THE UNIVERSITY OF CALGARY

STRUCTURAL CHANGE IN THE ALBERTA

HOG MARKETING INDUSTRY AND ITS EFFECT ON

RETAIL PORK PRICES

· BY

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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance a thesis entitled "Structural Change in the Alberta Hog Marketing Industry and Its Effect on Retail Pork Prices," submitted by James A. Moorhouse in partial fulfillment of the requirements for the degree of Master of Arts.

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ABSTRACT

The objective of this study is to consider how structural change in the Alberta hog marketing industry may have affected the price of retail pork products in Alberta. Attention is focused on the relationship between industry structure, market power and price determination.

The Alberta hog marketing industry comprises the hog producing, meat packing and grocery retailing sectors. The characteristics of each of these sectors is examined and the significant changes in their structure are emphasized. The powers and policies of the Alberta Pork Producers' Marketing Board are also discussed.

The following four structural and behavioural events are noted as salient features of the Alberta hog marketing industry's evolution: the institution of the Alberta Pork Producer's Marketing Board, vertical integration by the Board, the increasing concentration and vertical integration of the grocery retailing sector, and a well defined period of price collusion by the meat packing sector. The study considers how these events affected market power and thereby the price determination process in the slaughter hog, wholesale pork and retail pork markets.

Finally, an empirical investigation into how these four circumstances affected retail pork prices is presented. An ordinary least squares equation is developed in

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which independent variables representing these changes and other relevant influences are regressed on a dependent variable representing retail pork prices. The results of the statistical work imply that increasing retail concentration, the period of packer collusion and the time during which the Board has been integrated have all been related to the level and movements of retail pork prices.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

The Alberta hog marketing industry consists of the producing, meat packing and retailing sectors. In the past few decades there has been structural change in each of these sectors to varying degrees. In turn, producers, packers and retailers have altered their conduct in response to structural change. It is the objective of this study to examine these changes from the perspective of industrial organization economics and to consider what effect these changes have had on the price of retail pork products in Alberta. In this chapter an explanation of the study's organization will be presented.

1.2 Organization

Price determination in any market is strongly related to the market power of the participating sellers and buyers. In turn, the market power of buyers and sellers is associated with the structure of the industry they represent. Therefore, the following may be said with respect to the Alberta hog marketing industry: the structure of the producing sector will affect its ability to influence the price of slaughter hogs; the organization

of the meat packing sector will account for its power over the price of slaughter hogs and wholesale pork; and the nature of the grocery retailing sector will determine its leverage over wholesale and retail pork prices.

A relationship between retail pork prices and slaughter hog and wholesale pork prices is likely to exist. Therefore, price determination in these upstream markets may affect prices at the retail level. Changes in structure will alter the relative bargaining strength of each sector and thereby affect price determination. Hence, it is possible that these changes may affect the retail price of pork.

This study will be organized in a manner that attempts to account for the relationship between industry structure, market power and prices. In chapter two a brief review of the industrial organization theory that is relevant to this study is presented. The concepts covered will relate to the discussion in forthcoming chapters. Also in chapter two, the literature on the Alberta hog industry is reviewed. The review will serve to indicate what issues have been historically important, and where this study stands in relation to previous work.

In chapter three the structure of each sector in the Alberta hog marketing industry is considered, noting the most significant changes over the past three decades. The purpose of this chapter is to consider why each sector has

its particular structure. It also provides insight into the level of market power held by each sector. In chapter four the nature of the Alberta Pork Producers' Marketing Board is examined. The Board has an important place in the Alberta hog marketing industry as the sole seller of Alberta produced hogs. Therefore, the powers and policies of the Board should be understood.

In chapter five the vertical relationships in the Alberta hog marketing industry are considered. Attention focuses on how producers and packers have determined the price of slaughter hogs and how packers and retailers have determined the price of wholesale pork. The effect structural changes have had on market power, as noted in chapter three, will be emphasized.

Having discussed how the balance of market power in the slaughter hog and wholesale pork markets has been altered as a result of structural change, consideration may then be given to the impact these events have had on retail pork prices. Therefore, in chapter six an empirical investigation is undertaken which tests the impact structural variables have had on retail pork prices. Hypotheses will be offered regarding the results this equation is expected to produce based on the material covered in previous chapters. The actual results will then be reported along with a discussion of how they compare to the expected results.

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The study is then concluded in chapter seven with a summary of the material presented in previous chapters. Conclusions regarding the relationship between structural change and retail prices that are evident from this study will be noted. The limits of this study will also be considered and suggestions for further research will be made.

CHAPTER TWO

THEORY AND LITERATURE REVIEW

2.1 Introduction

This study is an application of industrial organization economics to a specific industry. Therefore, a brief review of the relevant theory from this field of economics is worthwhile. The first section of this chapter will discuss concepts of industrial organization which are germane to the forthcoming analysis. In the second section of this chapter a survey of the existing literature regarding the Alberta hog marketing industry will be presented.

2.2 Review of Industrial Organization Theory

Industrial organization concerns itself with three market characteristics - structure, conduct and performance. These three properties relate to one another in the following way: market structure affects the conduct of buyers and sellers and this behaviour conditions market performance. Causality is not completely one way, however, because conduct may influence market structure.

What follows is a brief review of the concepts of industrial organization theory that are relevant to this study. The major characteristics and determinants of market structure will be discussed first, followed by a review of different types of industry classifications. This section will conclude with an examination of industry conduct and some comments regarding industry performance.

2.2.1 Characteristics of Market Structure

Five dimensions of market structure will be considered in this section. They are concentration, product differentiation, barriers to entry, vertical integration and diversification.

Concentration Ratio

The degree of competition in a particular industry can be judged, to a certain extent, by the number of firms within it. Industries of a more competitive nature tend to exhibit a greater number of firms. However, the number of firms which form an industry can be a misleading piece of information when measuring competitiveness. It is possible for an industry to include numerous members, yet have one enterprise which produces eighty percent of the industry's output. An industry of this kind is unlikely to be competitive, given that it has one firm which controls the majority of industry output, and therefore can influence the price of the industry's product.

A measure which provides a better insight into the degree of competition within an industry is the concentra-

tion ratio. This concentration statistic takes into account the distribution of total industry output among firms. Instead of output, however, attention is more commonly given to a firm's share of industry sales. Scherer (1980) defines the concentration ratio as the percentage of total industry sales contributed by the largest few firms, ranked in order of market share.[55; p.56] Usually four, eight or twelve firms are considered.

When calculating a concentration ratio, care must be taken to include only those firms which are competing with one another for sales of a particular product. In other words, a well defined market is necessary to gain an accurate measure. All the same, Shepherd (1979) considers the concentration ratio to be the best all-purpose measure of an industry's competitiveness. He suggests that it is "unambiguous and has concrete meaning" and that the "problems of defining markets are at least as tractable with concentration ratios as with other indexes." [56;p.190]

Product Differentation

If firms within one industry sell products which are identical from the consumer's point of view, their market shares will not depend on consumer preferences. Market share will more likely be determined randomly or by the firm's historical development. Product promotion will not increase market share, because all products available to

the consumer are seen as perfect substitutes. As a result, there will usually be little difference between the price each firm charges for its product.[7;p.229]

However, if the product is regarded by consumers as similar but not identical, then they may prefer one product over another. This allows for price differences between firms, because a firm selling a preferred good may be able to charge a relatively higher price without discouraging the demand for its product. This firm will likely have a larger share of the market. If each firm's product is differentiated from the other's, then all firms may attract buyers to their product through promotional activities. An industry with these conditions is said to exhibit product differentiation.

Barriers to Entry

An industry which is selling its product at a price above minimal average cost is making pure profit and will therefore attract potential new members. However, an industry can make pure profits without new firms actually entering the industry. This is possible when for some reason a potential entrant to the industry is discouraged from entering. These reasons are referred to as barriers to entry. The greater these barriers are, the higher the selling price established firms may set without letting in new industry members. Bain (1968) suggests there are three

types of barriers to entry - product differentiation, absolute costs and economies of scale.[7;p.225]

(i) Product Differentiation

Product differentiation may represent a barrier to entry. Firms that have long been in an industry sell products which have developed a traditional group of buyers. These loyal consumers feel secure in their knowledge of what they are buying. Products which are new to a market are at an immediate disadvantage, because their quality is unknown to the consumer. They represent a risky purchase compared to the products of established firms.

To develop a demand for their own product, new firms must break the bond consumers have with competing goods. The new firm may achieve this by selling its product at a relatively low price, while still covering production costs. If this is not possible, firms may attempt to acquire a share of the market by promoting their product to an extent greater than that done by established firms. However, this is usually a costly strategy and may weaken the new entrant's financial position in the face of strong competition. Hence, it is possible for product differentiation to be a barrier to entry.[7;p.256]

(ii) Absolute Cost Advantage

Absolute costs are an entry barrier when established firms have an edge over potential entrants in production and distribution costs at any scale of operation. Bain (1968) lists four possible situations for this circum-First, established firms may have control over stance. superior production techniques which potential entrants are unable to acquire, because of patents or secrecy. Second, established firms can have access to input resources which are greater in quality than those available to potential entrants. Third, new firms may be unable to acquire factors of production on terms as favourable as those received by established firms. Fourth, liquid funds cannot be accessed by potential entrants and if they are they can only be obtained at exorbitant interest rates. [27; p.260] Α combination of these circumstances or any one by itself may be enough to discourage or prevent entry.

(iii) Economies of Scale

Economies of scale may represent an entry barrier when a plant operating at the minimum optimal size supplies a significant share of the industry's total output. Under this condition, when a new firm enters an industry at the optimal level, the industry's output will substantially increase. As a result, the price of the industry's product will decline. However, if established firms reduce their

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output by a combined total equal to the new firm's production, total industry output would remain the same and the market price would not change. Thus, the potential entrant must consider the reaction of established firms to its entry. If established firms do not reduce their output levels, the post-entry price may be too low for new entrants to develop a successful operation.[7;pp.264-265] Hence, new firms may be discouraged from entering the industry.

An alternative strategy is to enter at a scale smaller than optimal. Under this condition the increase in industry output would not be as great and consequently the fall in price would be less. However, because the firm entered at a less than optimal scale, its production costs would be higher than necessary. Therefore, the higher-post entry price under this strategy may not be enough to offset the firm's relatively higher costs and entry will again be discouraged.

Vertical Integration

Vertical integration has been defined as the process of organizing two or more successive stages of production within the same firm.[63;p.89] A firm may integrate upstream or downstream. Under upstream integration a firm brings under its control a stage of production that is prior to the production process in which it was originally

involved. In the instance of downstream integration, the firm acquires control over a stage of production that is subsequent to the process in which it was first involved.

Motives for vertical integration vary, but two of the more common are cost reduction and greater authority over the firm's economic environment. An example of cost reduction is found in the steel industry where the "integration of blast furnaces, converters, and primary reduction mills reduces handling and the need for reheating."[55;p.78] It is often easier to plan the flow of inputs between production stages when these stages are under the same authority. This increases efficiency and thereby provides a cost saving to the firm.

