus consumption; (2) establishment of the first export contract to Japan by the Alberta hog marketing agency and several packing firms; and (3) the beginning of trading relationships on a north-south basis with the U.S., rather than the traditional west-east orientation.

Hog price spreads between eastern and western Canada have narrowed considerably. Some packers believe that regional markets in Canada no longer reflect underlying supply and demand conditions because hog prices are determined from an external reference market, while local conditions are important in determining wholesale and retail prices.

Indicator 2c. Market signals

Canadian pork is generally regarded as high-quality, relative to major competitors. The leanness of Canadian pork provided through appropriate genetic selection and management is a direct

outcome of the grid-based pricing system. Special grids have been developed in most provinces to account for special needs. In one case, a special black hog contract for a Japanese trader was facilitated by Manitoba Pork. However, the system has not been fully responsive to market signals. Although some progress has been made in developing a chilled pork program for meeting consumer preferences in sales to Asia, most Canadian pork exports to the region continue to be frozen.

The transmission of consumer preferences to producers occurs through the pricing system. The Canadian grading system with its grid of premiums and discounts is designed to communicate preferences and directly reward or penalize producers based upon specific carcass values. Viewpoints were mixed regarding the effectiveness of the Canadian marketing system in transmitting consumer preferences. Virtually all stakeholders were supportive of the grading system design and the potential for effective transmission of preferences, but some packers felt that although the general design and infrastructure was good, there was a need

to develop a more focused and direct method of communication. Specifically, because price discovery along with the quality-related premiums and discounts are communicated to producers via provincial hog marketing agencies, the linkage was thought to be indirect and not always effective.

Price discovery for hogs in Canada is now essentially a basing-point system through the use of formula pricing methods. The use of a major market as a reference price ensures that Canadian markets are integrated with each other and U.S. prices, but might not reflect effectively the preferences of Canadian consumers.

Correlation between Canadian and U.S. prices is high, due to the high levels of market integration. By focusing on turning points, it is clear that the Quebec, Alberta, and U.S. price series follow fairly similar trends. Figure IV.10 depicts the changes in hog prices in Alberta, Quebec, and the United States. While consistently lower, Canadian prices track variations in the U.S. price in a systematic manner. In the literature on price dynamics, formal statistical tests of the strength of the relationship(s) binding prices together are referred to as cointegration tests. Most studies on the North American hog market have found evidence of cointegration (Coffin et al, Benson et al, Faminow and Benson, and Tanguay). Thus U.S. and Canadian prices appear to respond to the same market signals. The margin between Canadian and U.S. hog prices reflects the positive trade balance that Canada enjoys in hog-pork trade with the United States.

More recently, U.S. and Canadian price differentials have narrowed due to the implementation of formula pricing systems.

From Figure IV.10 it is interesting to note that the price differential between the United States and any of the two Canadian markets is not stable through time. These changes in relative prices can probably be explained by institutional changes that have shocked the North American hogpork market. From a review of previous studies in this area, two major types of shocks have been identified. The first type is linked to major changes in marketing regulations, like the creation of single desk hog marketing agencies in Canada. The second type corresponds to the many phases of the Canada-U.S. hog-pork dispute.

The creation of single desk hog marketing agencies has been addressed in other parts of this document. The regional implications of trade barriers between countries have received little attention. The substantial increases in Canadian pork exports and shifts in production location during the late 1970s and early 1980s were accompanied by an equally spectacular shift in destination as Canadian exporters found it increasingly difficult to maintain their involvement in the Japanese market due to increased competition from Denmark and Taiwan. At the same time, the fall of the Canadian dollar relative to the U.S. dollar in the early to mid 1980s made the United States a very attractive market for Canadian exporters of live hogs and pork products. The share of Canadian pork exports sold in the United States jumped from 20 percent to 80 percent over this period. This outcome did not please U.S. hog producers who launched countervailing actions against Canadian exports of hogs and pork in 1984 and against Canadian pork exports in 1989. As a result, a countervailing duty on Canadian live hogs was imposed in 1985. A countervailing duty on Canadian pork exports was enforced between 1989 and 1991. A more complete description of the Canada-U.S. hog-pork dispute

appears in Appendix E.

The impact of the U.S. countervailing duties on the arbitrage relationships between U.S. and Canadian prices has been the object of several studies (see Appendix C for a summary of these studies). These institutional factors directly affect modelling of the dynamics of international and regional price interrelationships. In this study, relationships among monthly prices in the U.S. and Eastern and Western Canada were analyzed with cointegration methods.. The U.S. price is a weighted average of prices observed in seven regional markets. The prices for western and eastern Canada are proxied by the prices in the largest producing provinces in each region,

Alberta and Quebec. Tests about the speed at which each price series moves back to equilibrium after a shock can provide useful information about market structures.

The cointegration tests and complete results are presented in Appendix D. The tests indicated that all three prices responded to shocks in a similar way. However, prior to 1985, the composite of U.S. prices is clearly the most prominent component of the pricing relationships in eastern Canada. The period following 1985 was characterized by a closer relationship between Alberta (or western) prices and Quebec (or eastern) prices. These results coincide with two factors: imposition of U.S. countervailing duties and also a greater movement to formula pricing off U.S. markets.

The price system transmits signals through the hog marketing system. The basic design of the price discovery system for market hogs in Canada is thought to be sound. However, some stakeholders reported that the system of premia and discounts in the pricing grids used in various provinces could be fine tuned to reflect better the quality preferences of consumers and thus provide proper market signals. In terms of spatial markets, price discovery is now essentially a basing-point system through the use of formula prices tied to U.S. reference markets. Correlation between Canadian and U.S. markets is high and studies show that they are cointegrated. However, price differentials and lag relationships are not stable over time, suggesting that institutional factors are important in determining spatial price relationships.

Indicator 2d. Adaptability to structural changes in demand

Stakeholders were asked whether or not their organization had a strategic plan. One objective shared by most members of the industry was to "meet the needs of pork consumers" in terms of quality, price and flexibility. Innovation and flexibility were often seen as critical to their strategic plans.

Data from the National Pork Carcass Cutout Project completed in 1992 were made available to the study team. A sample of carcasses chosen in 1992 were cut to determine meat yields and then compared to the last full cut-out which occurred in 1978. Although the data from the two were not strictly comparable, the project researchers (led by S.D.M. Jones at the Lacombe

Research Centre of Agriculture and Agri-Food Canada) were able to develop reasonable comparisons. Figures IV.ll and IV.12 present data taken from their study. In Figure IV.ll, aggregate yield improvement, expressed as a percentage change from 1978, is shown for three categories: carcass weight, grade ruler fat and yield. Over the time period of the data, average carcass weight increased by about 4 percent (2.61 kg.), while the average ruler fat measurement declined by about 12 percent (from 35.16 mm. to 30.61 mm). Taken together, heavier but leaner carcasses translate into substantial improvement in lean meat yield, from 47.48 percent in 1978 to 55.21 percent in 1992, a 16 percent increase. The authors of the report (Jones et al) give primary credit for this improvement to the Canadian grading system for effectively transmitting consumer demands for leaner pork to hog producers.

Figure IV.12 provides a different perspective on the adaptability to consumer demand. Substantial percentage changes in specific cut yields, relative to 1978 yields, are apparent. Jones et al (1992) argued that these data provide a good illustration of how the heavier weights translated into productive lean yield, rather than forcing carcasses into lower yield classes. Lower fat content of carcasses created lighter side ribs and bellies (plus significantly less kidney fat) and much higher relative weights of lean cuts.

The grading grids used in Canada specifically account for leanness and weight of the carcass so they reflect consumer preferences for these traits. However, most other consumer preferences are not considered. Some stakeholders argued that adjustments in the grid are needed to transmit a more complete set of consumer preferences, such as color of the meat, portion size and other nutritional information. This is especially important when consumer demands change rapidly as has happened during the last decade.

The information available from cutout tests implies that significant progress has been made by the industry in improving the value of hog carcasses. Significantly, this progress is directly related to structural changes in demand. An evolving consumer demand for leaner po has led to substantial improvements in the composition of carcasses, such as less overall fat, less kidney fat and a relatively greater proportion of the carcass in higher-valued cuts. However, some difficulties exist in transmitting consumer preferences for other quality factors back to producers.*

Indicator 2e. **Ensures quality**

Industry stakeholders were virtually unanimous in their belief that Canadian pork was ranked among the world leaders in terms of quality. The marketing system was credited as the prime force responsible for Canadian pork quality. When asked how important pork quality would be in maximizing market potential over the next five years, responses were of the form: "extremely important", "single most important factor", etc. Yet the quality advantage of Canadian pork may be fading. As noted in Chapter III, integrated U.S. operations now control closely their genetics and can produce consistent carcasses of any quality demanded in the market. Denmark and Taiwan also can produce pork of strict quality standards. One packer representative mentioned that the quality advantage that Canada used to have no longer exists.

Two primary steps were regarded as essential in ensuring that Canadian pork quality

continues to remain high relative to our competitors, and that quality is effectively utilized in achieving market potential:

- focus on genetic research to assure continued development of hogs that address issues such as PSE, lean yield and feed conversion;

- better communication and teamwork among all sector participants through the formation of strategic alliances or vertical integration.

Canadian pork is widely regarded as being among the world leaders in terms of quality. High levels of quality will be very important in the continued success of the Canadian industry.

Objective 3. Increase productivity

A third important objective for the Canadian hog-pork sector is to increase productivity of the hog production system. Several standard indicators of production efficiency are given below. However, it should be emphasized that data are quite limited in this area and additional information, particularly with regard to potential efficiencies arising from scale of operation in hog production and alternative system organization would be helpful. At the present time there is virtually no reliable information available on these important issues. However, the overall

improvement in system efficiency over time can be assessed using data on pig production and feed efficiency which reflect the cumulative impacts of factors such as genetic improvement and better farm management.

Figure IV.13 shows productivity of pig production, expressed in pigs born per sow, for Eastern and Western Canada. These data were taken from Statistics Canada Cat. No. 23-603E and calculated by dividing pigs born per quarter by sows farrowing in that same quarter. An upward trend over time is evident in Western Canada. In fact, simple regressions revealed that the productivity in Eastern Canada exhibited no significant trend, while in Western Canada there was a significant and positive trend. Also evident is the lower level of variability over time and the narrowed gap between Eastern and Western Canada (Note that statistical tests weakly (strongly) support reduced variability for Eastern (Western) Canada, and strongly support the conclusion of a narrowed gap between Eastern and Western Canada). Not only has this measure of productivity improved over time (in Western Canada), but there have been reduced temporal and regional variability.

Feed efficiency, another indicator of productivity, is shown in Figure IV.14. These data, shown for selected years, were taken from Record of Performance (ROP) provided to the study team by Agriculture and Agri-Food Canada. Improvement in feed efficiency over time is clear from the downward trend in the number of pounds of feed required to produce a pound of gain. For example, the amount of feed needed to produce a pound of gain fell from 3.12 in 1962 to 2.49 in 1980 and 2.28 in 1993, a 27 percent improvement in efficiency over the last thirty years.

The hog production system has clearly become more productive. In terms of farrowing efficiency, Canada has improved over time. Further, feeding efficiency has also improved significantly. In a recent comparison, Canada has been shown to compare favourably, in

terms of competitiveness, to other countries (kusen, Voigt and Hayes, 1995).

Objective 4. Equity

Another objective by which a marketing system can be evaluated is that of equitable distribution of opportunities and rewards. Such an evaluation is difficult to perform since equity is an evasive concept requiring value judgements about fairness.

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Although equity can not be precisely defined, it is possible to measure and discuss income distribution and market access for producers, income distribution among packers and income distribution between producers and packers. These performance indicators for the fourth objective are discussed below.

Indicator 4a. Income Distribution Among Producers

This performance indicator is concerned with whether or not some producers receive better treatment, returns, or marketing margins (relative to production and marketing costs) than do others because of discrimination against producers based on size of operation, favoritism or other non-economic criteria.

Stakeholders reported to the study team that one of the greatest advantages of the Canadian hog marketing system was the equal treatment accorded all producers. All producers in a given province receive the same price for equal quality hogs (during the pooling period) and incur the same costs imposed by the marketing agency for marketing, research, development and promotion. In addition, all producers have equal access to information on technology and product development, and to the benefits from promotion. In fact, all services provided by a provincial hog marketing agency are equally accessible to all its members.

All hog producers have a single vote in marketing agency elections, regardless of the size of operation. Some producers expressed concern that this democratic principle was not in itself equitable since large producers have a relatively smaller influence on the activities of the marketing agency than is their contribution to total production and, in many cases, the importance of hogs on their farms.

The above factors undoubtably play a role in enabling such a large number of small producers to exist along-side a smaller number of very large producers (see figures II.6 and II.7). Since the results of research, marketing and promotion are passed on to all producers, overall efficiency of production may not be affected by this arrangement; (it could even be enhanced -- see section 2.a of this report). Probably, the equal treatment of producers has resulted in more small producers remaining in business than would be the case without marketing agencies.

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One of the most important contributions of provincial hog marketing agencies in enhancing the performance of the hog marketing system is the equity guaranteed to all producers by central desk selling. In this regard, the Canadian system might be judged

as very equitable. This feature likely has been an important factor contributing to the continued importance of small family farms in hog production.

Indicator 4b. Market Access for Producers

Two issues of importance underlie this indicator: price variations among producers and sales restrictions. Clearly, the price pooling systems used by all hog marketing agencies across the country ensure equitable price determination for producers in each province.

The second measure of this indicator, sales restrictions, requires some additional attention. Presently, only Ontario permits the sale of slaughter hogs to occur on an individual contract basis (though Ontario Pork remains a party to all contracts). Other provinces do permit sales to small abattoirs. Packers in provinces other than Ontario indicated that inability to contract directly with producers restricts their ability to provide incentives for producers to provide hogs that will better meet their particular demand, particularly in the case of niche markets. In fact, a number of packer representatives suggested that they would be willing to pay more for hogs than the present formulas require, if they could get what they wanted and turn back what they didn't want.

Thus, there really are two conflicting components of market access and sales restrictions. On one hand, central desk selling helps ensure equity and access to producers, regardless of location and size. But, on the other hand, agreements outside of the central desk system between individual producers and packers are normally not allowed, implying a form of restriction to specific markets. Specific delivery agreements can assist in specifying precise quality needs to fill niche markets. However, the right to this type of voluntary, and potentially profitable, agreement between market participants can be difficult to facilitate under a central desk system. Further, this type of arrangement is contrary to the basic philosophy of central desk mechanisms.

Provincial hog marketing agencies help ensure market access for producers by utilizing central desk selling systems that provide equitable protection against price variation through pooling and right of access to all producers. However, the maintenance of a central desk system normally requires restrictions on the rights

individual producers and packers to enter into business agreements and contracts.

Indicator 4c. Income Distribution Among Packers

Although it is not possible to obtain information on packer revenues, an attempt was made to determine the degree to which packers have equal access to supply and assess whether raw input costs vary among packers. Hog marketing agencies ensure that packers cannot reduce price below that set by the formula. This does not ensure that all packers always pay the same price: in provinces where a substantial number of hogs are slaughtered in the U.S., the packers could bid those hogs away if they choose. In addition, the marketing agencies assemble hogs and incur virtually all of the transactions costs associated with the delivery of the hogs.

In Quebec, the FPPQ recently introduced a pre-allocation system (January 1994) which ensures that packers are allocated a share of hog production. This may appear to ensure equitable allocation, but some stakeholders argued that it had a negative effect on efficiency. Further, it was mentioned to the research team that some packers would be willing to pay more for a larger share of the hogs but they were prevented by the pre-allocation system. In addition, some packers worried that any potential entrant would be given a share of the available supply, further diluting their shares. The second largest pork processor in the province has challenged the legality of this marketing arrangement; the case is presently before the Quebec Supreme Court.

Income information about individual packers is not readily available. Hog marketing and pricing policies are generally neutral and designed to treat all packers in a province equally. However, occasional issues of fairness do arise, such as the current law suit in Quebec.

Indicator 4d. Income Distribution Between Producers and Packers

The single selling desk gives producers an effective monopoly that faces one or few pork processors (oligopsony). The theory of countervailing market power suggests that when a monopoly seller faces a monopsony (or oligopsony) buyer, the negotiated price will lie somewhere between the monopoly and the monopsony price, but no conclusion relative to the competitive market price can be made.

The information available regarding this issue relies heavily on responses from stakeholders. As one might expect, packers, in general, expressed concern over price setting by the provincial hog marketing agencies. Moreover, other stakeholders also disliked formula prices which are heavily tied to U.S. prices, since it was not apparent that higher quality Canadian hogs are receiving a sufficient premium. Finally, perhaps the most serious criticism levied by stakeholders (mainly packers) was that they couldn't choose to purchase only the product which yielded the highest returns to them. That is, they were required to **take all the** hogs shipped to them. Note, however, that this is equitable in the Canadian markets in the sense that all packers face the same problem. Nevertheless, it is more critical for those who desire to serve a specific market which requires specialization of product. Internationally, competitors in the U.S. and Europe are strategically aligning genetics, slaughter and wholesale marketing. Danish pork cooperatives require the use of one of several specific genetic lines, and the vertically coordinated systems in the U.S. also are linked closely to specific high lean genetic lines (see Chapter III).

This also could introduce inefficiencies because producers with inferior hogs are guaranteed access to the market. In principle, this problem is manageable within the context of the existing system by increasing the discounts for lower-quality hogs in grading grids. However, it is disturbing to hear such widespread complaints of these quality-control problems when the present grading system and pricing mechanism were specifically designed to prevent them from occurring.

The present marketing system was originally set up because of serious concerns about the income distribution between producers and packers. However, the system was designed not just to shift the balance of economic returns, but also to enhance efficiency. Although the system has delivered tora *great extent in this regard, there appear to be some concerns by packers about hog quality. These should be resolvable under the grading and pricing system, but, apparently, they continue to reduce market effectiveness.*

Objective 5. Access to Markets

The fifth objective evaluated in this study was the ability of the Canadian hog-pork sector to gain and maintain access to national and international markets. This is particularly important for a

country that is net exporter of hogs and pork. Two performance indicators were used: sales to alternative countries/regions and responses to changes in demand.

Indicator 5a. Sales to alternative countries/regions

Figure II.8 shows values of exports of Canadian fresh and frozen pork cuts for 1988-94 (in constant dollars) and figure IV.15 shows total pork exports in tonnes. It is evident that, although Canadian pork exports have trended upwards since the early 1970s, they have not changed much since 1988. This may be attributable partly to imposition of countervailing duties by the U.S. in the long running trade dispute with that country.

In recent years, most of Canada's exports of pork have gone to the U.S. (Figure IV.16), though the proportion going to that market has declined from 77.5 percent in 1988 to 71.8 percent in 1994 (Agriculture Canada, 1995). Japan is another major export destination for Canadian pork. However, Canada's exports to Japan have decreased by about one-third since 1983. Furthermore, while Japanese imports of pork have grown rapidly in the last decade, Canada's share of Japanese pork imports has fallen from 31 percent in 1982 to about five percent in the l990s (Japan MAFF, 1994).