Security over raw material supplies is an example of the control a firm may gain over its economic environment through integration. Another example is exhibited by a firm that integrates downstream to assure itself of a market for its product. [55; p.78]

It is generally believed that vertical integration increases industry efficiency and is therefore a positive factor in the economy. However, integration can give a firm excessive market power. A non-integrated firm whose competitors are integrated is precariously situated. The status of the integrated firms in both the upstream and downstream industries will be powerful enough to affect the business of the non-integrated firm. Input supplies to

this firm can be threatened by competitors that are integrated upstream. Firms integrated downstream are in a position to stop orders for the non-integrated firm's product. These circumstances will also discourage firms from entering the industry. Therefore vertical integration may also represent an entry barrier and thereby maintain a less than competitive market. [55; p. 303]

Diversification

A firm is said to be diversified when it sells more than one line of product. Many diversified firms sell products which are similar, but still belong to separate markets, such as food items. Diversification may also be through the ownership of a number of unrelated businesses. Green (1980) argues that the tendency towards diversification is related to the fact that losses which may incur from the production and sale of one product may be offset by the revenue obtained from others.[27;p.53]

There are a number of social benefits to diversification. Diversified firms may transfer proven efficient technology into different markets more quickly than would market forces. Similarly, capital may move more easily between markets when it flows through the different businesses of one firm. If diversification is achieved through a take over, the purchased firm may inherit a more efficient organization and managerial system. [56; p. 359]

The potential social cost of diversification is that diversified firms could use profits obtained in one market to support strategies which reduce competition in another market. An example is predatory pricing, whereby a firm attempts to increase its market share by undercutting its competitor's price to a level below its own cost of production. This tactic is usually very costly, but it may be supported with funding from another line of business. The end result is a market which is less competitive and which exhibits higher prices.[56;p.360] This may in fact be an extreme case, but it is important to note the possibilities that exist for diversified firms.

2.2.2 Determinants of Market Structure

Shepherd (1979) argues that economies of scale are probably the main determinant of market structure.[56; p.223] Scale economies allow for lower average per unit costs to be obtained with increasing levels of output, assuming the optimum combinations of labour and capital are being used. The two most important forms of scale economies to this study are plant-specific economies and multi-plant economies.

Plant-Specific Economies of Scale

Plant-specific economies of scale are derived from increasing the size, and therefore the output, of the plant

or plant complex.[55;p.81] At the plant level, scale economies usually result from increasing the size of production units because physical laws often favour larger dimensions. For example, as the size of a pipe increases, its flow capacity rises more than proportionately to its circumference.[55;p.81]

Plant-specific economies also relate to the use of labour. Larger plants will employ more labour allowing workers to specialize in particular tasks. Similarly, management will have more specific individual responsibilities which allows them to develop expertise. There are also types of machinery which can only be efficiently used in plants of a larger size.

Multi-Plant Economies of Scale

Multi-plant economies of scale are obtained when a firm operates more than one optimal plant. Bain (1968) notes economies of multi-plant operations may be gained in the areas of large-scale management, large-scale distribution and large-scale buying.[7;p.170]

With respect to management, scale economies are achieved through centralized administration and coordination of a number of plants, rather than each plant operating as a separate entity. Distribution economies are gained when one firm owns a plant in markets that are distant from one another; the firm with a single plant must

incur transportation costs to these markets while the multi-plant firm does not. Economies of scale acquired through bulk buying are obtained when firms arrange contracts with their suppliers to purchase large volumes at discounted prices. The firm with numerous plants will require more supplies than the firm with one plant and therefore the multi-plant firm is more likely to achieve this type of scale economy. [7;p.170]

How scale economies act as a determinant of market structure relates to the size of market in comparison to the size of the optimal plant. If economies of scale require large plants and firms, market demand will be met by fewer firms and the industry is thereby likely to be more concentrated. Furthermore, as previously noted scale economies may also represent an entry barrier, which may encourage the development of a concentrated industry.

2.2.3 Industry Classification

Industries can be classified according to the particular kinds of structural characteristics which they exhibit. The common classifications include perfect competition, monopoly, oligopoly and monopolistic competition. As monopolistic competition is not relevant to this study, only the first three types of industries will be considered.

Perfect Competition

The perfectly competitive industry is characterized by a number of conditions. The first is that the product sold by any firm is identical to that sold by another. Product homogeneity is important because its existence prevents product differentiation. A second feature is that firms are sufficiently small when compared to the total size of the market, that individually they are not able to influence the market determined price of the product. In other words, the optimal plant, as determined by scale economies, contributes only a small share to the industry's total supply.

For an industry to be perfectly competitive, resources must be able to enter the market freely. "Resources" include such things as raw materials and labour. It also includes the ability of firms to enter or leave the market at will; that is to say there are no barriers to entry. The last necessity for an industry to be perfectly competitive is that consumers, firms and resource owners have complete knowledge regarding the relevant economic and technological information. This information will include such things as prices, wages and the most efficient produc-It is rare for an industry to meet each of tion methods. these conditions simultaneously, and therefore the existence of the perfectly competitive industry is uncommon. [45; p.248]

Monopoly

If the total output of an industry comes from one firm, the industry is said to be a monopoly. This firm is referred to as a monopolist and as the sole seller of a product its influence over the price is significant. Theoretically speaking, the monopolist faces a downward sloping demand curve identical to the market demand curve for the product.

One reason for a monopoly to exist is scale economies. It is possible that a production process may reach its minimum average cost at a level of output large enough to satisfy the demand of an entire market. As firms in this industry try to attain the optimal size, they will be competing with one another over sales of their increasing The firm which survives this competition will output. emerge as the sole supplier to the market. [45;p.278] Three other conditions are conducive to monopoly. First, a single firm may control the entire supply of a necessary input for a good's production. Second, a firm may acquire patents on the product it produces or on its production process. Third, governments may grant access to a particular market to one firm only.[45;p.278]

Once a monopoly has established itself, its position is sustained through formidable barriers to entry. Government legislation may allow no other firms to participate in the industry and thereby be an entry

barrier. When monopoly is determined by economies of scale, a potential entrant would have little alternative but to enter the industry operating at minimum average cost. This alone would be difficult to achieve. However, if the attempt to enter is made, the market supply would double and the resulting fall in price would jeopardize the new firm's existence.

Oligopoly

The last industry classification to be considered is oligopoly. This type of industry is exemplified by a few firms whose actions in the market are interdependent. This behavioural interdependence between firms sets oligopoly apart from other industry classifications. There are two types of oligopolies. If the product is homogeneous, then the industry is a pure oligopoly. If the product is heterogeneous, then the industry is a differentiated oligopoly.

Barriers to entry may be an important structural characteristic of oligopolies. They may originate in the conduct of incumbents intended to keep others out, or by structural circumstances - most notably economies of scale. The size of the market in relation to the size of the optimum firm would be the governing factor. If the market will support numerous optimal plants, entry will be easier and the creation of an oligopolistic industry is

less likely. In the case of a differentiated oligopoly, the degree of product differentiation may be enough to represent an entry barrier.

2.2.4 Conduct

Green (1980) suggests that there are at least four classifications of firm behaviour. They are price-output decisions, sales promotion policies, product design policies and tactics of firms towards their rivals.[27;pp.91-92] The last of these is particularly significant to this study. Therefore, the discussion of conduct will be limited to firm strategy in the face of rivalry. This type of behaviour is most relevant to the oligopoly in which firm profitability is interdependent. Collusion between firms is the most common form of oligopolistic behaviour and a number of aspects of this type of conduct will be briefly reviewed. They are the importance of information, tacit collusion, price leadership, rule-of-thumb pricing, buyer collusion and countervailing power.

Collusion

(i) The Importance of Information

The presence of collusion relates to the availability of information. If firms in an oligopoly have immediate knowledge concerning the conduct of their industry com-

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petitors, they can react quickly to prevent competing firms from gaining any market advantage. In this situation firms are not able to advance their position by acting individually. This promotes the attitude that if firms adopt policies on which all agree, the circumstances of the group could be improved. In this manner the ability of industry members to be informed about the actions of rivals is related to their conduct. The fewer firms there are in an industry, the easier it is to be informed and the more likely it is for collusion to occur. [56;p.283]

(ii) Tacit Collusion

Collusive activities are not necessarily arranged by direct communication between the firms involved. Tn industries which are older and have remained stable for a long period of time, collusion can exist without spoken or written agreements. This is referred to as tacit collusion. Years of operating in competition with the same organizations makes it easier for individual firms to anticipate the reaction of their competitors to market conditions without actual communication. Each firm's position in the market will have been determined when the industry was young and firms struggled for market share. Certain behaviour is expected of certain firms and this is known to all members of the industry. [56;p.286]

(iii) Price Leadership

Price leadership is a form of collusion which is tacit in nature. It involves the practice whereby members of an industry follow the price changes initiated by the firm which is seen to be the leader. If firms do not comply with the pricing decisions taken by the leading firm, they may suffer consequences which usually take the form of price cutting. Scherer (1980) classifies three types of price leadership - dominant firm, collusive and barometric. [55;p.176]

Dominant firm price leadership occurs when one firm leads an industry in all respects and sets the price for its own benefit and expects competitors to follow suit. An industry need not be an oligopoly of high degree for this to occur. In fact, firms competing with the dominant organization could be seen as perfectly competitive, because they accept the price as given without influencing its determination. [55; p.176]

Collusive price leadership is undertaken through direct communication of some form. Five coexisting conditions are conducive for this behaviour to occur. They are an oligopoly of high concentration, a low degree of product differentiation, firm's with similar cost structures, the existence of barriers to entry and an inelastic demand for the industry's product. [55;p.176]

Price leadership is barometric when the price set by

the leading firm is, in all likelihood, the competitively determined price. Price leaders in this situation have little power to enforce their pricing decisions and the leading position often changes. [55; p.176]

(iv) Rule-of-Thumb Pricing

The rule-of-thumb method for pricing is considered to be another form of collusion. This technique involves some form of cost-plus pricing in which product price is calculated by adding the desired profit margin to estimated per unit costs. This behaviour on the part of all firms minimizes price cutting below total costs. For the industry to use rule-of-thumb pricing effectively, industry members must have similar cost structures and similar costplus formulas.[55;p.185]

(v) Buyer Collusion and Countervailing Power

Collusion is not limited to influencing prices from the selling side of the market. When the buying side of the market is composed of a few firms (which is termed an oligopsony), it is possible for these firms to work in unison to accept only certain purchasing prices from the seller. As such, these firms are involved in the price determination process. This type of behaviour is a form of countervailing power.

Although an oligopsony is usually required for an
industry to have countervailing power, collusion is not always a necessity. Dominant firms within an oligopsonistic industry can have effective market power alone without operating in concert with other industry members. One example of this occurs when large buyers are able to persuade oligopolistic sellers to depart from their collusive pricing structure by offering to purchase large orders at discounted prices. A second example is the instance when large buyers threaten to take their business elsewhere unless price concessions are offered. These buying strategies are most successful when demand for the seller's output is slack, and the resulting excess capacity can be profitably used if a major order is negotiated with a buyer. [55;p.308]

2.2.5 Performance

Market structure and conduct will determine an industry's performance. Performance is usually measured in terms of efficiency and equity. Efficiency commonly refers to the proficient allocation of scarce resources with as little waste as possible. Said differently, efficiency means the full-employment of resources, especially human resources. It also suggests that production should be responsive to consumer demands in terms of both quantity and quality.

Equity refers to the equitable distribution of income.

Scherer 1980 states that equity "implies at least that producers do not secure rewards far in excess of what is needed to call forth the amount of services supplied."[55; p.4] He also suggests that equity includes reasonable price stability so that the distribution of income is not distorted in ways which are generally deemed undesirable.[55;p.4]

2.2.6 Theory Summary

This section has briefly reviewed the theory of industrial organization economics which is deemed relevant to this particular study. Characteristics of industry structure discussed were concentration, product differentiation, barriers to entry, vertical integration and diversification. The discussion regarding determinants of structure focused on economies of scale, in particular plant-specific and multi-plant scale economies. The specific characteristics of perfectly competitive, monopolistic and oligopolistic industries were also considered. Particular aspects of the potential collusive behaviour of an oligopolistic industry were reviewed, noting the countervailing power of strong buyers. Most of the topics discussed in this section will at some point be part of the discussion regarding the impact of structural change in the Alberta hog marketing industry.

2.3 Literature Review

Having reviewed the theory which will be employed in forthcoming chapters, this section will survey the existing literature regarding the Alberta hog marketing industry.

Leonard Poetshke's report, "A Study of Price Determination in the Alberta Hog Market," was published in 1960. This study attempted to answer the following question: what are the market forces in the Alberta hog market which explain the expected and unexpected price behaviour of Alberta slaughter hogs? Poetshke gave special attention to a comparison of hog prices in Alberta and Toronto.

Data collected by the Federal Department of Agriculture from manifests of hog transactions between producer and packer for the years 1957 and 1958 were used. Using this information, Poetshke determined such things as the methods by which the majority of hogs were transported to market, the number of hogs passing through the three Alberta stockyards (Edmonton, Calgary and Lethbridge), the number of hogs going directly to packers, and the percentage of hogs purchased by small and large packers.

Poetshke noted three important characteristics of the Alberta hog industry which affected behaviour and thereby prices. First, hog production in Alberta was greater than the province's requirements. As a result, fifty percent of the pork derived from Alberta hogs was sold in Eastern

Canada and eighteen percent of Alberta nogs were slaughtered in British Columbia. The price for Alberta slaughter hogs was therefore, in part, dependent upon the forces of these two markets.

Second, Poetshke noted an important relationship between the large national packers and the small local packers. Small packers, whose business was limited to the Alberta and British Columbia region, were essentially price takers because they purchased too few hogs relative to the size of the market to have any individual effect on price. However, when demand was high relative to supply the price of slaughter hogs would rise, and the combined actions of the small packers acting as price takers helped maintain the higher price. The large national packers found it difficult to pay the higher Alberta hog price and still compete in their eastern wholesale pork markets. They would also lose some of their necessary hog supply to the smaller packers.

The large packers reacted by attempting to acquire their hogs through forms of non-price competition so as not to put further upward pressure on the price of slaughter hogs. Given that the national packers purchased the majority of hogs, the price they paid was not as high as it might have been had circumstances been more competitive.

Finally, Poetshke felt that a producer organization known as the Alberta Livestock Cooperative provided some

countervailing price power for producers, especially during times of conflict between the large and small packers.

James Lockhart presented his thesis, "Alberta Hog Market, Conduct and Performance," in 1967. Lockhart evaluated the existing hog marketing system based on the following goals: producers should be responsive to the quality and quantity preferences of consumers; buyers and sellers should be equally and adequately informed of market conditions; marketing charges should be based on actual costs and normal profits and these costs should be at their minimum level; physical procurement of hogs should be as efficient as possible with as little loss as possible; and marketing systems should promote the growth of the industry and encourage the development and adoption of improved marketing services and techniques.

To analyse the industry with regard to these goals, Lockhart gathered data through questionnaires given to meat packing plant officials and acquired other information from interviews with representatives of government, public stockyards and terminal markets.

Lockhart stated that there were three functions of the hog marketing system in Alberta that existed at the time of his study. The first was the exchange function, which consisted of the negotiation of the terms of trade, the transfer of title and actual payment. The second related

to the physical movement of hogs, which involved the transportation and storage from the farm to the place of slaughter. Finally, there was the facilitating function, which included the financial responsibility for losses that resulted from the physical deterioration and damage of hogs, market information, standardization and grading of swine.

Lockhart concluded that the industry was performing poorly in the establishment of the sale price of slaughter hogs and the assembly and movement of hogs to the meat packing plants from the farms. The collection of sufficient and accurate data on market conditions and distribution of this information in a useful manner to the industry was also considered to be inadequate.

T.W. Manning's, "Performance of the Hog Marketing System in Alberta," was also published in 1967. The stated objectives of this study were to determine and evaluate the following: the market's competitive power structure; the roles played by terminal market agencies and others in the determination of slaughter hog prices; both the price and non-price procurement practices of different marketing agencies; the performance of the present marketing system; and the likely effectiveness of different programs. Information was gathered from interviews with packing plant officials, stockyard companies, terminal market agencies; retail food companies and reports published by Canada's Federal Department of Agriculture.

In his description of the hog marketing system in Alberta, Manning noted the increasing concentration of the grocery retailing industry as well as the slaughtering and meat processing industry. He also commented that the Alberta Livestock Cooperative, a producer organization, was an important factor in the pricing of Alberta slaughter hogs. According to Manning, the industry's major performance weakness was found in the prices producers received for their product. He suggested this was in part because basic prices were established on the terminal exchanges and too few hogs were sold on these exchanges for an appropriate price to be determined. Three other reasons that were noted for unfair producer prices were redundancies in hog assembly operations that added unnecessary costs to the system, discriminatory buying practices by packers and the lack of producer market power to force a more competitively determined price.

Hu Harries and Associates Ltd. presented their requested study, "Price Relationships in the Alberta Hog Market," to the Alberta Minister of Agriculture in 1977. The purpose of this report was to research the relationships between the prices of slaughter hogs that should exist between the Alberta market and other North American

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markets. Three markets were accounted for - Ontario, Alberta, and American River Points. The American River Points market was considered to be the price setting center for these three markets based on the volumes and directional flows of hogs. This market consists of the following hog centers: Sioux City, Iowa; St. Joseph, Missouri; St. Paul, Minnesota; Indianapolis, Indiana; Omaha, Nebraska; Kansas City, Kansas; St. Louis, Illinois. Sioux City was used as the representative market for the American River Point areas.

The report contends that when the Alberta market is in a deficit position the "Sioux City price plus freight, plus exchange, plus duty, plus or minus processor and convenience differences" should define the price relationship between Alberta and other North American points at both the producer and wholesale levels.[31;p.18] If the Alberta market is in a surplus position then the appropriate price is the Sioux City price, plus exchange and duty when applicable, plus freight to the "best" market able to absorb the excess product. Harries felt that in practical terms the American Pacific Northwest is where the Alberta

It was also Harries' view that Alberta hog prices have shown many departures from the appropriate price relationship he outlined. He felt that outdated processing facilities, higher costs of product distribution in Alberta

compared to Ontario and the U.S, the role of large retailers and the concentration of processing facilities in Edmonton when a large share of production occurs in the Calgary area, all contributed to the departures.

The importance of vertically integrated retailers in the pork industry was considered by Hawkins and Norby in their 1977 paper, "The Implications of Vertical Integration by Food Retailers on the Canadian Pork Marketing System." The purpose of this study was to examine what impact the vertical integration by food retailers would have on the development and expansion of the pork industry. The authors noted two major methods by which retailers were ensuring their position in the market place; these were horizontal or vertical integration and concentration.

Evidence was provided that food retailers held considerable investment in processing facilities while no national packer, with the exception of Canada Packers Inc., appeared to have direct involvement at the retail level. Concern was expressed regarding the high concentration at the retail level and the rapidly growing vertically integrated marketing system. These circumstances gave food processing in Western Canada a somber future as market alternatives for processors were reduced, inhibiting industry expansion. The authors made various recommendations to increase competition at the retail level and maintain it at the processing level. One of these was to limit vertically integrated retailers to supplying their own stores.

The Canadian Pork Council published its report, "Spatial Price Differences For Hogs in Canada," in 1979. The stated objective of this study was to explain hog price differentials that existed between points in Western and Eastern Canada. The paper assembled information already documented regarding price differentials between markets and applied it to hog marketing in Canada. The following five factors that are related to market price differentials were considered in separate chapters: transportation and other transfer costs, local supply and demand conditions, the competitive structure of the meat packing and retailing sectors, regional differences in the cost of hog production and processing, seasonal and other factors.

Based on its research, the Council made a number of observations. One observation was that there appeared to be no clear relationship between regional hog prices in North America and the degree of surplus or deficit in hog production. It was also noted that from 1965 to 1977 Edmonton-Toronto price differentials and pork transportation costs between these markets showed no correlation. A third observation pointed out the high concentration in the packing and retailing industries for pork in the west, but

the lack of it in Quebec and Ontario. Alberta appeared to exhibit non-competitive hog buying practices whereas the purchase of swine in Ontario seemed competitive. Price leadership had been evident in hog purchasing in both Alberta and Ontario and the larger packers in Alberta bought hogs on a market share basis rather than on an The Council discerned that absolute number basis. wholesale and retail margins for pork cuts were greater in Western Canada than in Eastern Canada, while producer hog prices were lower in the West than in the East. The report concluded that excessive hog price differentials between Western and Eastern Canadian markets can be explained in a significant way by the nature of competition in these markets.

Greg Whalley's 1980 report, "The Western Canadian Hog Industry in the Eighties," considered the trends that were evident in the pork industries of the four western provinces during the 1970's. Based on these trends Whalley offered predictions on the nature of the Western Canadian industry up to 1999.

Whalley described the 1970's as a period of considerable decline in the Western Canadian pork industry. The production of hogs reached an extreme low (a 47% decline between 1971 and 1976) which affected the entire industry, causing closures and consolidations in the meat

processing sector. Whalley saw this as an absolute decline in the industry rather than a natural low determined by the cyclical nature of hog production. The report noted the price disputes between packers and producers and suggested this would be a continuing feature of the industry during the 1980's. Concern was expressed regarding the market power that existed at virtually every stage in the industry, and the comment was made that this would lead to inefficiency, poor price performance, and excessive Whalley also stated that there was an apparent margins. increase in the administrative procedures and that the Canadian hog/pork complex would continue to become increasingly administrative in nature. The paper emphasized the importance of the need to develop new markets if the Western Canadian pork industry was to achieve any significant growth in the future.