Exports to minor markets, including New Zealand, Bahamas, Trinidad and Tobago, and the Dominican Republic have decreased in the last ten years (Figure IV.17). In the l990s, these markets have almost disappeared.

Figure IV.18 illustrates the ratio of pork exports to hog production in Canada. Since 1970, exports have been increasing relative to production implying the strong international competitiveness of Canadian pork. However, since 1988, exports have not grown as a proportion of production.

Despite the slide in Canada's success in traditional export markets, the Canadian hog-pork sector has done an excellent job of opening new markets. Part of this could be due to the changing international trade opportunities arising from NAFTA and GATT. Canada Pork International was set up in 1991 to explore these opportunities. Canada presently exports pork to more than 50 countries across the world (Agriculture Canada, 1995).

Virtually all stakeholders agree that Canadian pork has access to more international markets and demand than can presently be supplied. That is the major reason behind movements in several provinces to encourage greater output of hogs. Of course, the present shortage in supply can partly be explained by the low value of the Canadian dollar which gives domestic exporters an advantage in the world market.

A common issue raised by stakeholders was that competitiveness in international markets was contingent on prices, quality, and the ability to deliver and maintain a stable supply. Further, it was felt that the present system does an excellent job at ensuring drug-free pork and good quality. All stakeholders share a desire to improve quality and ensure that pork carcasses do not contain any drug residues. The provincial hog marketing organizations have played a central role in educating producers and follow-up efforts with violators of the need and the means of minimizing such residues. It has been reported that incidence of sulfa drug residues have decreased from 4.11 percent in hogs tested in 1982-83 to only 0.32 percent in 1992-93. Manitoba Pork Est. has lobbied for a new testing laboratory as part of a new quality assurance program (Rampton, 1995).

Many stakeholders believe that markets for Canadian pork exports will grow over the next five years. In addition to the U.S., many expect market opportunities to develop or increase in Japan, South Korea, China, Mexico, Australia, Eastern Europe, South Africa, Chile, and Argentina.

The only major destination for live hogs is the U.S. Other markets tend to be special one-time agreements made by the federal government.

Canada has made a significant investment in export market development for the pork sector over the years, with a great deal of success. The Canadian industry grew from a situation where production and consumption were more or less in balance in the 1970s into a major international force with sales to over 50 countries in the 1990s. Despite considerable efforts to increase sales, exports have stagnated in the past 6-7 years, possibly due to hog supply problems. However, large increases in value of exported pork and pork products have occurred since 1991, indicating increased sales of higher valued processed items.

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Indicator Sb. Response to increases in international demand

While the growth in Canada's hog production since the early 1970s has been high (Figure IV.1), major competitors in Canada's export markets have been increasing production at an even greater rate. Figures IV.l9 and IV.20 show annual ratios comparing Canadian production to major competitors. In all cases, after 1986-88, Canadian pork production has not kept pace with these competitors. This has been the case especially with the U.S., China and Denmark.

The consensus among stakeholders was that supply of hogs in Canada has been a severe constraint to meeting increases in demand, both in the short and long run. Some of these constraints may be alleviated with the elimination of transportation subsidies for grain, a policy change expected to stimulate livestock production in Western Canada. However, continued

resistance to growth in hog production comes from environmentalists and urban residents objecting to offensive odours from hog barns. Development of effective measures to mitigate environmental and nuisance concerns would help prevent the establishment of more binding constraints on hog production.

Although many packers indicated a capacity to pay more for hogs, this willingness is constrained by hog quality concerns. In addition, the capacity to pay more is also affected by the competitiveness of packers, given the limited exploitation of scale economies in Canada (Ward and Faminow, 1992). Since Canada continues to export significant numbers of live hogs for processing in the U.S., it appears that this supply constraint is not rigid.

There appears to be strong demand for Canadian pork products. However, Canadian packers, processors and provincial hog marketing agencies have been frustrated by the stagnation in growth of Canadian hog numbers in recent years. Competing countries, particularly the U.S., Denmark, China and Taiwan have expanded production more rapidly than has Canada

Objective 6. Encourage growth

The sixth performance objective of the marketing system is to encourage growth and expansion in the pork processing sector. Clearly, in order for the processing sector to grow, hog production

must grow. Thus, one indicator is the availability of hogs. The second is a related indicator: plant capacities relative to economies of scale and efficient capacity utilization.

Indicator 6a. Availability of Hogs to Packers

Figure IV.2, discussed earlier, illustrates the relatively stable but positive growth of hog production in Canada. Although production has increased, it has been slower than export growth (Figure IV.18). The hog breeding herd has remained almost the same size since 1984, with increases in Western Canada balanced by decreases in Eastern Canada.

Rapid growth in breeding stock occurred during the 1970s, mainly in Ontario and Quebec (Figure IV.21). Breeding stock in the western provinces has grown throughout the period from 1976 to 1994. This fact, coupled with marginal gains in productivity, mainly in western Canada (Figure IV.22), led to the increases in production from 1984-1988 (Figure IV.1). Since 1988, production in Canada has declined slightly.

Although packers acknowledged that they are virtually assured a supply of hogs, several openly stated that these supplies are inadequate and the hogs vary drastically in quality and size, decreasing their processing productivity. All stakeholders recognize and worry that environmental laws could restrict further the hog supplies in Canada.

Several packers suggested that a system of dual marketing where producers would have a choice between using the provincial hog marketing agency or making contracts directly with packing plants, would lead to increased supplies. However, producer representatives were

nearly unanimous in their opinion that this kind of arrangement would not alleviate the problem and it would lead to inequitable treatment of producers by packers. Both groups thought that greater cooperation was required in order to improve the availability of hogs and consistency of quality but they had vastly different ideas of what was needed to get the cooperation. Some suggested that this type of flexibility was possible within the present system and that provincial hog marketing agencies could provide a valuable service by coordinating and assembling hogs that satisfy specific quality requirements.

Most packers in Quebec did not feel that dual marketing was the solution. They also felt the present system which allows for small producers should be kept because small units tend to be

more meticulous and efficient than large integrated operations. Though all but one packer signed the convention for pre-allocation of hogs, most thought it should be abolished. Before the end of 1995, the FPPQ and the provincial packers will consult on whether or not the system will continue to be used.

All stakeholders agreed that there is tremendous growth potential in the hog-pork sector of Canada but they disagreed on how to effect it.

*Virtually all packers in Canada would like to receive more hogs of constant specif ed qualities. They sense ma*et opportunities for additional pork but cannot obtain the hogs to meet this demand. Some packers argued for more flexible marketing arrangements which they thought would stimulate hog production. However, producers and their provincial marketing agency representatives, who also would like to see production increase, reject that solution.*

Indicator 6b. Capacity Utilization

Although most packing plants in Canada are relatively small by modern U.S. standards, there appears to be no shortage of slaughtering and packing capacity in any region of the country. Packing plants appear to have little incentive to expand because the hog breeding herd in Canada has not been growing (Figure IV.21).

Most hog slaughtering and pork processing plants in Canada are small and under-utilized. Since growth in hog numbers has been stagnant in recent years, existing packers and potential investors have been reluctant to make major new investments.

Objective 7. Investment Opportunities

The seventh objective evaluated is the ability of the marketing system to provide growing and stable investment opportunities. This is indicated by investment in hog production and processing.

Indicator 7a. Investment in Hog Production and Processing

Very little new investment has been made in hog slaughtering and pork processing plants in Canada during the last two decades. What investment has been made in the hog-pork sector has come primarily from provincial hog marketing agencies, Hutterite Brethren, and governments, though some individual plants have added new equipment and made modest improvements in their facilities. Many of the packers suggested that the investment needed by the business community will not be forthcoming until there is a structure in place which will ensure the availability of greater supplies of hogs and reduced variability in quality, weight and other specifications of the product. Some packers were adamant that an adequate supply of high quality hogs could not be obtained without contracting or instituting a vertically integrated system.

All stakeholders agreed that long-term investment opportunities in Canada's hog-pork sector are very good. Canada has many advantages: ample supply of land to grow feed and dispose of manure, highly skilled labor force, first rate grading system and high quality breeding stock. But there was little agreement between the producers and the packers about how best to get the job done.

Unlike the packers and processors, producers have made significant investments in the past twenty years. They have adopted new technologies in building design, ventilation and manure disposal. They have invested in breeding stock with improved genetics and improved the health status of their herds. They have invested in human capital by improving their management capabilities. Provincial pricing grids based on the grading system and encouragement from provincial marketing agencies have spurred these investments. This indicates that producers can be expected to continue to make improvements, if given the necessary incentives.

There are some positive signals that needed investments might be forthcoming. In Manitoba, existing packers and Manitoba Pork est. are cooperating to study the feasibility of establishing a large-scale slaughtering facility. Given the substantial and growing degree of understanding and cooperation between Manitoba Pork est. and packers in Manitoba, it is possible that the merits of integrated operation of such a plant are being studied. In addition, virtually all provincial hog marketing agencies have developed new strategic plans during the past several years, with a specific focus on the prospects for sector expansion and the joint roles of all

stakeholders as key components. Finally, if increased hog production comes about from elimination of the transportation subsidies for grain, this could provide the stimulus necessary for new investment in hog packing.

Many hog producers have made large investments in larger and more modem facilities, manure disposal systems, improved quality breeding stock and human capital. However, little investment has occurred in the packing and processing sector due to already existing excess capacity and a perceived inability of packers to contract for assured production levels.

Objective 8. Degree/Nature of Competition in Industry

This eighth and last objective in the evaluation of the Canadian hog marketing system can be stated as the need to provide a trade environment in which firms and producers behave competitively. In addition, it deals with the need for end products to compete with close consumer substitutes. Three performance indicators are used to assess this objective: market structure, view of competitors and competitiveness with substitute products.

Indicator 8a. Market Structure and Price Discovery

Generally, it is considered that any market system which closely approaches the perfectly competitive structure will yield the most economically efficient outcome. All resources will be allocated to their best use. Although it is rare to find a market that is completely competitive, one viewpoint is that the closer it is to perfect competition, the more efficient it will be. However, new concepts of strategic organization and system planning challenge this conventional viewpoint. A growing number of economists and business analysts believe that international competitiveness and system coordination are much more important concepts in a global economy.

The Canadian hog marketing system has never fit the traditional view of a competitive sector. Before the introduction of compulsory provincial hog marketing agencies, a small number of packers had considerable power relative to the many producers. Now, producers sell hogs through central desk marketing agencies in each province which negotiates with the few packers on behalf of the producers. The theory of countervailing market power provides no conclusion as to the allocative and pricing efficiency in this setting. Furthermore, the desire to exploit

international access to markets under trade arrangements and compete head-to-head with other major exporters has led to a new emphasis on scale economies, system coordination, value-added processing and product development.

Further, the method of negotiating prices is very important. Presently all of the hog marketing agencies use formula prices which are closely linked to the U.S. prices. This ensures market integration but local supply and demand conditions may not be met under such circumstances. In fact, most stakeholders reported that they believed prices to be more competitive or at least more fair, relative to the period before formula pricing was instituted. However, many packers also indicated that they would be willing to pay more if they could get more hogs of a specific quality, implying inefficient price discovery and revealing that local supply and demand conditions are not being met at all times. In addition, most felt that pricing was competitive at the processor but not at the retail level.

Traditional viewpoints about market structure and pricing have given way to new ideas of global competitiveness where free trade agreements create open access to markets on a worldwide basis. In these new concepts, size and industry concentration within a national economy can be exploited in order to penetrate foreign markets and withstand competition on a global scale.

Indicator 8b. View of Competitors

This section relies almost entirely on questionnaire responses, since the views of competitors are tied closely to perceptions of individuals in the sector. The research team found that:

- although packers compete vigorously in the output market, many have positioned

themselves to serve distinct market segments to avoid competing head-to-head on all products;

- packers believe that hog marketing agencies compete with each other which

weakens the prospect of strategic alliances and central coordination of hog supply;

- producers tend to see packers as competitors with respect to the total profit pie;

- Quebec views the prairie provinces as major competitors in the future due to lower

feed prices while stakeholders in the prairies view Quebec as having a competitive advantage due to close cooperation between producers, packers and the government of Quebec;

- all agree that the U.S. will be the most formidable competition in the future since

their genetics and quality are beginning to compare to Canadian standards, and due to vertical integration.

In meetings with stakeholders competition was viewed primarily on an international basis but also on a regional basis. These perspectives seem to correspond closely with the new emerging concepts of industry coordination and global competitiveness.

Indicator 8c. Competitiveness with Substitute Products

The availability of close substitutes provides some discipline to ensure efficient production. The degree of substitutability and growth in demand of substitute products are important factors in competitiveness.

Cross elasticities of demand between pork and other meat products have been estimated in various studies (see for example Chen and Veeman, and Moschini and Moro): between beef and pork, estimates range from 0.26 and 0.15; between pork and chicken they range between 0.17 and 0.10. This means that if the price of beef (chicken) increases by one percent, the quantity of pork demanded would increase between 0.26 and 0.15 (0.17 and 0.10) percent. Since consumers are willing to substitute other meats for pork, the hog-pork sector must remain competitive if it wishes to grow.

All the stakeholders indicated that pork competes well with beef but against chicken has some disadvantages. However, many also reported to the study team that genetic improvements in hog production have been initiated only recently, whereas genetic

improvements in chickens have reached a point of low marginal return. The consensus was that pork can hold its own in the long-run.

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Beef and chicken compete for the consumers' meat purchases with pork. This means that the hog-pork sector cannot take their market segment for granted. There is widespread belief (or hope) that genetic improvements in pork will improve pork's position in the market place.

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V. **Opportunities and Challenges for the Canadian Hog-Pork Sector**

The hog marketing system has been the source of much debate in Canada. The vast majority of hog producers across the country give it strong support; even many of the larger producers who may be thought to have an advantage in a dual or more open system appear to be solidly behind the compulsory provincial marketing agencies. All packers think that centralized assembly and orderly deliveries of hogs decreases their unit costs as well as decreases the overall marketing margin. However, many packers complain that the system comes between them and the producers and, as a result, frustrates their efforts to reward specific producers for timely deliveries of hogs of specified quality.

The Canadian hog-pork sector faces new and vigorous challenges at the present time:

- new multilateral trade agreements including the new World Trade Organization,

NAFTA and possible extensions of NAFTA to other South American countries;

- competitive threat from industrialization of hog and pork production in the U.S.;
- domination by Taiwan of exports to the high priced market of Japan as well as

international competition from Denmark and other Northern European countries;

- removal of most forms of government support of this and other agricultural sectors

in Canada;

- high capital requirements for expansion of breeding herds and packing plants;
- pressures from urban residents to reduce smells, not permit groundwater

contamination, ensure safe and humane treatment of animals and maintain zero tolerance of drug residues in meat.

Stakeholders in the hog-pork sector appear confident that they can meet these challenges. Everyone interviewed during the course of this study believed that any required changes can

be developed internally and should not be imposed by outsiders. On several occasions, stakeholders mentioned that the primary role of public bodies is to facilitate those who have made significant

investments in the sector by "clearing the path of debris" so that profit-seeking agents can go ahead with what they do best. Governments can provide market intelligence, negotiate elimination of trade barriers and provide an environment where producers and packers can invest with confidence. Governments need to ensure that support programs are "GA11 green" to ensure market access for Canadian products. Governments should work to make the regulatory-political environment non-confrontational.

Following is a summary of the most important issues facing the hog-pork sector as it struggles with growth in the next several years.

1. **Integration (vertical and horizontal)**

This is a very controversial issue that needs to be addressed by players in the hog-pork sector. The recent report in Manitoba which recommended that the hog-pork sector make organizational changes to allow vertical arrangements (Gilson, Donaghy and Moore, 1994) has met with widespread condemnation. The study called for dual marketing to allow processors and large producers to develop specific delivery contracts with packers. This in itself was primarily in conflict with the basic structure and philosophy of the provincial hog marketing agency. But the report went one step further by calling for the establishment of a world-scale slaughtering plant that would kill hogs and then sell them to existing plants in the province for processing. Underlying this plan was the stated goal of doubling the size of Manitoba's production by the year 2000.

The competitive challenge seen by most observers is the integrated form of U.S. operation described in Chapter III of this report. Small and mid-sized hog producers in the U.S. mid-west feel pressure to re-capitalize their farm level operations in order to keep up with the latest technologies, such as genetics, three site production systems, all-in, all-out production, segregated early weaning, and split sex and phased feeding. In Iowa and Minnesota, many smaller sized producers are forming joint ventures of various kinds to gain the size needed to capture economies associated with these technologies. Much of this is based on anticipated gains from specialization in specific phases of the production process. In order to specialize effectively they must be large enough (individually or collectively) to devote at least one person full-time to each phase (especially breeding-farrowing and the nursery). Those two phases are where the perceived

benefits of specialization are greatest, i.e., anyone can finish hogs but it takes a special person to breed, farrow, and take care of baby pigs.

Some hog producers as well as executives of packing and processing plants seem to believe that this may be the competitive standard in the future and that Canada needs to make some changes to the way hogs are marketed to meet this challenge. However, they did not believe

that anything really drastic was needed and that in the future it would be possible to work within the existing structure. In other words, despite the difficult and strained relations that have occurred on occasion in the hog-pork sector, it seems that provincial marketing agencies and many packers believe that the fundamental shape of the marketing system is workable. However, many packers' representatives worried that democratic control of provincial marketing agencies (based on one producer, one vote) might inhibit growth which would not be in the best long term interests of the producers and the sector in general.

The type of system changes that might be required to meet the U.S. competition in the future include: (1) development of specific price, delivery and quality arrangements, but within the context of single-desk selling; (2) continued evolution of provincial hog marketing agencies from primarily pricing activities to "full-service" raw input supply coordination, i.e., replicating the coordination function of the vertically integrated firm; (3) development of more specific quality control tools, particularly to target export markets; (4) development of a more precise grading system which would reflect more quickly the changing preferences of consumers, both domestic and foreign; and (5) more focused and commercially-oriented research with an emphasis on genetic improvement.

2. **Large-scale production and processing**

Much has been said about the need for large-scale and competitive hog production and processing sectors. Canada does have some large producers and additional investment in large-scale integrated hog operations continues. Several packing and processing plants have rationalized their plants in the recent past, but, as yet, there has not been the sort of new investment in large ultra-modern plants that some think necessary for the future prosperity of the Canadian hog-pork sector. A key question is which should come first: a packing plant or expanded pig production? Currently, Manitoba Pork Est, along with existing pork processors in Manitoba are investigating

the feasibility of establishing a large-scale plant in Manitoba, although nothing has yet been announced.