Foodwest Resource Consultants also presented their study, "Pork Industry in the Alberta Economy," in 1980. The report did not provide detailed consideration of the pricing relationship between the Alberta packers and the Alberta Pork Producers' Marketing Board, because a court case involving these two groups was taking place at the time of research. Otherwise, the report looked at all aspects of the industry. Comments similar to Whalley's were made concerning the industry's decline during the 1970's. The report gave considerable attention to government involvement in the industry at the federal and provincial levels and compared pork industries in the different provinces on this basis.

With respect to government association with the Alberta industry, Foodwest recommended that "the Alberta government must make up its mind about the pork industry and provide the programs to back its view."[23:p.vi] In this area Foodwest encouraged an insurance program for producers, a five year interest rebate program for inflationary costs on producer borrowed capital, a similar rebate program for applicable investments by meat packers in new plant technology, a meat industry development program which would help phase-in labour saving technology in meat processing and accelerated depreciation allowances. The report also recommended that the Alberta Pork Producers' Marketing Board should consider contractual or ownership techniques to acquire greater integration and coordination with both the wholesale/packer sector and the retail, hotel, restaurant and institution sectors when expanding into new domestic and export markets. A more general recommendation stated that selective integration of various forms might be the way to more dynamic growth of Alberta agriculture in the 1980's.

In 1981 a study requested by the Alberta Minister of Agriculture was completed. The study originated from the concern the Minister had for the poor relations between Alberta hog industry members, in particular the Marketing Board, meat packers, the Marketing Council and the Alberta Department of Agriculture. A committee chaired by Jim Foster researched the circumstances of Alberta's pork industry at the time and put their findings and recommendations into a paper entitled, "The Hog Marketing Review Committee." Information for this report was gathered from hearings which were to determine what was happening in the industry, why it was taking place and how different groups were involved. The stated goal of the committee was to accept all relevant information and to accommodate all participants.

In his description of pork industry economics in Alberta, Foster noted that producers' profits are dependent upon production costs and the price of pork. Producers must concentrate on hog production, because they are not large enough individually to affect the price of hogs. Regarding the Alberta Pork Producers' Marketing Board, Foster commented that the Board has exceptional powers which are granted by legislation. The Board has a monopoly selling position, but because it must sell any and all hogs that are produced it is unable to set prices for these hogs. The Board therefore does not represent a complete

monopoly. Concerning the packing industry, the Review Committee stated that it is an oligopoly, but continued to say that more important than the fact an oligopoly exists, is the concern related to the performance of the oligopsonistic market. It was suggested that the market place in Alberta can function properly as is, but there should be minimal barriers to entry and predatory pricing by existing firms should be prevented. At the retail level the Review Committee regarded as exceptional the concentration of Alberta market power in the hands of Safeway. Foster commented that the packer either sells to Safeway or eliminates sixty percent of the consumer market.

The Review Committee also felt that there existed an inability or unwillingness on the part of industry members to communicate with one another. It therefore recommended the formation of a Hog Industry Committee consisting of representatives of the major industry members. This committee was to define industry goals and objectives, commit itself to the development of innovative approaches to food production and processing, to the expansion of domestic and export markets and to better dissemination of information within the industry. The report also stated that if producers wished to participate in the ownership and operation of a packing plant, they should be allowed to It was suggested, however, that the control of the do so. new plant should be in the hands of a group other than the

Board.

In 1982 J.C. Gilson completed his working paper for the Economic Council of Canada entitled, "Evolution of the Hog Marketing System in Canada." Gilson directed much attention towards the development of hog marketing boards as a form of countervailing power and asked the following question: has this development evolved to a point where a form of workable competition can exist?

Gilson noted that Boards are created through legislation and their operations must abide by this legislation which is laid down by government. The business of meat packers is conducted "under conventional commercial practices" and their actions are "governed, to a large extent, by what is permitted under the Combines Investigation Act."[26;p.107] Gilson goes on to say that these circumstances present an anomalous situation, because the nature of public legislation and policy encourages producers to reduce competition amongst themselves so as to achieve a better bargaining position, while buyers, according to the provisions of the Combines Investigation Act, must not conspire to reduce competition. Gilson commented that this may be appropriate when producers are attempting to gain countervailing power, but he questioned how the industry should operate after this market power had been attained. It was suggested that new policies are required if the frustrations of confrontation in the

industry are to subside.

The Leavitt, Hawkins and Veeman 1983 study, "An Evaluation of Pricing and Operational Efficiency Within the Alberta Pork Producers' Marketing Board," was specifically interested in any operational or pricing efficiency changes which could be attributed to the existence of the Alberta Pork Producers' Marketing Board. Four different econometric models were used to test pricing efficiency. The first calculated correlation coefficients between price time series of different spatially separated markets (Toronto, U.S., Edmonton and Winnipeg). The second was a simple regression model in which the dependent variable represented weekly average slaughter hog prices for one market and the single independent variable stood for the average weekly price in another market. The third model was similar to the second and tested whether the difference in price between two markets during the same time period was dependent upon weekly average slaughter numbers in both these markets and the deficit or surplus position of these markets.

Each model was tested using data from six different time periods which covered January 1, 1969 to December 31, 1980. A before and after Board time period (January 1, 1969 to October 31, 1969 and November 1, 1969 to December 31, 1980) was also tested. Operational efficiency was analyzed through the determination of any cost reductions that

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resulted from hog marketing policies implemented by the Board.

Based on their empirical and subjective analysis the authors concluded that the Alberta Pork Producers' Marketing Board increased the information available to producers. This should have benefited operational and pricing efficiency through the better time production of hogs. The pricing efficiency analysis provided mixed evidence. After the Board began its operations there appeared to be improved pricing efficiency of hog marketing, but later time periods indicated the opposite.

Baah's 1984 thesis, "Pricing Efficiency in the Alberta Hog Industry," is similar to the Leavitt, Hawkins and Veeman study and was concerned with changes in pricing efficiency produced by the Markéting Board's major policies and whether the Board had improved pricing efficiency in Alberta's hog marketing system. Other objectives of the paper were to study the lead-lag structure of the relevant markets and to research the movement of the price spread between the Edmonton hog market and other North American markets (Toronto and U.S.)

Baah studied the time periods January 1, 1964 to October 31, 1969 and November 1, 1969 to December 31, 1983, which again were the periods before and after the Board's formation. The empirical analysis used was a Box-Jenkins procedure - a type of Autoregressive Integrated Moving Average model. Baah felt that this would provide more reliable results than those given by a simple regression model. It was hypothesized that the introduction of the Alberta Pork Producers' Marketing Board did not increase pricing efficiency.

Baah's empirical work led him to conclude that the improvement of pricing efficiency was short lived after the formation of the Alberta Pork Producers' Marketing Board. He decided that the provincial government's intervention in the operations of the Board adversely affected the industry and contributed to the loss of price efficiency gains. He also concluded that Edmonton hog prices reflected Toronto hog prices and therefore the information flow between these two markets was efficient. This allowed the rejection of the null hypothesis that the formation of the Board did not increase pricing efficiency. However, the empirical results indicated that United States hog prices did not reflect Edmonton hog prices and therefore information flow between these two markets was inefficient. As a result, the null hypothesis at the international level was confirmed.

Baah also argued that since the formation of the Board, price margins between Edmonton and Toronto markets narrowed a great deal. He stated that the Alberta hog market is isolated from the Ontario and United States

midwestern hog markets.

In 1985 Deloitte Haskins and Sells Associates presented their report, "Economic Development Prospects for the Alberta Pork Industry to the Year 2000." This study reviewed the industry from 1963 to 1983 and examined the industry's development prospects to the year 2000. Some of the points noted by the report's historical review were as follows: in 1961 there were approximately four times the number of hog farms in 1981, but only twenty-three percent more hogs; several slaughtering and meat processing plants closed since 1976 and many of these plants were faced with outdated multi-storey operations, high fixed costs, low throughout volumes and high labour rates and the packing sector went from excess capacity to under capacity in a few years.

The authors suggested four areas of opportunity for future hog industry development in Alberta. They were expanded production, exports, product improvement and enhanced production and productivity. Constraints to these development prospects that were mentioned were industry structure, trade limitations and market limitations. Regarding industry structure Deloitte Haskins and Sells Associates felt there was a lack of cooperation within the industry with numerous rifts between the Board, the Alberta Marketing Council and the meat packers.

2.3.1 Literature Review Summary

In summary, the literature surveyed considered several items regarding the Alberta hog marketing industry. Perhaps the most notable was the concern over prices which producers' received for their product. It may be understood from the literature that the Alberta market for slaughter hogs is part of a larger North American market and is affected by prices determined in other markets. However, comments were made that suggested the Alberta market is isolated to a certain degree from other North American markets because of the structure and behaviour within it.

The concentration of market power at the meat packing and retailing levels was felt to have a negative impact on the performance of the industry, especially the level of producer prices. As a countervailing power the Alberta Pork Producers' Marketing Board aided producers by providing them with information and a more competitive selling arrangement. However, empirical testing showed no substantial support for consistent fair producer prices attributable to the Board's presence. It was also mentioned that, because of the ill will which had developed in the industry, there was little communication between its members to the detriment of the industry.

CHAPTER 3

THE STRUCTURE OF THE PRODUCING, PACKING AND RETAILING SECTORS

3.1 Introduction

In this chapter the three sectors which comprise the Alberta hog marketing industry will be described separately. They are the producing, meat packing and grocery retailing sectors. The objective of this chapter is to consider why a sector is characterized by a particular structure. Concentration gives some indication of an industry's structure and therefore much of this chapter will focus on its determinants. Attempting to account for the structure of each sector in the Alberta hog marketing industry is the first step in understanding the vertical relationships between them.

3.2 Producing Sector

3.2.1 Concentration

The level of concentration in the hog producing sector is very low. This is obvious even though no actual concentration figures are available. Each producer operation is small relative to the total size of the market. For example, a large hog producing unit would market two thousand hogs annually. This farm would contribute less than one half of one percent to the number of hogs slaughtered annually in Alberta's meat packing plants.

The market for pork from Alberta produced slaughter hogs declined as Canada's eastern markets became selfsufficient. However, the market remains large enough to support many thousands of efficient producers. Table 3.1 below shows there has been a significant reduction in the number of hog farms in Alberta from 1931 to 1981. It also shows there are still many thousands of producers in the province.

TABLE 3.1

	NUMBER OF	FARMS	REPORTING	PIGS IN	ALBERTA	
YEARS:	1931	. 1941	1951	196	L 1971	1981
FARMS:	54,512	69,55	4 49,660	ð 41,Ø2	L7 26,204	4 9,994

Source: Mike Shumsky, The Changing Profile of the Canadian Pig Sector, May 1985.

3.2.2 Economies of Scale

Producers who raise hogs to the slaughter stage may be involved in either of two types of enterprises, farrow to finish or finishing. The farrow to finish venture involves the breeding of sows and caring for the sow's offspring until the litter reaches the appropriate weight (190 to 210 lbs.) to be sold on the slaughter hog market. The farmer with a finishing operation purchases hogs that are weaned and cares for these hogs until they are ready for slaughter.

Before the 1960's hog farming was on a small scale and required little investment. In part this was because hogs were considered a secondary source of income. However, a factor concerns technology, which at that time second precluded large scaled, specialized hog enterprises. In the early 1960's hogs were kept on a "loose" basis and they foraged and roamed outdoors. [16; p.27] However, technological advances were made in the area of confined livestock feeding in the 1950's, with the result that during the late sixties and seventies hogs were increasingly raised in Today the confinement barn is common in hog confinement. production.

With these technological advances hog production became specialized and it was possible for hogs to be a primary source of income. As a result, production units have increased in size. Foster states that for a farrow to finish operation in 1950 a herd of fifty sows was considered large. In the 1960's this figure increased to one hundred and fifty sows and in the eighties herds of two to three hundred are the makings of a large enterprise.[24; p.ll] The vast majority of the large scaled operations in Alberta today are farrow to finish enterprises.

Figures 3.1 and 3.2 provide evidence of the increasing share of hogs coming from units of greater scale. Farms with fewer than five hundred pigs reported a declining share of the total number of hogs marketed between 1971 and 1981. Figure 3.3 shows the percentage of producers involved in different sized operations for the years 1976 and 1980. Though the majority of producers were involved in smaller scaled ventures for both years, the percentage of producers in this category did decline between 1976 and 1980, while the proportion operating larger units increased.

Producers would not involve themselves in large operations if they did not think it was profitable to do so. This fact points to the possibility of scale economies in hog production and there is evidence which indicates they are present.

Eyvindson (1973) considered the 1970 per animal building and equipment costs for different sized hog operations and found that "the cost for the largest weanling pig and hog finishing enterprise groups are less than one half the cost of the smallest enterprise groups." [21;p.22] He also discovered that for farrow to finish operations the largest enterprises had just over one half the per animal costs of the smallest ventures. Medium to large farrow to finish operations on average had a slightly



Sector, 1985, p. 18.



Sector, 1985, p. 18.



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larger number of pigs per litter than smaller enterprises. Finishing units of a greater scale had a lower death rate loss of hogs than the smaller scaled units.

Tables 3.2 and 3.3 also provide an indication of scale economies in hog production. Shown in these tables are feed costs, cash costs and non-cash costs per hundredweight of dressed pork in 1980 for production units of different size. Cash costs are all out-of-pocket expenses and include cash outlays for insurance and tax. Non-cash costs comprise operator and family labour, depreciation and interest costs on fixed assets.

It is apparent for both farrow to finish and finishing operations that as the size of the business increases total cash costs and total costs per hundred-weight dressed pork decline. Table 3.4 shows there is a correlation between farm size and hog quality; larger units have better grades of market hogs. Table 3.5 relates deathloss percentage to enterprise scale and, as Eyvindson found, deathloss was lower for larger production units.

Although scale economies exist in hog production, it does not seem likely they threaten to lead to the development of a highly concentrated industry. The trend towards larger production units will have increased concentration to some degree, however the level of concentration still remains negligible. What is interesting to note regarding scale economies and the optimal size of a hog farm is that

TABLE	3.	2

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ESTIMATED RETURNS AND COSTS FOR FINISHING ENTERPRISES BY SIZE ALBERTA, 1980

		Size Classes					
	50	50-99	100-199	200-499	500-999	1000	Alberta
2				- Dollars -	~ ~		
RETURNS					,		
Returns/Cwt Dressed	73.44	70.81	70.83	76.97	80.95	76.83	78.38
TOTAL RETURNS	3603.55	8948.12	17412.22	39444.36	82960.01	136227.81	57039.76
COSTS							
Feed Costs/Cwt Drs.	35.61	33.45	37.93	35.73	35.78	35.17	35.63
Other Cash Costs/Cwt Drs.	31.11	24.70	31.55	34.71	35.34	30.78	33.42
Total Cash Costs/Cwt Drs.	66.72	58.16	69.47	70.45	71.13	65.96	69.05
Non Cash Costs/Cwt Drs.	35.62	30.58	29.99	18.24	14.16	10.60	14.74
Total Costs/Cwt Drs.	102.34	88.73	99.47	89.29	85.29	76.56	83.79
TOTAL COSTS	5021.62	11212.55	24452.00	45757.60	87403.52	135744.69	60977.29
Returns Over Cash/Cwt Drs.	6.72	12.65	1.36	6.52	9.82	10.87	9.33
Net Returns/Cwt Drs. (Returns to Management)	(28.90)	(17.92)	(28.64)	(12.32)	(4.34)	0.27	(5.41)

Source: Carlyle Ross, <u>Economics of Hog Production in Alberta 1980</u>, August 1982, p. 82.

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	Size Classes								
	< 50	50-99	100-199	200-499	500-999	1000-1499	1500-2499	≥2500	Alberta
					Dollar	s			
RETURNS			-						
Returns/Cwt Dressed	57.73	64.77	65.57	67.31	72.12	67.70	74.46	66.96	68.74
TOTAL 'RETURNS	6341.15	15177.99	17993.52	38220.20	95746.78	150446.68	242578.72	422859.20	113794.90
COSTS									
Feed Costs/Cwt Drs.	38.75	35.73	45.24	41.73	42.14	38.55	39.12	35.86	38.56
Other Cash Costs/Cwt Drs.	9.80	16.23	17.70	13.90	12.85	11.18	9.43	9.01	10.82
Total Cash Costs/Cwt Drs.	48.56	51.96	62.94	55.62	54.99	49.73	48.55	44.87	49.38
Non Cash Costs/Cwt Drs.	39.58	36.27	36.77	28.29	22.18	17.30	15.08	11.69	17.22
Total Costs/Cwt Drs.	88.14	88.23	99.72 [`]	83.91	77.17	67.03	63.63	56.56	66.61
TOTAL COSTS	9680.58	20675.71	`27363.73	47647.97	102449.18	148958.18	207295.49	357149.63	110264.18
Returns Over Cash/Cwt Drs.	9.17	12.81	2.63	11.69	17.12	17.97	25.91	22.09	19.36
Net Returns/Cwt Drs. (Returns to Management)	(30.41)	(23.46)	(34.15)	(16.60)	(5.05)	0.67	10.83	10.40	2.13

Source: Carlyle Ross, Economics of Hog Production in Alberta 1980, August 1982, p. 80.

TABLE 3.3

 ESTIMATED RETURNS AND COSTS FOR FARROW-FINISH ENTERPRISES BY SIZE ALBERTA, 1980

HOG	INDEX	BY	SIZE	OF	OPER

TABLE 3.4

AVERAGE	HOG	INDEX	BY	SIZE	OF	OPERATION
	AI	LBERTA	, 19	975-19	980	

Average Index	Number of Market Hogs											
	< 51	51-200	201-500	501-1000	1001-2500	2501-5000	> 5000	Total				
1975	97.97	100.07	101.27	101.17	102.04	_	-	100.33				
1976	97.15	98.62	100.30	.101.23	101.74	102.09	103.11	100.56				
1977	97.63	98.95	100.64	101.60	102.23	102.51	102.80	100.95				
1978	98.06	99.23	100.82	101.61	102.21	102.37	103.02	101.04				
1979	98.29	99.42	100.88	101.69	102.38	102.50	102.67	101.19				
1980	98.26	99.38	100.81	101.83	102.48	102.77	102.46	101.31				

Source: Alberta Pork Producers Marketing Board Producer Profile 1976-1980, Edmonton, Alberta.

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ADDERIR; 1900												
	Size Classes of Annual Sales											
Type of Operation	K 50	50-99	100-199	200-499	500-999	1000-1499	1500-2499	>2500				
Farrow- Finish	4.4	3.2	6.8	3.5	2.2	2.4	3.7	3.0				
Finishing	3.8	2.8	2.4	2.7	2.4	2.3	-					

TABLE 3.5

PERCENTAGE DEATHLOSS BY OPERATION SIZE ALBERTA, 1980

Source: Carlyle Ross, Economics of Hog Production in Alberta 1980, August 1982, pp. 21, 25.

although the larger sized operations are decidedly more efficient, the majority of producers are involved in small scale enterprises. This is a seemingly important feature of the hog producing sector in regard to the price of slaughter hogs, because a higher price is necessary for small scaled operations to cover their costs per hog.

3.2.3 Barriers to Entry

Hogs usually represent a secondary source of income to producers who are involved in hog production on a small scale. These farmers tend to have small hog finishing enterprises and they enter the industry when it is profitable and leave it when it is not. Thus they are often referred to as "inners and outers", and they have historically represented the majority of producers. Their entry and exit at will seems to indicate a lack of barriers to entry in the producing sector. This may be true for the "inner and outer", but is probably not the case for someone who wishes to start a relatively large hog farm.

Technological improvements and the trend towards larger, specialized units have altered the cost structure of the typical hog farm. When production units were limited to small, secondary income operations, little investment was required. However, today's standard enterprise is much more capital intensive, a fact which draws attention to the possibility that absolute costs have

become an entry barrier. Whether absolute costs now discourage potential hog farmers from entering the business will likely depend on the type and size of operation considered.

Tables 3.6 and 3.7 show the average market value of fixed assets for different sized farrow-finish and finishing enterprises in 1980 (size is measured by the number of pigs marketed). Tables 3.8 and 3.9 present the average annual interest costs of fixed assets of these businesses for the same year. As expected, the necessary level of investment and interest costs increased with farm size for both farrow-finish and finishing operations. Also shown is the lower level of investment and interest cost for a finishing enterprise as compared to a farrow-finish business of similar size. If absolute costs are an entry barrier, they are less so for smaller operations than larger, and also lower for finishing ventures than for farrow-finishing ventures. The continuing presence of "inners and outers" likely supports this conclusion.

For those who want to specialize, absolute costs are a greater factor and could be a problem. It appears from tables 3.2 and 3.3 that farrow to finish farms were on average more profitable than finishing enterprises during 1980 (brackets indicate a negative return). In both types of ventures the larger scaled units have a higher average net return for the same year. Thus the farmer who wishes to

TABLE 3.6

AVERAGE MARKET VALUE OF FIXED ASSETS FOR FINISHING ENTERPRISES BY SIZE ALBERTA, 1980

Size Classes	Buildings & Equipment	Manure Storage & Handling	Feed Storage & Equipment	Machinery & Other Equipment	Land	Total
			Dollars -		•	·
< 50	1260	13	374	1377	194	3216
50- 99	2782	263	1040	2838	1275	8197
100- 199	12493	2143	1919	2753	2664	21972
200- 499	21882	1475	3971	6665	3219	37212
500- 999	40939	2761	3791	11598	1916	61005
≥1000	58140	3416	7763	17825	2800	89943
ALBERTA	27731	1951	3497	8326	2135	43639

Source: Carlyle Ross, Economics of Hog Production in Alberta 1980, August 1982, p. 36.