The key issue from a public perspective is competition. A large-scale plant, if established, probably will drive out most of the existing smaller plants, as happened with beef packing plants in Alberta. The need for high capacity utilization to exploit the cost economies associated with size mean that once a plant of this type is established, it can easily compete away hogs and product markets from other firms. It is imprudent to base expectations on the hope that a large-scale modern packing plant necessarily will stimulate hog production so there will be hogs enough for all firms. Past experience with the packing industry is that large plants with lower costs can often outbid smaller rivals for hog supplies and because they have so much flexibility in terms of altering line speeds, overtime, extra shifts, weekend operation, etc., they can easily absorb extra production that might come along at a future date.

Under NAFTA and an increasingly liberal world trade environment, Canadian producers now participate in an international market more expansive than ever before. Thus, if Canada wants world-scale processing plants it must be prepared to define the competitive nature of the market in that same manner. For instance, if rationalization were to create a situation where

one plant killed all hogs in a major producing province like Manitoba, how should the competitive nature of the provincial industry be defined-- in terms of North American, Manitoba or Canada? Because all hogs in Canada are now directly (or in some cases indirectly) priced off the U.S. market by a formula, it might be argued that a more highly concentrated regional slaughter could still be consistent with competitive norms.

3. **Improved carcass evaluation criteria**

Currently there is a great deal of interest in the development of more sophisticated ways to evaluate a carcass. Basically, the current system relates weight to fat thickness to predict lean yield (i.e., cutability) but does not address the other quality-related issues that might arise. More comprehensive criteria and improved measurement instruments, including computer enhanced carcass evaluation models, might help ensure a continued competitive advantage for Canada.

All stakeholders demonstrated a keen interest in improving carcass evaluations. Several provincial hog marketing agencies have sponsored research in this area. Everyone agreed that

this is one area where Canada has an advantage and they were determined to see Canada retain this advantage.

4. **Evolving role of provincial hog marketing agencies**

A main benefit of a mandatory single-desk marketing system is that it transmits consistent signals to all producers. If there are multiple marketing systems, then the signals might become confused by hog producers. If hog marketing evolves to a large number of special arrangements then it simply becomes a set of privately negotiated delivery contracts and most of the reasons for single desk selling and a mandatory grading system disappear.

This is an issue where stakeholders seem to share a lot of common ground and have demonstrated a capacity to cooperate. Flexibility to changing market conditions is critical and opportunities for profitable trade should not be lost because of an inflexibility in the system.

All provincial hog marketing agencies have shown not only a willingness but also a determination to adapt to changing conditions and to better serve the producers' long term interest. Several examples were noted in Chapter II, including risk management through contracting, sponsorship of research, more specialized delivery contracts, and inter-provincial coordination. The same is true for packers. New specialized products have been developed and some firms have established significant capabilities for innovation in penetrating export markets.

Some questions can be posed about organizational design of future hog marketing systems. If the hog-pork sector in Canada is moving into an era of closer cooperation and coordination between stages of production and processing how can this be facilitated? Traditionally, the pricing of hogs has been thought of as a zero-sum game, i.e., gains by one party imply losses for the other. The logic of coordination suggests it really is a positive-sum game and that both

producers and packers can benefit. How might the marketing system be set up to reap these gains and arrange a "fair" distribution? Could organizations like the Manitoba Red Meat Forum or the George Morris Centre Guelph, Ontario, which have gotten all players in their respective provincial meat industry together, be something of more permanent interest to the sector?

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5. Right to farm and environment

These two issues are symbiotically linked, because the first is a response to the second. All stakeholders saw this issue as critical to the long-term development and health of the hog-pork sector. Manitoba Pork Est. has hired a permanent staff person to deal with environmental issues. All across the country, producers and provincial hog marketing agencies have wrestled with this issue. Committees have been instituted to investigate alternative courses of action. There has been general agreement that standards for "safe" hog production and manure disposal must be established. With increased urbanization these issues likely will grow in importance.

This clearly is one area where a partnership between the industry, government and university researchers could be profitably pursued. Environmental regulation and safe hog production standards should be based upon the best scientific information available, be practical and not onerous for the industry and acceptable to the general public. Cooperation between all parties appears to be the best way to ensure that these constraints are met in a satisfactory manner.

6. Future competitive challenges

The future of Canada's hog-pork sector depends on its ability to compete with: (1) beef, poultry, fish and other high protein foods, and (2) pork produced in other countries, particularly the U.S., Denmark, Netherlands, Taiwan and China. All stakeholders have recognized this. The provincial hog marketing agencies and their umbrella group, the Canadian Pork Council, have attempted to stimulate demand for Canadian pork by product promotions and international trade missions (recently under the auspices of Canada Pork International). They have supported periodic evaluation of Canada's grading system to better reflect consumers desires to hog producers, struck committees to define safe and healthful production practices for hogs and cooperated in attempts to reduce drug residues and other harmful contaminants in pork. For their part, packers and pork processors have recognized the need to reduce unit costs of production and to cooperate with hog producers. Some packing plants have been modernized, some have developed specialty products or aimed their products at specific market segments. Even provincial and federal governments have assisted the hog-pork sector to become more competitive by funding production-related research, grading and inspection services (though some of these costs will be shifted to the private sector in future years), organizing trade missions and actively pursuing access to foreign markets.

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Regardless of how successful Canada's hog-pork sector has been in the past, it cannot rest on its laurels if it wants to remain competitive in the future. The deregulation of economic activities and trade around the world exposes the Canadian hog-pork sector to uncompromising economic forces. Just because Canada has become a major exporter to

the U.S. over the past two decades does not give it automatic license to this market forever. The large, integrated hog-pork production units that have emerged recently in that country provide a much bigger challenge to the Canadian sector than ever before. If this trend in the U.S. continues and the Canadian sector is not able to match its productivity, it is entirely possible that the U.S. could become a net exporter not only to off-shore countries but to Canada as well. The Canadian hog-pork sector cannot ignore this threat.

Production of hogs and pork in other countries, particularly in Northern Europe, Taiwan, China and Thailand, also offers a stiff challenge to Canadian producers. Reports indicate that Denmark and Taiwan have been able to attain lower feed conversion ratios than seen in Canada or the U. S. This is of critical importance since feed grain is the major cost of hog production. Certainly, Denmark, Netherlands and Taiwan have been able to organize their production to not only achieve low unit costs but also to control carefully hog carcass specifications demanded in specific markets. In recent years, Taiwan has become the major source for imported pork in Japan, the highest price market in the world. This has occurred in spite of the many production limitations imposed by the densely populated and soil-poor island of Taiwan.

In North America, health concerns over the consumption of red meats have reduced demand for beef and increased demand for poultry products. Demand for pork was not affected to the same extent as was the case for bee£ The hog-pork sector quickly recognized the challenge and acted quickly to counter the threat by seeking more up-to-date and reliable information on nutritional attributes of pork. This, combined with active promotion of pork products, undoubtedly played a role in consumers' continued confidence in pork.

7. **Opportunities in the regions of Canada**

Producers in all regions of Canada believe that their hog production can be increased. While physically possible, it is also unlikely in an era of less government regulation and freer trade. It is more likely that production patterns will change to accommodate changes in population, costs of

production, environmental laws or even the occurrence of a completely unexpected event. For example, what would happen if some big **company suddenly announced plans to set up a large-scale, integrated hog-pork operation** in Roblin **Manitoba, or Rosthern Saskatchewan, or Red Deer** Alberta? Although such an operation would require some changes in provincial marketing legislation to operate in the same way as do the large-scale plants in North Carolina or Virginia, it is not inconceivable that one provincial government would make the necessary changes to obtain the added economic activities. Then, what would happen to the existing hog-pork sector in that and neighbouring provinces? Certainly, one or more packing plants would cease operations. But many existing producers might also find it difficult to compete with the large-scale, modern operations. The agglomeration effect could stimulate additional production in the region of the large-scale, integrated unit, much as what has happened in the beef sector in Southern Alberta, creating further disadvantages for producers and packers in other areas of the prairies.

In the following sub-sections, opportunities for growth of the hog-pork sector in each of the producing regions of Canada are discussed briefly.

a. Quebec

Quebec is the largest hog producing province in the country. It had almost exponential growth in the 1970s but virtually no growth in the last 15 years. Nevertheless, the hog producing sector has continued to rationalize and Quebec has a higher proportion of large hog farms (more than 1 128 hogs - see Figure II.7) than does any other province except British Columbia. Moreover, some stakeholders mentioned that even though the total number of hogs has not increased over the last 15 years, management capability of producers has increased tremendously. and the potential is now there for another significant increase in production.

Although Quebec is a feed deficit province, it is not far away from plentiful supplies of feed grains in Ontario and the mid-western U.S. One of Quebec's biggest advantages is its proximity to the large urban areas in the U.S. Northeast. This represents a permanent opportunity for exports of pork from Quebec.

A high degree of cooperation exists in Quebec among producers, government, and meat packers who meet regularly as a group called La table de concentration porcine. This group has developed the first strategic plan for the sector and they are planning to revise it soon. This cooperation among sector participants and the combination of many large producers with good business management skills bodes well for future hog production in Quebec.

b. Ontario

Major changes to the organization of hog marketing have occurred recently in Ontario. Nearly half of the hogs marketed currently are under some sort of private contract arrangement with particular packers, although the provincial hog marketing agency still is involved in its traditional role of negotiating overall price levels, price pooling, assembly and delivery of hogs, etc. More than a dozen different grading grids are in use in the province to reflect demands for specific sizes, cuts, genetics, etc. Interviews with representatives of Ontario packers and officials of the hog marketing agency revealed that both parties like the new arrangement and see it as a way to not only repel economic pressures from Michigan and Ohio but also to increase overall production which has stagnated in recent years.

Fearman's, the largest pork packing plant in all of Canada, recently has invested heavily in modernizing its plant, and appears to be well-positioned to compete aggressively in the future.

c. **Alberta**

Although hog marketing and pork slaughtering activities in Alberta have been plagued by controversies during the past two decades, the future looks bright for the hog-pork sector in Alberta. Removal of the Western Grain Transportation (WGTA) subsidy in August 1995 likely will stimulate hog production in Alberta. Barley prices in Alberta will be reduced by about $15 per tonne with removal of the WGTA subsidy. Alberta is the largest producer of barley in

Canada, a major input in raising hogs.

Alberta also has other advantages that may help it to expand production of hogs and pork: a large number of ambitious entrepreneurs, relative closeness to major consumption areas of British Columbia, Washington, Oregon and California, large areas of land on which to dispose of manure and waste, relatively low (in Canada) taxes. Furthermore, developments in the large, growth

oriented beef sector in the province provides encouragement as well as some related expertise to the hog-pork sector.

The recent purchase of Gainers' plant in Edmonton by Burns' Foods brings expertise from the long established meat packing firm to the Alberta pork business. Discussions with representatives of Gainers and Fletchers in Red Deer revealed that these plants would welcome expansion and would like to play a major role in an expanded and more profitable hog-pork sector in Alberta.

d. Manitoba

Manitoba already has a modern and highly integrated hog production sector with Hutterite Brethren and feed companies accounting for about three-quarters of all hog production in the province. Hog producers in Manitoba will receive a major boost when, in August 1995, WGTA freight rates on grains are removed. Feed prices in Manitoba should become the lowest in Canada at that time. Manitoba's grain prices will be further reduced if the basis of Canadian Wheat Board pooling is changed from Thunder Bay to the lower St. Lawrence River (see Klein et al 1991), a change the government of Canada has been considering. Klein et al estimated that, on strict economic grounds alone, hog production in Manitoba could increase by up to 4.4 percent with removal of both WGTA rates and Thunder Bay pooling.

Manitoba also has a fairly large and diverse packing industry, with four major plants in operation. Two of the plants are relatively modern and could easily expand output considerably if hog production were to increase.

e. Saskatchewan

The hog industry in Saskatchewan, through the efforts of Saskatchewan Pork International has made a serious attempt to increase production. The demise of the WGTA should provide a stimulus for hog production. Klein et al estimated that hog production in Saskatchewan could increase by 2.4 percent when grain producers had to pay the full costs of transporting grain to terminal locations.

Stakeholders of the hog-pork sector in Saskatchewan decried agricultural policies which they believed favored the cropping sector and disadvantaged the livestock sectors. Perhaps this is

natural in a province so dependent on grains for economic activity. Nevertheless, the provincial government in Saskatchewan has promoted diversification into livestock production by establishing training courses for workers in the hog-pork sector and funding research at the University of Saskatchewan.

Saskatchewan has the lowest population density and the highest grain production of any province in the prairies; this gives the hog-pork sector almost limitless potential to expand. Environmental conflicts with neighbours can be avoided. Feed is always close at hand. The primary need is to develop a large enough production base so as to permit economies of scale in the sector, which would raise profits for everyone.

f. British Columbia and Atlantic provinces

The outlying provinces of Canada have a major disadvantage in hog production: feed grains are expensive. The Atlantic provinces have a further disadvantage in a low consumer population base. Still, several large and efficient hog producers survive (and even prosper!) in these provinces. They have a transportation advantage that affords some protection against hogs and pork imported into the regions.

Although the packing plants in these provinces are small and aging, they have managed to keep unit costs low and stay in business. Certainly, they have plenty of extra capacity if hog production was to rise in these provinces.

In spite of some disadvantages of producing hogs in British Columbia and the Atlantic provinces, producers remain optimistic. Somewhat telling were revelations by current representatives from both British Columbia and the Atlantic provinces on the Canadian Pork Council of major expansions of their personal hog operations to 400-600 sow units, levels considered highly efficient in the rest of the country.

g. Overall...and last word

The future of the Canadian hog-pork sector looks bright. Although stagnation has occurred in recent years, the sector has experienced rapid growth and a large degree of export success over the past two decades. The different regions of Canada have many advantages for continued

growth of the hog-pork sector: plentiful supply of low cost feed grains, fewer environmental restrictions than most competing countries, highly skilled and ambitious producers, one of the best grading systems in the world, genetics that result in lean meat in the breeding herd, government-funded, production-oriented research. But, to the study team, perhaps the biggest advantage of all is the large number of knowledgeable, interested and entrepreneurial producers and packers in the sector. The present marketing system may have had something to do with this. It has resulted in many producers in all provinces regularly being educated in all aspects of the entire hog-pork sector. This is not the case in the beef, poultry or grains sectors where producers typically are not so involved in the marketing, processing, promotion and sales of the final product. To some extent, this has led to acrimonious debates about the best strategies for the sector. However, it is also a major strength and gives hope for continued success.

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Tables

Table II.1 Provincial Hog Production, 1993

Province	Number of Hogs (millions)	Percentage of Canada's Total
British Columbia	0.324	2.1
Alberta	2.385	15.9
Saskatchewan	1.032	6.9
Manitoba	3.002	13.5
Ontario	4.019	26.7
Quebec	4.711	31.6
Atlantic Provinces	0.491	3.3
CANADA	14.964	100.0

Source: Gilson, Donaghy, and Moore (1994)

Table II.2 Canadian Live Swine Exports to All Countries, by Province, 1989 - 1992

Province	1989	1990	1991	1992
	(thousand head)			
British Columbia	8.5	0.0	0.0	0.0
Alberta	571.6	252.1	225.9	109.1
Saskatchewan	67.8	69.4	66.6	32.7
Manitoba	289.8	358.7	470.1	368.3
Ontario	67.2	176.1	256.2	161.2
Quebec	1.8	35.3	45.4	0.6
Atlantic Provinces	0.3	0.1	1.5	0.0
CANADA	1,006.9	891.6	1,065.6	671.8

Source: De Matos et al., Canada's Trade of Live Swine and Sheep with the United States and Rest of the World, 1989 - 1992, Manitoba Red Meat Forum, Winnipeg, June.1993

Table III.1 *Pork '94* Producer Survey: Percentages of U.S. Producers Using Various Channels for Market Hogs in 1993.*

	Size of Farm (head marketed per year)			
Channel	Total	500-1999	2000-4999	5000+
Packer Buying Stations	43	46	42	21
Direct to Plant	40	31	56	75
Other Buying Station	26	28	26	16
Terminal	10	11	10	8
Auction	9	11	5	5
Marketing Group	6	5	8	6
Other	2	3	0	0

* The survey question was: "Through what sources did you sell your market hogs during 1993?"

Table III.2 *Pork '94* Producer Survey: Percentages of U.S. Market Hogs Sold Through Various Channels in 1993.*

	Size of Farm (head marketed per year)			
Channel	Total	500-1999	2000-4999	5000+
Packer Buying Stations	34.7	38.9	29.0	14.7
Direct to Plant	30.1	22.3	40.4	69.3
Other Buying Station	19.5	21.6	16.8	8.8
Terminal	6.9	7.4	6.5	3.7
Auction	3.8	4.9	1.5	1.3
Marketing Group	4.4	4.2	5.8	2.3
Other	0.6	0.8	0	0

* The survey question was: "Please indicate what percentage of your market hogs sold in 1993 went through each of the sources used."

Table III.3 Estimated Percent of U.S. Hogs Sales by Marketing Channel in 1993.*

Marketing Channel	Percent Marketed (Market Hogs)	Percent Marketed (Feeder Pigs)
Direct to Slaughter Plant	37	.5
Packer Buying Station	39	.5
Dealer, Broker, or Order Buyer	7	6
Auctions (All Types)	3	21
Terminal Markets	4	1
Cooperative and Group Sales	4	2
Contract Removal	5	4
Other	1	65

* Source: Correspondence with staff at USDA ERS Agricultural and Rural Economy Division.

Table III.4 *Pork '94* Producer Survey: Percentage of U.S. Finishers Purchasing Feeder Pigs Through Various Channels in 1993.*

Channel	Total	500-1999	2000-4999	5000+
From 1 other producer	59	58	61	57
Live auction/sale barn	35	35	39	29
From 2+ other products	29	29	29	29
Coop or network	9	10	8	5
Tele-auction	6	5	10	0
Contract removal	1	1	0	10
Other	0	0	0	5

* The survey question was: "Please indicate what percentage of your market hogs sold in 1993 went through each of the sources used."

Table III.5 Pork '94 Producer Survey: Percentage of Replacement Gilts Purchased by Source in 1993.*

		Size of Farm		
Source	Total	500-1999	2000-4999	5000+
Independent Crossbreeds	37	42	36	18
Independent Purebred	14	18	11	5
Independent Hybrid	6	10	0	5
Corporate Crossbred	17	13	18	26
Corporate Purebred	6	5	6	11
Corporate Hybrid	19	11	27	32
Other Crossbred	1	0	0	3
Other Hybrid	1	1	2.5	0

* The survey question was: "Approximately what percentage of your replacement or foundation gilts purchased in 1993 were from each of the following sources and breeding schemes?"

FIGURES

Figure II.1 Canadian Hog Production, 1976 - 92

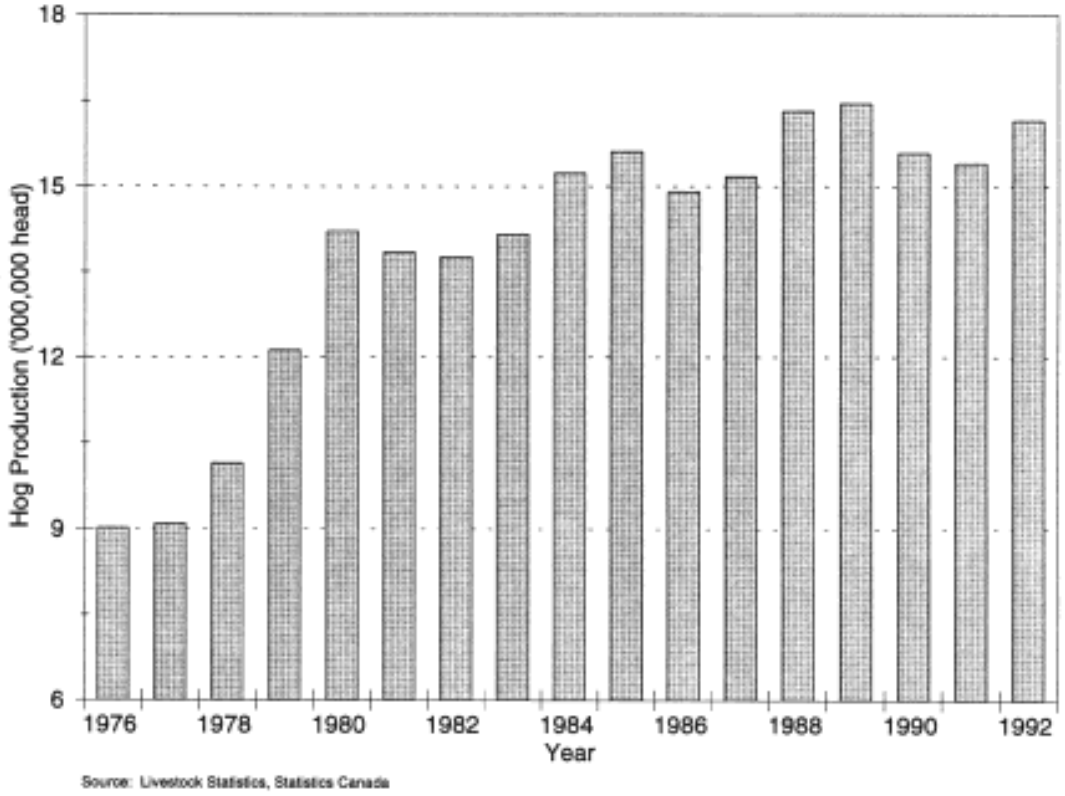


Figure II.2 Total Number of Hog Farms, by Province and for Canada, 1971 and 1991

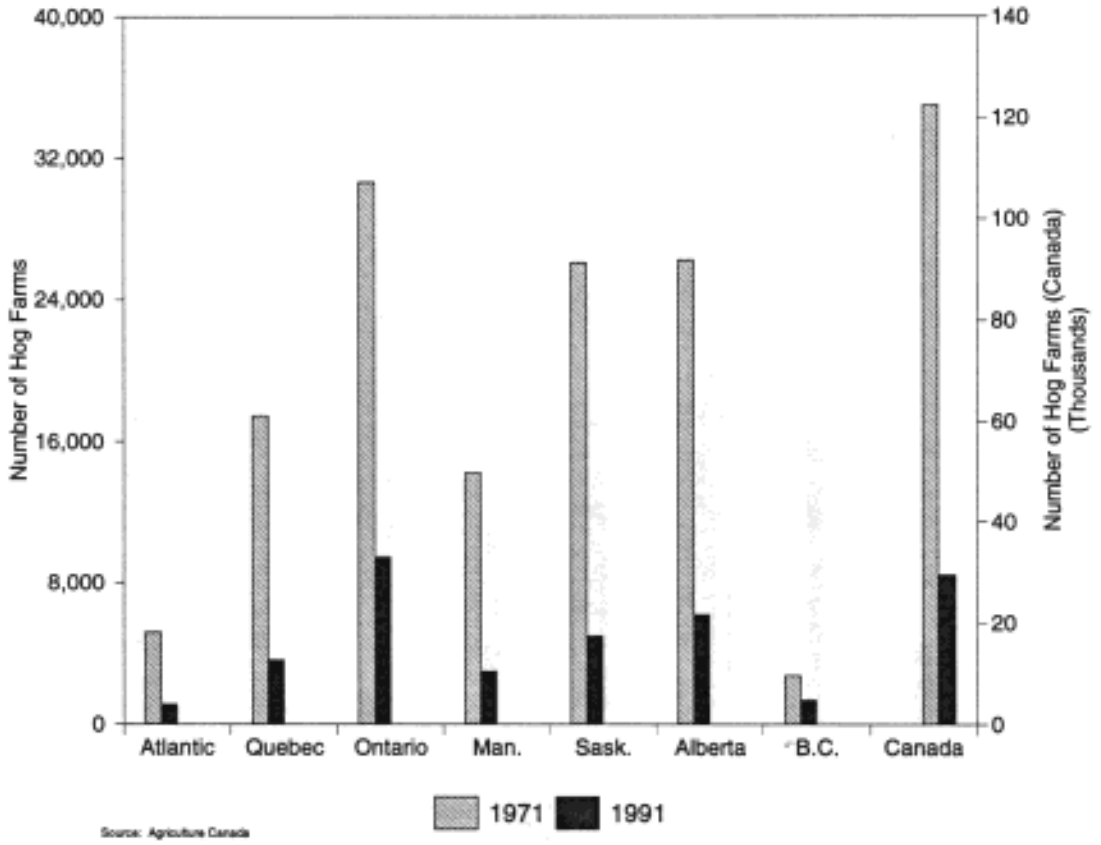


Figure II.3 Hog Inventory (thousand head), by Province and for Canada, 1971 and 1991

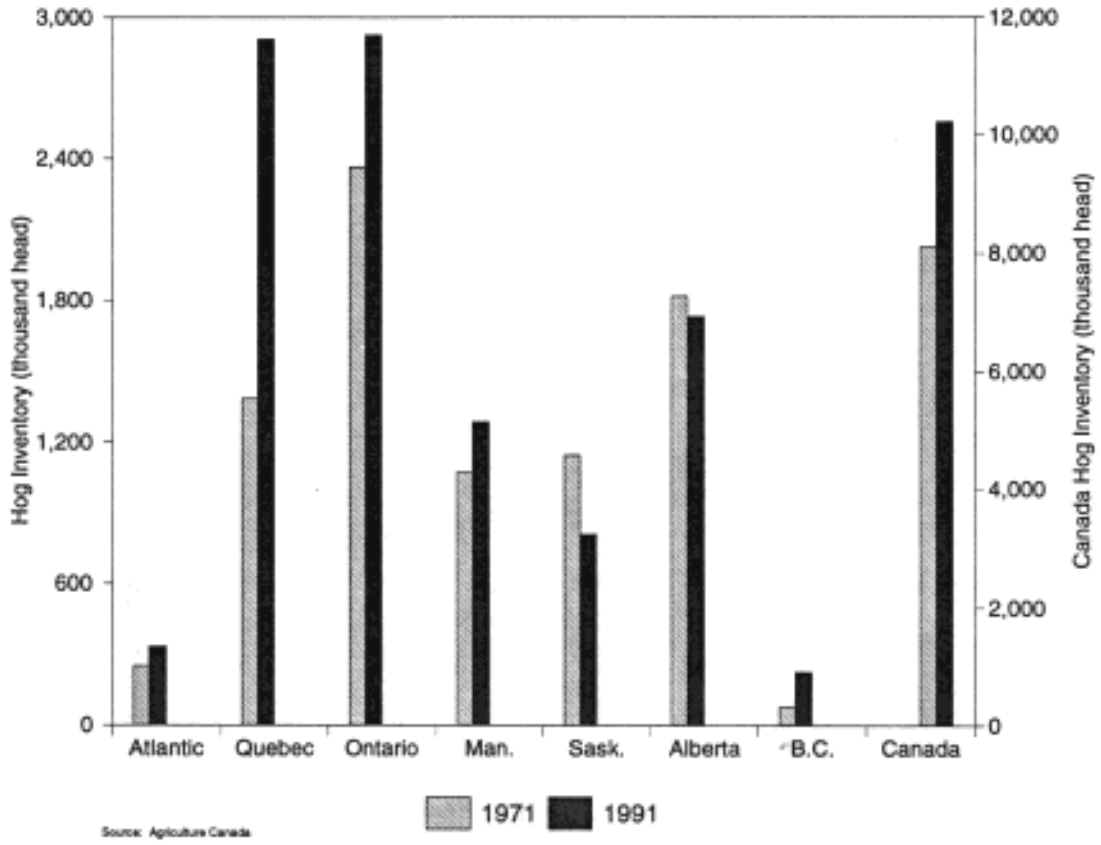


Figure II.4 Average Number of Pigs per Farm, by Province and for Canada, 1971 and 1991

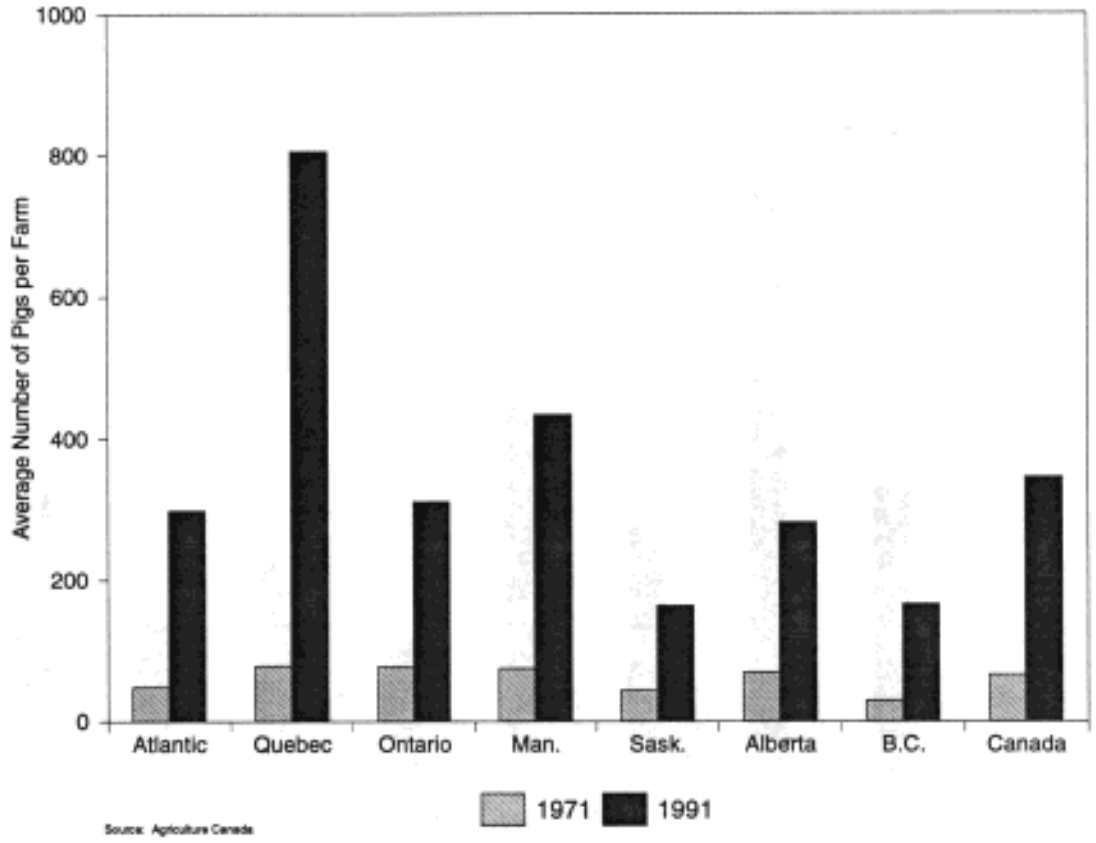


Figure II.5 Average Marketings of Pigs per Farm, by Province and for Canada, 1971 and 1991

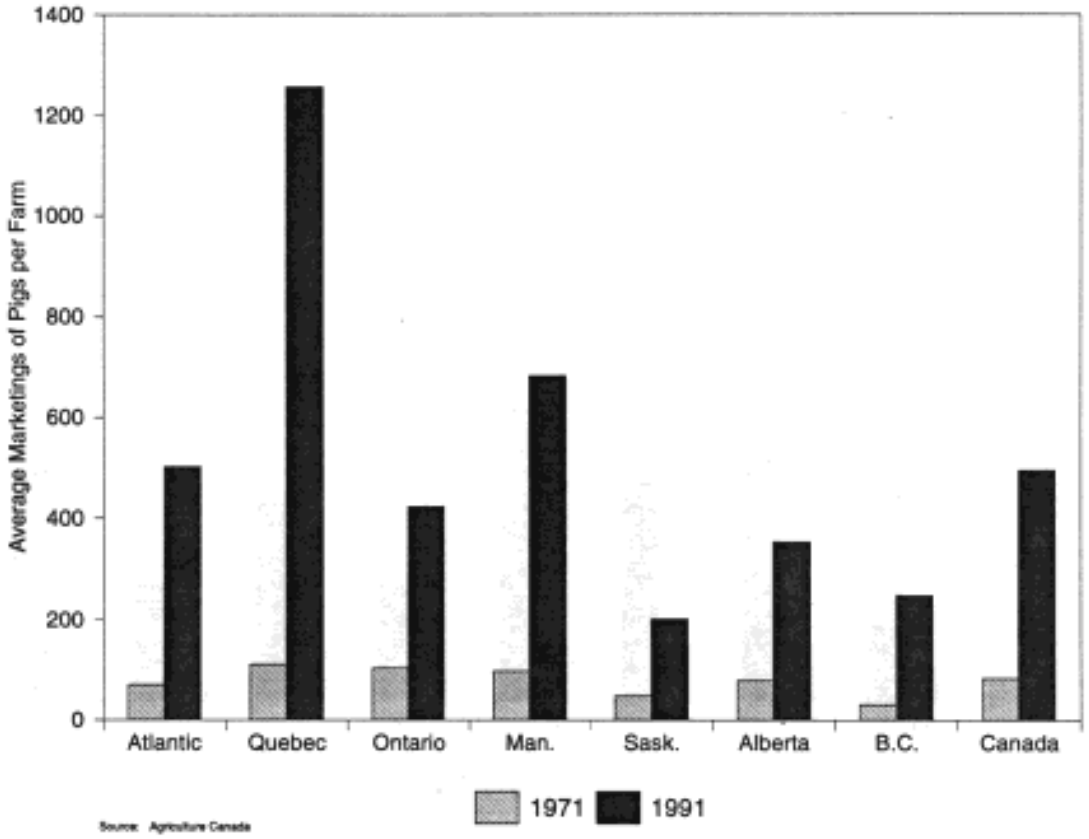


Figure II.6 Percent of Farms and Animals in Small Hog Farms (Under 273 Hogs per Farm), for Provinces and for Canada, 1991

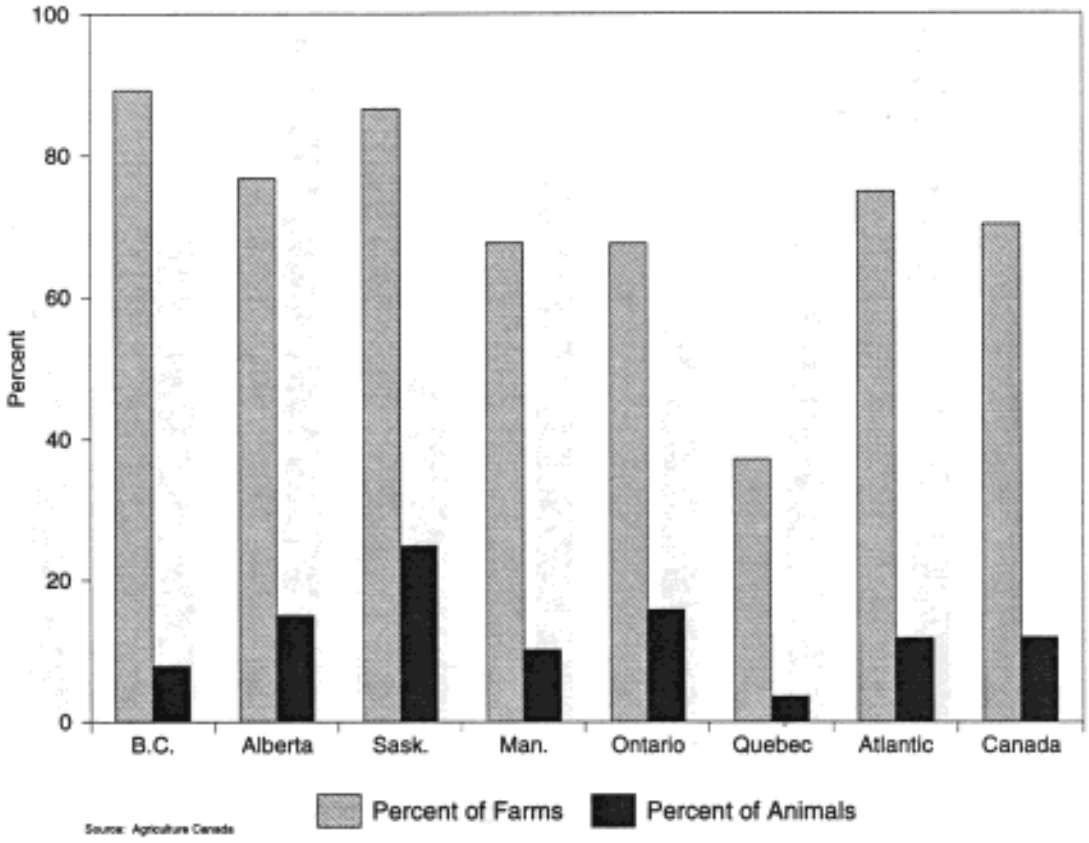


Figure II.7 Percent of Farms and Animals in Large Hog Farms (1,128 Hogs per Farm and Over), for Provinces and for Canada, 1991