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Size Classes	Breeding Stock	Buildings & Equipment	Manure Storage & Handling	Feed Storage & Equipment	Machinery & Other Equipment	Land	Total
· .				Dollars			
. < 50	871	6544	376	. 804	1810	1171	11576
50- 99	2190 .	13221	1670	2239	7969	1440	28729
100- 199	3418	16469	718	4654	5336	775	31369
200- 499	6419	33156	2115	6284	10466	4821	63262
500- 999	14600	89939	3983	10588	17371	3941	140421
1000-1499	17930	124082	5427	18216	25682	6360	197696
1500-2499	24230	185591 [`]	4445	34780	20081	7920	277047
≥2500	49821	320853	7987	36440	42634	7565	465300
ALBERTA	14696	93538	3501	12857	17005	4465	146061

AVERAGE MARKET VALUE OF FIXED ASSETS FOR FARROW-FINISH ENTERPRISES BY SIZE ALBERTA, 1980

TABLE 3.7

Source: Carlyle Ross, <u>Economics of Hog Production in Alberta 1980</u>, August 1982, p. 30.

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TABLE	3.8
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AVERAGE ANNUAL INTEREST COSTS OF FIXED ASSETS FOR FINISHING ENTERPRISES BY SIZE ALBERTA, 1980

Size Classes	Buildings & Equipment	Manure Storage & Handling	Feed Storage & Equipment	Machinery & Other Equipment	Land	Total
		· •	Dóllars	5		
< 50	86.58	0.86	25.69	94.64	. 24.22	231.99
50- 99	191.23	20.16	71.50	195.08	159.38	637.34
100-199	858.92	147.32	131.90	189.26	333.04	1660.44
200-499	1504.35	105.59	272.97	458.25	402.40	2743.57
500-999	2814.61	192.01	260.58	797.39	239.47	4304.06
≥1000	3997.09	245.18	533.71	1225.46	3,50.00	6351.43
ALBERTA	1906.45	137.30	240.41	572.43	266.84	3123.45

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Source: Carlyle Ross, Economics of Hog Production in Alberta 1980, August 1982, p. 49.

Size Classes	Breeding Stock	Buildings & Equipment	Manure Storage & Handling	Feed Storage & Equipment	Machinery & Other Equipment	Land	Total
				- Dollars	_ ~ _ ~		·
< 50 [′]	108.93	449.88	25.83	55.27	124.46	146.34	910.71
50- 99	273.75	. 908.89	141.81	153.93	547.88	180.00	2206.28
100- 199	427.22	1132.20	49.38	319.95	366.83	96.88	2392.45
200- 499	822.36	2313.13	157.04	423.87	726.85	608.80	5052.03
500- 999	1824.97	6183.30	282.19	727.90	1194.24	492.69	10705.28
1000-1499	2241.29	8530.60	383.58	1252.33 ·	1765.61	795.00	14968.42
1500-2499	3028.75	12759.38	328.09	2391.13	1380.58	990.00	20877.93
≥2500	6227.60	22058.61	641.95	2505.28	2931.07	945.57	35310.09
ALBERTA	1836.96	6430.75	258.09	883.91	1169.07	558.09	11136.86

TABLE 3.9

AVERAGE ANNUAL INTEREST COSTS OF FIXED ASSETS FOR FARROW-FINISH ENTERPRISES BY SIZE ALBERTA, 1980

Source: Carlyle Ross, Economics of Hog Production in Alberta 1980, August 1982, p. 47. make hogs his primary source of income is likely to consider a large farrow to finish enterprise as a good choice. However, he may be discouraged from entering the industry with this size and type of venture because of the large initial capital outlay required. Furthermore, he may have difficulty in attaining the necessary funding from a financial institution. Hence, absolute costs are a potential barrier to entry.

Apart from absolute costs there are really no other entry barriers to hog production. Scale economies are unlikely to be a barrier given the market will support numerous efficient farms. Furthermore, entry of a large unit will not affect the price of hogs, therefore entrants need not worry about tactics employed by existing farmers to keep them out. Product differentiation is almost nonexistent in hog production because hogs are essentially a homogeneous product. Differences in quality are not enough to allow a substantial market share to be controlled by a small group of producers, and these differences are accounted for by the price awarded to various grades of hogs.

3.2.4 Summary

In summary, the hog producing sector may be described as a competitive industry. This sector exhibits very low concentration for a number of reasons. First, the

market is large enough to support many efficient hog farms. Second, though scale economies exist in the industry and an increasing proportion of hogs have come from larger units, these sizable operations do not supply a share large enough to affect price to the detriment of smaller producers. In this manner scale economies do not represent a barrier to entry. Entry barriers are likely to exist in the form of absolute cost requirements, however this is probably limited to large operations only. It seems producers may enter the industry almost at will on a smaller scale.

3.3 Meat Packing Sector

3.3.1 Concentration

The Alberta meat packing industry has historically been both an oligopsony and an oligopoly. The industry has consisted of a few large firms whose operations extend nationally and small firms whose business has been limited to the Alberta region. The large national firms have dominated the market for slaughter hogs to a considerable degree. Table 3.10 lists the share of the total number of Alberta hogs purchased by the top few firms for different years.

The share of hogs purchased by the top few firms is to some extent also an indication of their market share for wholesale pork products. Statistical figures in this area are limited, but it has been reported that in 1972 the top

Year	Number of Top Firms	Share of Total Alberta Hogs Purchased
	•	
1957 ¹	3	80.0%
1975 ²	4	77.2%
1976 ³	4	80.0%
1983 ⁴	5	95.0%

TABLE 3.10

Source: ¹ Leonard E. Poetshke, <u>A Study of Price Determination</u> in the Alberta Hog Market, 1960, p. 23.

> ² Canadian Pork Council, <u>Spatial Price Differences</u> for Hogs in Canada, March 1979, p. 7.3.

3 Ibid.

⁴ S. Leavitt, M. Hawkins and M. Veeman, <u>An Evaluation of Pricing and Operational Efficiency Within the Alberta Pork Producers Marketing Board</u>, September 1983, p. 17.

four firms in the Alberta meat packing industry held 81.4% of total meat shipments and the top eight firms had 94%.[10;p.7.3] These figures would include pork products shipped outside of Alberta. Today in Alberta there are two large packing plants, Gainers Inc. and Fletcher's Fine Foods Ltd. These plants purchase a majority share of Alberta hogs.[1] Thus the Alberta meat packing industry has been and continues to be highly concentrated.

3.3.2 Economies of Scale

High concentration in the Alberta meat packing industry may involve economies of scale. This possibility relates to the number of optimal packing plants the hog market can support. For example, if economies of scale lead to an optimum hog plant which kills 5000 hogs per week and 40,000 hogs are marketed per week, then the market will support eight efficient plants. If the number of hogs marketed dropped to 30,000 hogs per week, the market would then support six optimum plants. Thus, the supply of hogs is distributed amongst fewer firms and the industry is more concentrated. Scale economies are related to concentration in the sense that they will determine the optimum plant size.

The Canadian Pork Council (1979) found a strong correlation between 1975 concentration figures for different provincial hog packing industries and the number

of federally inspected hogs slaughtered. Peak slaughter numbers were used for each region to capture plants operating at or near capacity. The results showed that on average as the maximum size of the provincial hog market dropped by ten percent, concentration increased by 5.4 percent.[10;p.7.6] This result suggests that concentration is related to the number of efficient plants the hog market will support, and therefore concentration is likely related to economies of scale in meat packing.

Plant-Specific Economies of Scale

Meat packing facilities operate with high fixed capital costs. To a certain degree they also operate with high fixed labour costs because most packers are unionized and they must guarantee a minimum number of work hours per week.[48;p.45) High fixed costs make the financial stability of meat packing operations sensitive to the number of animals they handle. Unit costs are reduced by spreading expenses over a greater number of slaughtered and processed hogs.

Testimony provided in the 1961 Restrictive Trade Practices Commission (RTPC) report stated that the cost of erecting a meat packing facility in 1961 did not increase directly with the size of the plant.[8;p.371] If this was the case, larger plants with greater throughput could have lower per unit capital costs than a smaller plant with less

through-put. Testimony was also provided that there was a minimum plant size for the economical use of many types of meat packing equipment.[8;p.379] These two characteristics represent plant-specific economies of scale.

Kerr and Ulmer (1984) stated that new technology in pork slaughter and processing is tied to economies of scale. The newest plants in the United States use this technology and slaughter hogs on a relatively large scale (over 750,000 hogs annually). In the United States one hundred and one plants, comprising eight percent of the total, slaughter ninety percent of all hogs. In 1982 there were thirty-four plants which slaughtered more than one million hogs. Close to sixty percent of the total hog supply was killed in these plants.[35;p.39] It appears plant-specific economies of scale are available in the meat packing industry and that optimum plants will have a considerable share of the market for slaughter hogs.

Whether Alberta's plants have been built to the optimum size has at times been questionable. There is little doubt that during the seventies and early eighties the industry exhibited significant excess capacity. The Alberta hog supply could not support the number of plants in operation. For the period January 1974 to July 1975, the average hog slaughter capacity used was forty-five percent.[50;p.4] Hu Harries (1977) reported that the Alberta meat packing industry at the time of his study was

operating at not more than sixty percent of its capacity.[31;p.25]

Kerr and Ulmer (1984) also stated excess capacity was a salient feature of the Western Canadian livestock and meat processing industry. They noted that the industry expanded during the 1960's and 1970's in response to increases in population and per capita pork consumption.[35;p.52] After the mid-seventies there was a decline in per capita consumption and the Canadian economy experienced a recession in the early eighties. The impact of these events created excess capacity in the meat packing industry. An industry spokesman commented, "slaughter animal supplies, while holding steady overall, have never justified the surge of construction which occurred in the 1960's and 1970's."[4;4/16/84;p.22]

During this time period many firms withdrew from the industry. By 1985 there were only two plants killing hogs in the province. It appears market size and plant-specific scale economies have played a role in determining the high level of concentration in the Alberta meat packing industry.

Multi-Plant Economies of Scale

The presence of national firms that have plants across the country draws attention to the possibilities of multiplant economies of scale. The 1961 RTPC report commented

that each individual plant of one large national packing company would benefit from "highly skilled central accounting and management organizations, access to ready credit on favourable terms, national advertising and comprehensive research and development work."[8;p.381] National packers have another advantage in their wide distribution system, which enables them to distribute their products on a country wide basis and to shift supplies readily from surplus to deficiency areas.[8;p.410]

The ownership of numerous plants also has its problems. Conflict can arise between centralized management and individual plant management. The RTPC report noted that coordination of buying and selling among plants to secure the largest distribution of overall production was often an issue. Plants in different markets often wanted to pay or sell at prices that benefited them individually, but at the same time were a detriment to the company as a whole.[8;pp.382-383] The difficulty of adapting a large scale organization to a major change in the system of distribution was also mentioned.[8;p.387]

Despite problems such as these, multi-plant scale economies do give the national packers an advantage over smaller packers in regional markets. This is an important contributing factor to the power of the major packers. It helps them to maintain their position in the market and has likely encouraged the oligopolistic nature of the Alberta

meat packing industry.