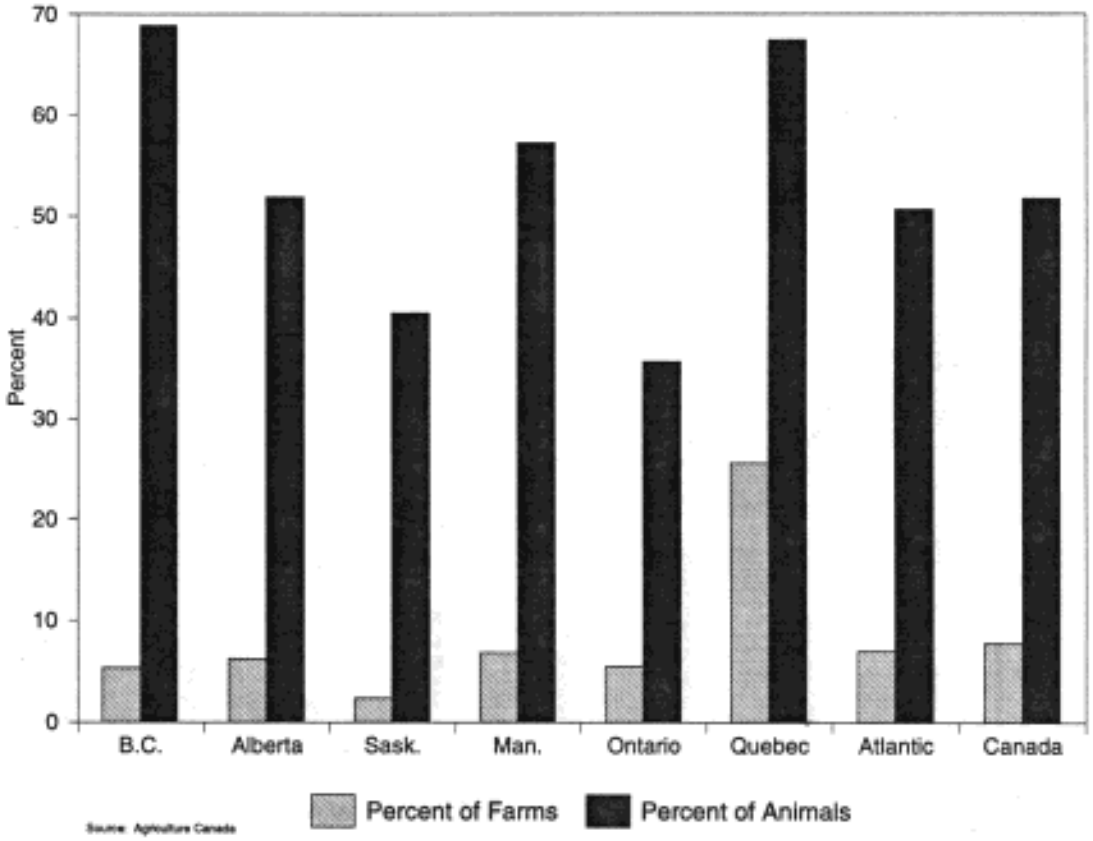
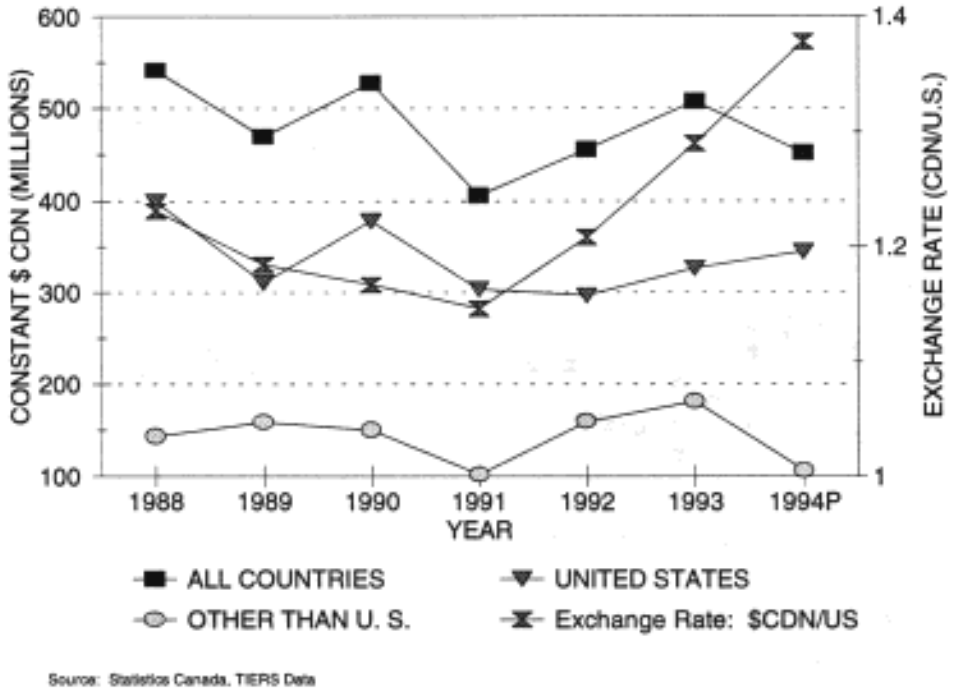
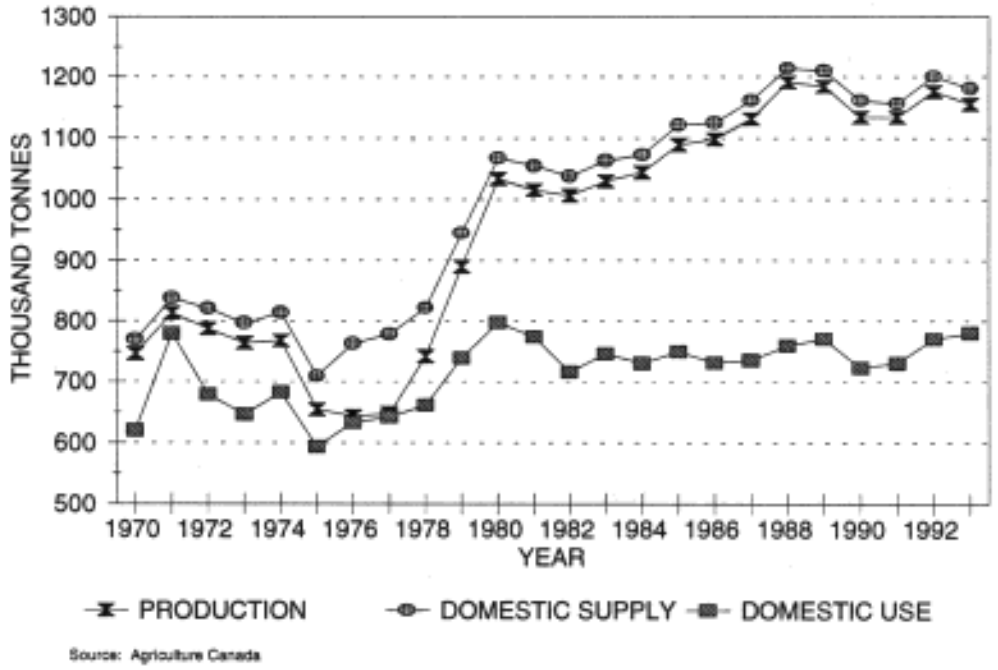


Figure II.8 Canadian Pork Exports, Total, U.S., and Other, 1988-1994



Source: Statistics Canada, TIERS Data

Figure IV.1 Production, Supply and Use, Canadian Pork, 1970 - 1993



Source: Agriculture Canada

Figure IV.2a Domestic Supply and Linear Trendline, Canadian Pork Supply, 1970 - 1993

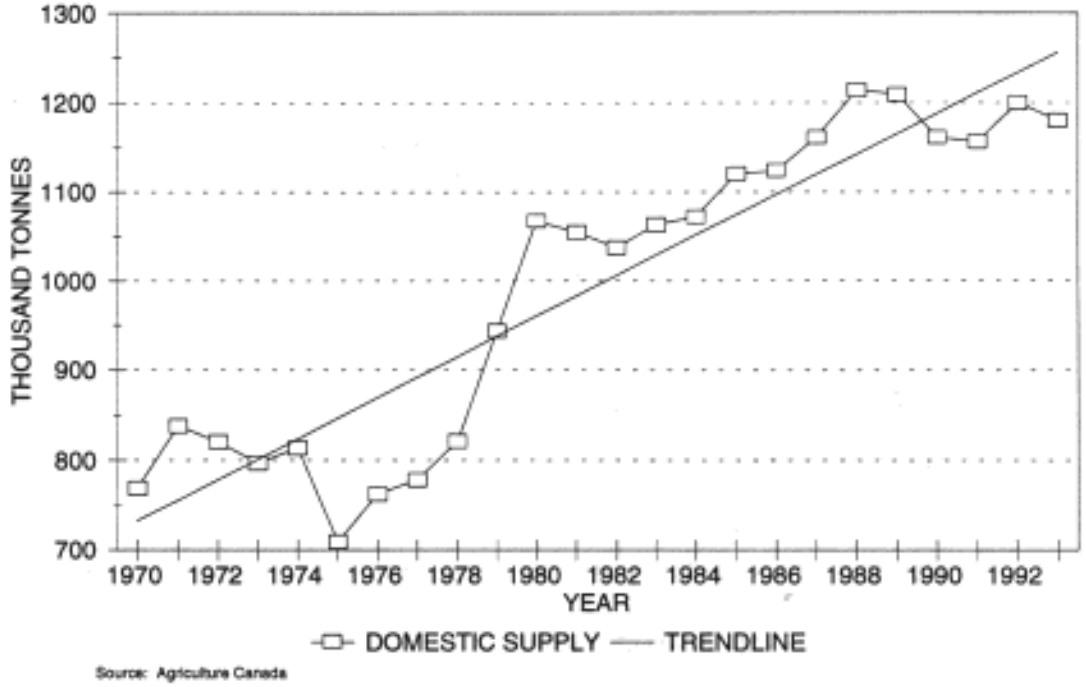
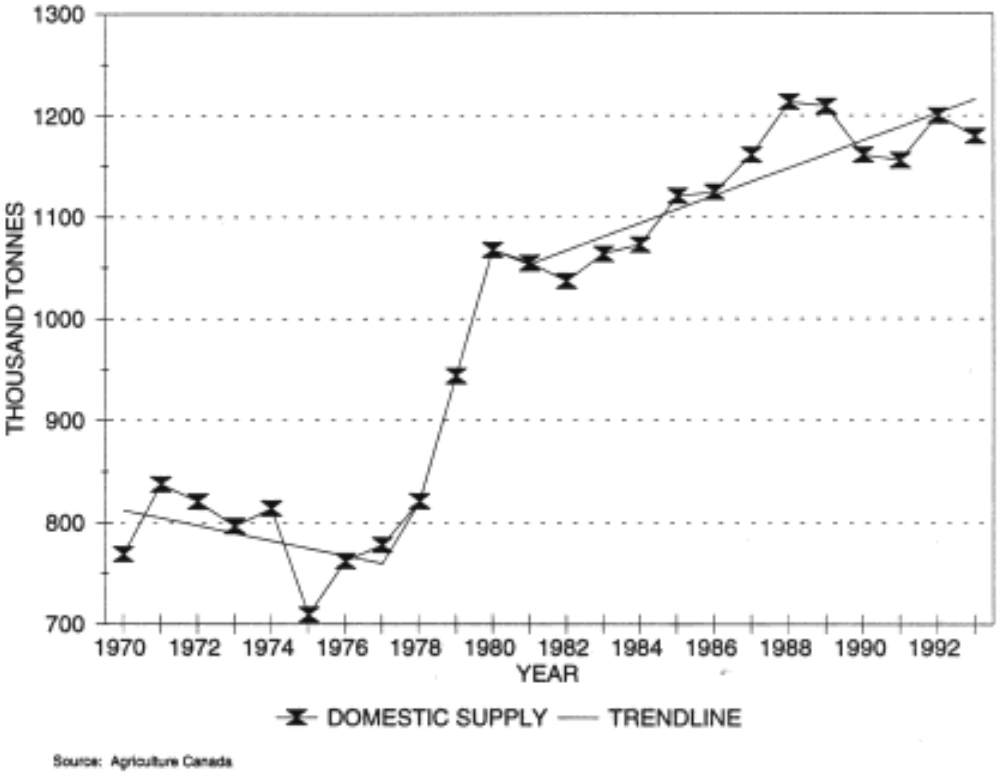


Figure IV.2b Domestic Supply and Piece-wise Linear Trendline, Canadian Pork Supply, 1970 - 1993

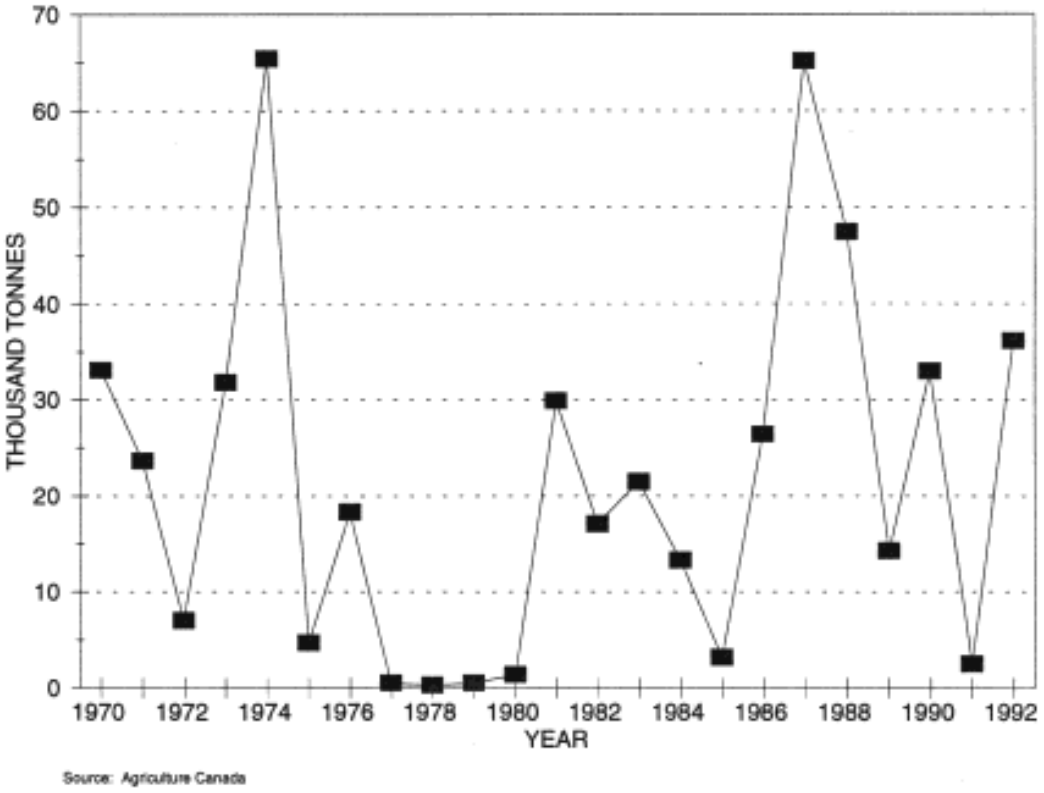


Source: Agriculture Canada

Figure IV.3a Supply Variation From Linear Trendline, Canadian Pork, 1970 - 1993

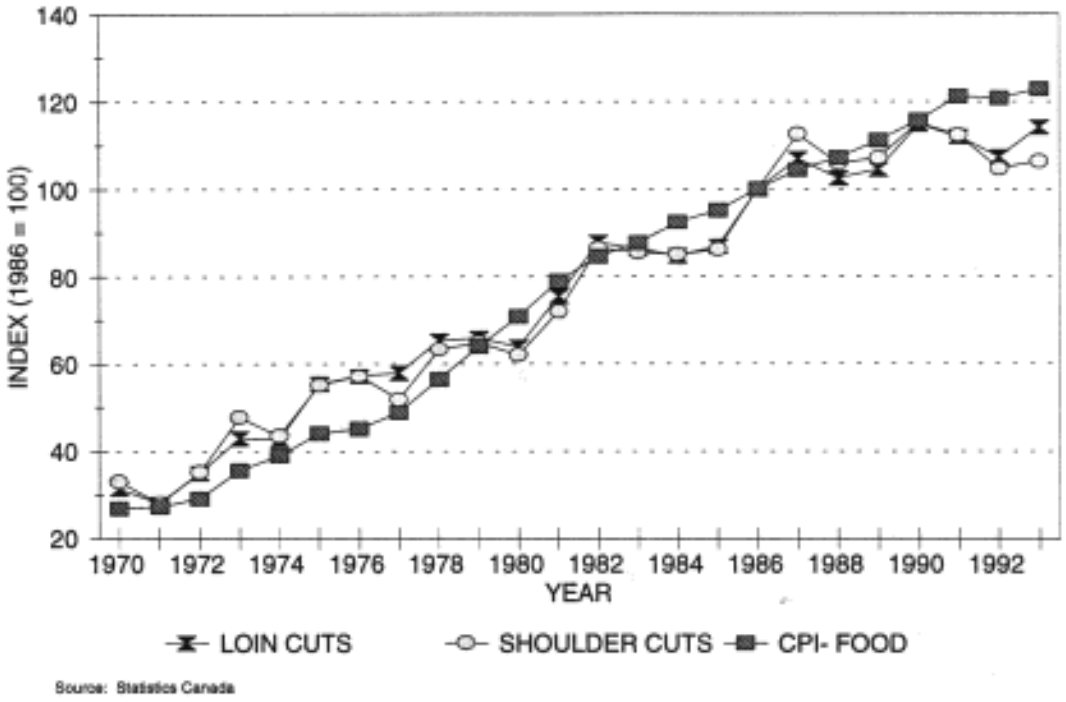
Source: Agriculture Canada

Figure IV.3b Supply Variation From Piece-wise Linear Trend, Canadian Pork, 1970 - 1993



Source: Agriculture Canada

Figure IV.4 Index of Pork Cut Prices, Canadian Pork, 1970 - 1993



Source: Statistics Canada

Figure IV.5 Relative Price Changes, Ratio of Price Index to CPI (All Goods)

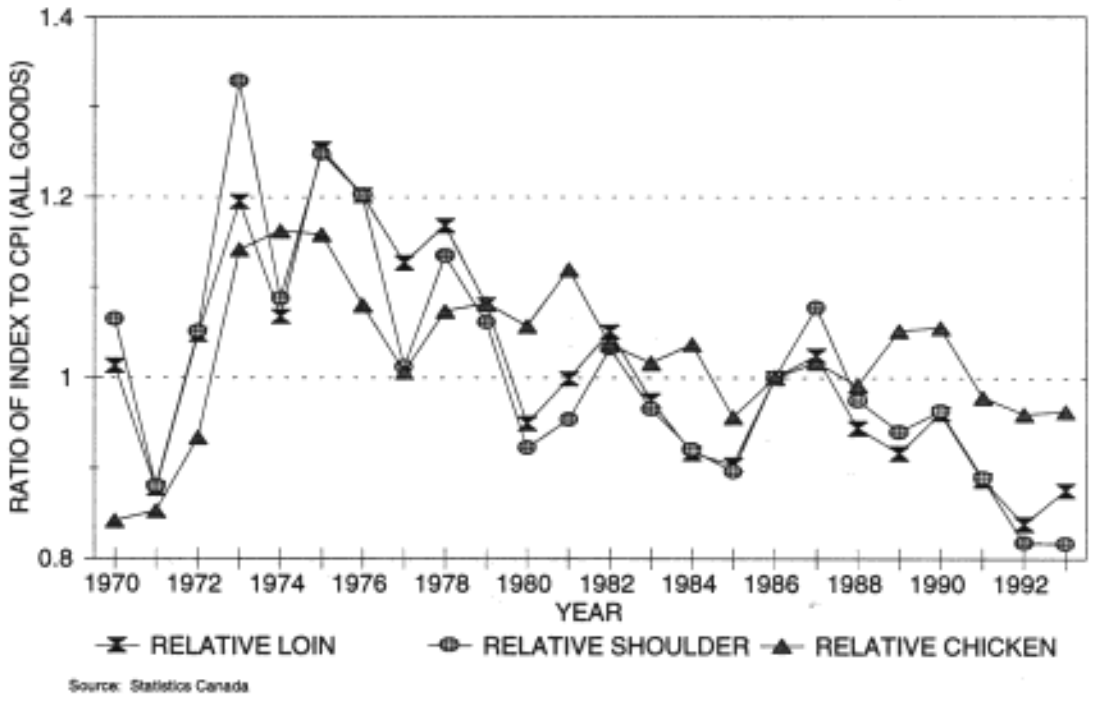
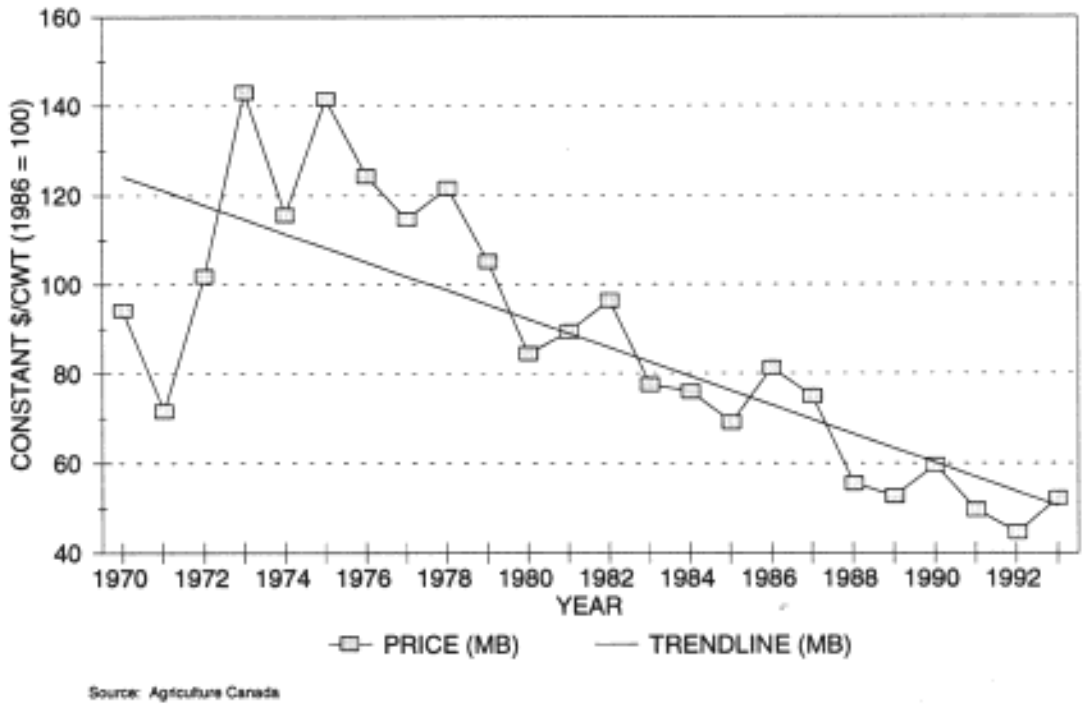
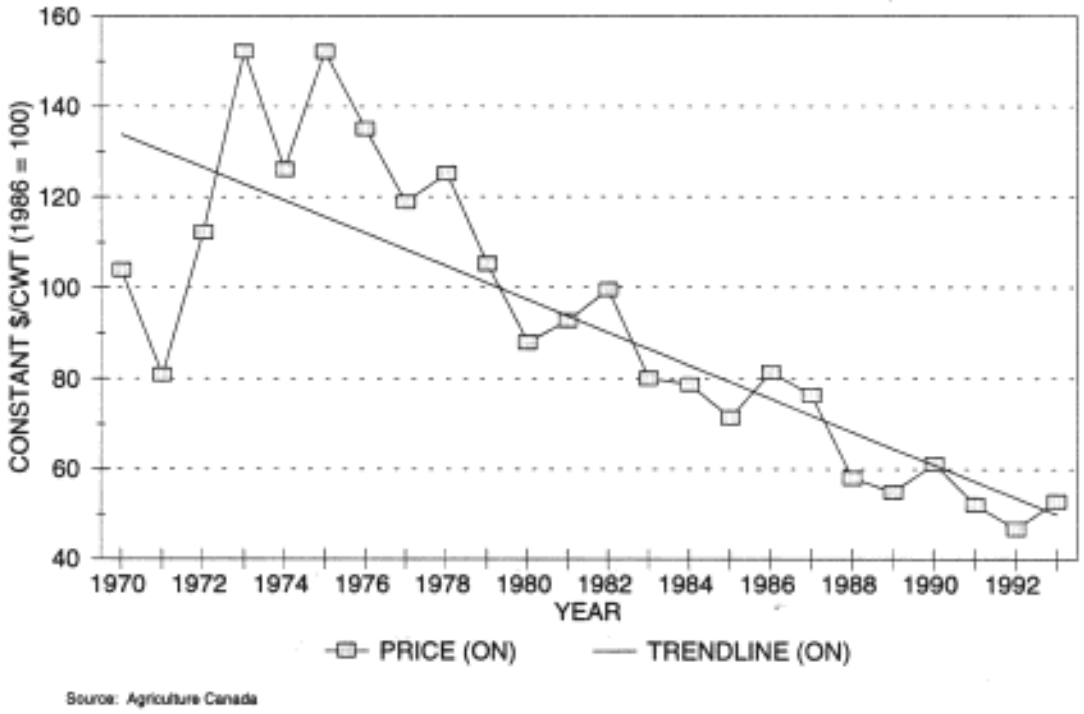


Figure IV.6 Manitoba Producer Price Trend, Canadian Pork, 1970 - 1993



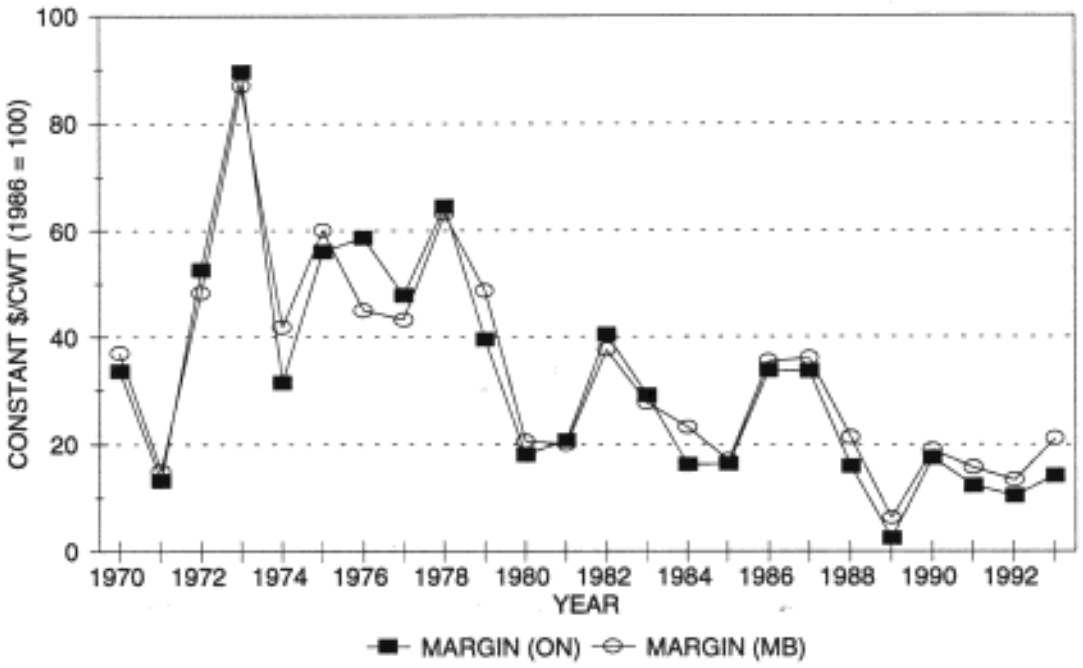
Source: Agriculture Canada

Figure IV.7 Ontario Producer Price Trend, Canadian Pork, 1970 - 1993



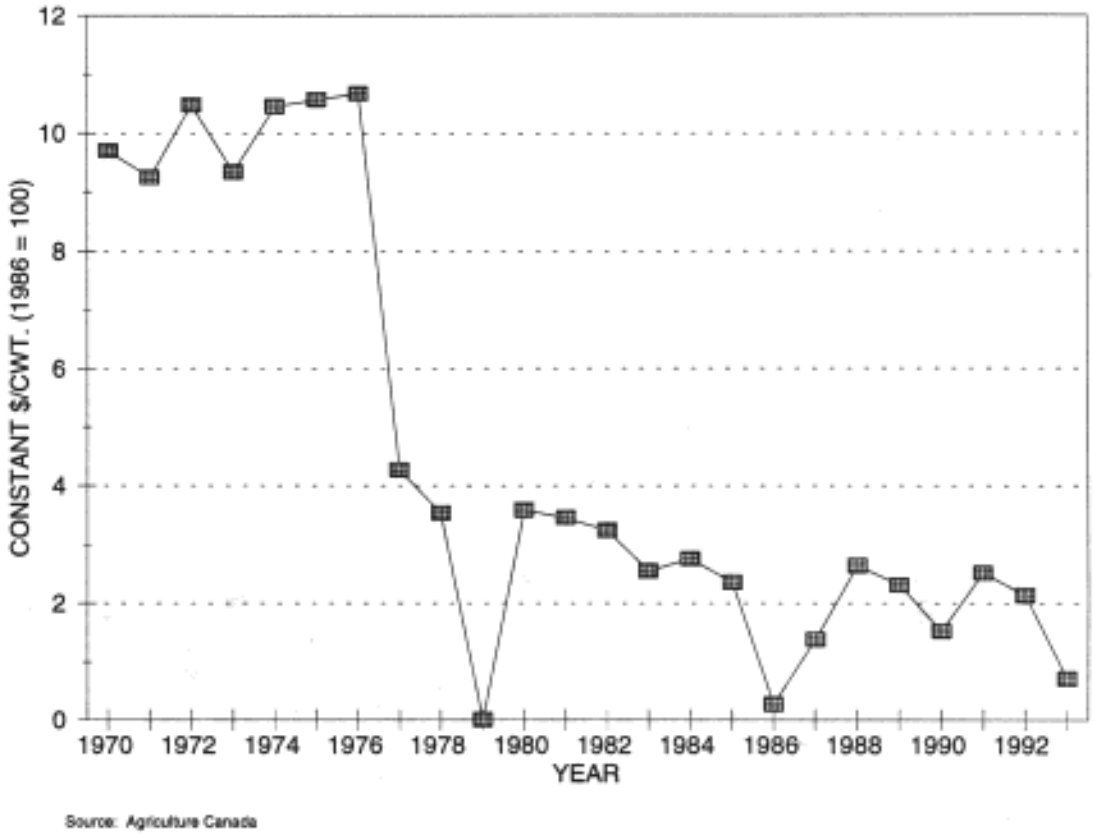
Source: Agriculture Canada

Figure IV.8 Real Price-Cost Margins, Canadian Pork, 1970 - 1993



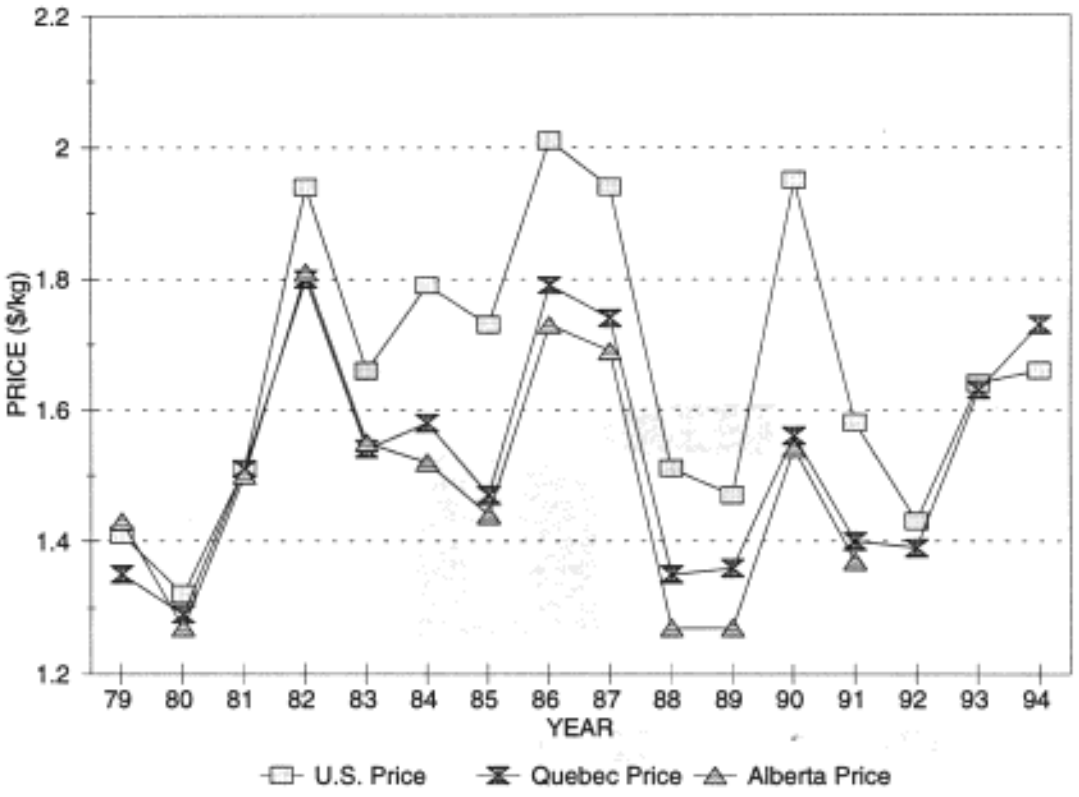
Source: Cost of Production Report for the National Tripartite Stabilization Program

Figule IV.9 Price Difference, Ontario and Manitoba, 1970 - 1993



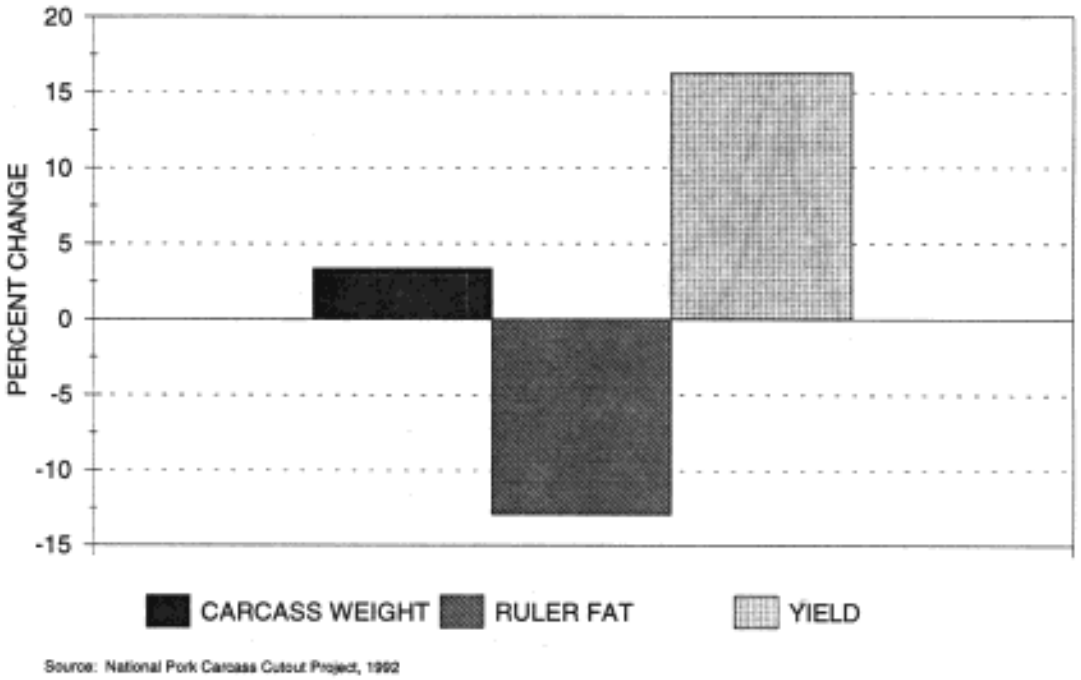
Source: Agriculture Canada

Figure IV.10 Hog Prices in the North American Market



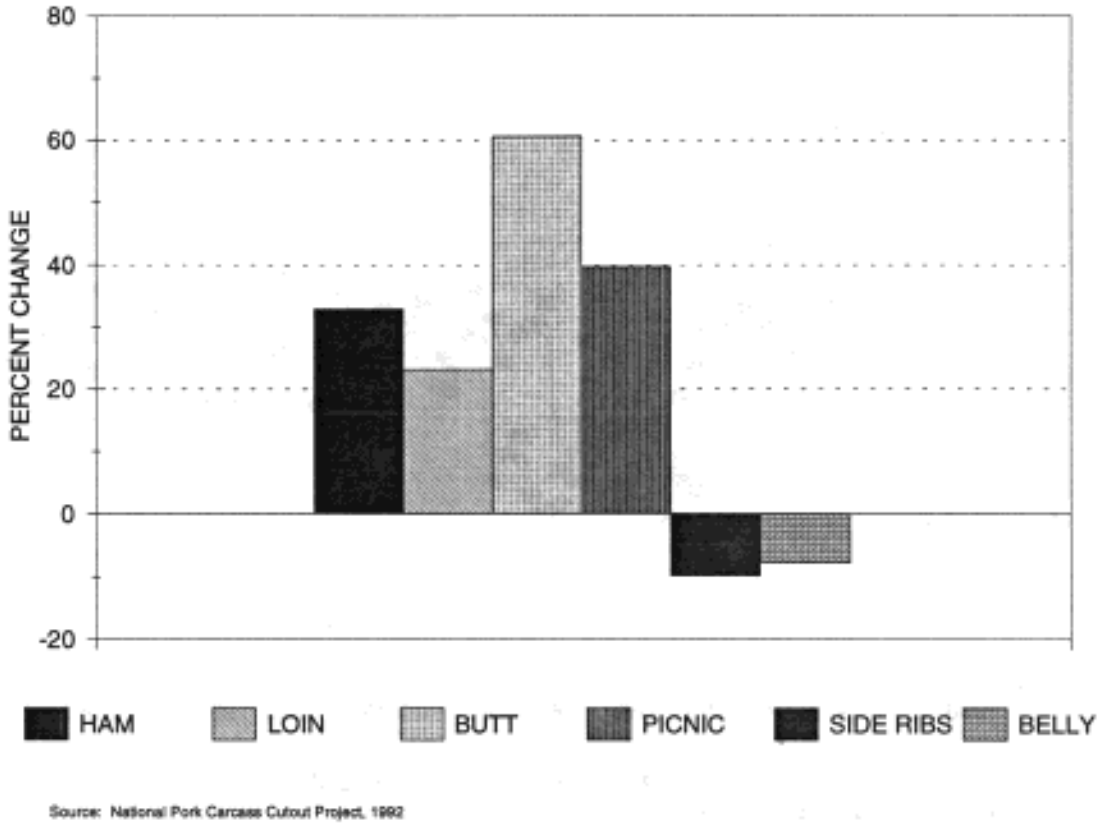
Source: GREPA, Annuaire statistique porcine quebecois 1994.