3.3.3 Barriers to Entry

In addition to scale economies, the competitive nature of the Alberta meat packing industry will have been affected by barriers to entry. Foster (1980) states that entry barriers in the packing industry are large financial requirements, security of hog supply and problems of acquiring space for meat products on a retail shelf. In addition to these, Foster sees predatory pricing by established firms as a commonly employed tactic to discourage entry.[24;pp.27-28]

All of these relate to scale economies in the sense that entry of a plant of optimal size would significantly increase the competition for hogs and retail sales. This would raise hog prices and lower wholesale pork prices. To prevent this from happening, established firms may employ the predatory pricing tactics Foster notes to prevent new firms from entering.

Product differentiation also has some potential as an entry barrier. However, it would be limited to a new firm that wishes to sell processed meat products. Processed meats are differentiable because they can be given a variety of tastes through different methods of curing and smoking. Brand labels are standard on processed items and therefore the products of established firms are well known in the market. New firms would have trouble attracting consumers away from the products of existing firms to their own.

3.3.4 Diversification

In addition to scale economies and entry barriers, the position of the national packers has, to some extent, been enhanced by their diversification - a feature long evident in the meat packing industry.

Packers initially diversified to acquire market outlets for their animal by-products. However, diversification has also served as a useful means to employ the unutilized resources of management. Packers were experienced at handling perishable products and they added to their business goods of similar nature, such as fruits and vegetables. Diversification also meant that marketing channels controlled for certain products could be used for other items.[8;p.139]

Through their diversification the large national packers gained further advantage over their smaller regional rivals, especially in their ability to utilize animal by-products. The revenue national packers acquired from their businesses outside of meat packing and processing provided some additional financial stability to the cyclical nature of meat packing. Table 3.11 shows some of the subsidiaries of three of the packing firms that have at

TABLE 3.11

SELECTED SUBSIDIARIES OF THREE NATIONAL PACKERS

National Packers	Subsidiaries
Canada Packers Inc.	Canadian Vegetable Oil Processing Ltd. The Collis Leather Company Ltd. Federal Cold Storage and Warehousing Co. Ltd. The Harris Abattoir Co. Ltd. Hoffman Meats Inc. Industrial Bags Ltd. Tender-Lean Beef Inc. York Farms Ltd.
Burns Fine Foods Ltd.	Burns Foods Inc. Burns Meats Ltd. Alberta Hide Processors Ltd. Canadian Dressed Meats Lethbridge Ltd. Canadian Dressed Meats Ltd. Canbra Foods Ltd. Stafford Foods Ltd. Palm Dairies Ltd. Scott National Co. Ltd. Snowcrest Packers Ltd.
Gainers Inc.	Four Corner Farms Ltd. Lincoln Poultry Farms Ltd. Nutriproducts Ltd. The Toppings Co. Ltd.

Source: Statistics Canada, Inter-Corporate Ownership, 1985.

one time or another been involved in the Alberta hog market.

Alberta packers are also diversified in terms of the different species of animals they slaughter. The typical plant's throughput consists of both cattle and hogs. By slaughtering and processing two species, packers are protected to a certain extent from a decline in the supply of one animal input. However, even though cattle and hogs have different cycles, their supply numbers can reach lows at the same time, as was evident during the seventies.

Hogs do tend to have a special place in packer operations. The hog cycle repeats itself faster than the cattle cycle and hog volumes are therefore relatively more consistent than cattle volumes. The more stable hog supplies are very important to the efficiency of packer operations. A representative of the Canadian Cattlemen's Association was quoted as saying,

> Without a steady hog volume, packers can't operate efficiently. This is especially true of small packers. The swings in the cattle market are too wide and the cycle too slow, for the small packer to survive.[4;4/27/79; p.16]

3.3.5 Conduct

The conduct exhibited by the meat packing sector is in accordance with its oligopoly/oligopsony structure. There has been evidence of both price leadership and market sharing. The 1961 RTPC report contains evidence of price leadership in the following letter sent by the chairman of Canada Packers to all the company's plant managers. This letter is date April 12, 1956.

> We must take corrective action on provision's selling prices. We can only lose by delaying it. Hogs cannot be cheaper than they are now, so that selling prices are the only possible correction, and although it may cause some very temporary strain, I am certain that the industry will follow our lead. As by far the biggest factor in the industry, we are the ones who must initiate corrective action.[8; p.280]

The Canadian Pork Council (1979) also found indications of price leadership when it considered Alberta sales data for the week May 9th to May 12th of 1977. The Council concluded that during this period two packers had a significantly greater influence over changes in market price than any other packer. [10; p.7.25][2]

It was difficult for the Council to find definitive results concerning market sharing. The Council stated that some packers purchased a fairly constant share of hogs each month while other packers did not.[10;p.7.28] Leavitt, Hawkins and Veeman (1983) reported that the market shares of four of the major Alberta meat packers had remained stable for the years 1972, 1974 and 1976.[3]

Smaller packers have at times experienced frustration when attempting to increase their market share, because

large packers have taken action to prevent it from happening. The letter below is evidence of this. It was written by the president of Grande Prairie Packers to the Alberta Minister of Agriculture and is dated September 25, 1978.

> Prior to July, 1977 our firm experienced some difficulty in obtaining the necessary supply of hogs for slaughter, which is unusual since the immediate area produces more than my slaughter requirement. I experienced a situation where Edmonton packers paid much more for F.O.B. Grande Prairie hogs than they paid for Edmonton area hogs, and then these Edmonton packers had to pay transport costs to This situation was certainly not a Edmonton. reflection of any quality differential between Edmonton and Grande Prairie hogs. It is my view that such a phenomenon occurs to ensure that there is industry unanimity - that is, my firm must not grow, and certainly must not participate in the Edmonton market. [37;p.22]

The national packers are able to influence the business of smaller packers in other ways. National packers take part in markets across the country and are able to influence market conditions by diverting their own supplies and products from one market to another. By this method they can affect the price level. What follows is evidence from the 1961 RTPC report. It consists of two letters: the first, dated December 7, 1950, was sent by the Canada Packers' chairman to the Edmonton plant manager; the second, dated December 8, 1950, was sent by the plant manager to the chairman.

Surely, there must be some simple way of getting a bit of common sense into the Alberta hog picture. If you still feel Vancouver (particularly Diamond) is largely responsible for your high market, isn't the natural thing to make the provision situation bad in Vancouver? If Diamond finds that he cannot go along week after week raising Alberta costs, and get out on his hogs in Vancouver, then surely he will tone down a bit. But, if he makes money on these hogs, he will continue to buy them at steadily advancing prices.[8;p.292]

We are selling Vancouver considerably more product ... With our crazy high market in Alberta, we took a heavy loss on our sales to Vancouver this week. ... Our Vancouver sales this week should slow up Diamond. Upon arrival in Vancouver, practically all this product has been or will be immediately resold to the trade. [8;pp.292-293]

These letters refer to a situation in which small packers in Vancouver (e.g. Diamond) were receiving relatively high prices for their processed pork products. As was usually the case for Vancouver packers, these firms were purchasing and processing Alberta produced slaughter hogs. They were able to pay higher prices for Alberta hogs, because they were getting high prices for their wholesale products. This put upward pressure on the price level in the Alberta slaughter hog market. Canada Packers responded by increasing the supply of their wholesale processed pork products in Vancouver, in hopes of reducing wholesale pork prices in that market. With lower Vancouver wholesale prices, the smaller packers would not be able to bid as high for Alberta hogs. Thus, the price paid for Alberta hogs would likely decline.

The major packers have also been involved in price collusion and pleaded guilty to charges of conspiracy to unduly lessen competition in the purchase of slaughter hogs. The original charges also included price collusion in the sale of wholesale pork products, however the Crown did not proceed with these charges. This event will be considered in detail in chapter five.

3.3.6 Packing Sector Summary

The Alberta meat packing sector is a highly concentrated industry that comprises a number of small meat packing firms and a few large national packers. The national packers dominate the market to a considerable degree. The strength of these firms in their industry has come from plant-specific and multi-plant scale economies, diversification and barriers to entry. Their conduct in relation to other members of their industry has been typical of an oligopoly. There is evidence of both market sharing, price leadership and behaviour which prevents smaller packers from increasing their market share.

3.4 Retailing Sector

3.4.1 Concentration

At one time the grocery retailing industry comprised many small shops offering few items. Although these neighbourhood shops still exist, today the industry is dominated by large supermarkets which offer many items in one store. It is the large supermarkets which are of interest because they handle the greatest amount of retail pork products.

Grocery and combination stores are usually classified under the following three headings: chain stores, voluntary groups and unaffiliated independents. Chain stores include four or more stores that fall under single ownership. Voluntary groups are independent stores which operate in major or secondary wholesale sponsored group programs. Unaffiliated independents consist of all other grocery and combination stores. [43;2/78;p.85] Two additional groups that may be used for supermarket classification are department stores and consumer cooperatives. Woodward's was the most recent example of a department store retail operation, but it has been purchased by Canada Safeway Ltd., a powerful corporate supermarket chain. Calgary Coop is a typical co-operative and along with I.G.A. it represents a voluntary group store.

The dominant characteristic of the grocery retailing industry over the past few decades has been its increasing

concentration. This is especially true of the prairie provinces. Concentration figures for the grocery retailing industry in Alberta are few. Table 3.12 presents four firm concentration ratios for the years 1966 and 1973 for Calgary and Edmonton. The figures are divided between the assumption that "stores affiliated with voluntary or cooperative groups are free from central control" and the assumption that they are not.[20;p.6] Under the second assumption the concentration ratio's are much higher and in either case, concentration was greater in 1973 than in 1966.

Food West Resources (1980) stated that four firms control ninety percent of the Edmonton market.[23;p.12] Foster (1981) suggested that because Canada Safeway controlled sixty to seventy percent of retail meat sales in Alberta, it had close to monopoly power for this product and that together the major retail food stores make an oligopoly.[24;p.28] As stated above, Canada Safeway is a supermarket chain store and it is the chain stores which have been acquiring the majority of market share. Table 3.13 provides the figures which show this development. Safeway's recent purchase of Woodward's Food Floors has further added to its market power and increased the level of concentration.[4]

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Degree of Control by	1	966 ¹	1973 ²		
Affiliated Voluntary or Cooperative	Calgary	Edmonton	Calgary	Edmonton	
Free from Central Control	67.2%	64.1%	76.2%	92 . 9%	
Centrally Controlled	69.1%	73.4%	91 . 9%	93.0%	

TABLE 3.12

MARKET SHARES OF TOP FOUR GROCERY RETAILERS

Source: ¹ Peter Dooley, <u>Retail Oligopoly: An Empirical Study of</u> the Structure, Conduct and Performance of the Grocery Trade on the Prairies, 1969.