Figure IV.ll Aggregate Yield Improvement, Change from 1978



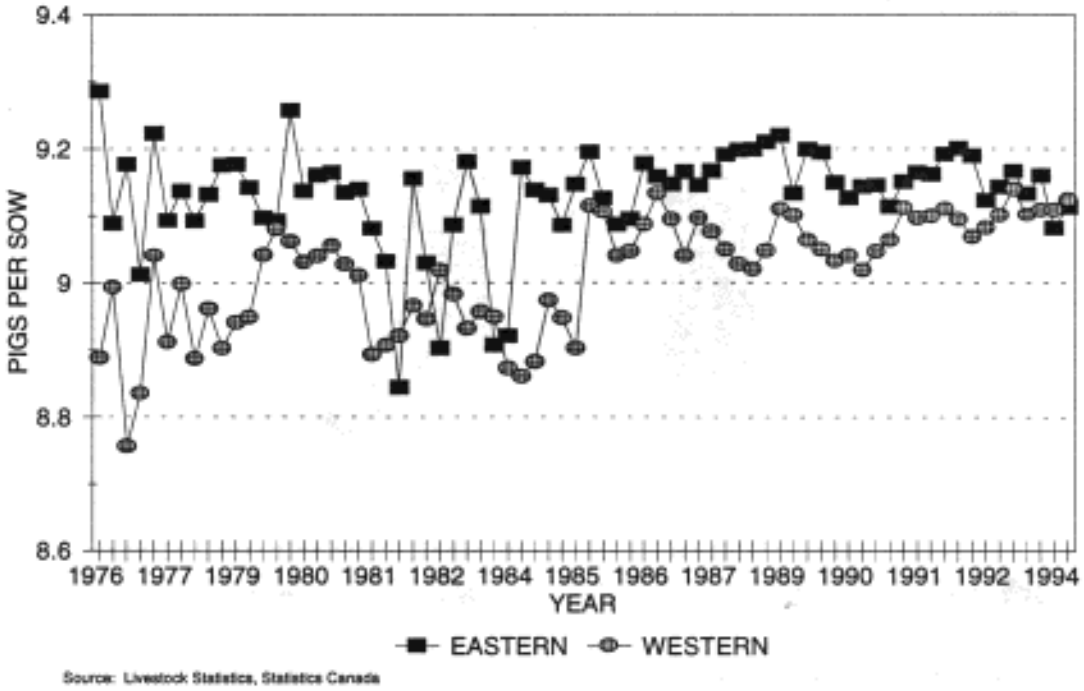
Source: National Pork Carcass Cutout Project, 1992

Figure IV.12 Cut Yield, Change from 1978



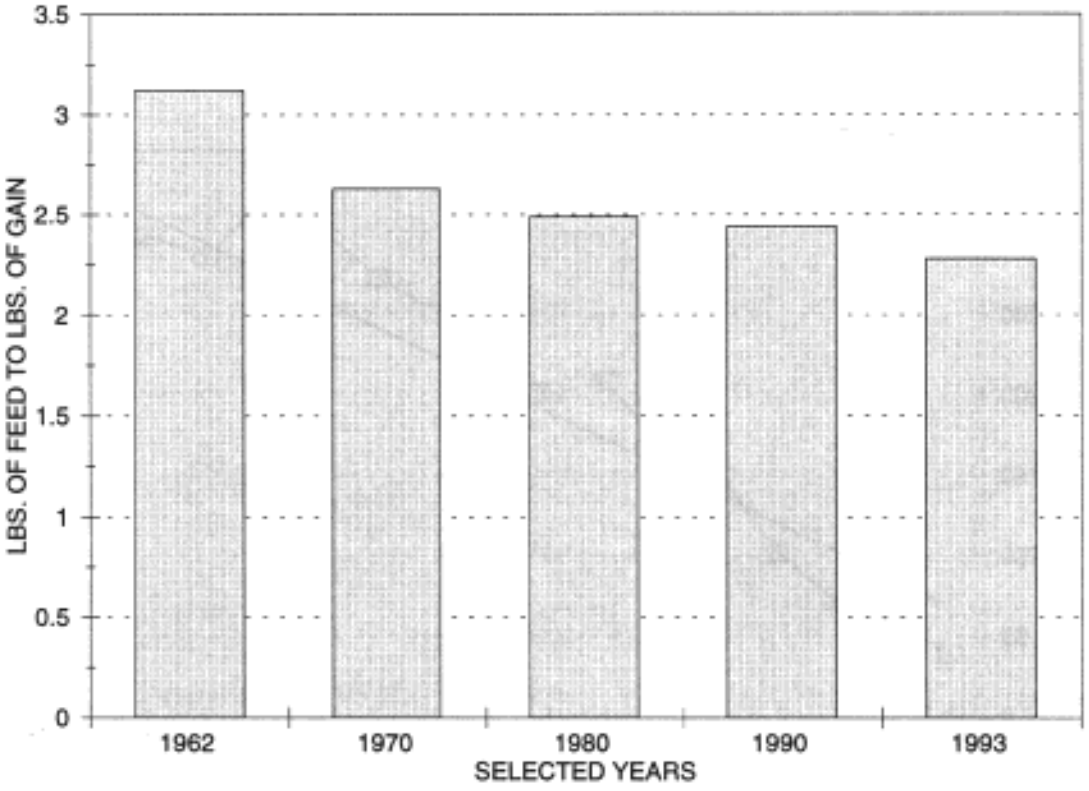
Source: National Pork Carcass Cutout Project, 1992

Figure IV.13 Producuctivity of Pig Production, Quarterly Pigs Born per Sow



Source: Livestock Statistics, Statistics Canada

Figure IV.14 Feed Efficiency of Hogs, Ratio of Feed to Gain



Source: Agriculture Canada

Figure IV.15 Canadian Pork Exports, Dressed Carcass Basis, 1976 - 1992

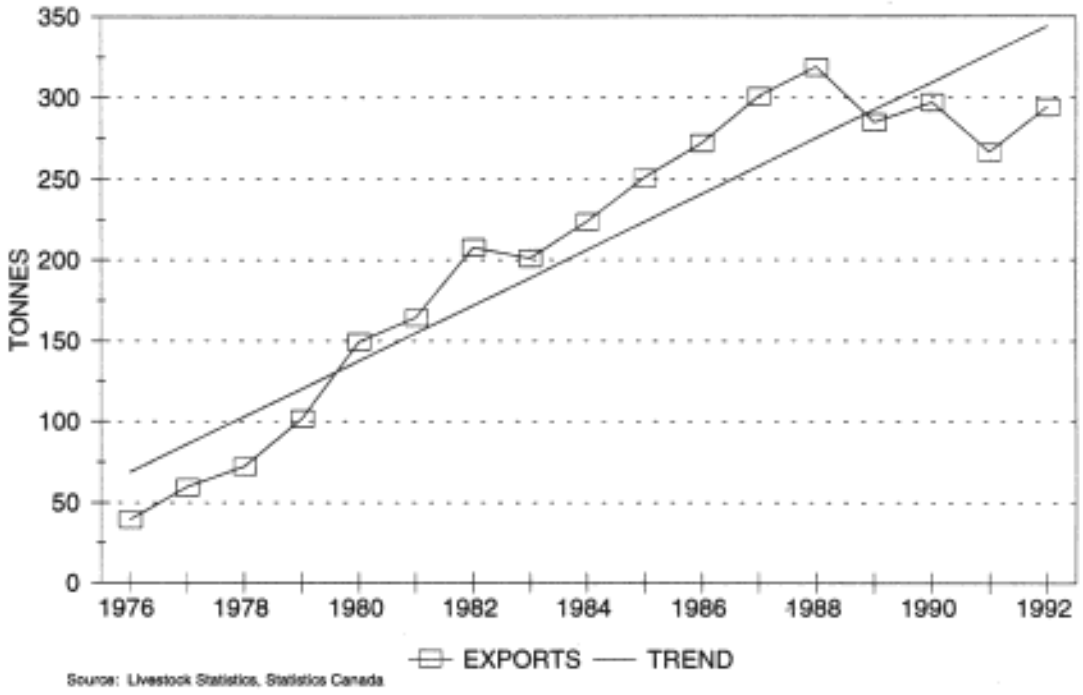


Figure IV.16 Canadian Exports to the U.S.A., Dressed Carcass Basis, 1976 - 1992

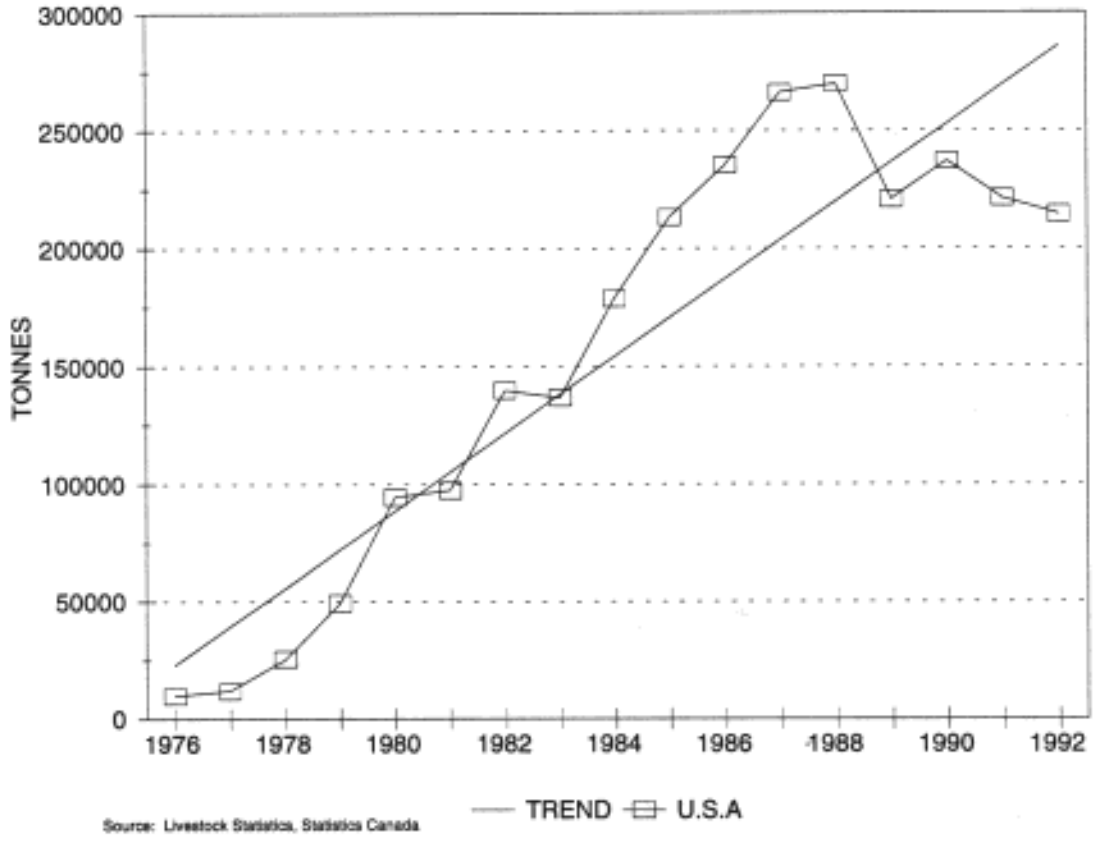


Figure IV.17 Canadian Exports to Selected Countries, Dressed Carcass Basis, 1976 - 1992

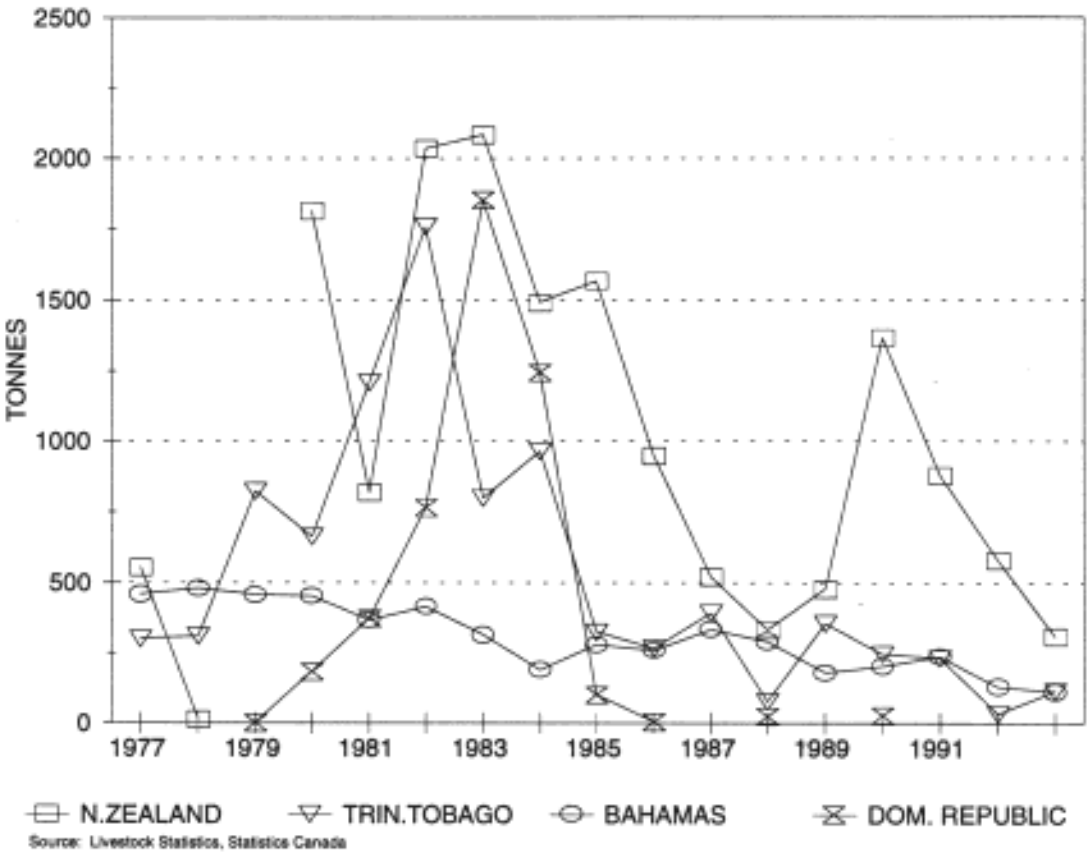
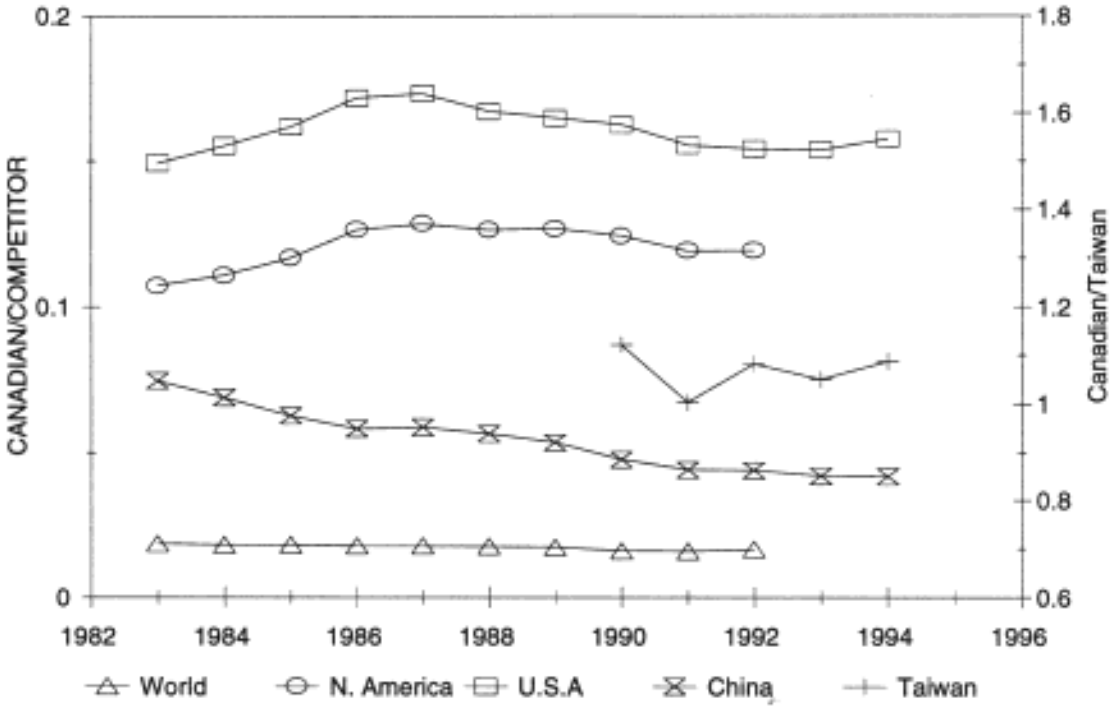


Figure IV.18 Canadian Pork Production, Exports over Production, 1970 - 1993

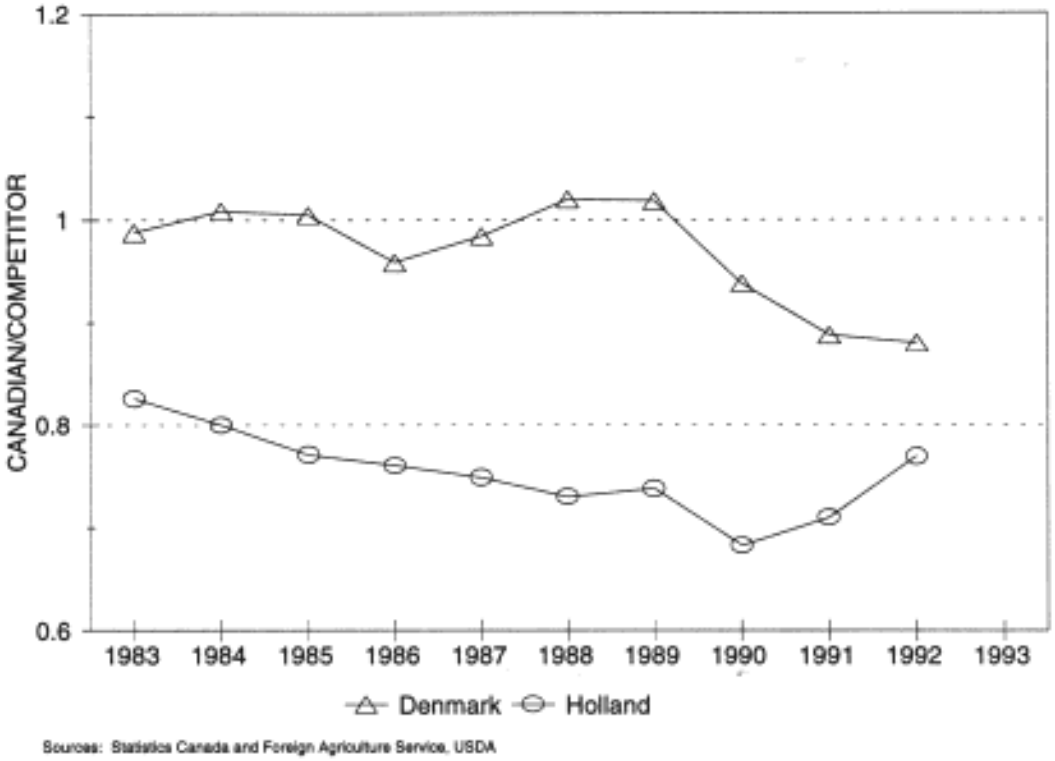
Source: Livestock Statistics, Statistics Canada

Figure IV.l9 Canadian Pork Production, Canadian Over Major Competitor, 1983 - 1994



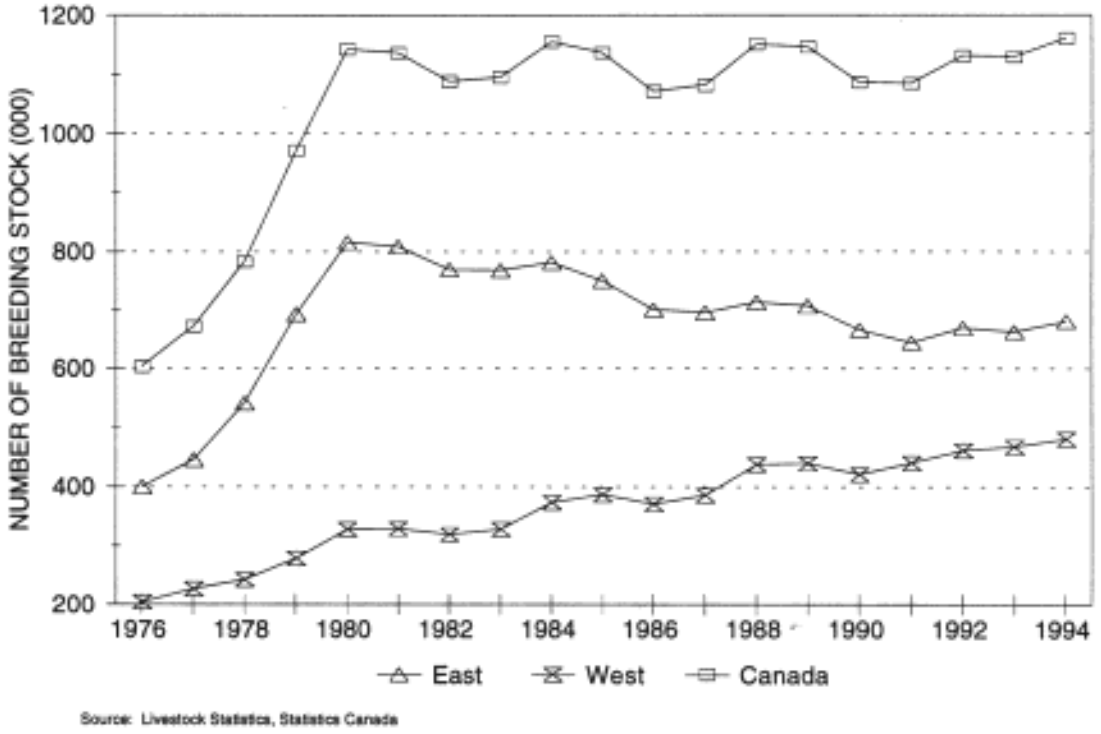
Sources: Statistics Canada and Foreign Agriculture Service, USDA

Figure IV.20 Canadian Pork Production, Canadian Over Major Competitor, 1983 - 1992



Sources: Statistics Canada and Foreign Agriculture Service, USDA

Figure IV.21 Canadian Hog Breeding Stock Numbels, 1976 - 1994



Source: Livestock Statistics, Statistics Canada

Appendices

Appendix A: Confidential Stakeholder Interview Questions

I am going to ask questions in conjunction with a study of hog marketing systems in Canada All responses are confidential and will be reporting in such a way that your anonymity will be maintained. The working notes of our meeting will be confidential.

Organization
Official interviewed

Position

Telephone no.

Date

Interviewer

A. **Organization**

1. What are the primary product categories of your organization?
2. What geographical regions are the primary markets for your products?
3. Does your organization have a strategic market plan? If so, what are the primary objectives of this

plan?

4. What services does your organization provide to the following (as applicable)?

1. hog producers
2. packers
3. other value-added processors

5. How do you feel these services affect the competitiveness of the following?

1. hog producers
2. packers
3. other value-added processors

B. **Malkedng system**

1. What changes in consumer preferences for pork, if any, do you foresee over the next five years?

2. What do you feel are the primary strengths of the current system for marketing hogs in your province?

3. What do you feel are the primary weaknesses of the current system for marketing hogs in your

province?

4. Do you feel the hog marketing system effectively transmits consumer preferences through to hog

producers?

5. Do you feel that dual marketing, where sales through marketing boards coexist with non-board

sales arrangements, would help the hog/pork sector in your province maximize market potential over the next five years?

6. What conditions do you feel would be necessary for a dual marketing system to be viable?
7. What type of marketing system do you feel would be the best for the hog/pork industry in your

province? Why?

8. Do you feel the current hog marketing system in your p~vince should be changed? If so, what

changes would be needed.

9. Do you feel that all Canadian provinces should have the same type of marketing system?

C. **Pncing system**

1. Do you feel the pricing of pork and pork p~oducts in Canada is competitive?
2. Do you feel the pricing of Canadian hogs is competitive?
3. What do you feel should be the relative price relationship between Canadian and U.S. markets

if prices are competitive?

4. Do you feel that relative price relationships between Canadian regional markets reflect regional

demand and supply conditions? Explain.

5. What does the te~m "competitive pricing" mean to your organization?
6. What do you feel is the role played by hog prices in dete~mining the competitiveness of Canadian

pork products?

D. **Long-term demandlsupply oudook**

1. What would you estimate to be the long-te~m growth potential for the Canadian hog-pork sector?
2. What market opportunities for the Canadian hog-pork sector do you feel are likely to arise over

the next five years?

3. How would you describe the competitive position of pork relative to othermeats such as beef and

chicken?

4. Which regions/provinces of Canada do you feel are likely to be the most fo~midable competition

for the hog-pork sector in your own region/province over the next five years?

5. What do you feel are the comparative strengths or advantages of those regions/provinces?

6. Which countries do you feel are likely to be the most fo~midable competition for the Canadian

hog-po~ sector over the next five years?

7. What do you feel are the comparative strengths or advantages of those countries?

8. How do you feel the Canadian hog-pork sector could best capitaliæ on market opportunities to

maximiæ market potential over the next five years?

9. How do you feel the quality of Canadian po~ p~oducts rates, relative to major intemational

competitors?

10. How important do you feel will be Canadian pork-product quality in maximizing market potential

over the next five years?

11. What steps do you feel could be taken to ensure that Canadian pork quality contributes all it can

to maximizing market potential over the next five years?

12. What do you feel will be the main domestic constraints on Canadian hog-pork sector growth over

the next five years?

13. What do you feel will be the main intemational constraints on Canadian hog-pork sector growth

over the next five years?

E. **Public policy**

1. What do you feel are the primary contributions of the Federal and Provincial Govemments to the

long-te~m viability of the Canadian hog-pork sector?

2. What do you feel govemments could do to help ensure that market potential for the Canadian

hog-pork sector is maximiæd over the next five years?

3. What specific Federal and Provincial govemment regulations do you feel might hinder the

maximization of market potential over the next five years?

4. What particular Federal and Provincial Govemment programs affecting your organization should

be modified or eliminated? Can you suggest modifications to programs that would be necessary?

5. What do you feel are the primary implications of intemational agreements such as GATI' and

NAFTA that should be considered in the design of hog marketing systems in Canada?

F. Final

Is there anything else that you would like to add?

Appendix B: List of Stakeholdem Intenriewed

David Craven	Canadian Pork Council	Shawinigan Lake, BC
Irene McGuiness	B.C. Hog Marketing Commission	Abbotsford, BC
W.W. Ballantyne	Gainers	Edmonton, AB
Real F. Proulx	Gainers	Edmonton, AB
Ed Schultz	Alberta Pork Producers Dev. Corp.	Edmonton, AB
Don Sim	Fletchers	Red Deer, AB
Jim Smith	Canadian Pork Council	Innisfail, AB
Bob Telford	Fletchers	Red Deer, AB
Michael Hallat	Intercontinental Packers	Saskatoon, SA
Al Lanfermann	Intercontinental Packers	Saskatoon, SA
Jim Morris	Saskatchewn Pork International	Saskatoon, SA
Ken Foster	Manitoba Pork Est.	Winnipeg, MA
Bill McLean	J.M. Schneider Ltd.	Winnipeg, MA
Wayne Urbonis	Burns Meats	Winnipeg, MA
Bill Vaags	Manitoba Pork Est.	Winnipeg, MA
Martin G. Abell	Ronald Chrisholm Ltd.	Toronto, ON
Tom Cowan	Cold Sprins Farm Ltd.	Thamesford, ON
D.H. Davidson	Fearmans	Burlington, ON
Carl Moore	Ontario Pork	Etobicoke, ON
Timothy Murphy	Ronald Chrisholm Ltd.	Toronto, ON
William Murphy	Ronald Chrisholm Ltd.	Toronto, ON
Edouard Asnong	Federation des Producteurs de Porcs du Quebec	Longueuil, PQ
Gilles Beaule	Groupe de Concertation et de	Quebec,PQ

	Developpement de L'Industrie Porcine	
Robert Bienvenue	Olymel	Anjou, PQ
Richard Davis	Olymel	Anjou, PQ
Benoit Desilets	Federation des Producteurs de Porcs du Quebec	Longueuil, PQ
Andre Forcier	Les Salaisons Brochu	St-Henri de Levis, PQ
Serge Lebeau	Centre du Developpement General	Quebec, PQ
Jean-Claude Montpetit	Agri-Marchi	St-Isidore, PQ
Gaetan Malo	Regie des Assurances Agricoles Du Quebec	Levis, PQ
Charles Proulx	Federation des Producteurs de Porcs du Quebec	Longueuil, PQ
Lise Sarazin	Federation des Producteurs de Porcs de la Region de Lanaudihre	St-Jean-de Matha, PQ
John Miller	Pork Nova Scotia	Truro, NS

Appendix C: Summary of Studies on the Relationships Between U.S. and Canadian Hog Prices

Higginson et al used weekly data from January of 1982 to April of 1985 and from April of 1985 to December of 1986 to assess the impact of the 1985 countervailing duty on Canadian exports of live hogs on the price relationships between Ontario, Western Canada, and the United States. Their vector auto-regression (VAR) analysis indicates that all three prices follow similar trends but that the U.S. price had a smaller impact on the western price after the imposition of the U.S. countervailing duty. In contrast, the influence of the U.S. price on the Ontario price was the same before and after the countervailing duty. They also found that the countervailing duty caused Canadian markets to be more isolated from one another.

Coffin et al also used a VAR analysis but on monthly prices over longer time intervals. They found that prior to 1985 the Quebec price influenced the Alberta price but was not influenced by the latter. After 1985, causality was established in both directions between the Quebec and Alberta markets. Cointegration tests were also implemented and confirmed that the countervailing duty had reduced the strength of the binding relationships between Canadian and U.S. prices.

Benson et al analyzed the relationships among hog prices in the United States, Ontario, and three Western Canadian markets using weekly data from October of 1982 to December of 1987. Their three cointegration relations before and after the imposition of the U.S. countervailing duty provide further evidence of the high degree of integration of the North American hog market. Their other significant result was that the U.S. price became a more important determinant of hog prices everywhere in North America after 1985. This greater influence of the U.S. price on the North American market was realized at the expense of the Canadian regional prices. The effect of the countervailing duty on the U.S. price is not surprising given that the objective of the countervailing duty was to isolate the U.S. market from foreign competition. However, the increased influence of the U.S. hog price on Canadian regional hog prices seems peculiar at first glance. The duty on Canadian exports of live hogs could trigger two kinds of adjustments: it could increase domestic processing and hence pork exports and/or increase inter-regional hog trade. Given the results of Benson et. al. and trends

in Canadian pork exports, it can be concluded that the adjustments made in the one year following the imposition of the duty were highly skewed toward domestic processing. Since a large proportion of domestic pork production is exported to the United States, the U.S. pork price must have been driving Canadian pork prices which in turn were driving Canadian hog prices. It is fair to conjecture that U.S. hog and pork prices are highly correlated and this would explain why U.S. hog prices appeared to be driving Canadian hog prices in 1986.

As stated previously, the Canada-U.S. hog/pork trade dispute went through several phases. Therefore studies covering different sample periods are not directly comparable. The imposition of a countervailing duty on Canadian exports of fresh, chilled, and frozen pork to the United States between 1988 and 1991 undoubtedly offset some of the effects of the duty on live hogs while reinforcing others. For instance, the 1988-91 duty on pork, like the duty on hogs, encouraged a shift in the composition of Canadian exports toward higher value-added and more expensive products (Larue and Gervais). Unlike the 1985 hog duty, the pork duty discouraged

domestic processing and provided greater incentives for Canadian provinces to engage in interregional trade.

Tanguay's analysis of the relationships among hog prices in Quebec, Alberta, and the United States covers two sample periods, including one from 1985 to the end of 1991 that captures the effects of both the 1985 countervailing duty on hogs and the 1988-91 countervailing duty on pork. This study is the most up to date assessment of the Canada-U.S. hog/pork trade dispute.

Tanguay split his sample into two periods to capture the characteristics of the pricing relationships between the Quebec, Alberta, and U.S. hog markets before and after the beginning of the Canada-U.S. hog-pork dispute. In both periods, his finding of two cointegration relations indicate that the regional markets in North American are highly integrated and respond to the same market signals. Further testing on the characteristics of the cointegration relations (i.e., on the nature of the signals guiding the price adjustments in the various markets) allowed him to conclude that during the 1979-85 period, it was the price differential between the United States and Quebec (PUS-PQ) that triggered most of the adjustments, even in Western Canada. The relative unimportance of the Western Canadian price in the arbitrage relationships prior to 1985 reflects the delay in the growth of the Western hog-pork sector relative to the hog/pork sectors in Ontario and Quebec.

Tanguay's results for the period starting in 1985 are quite different from those in the period before 1985. He found that after 1985 the price differential between the Alberta and Quebec markets mattered. This seemingly sudden prominence of the Western Canadian price can be rationalized by the pressures of the hog and pork countervailing duties to reduce trade between Canada and the United States and to increase inter-regional trade within Canada. It should be pointed out that the increased potential threat from another region, regardless of the variations in the volume traded between these regions, is sufficient to magnify the importance of regional markets in the arbitrage relationships. The argument is that tariffs discourage international trade and make regional markets more contestable. Not surprisingly, pork trade between Western and Eastern Canada increased

between 1985 and 1991. During that time, a deal was negotiated between a Quebec pork processing firm (Olympia) and a slaughtering plant in Western Canada (Springhill farms) that guaranteed the trucking of a weekly supply of 11-12,000 carcasses to be further processed in Quebec. This is undoubtedly reflected in Tanguay's results.

Appendix D: The Canada-U.S. hog/pork Dispute

In response to the spectacular rise of imports of live hogs and pork from Canada in the early 1980s, the U.S. National Pork Producers' Council (USNPPC) initiated a countervailing action against Canadian exports of live hogs and pork in November of 1984 under the assumption that hogs and pork were "like" products. It was alleged that hog production in Canada was subsidized via 22 federal and provincial programs (USTRD, 1993 p.23). As a result, the U.S. department of Commerce ordered the U.S. Customs Service to on June 17 of 1985 to administer countervailing duties of 0.0439 dollars (Can.) per pound on imports of Canadian hogs and 0.055 dollars per pound of Canadian exports of fresh, chilled, and frozen pork. However, the U.S. International Trade Commission concluded in August of 1985 that the U.S. pork industry had not been (or was not threatened to be) materially injured and consequently abrogated the countervailing duty on imports of Canadian pork. Undeterred by this setback, the USNPPC initiated another action in 1989 which led to the imposition of a 3.6 cents countervailing duty on every pound of fresh, chilled and frozen Canadian pork. Canada responded by challenging the admissibility of U.S. duties on Canadian pork under GATT. A GATT Panel was established to address the question of pass-through: that is, can subsidies on hogs be considered as subsidies on pork. In addition, Canada demanded that two Chapter 19 dispute panels (of the Canada-U.S. Trade Agreement) be established to investigate the subsidy determination and the threat of injury. The Binational Panel addressing the injury question ruled against the subsidy and injury determination rendered by U.S. authorities. It was this decision that eventually overturned the duty. This setback prompted U.S. officials to request the establishment of an Extraordinary Challenge Committee. Two months later, in June of 1991, the request was rejected by a special trade panel, and thus the decision of the Binational Panel that there was not enough evidence to support the finding of injury or threat of injury was upheld. Shortly after, the United States decided to abide by the ruling and refunded the duty revenues ($33 million) collected over 22 months (The Financial Post, 1991). The GATT panel was never implemented since the duty was withdrawn (although it did rule that an upstream subsidy investigation should be performed). For this same reason, the second Binational Panel dealing with the subsidy issue was of no consequence either.

Unlike the pork duties, the hog duties are still being collected. Their levels are monitored and adjusted on a periodic basis. The duties are adjusted according to the level of the subsidy programs in Canada. For instance, federal Agricultural Stabilization Act (ASA) and Quebec Farm Income Stabilization Insurance Program (QFISIP) accounted for 80 percent of the calculated subsidy in 1984 while the National Tripartite Stabilization Program (NTSP) and QFSIP accounted for 90 percent of the 1989 calculated subsidy (Moschini and Meilke). International trade regulations are unclear as to the appropriate level of countervailing duties although a ceiling is placed on permissible duties by requiring that they do not penalize the exporter by more than the subsidy received (Hufbauer and Erb).