> ² Bruce Mallen, "Competition in Canadian Food Retailing," 1977.

		Percentage Share				
Year	Chain Stores	Group Independents	Unaffiliated Independents			
1066	50 5					
1966	50.6	36.6	12.8			
1967	52.3	37.8	9.9			
1968	52.4	41.8	5.8			
1969	55.2	41.6	3.2			
1970	58.1	40.5	1.4			
1971	58.4	39.4	2.2			
1972	66.4	31.6	2.0			
1973	63.1	31.5	5.4			
1974	64.7	28.2	7.1			
1975	67.7	25.8	6.5			
1976	69.0	24.7	6.3			
1977	70.1	23.8	6.1			
1978	69.8	24.0	6.2			
1979	66.0	27.0	7.0			
1980	65.6	27.3	7.1			
1981	66.0	27.0	7 0			
1082	68.8	2/ 9	× 6 /			
1002	00.0	24.0	0.4			

TABLE 3.13

DISTRIBUTION OF SALES IN ALBERTA

Source: <u>Canadian Grocer</u>, August 1976 and February 1984.

3.4.2 Economies of Scale

Plant-Specific Economies of Scale

Peter Dooley (1969) stated, "Grocery retailing has become concentrated into fewer and fewer hands in the last several decades because the cost and demand structure favours the larger firms."[20;p.8] This statement suggests scale economies exist in grocery retailing. However, Dooley's statistical work did not strongly support plantspecific scale economies.

Dooley categorized stores into six different groups based on similar characteristics. For three store groups, as the size of the store increased from 1000 to 20,000 square feet of selling space, operating costs fell in a linear fashion. For a fourth group per unit costs increased with store size and for the last two categories, as store size expanded per unit costs fell and then increased.[20;p.33]

Other figures, however, do indicate some forms of scale economies that are related to store size. Table 3.14 presents weekly sales per square foot of selling space, per checkout and per full-time employee as reported in the magazine, "Progressive Grocer," for the years 1980, 1982 and 1984. According to this data, in 1980 a store with fifteen to twenty thousand square feet of selling space had the greatest sales per square foot. In 1982 among independent groceries, stores with under 10,000 square feet

		RE	TAIL WEEKLY	SALES AS A	FUNCTION O	F SIZE			
			Square Feet of Selling Space (Thousands)						
		Under 10	10-15	15-20	20-25	25-30	30-35	> 35	
					- Dollars -				
Per	Square Foo	t of Selling	Space:						
	1980 ¹ 1982 ² 1984 ² 1984 ³	6.90 8.23 8.84 11.58	6.70 7.12 6.65 7.29	7.51 7.23 6.18 6.97	6.63 6.94 6.66 6.94	5.76 7.00 7.70 6.15	 5.80 7.41 6.54	- 6.20 6.58 6.35	
Per	Checkout:							•	
	1980 ¹ 1982 ² 19842 1984 ³	12,820 . 14,968 16,078 16,923	14,790 15,601 15,646 15,460	18,070 18,307 16,340 17,021	16,530 18,973 19,363 20,030	18,060 20,145 22,265 20,222	- 21,092 25,831 21,817	- 22,219 24,518 24,652	
Per	Full-Time	Employee:							
	1980 ¹ 1982 ² 1984 ² 1984 ³	2,610 2,741 3,164 3,614	2,670 2,957 3,157 3,395	2,980 3,146 3,043 3,604	2,760 3,031 3,518 3,779	2,400 3,296 3,623 3,414	- 3,589 3,945 3,815	3,140 3,371 3,370	
Ave	rage Custo	mer Transact:	ion Size:						
	1982 ² 1984 ² 1984 ³	9.82 10.99 12.98	11.33 11.37 11.49	12.84 12.28 13.52	14.86 14.96 14.02	14.99 16.21 14.78	17.56 18.63 15.49	15.70 18.22 16.83	

TABLE 3.14

Source: Progressive Grocer, April 1981, 1983, 1985.

1 Both Independents and Chain Stores included

² Independents only

³ Chain Stores only

of selling space had the greatest sales per square foot. The same went for both chains and independent stores in 1984. Based on these figures alone there is a tendency to reason that economies of scale do not exist at the store level. However, it is the larger stores which had higher weekly sales per checkout and per full-time employee. The latter indicates scale economies in labour costs.

In his 1969 report Dooley commented that the continuing presence of small neighbourhood stores casts doubt on the significance of in-store scale economies.[20;pp.32-33] More recently, however, the newly opened supermarkets have tended to be quite large. Dr. Timothy Hammonds of the United States Food Marketing Institute has been quoted as saying,

> The industry is closing smaller supermarkets and opening larger ones ... fitting today's lifestyle by emphasizing one-stop shopping which requires extensive variety and selection.[43;10/84;p.29]

The trend to larger stores has been in response to changing customer preferences. Consumer desire for onestop shopping in addition to their growing interest in health and nutrition, has caused supermarkets to expand fresh fruit and vegetable departments, fresh fish departments, salad bars and bulk foods.[43;9/84;p.29] Table 3.14 indicates that for the years 1982 and 1984 the average

customer transaction size was greater for larger stores an indication of one-stop shopping. It would appear that, contrary to Dooley's statement, scale economies have some significance.

Multi-Plant Economies of Scale

It seems logical to think that the dominance of the chain store in grocery retailing is at least in part related to multi-plant scale economies. However, data for the year 1963 indicates that as a chain increases its sales from under ten million dollars to over one hundred million dollars, the chain's in-store operating expenses increase by twenty percent. [20;p.34] Economies owing to centralized management have been said not to exist in the grocery retailing industry, because individual stores differ in their location, income area and customer preferences. Therefore, individual store management is very important. [20;p.37]

A grocery chain does acquire multi-plant scale economies in advertising. Per unit costs of advertising decline as advertising expenses are spread over a greater number of stores in one city. Stores which advertise more are also given discounts for their promotion expenditures. Quoting Dooley (1969),

A firm with \$2 million in annual sales in a city tends to spend 4.3 cents per dollar of

sales, while a firm with \$20 million in sales tends to spend 1.7 cents per dollar of sales and a firm with \$40 million in sales tends to spend .9 cents per dollar of sales, despite the fact that the larger firms advertise more. [20; pp.39-40]

Multi-plant scale economies also take the form of discounts. Large chains are favoured by the ability to buy large amounts of inputs and thereby attain price reductions. A survey of non-chain stores done by the Prairie Provinces Cost Study Commission (1968) found that three quarters of the smallest stores did not receive any discounts. The survey also indicated that as the size of the store increased, so did the incidence of discount purchasing.[20;p.37]

3.4.3 Barriers to Entry

There are a number of potential entry barriers to grocery retailing. The advertising programs of established firms represent an entry barrier because it gives them a considerable advantage over potential entrants in the form of scale economies and product differentiation.

A second entry barrier involves location of the grocery store. Placement is more important to the supermarket, which attracts customers from a wide geographic area, than it is for small grocery convenience stores. Shopping centers are a prime location, especially for a large supermarket. New entrants can have problems locating in these areas, because operators of shopping centers have a tendency to prefer well known supermarkets as their tenants. In fact, established supermarket chains have been known to locate in shopping centers on the condition that no other supermarket be allowed to inhabit the same shopping center. This arrangement is referred to as a restrictive lease.[58;p.66] If stores require large customer parking lots, then further placement difficulties are created.[20;p.58]

Another entry barrier which involves location is market pre-emption. To discourage entry of new firms in a developing market, existing firms that already have one or more stores, will add another before it is profitable for a new firm to enter. In this way new firms are pre-empted and existing firms avoid potential costly price competition with a new firm. Some evidence of market pre-emption was found for the Greater Vancouver Regional District of British Columbia.[5]

Whether large or small, new entrants into grocery retailing require wholesalers to supply them and they need to obtain supplies at prices comparable to those paid by established firms. If a suitable wholesale firm cannot be found entry will be discouraged. Even if a suitable wholesale arrangement is made, new firms require an aggressive pricing strategy for successful entry. However, established neighboring chain stores will compete on the

same level, making it extremely difficult for the new entrant to gain the necessary market share.[17;p.47]

Finally, the size of store may be an inhibiting factor to entry in terms of capital investment. If the potential entrant wishes to enter grocery retailing at the level of one stop shopping which is provided by a supermarket, then capital costs will be greater.

3.4.4 Vertical Integration

A salient feature of food marketing is the central control of channel systems. Large chain operations have been vertically integrated into wholesale operations for a long time. For example, when Safeway first entered Canada in 1928 one of its primary objectives was to acquire an established grocery wholesaling business. This was accomplished with the purchase of Macdonald's Consolidated Wholesale in 1929. Retail firms that own wholesale operations are better able to supply their grocery stores with the particular products they need. Their retail business will receive deals and discounts from their wholesale operation. [29; p.163] Warehouse integration economies may also be gained through control over the store delivery operation, because it can be specialized to the retailer's particular need's.[29;p.163]

Retail firms have integrated further upstream into food processing.[6] Grinnell (1980) suggests this is

because retailers wish to produce their own private label products. Other reasons that have been cited are the following: to introduce new production processes into food manufacturing; to improve product quality; to avoid processor's selling costs that include promotional expenses for creating and maintaining national brands; to avoid distribution methods used by processors which are excessive in costs; to share in non-competitive profits earned by firms in an oligopolistically structured manufacturing industry.[28;p.11]

The concept of vertical integration is not limited to ownership of upstream or downstream operations. Contractual arrangements, whether they be formal or informal, are also considered a form of integration. Hawkins and Norby (1977) stated they were not aware of any formal written contracts that existed in the Western Canadian meat trade at the retail level. Allegedly, Intercontinental Packers of Saskatoon and Canada Safeway had an informal arrangement for processed packaged cooked meat and pork supplies under Safeway's private labels. This arrangement did not involve tenders or any other packers.[33;p.18]

3.4.5 Conduct

Pricing strategies of established firms which discourage entry are a common behavioural trait of the grocery retailing industry. In 1973 the Attorney General

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of Canada was successful in obtaining orders of prohibition against Canada Safeway which were an attempt to stop this firm from engaging in a pricing policy that discouraged competition and inhibited the growth of small competitors. Canada Safeway stores were in a position to easily meet the lower prices of new entrants, because these prices only affected Safeway at one of its many stores. New entrants were not able to handle this type of competition without comparable financial resources.

Established stores like Canada Safeway recognize their interdependence and pricing policies are oligopolistic in nature. Price leadership is common. A 1967 survey of nonchain stores with \$500,000 and over in sales recognized a price leader in their city 94.4% of the time. Canada Safeway was most commonly seen as the leader in price setting.[20;p.65]

Apart from price leadership, the most common conduct featured in grocery retailing at the supermarket level is mass advertising. Newspaper advertising is the most popular and it has been dominated by the corporate chain. However, voluntary and co-operative groups have increased their share. Again, Canada Safeway has set the example. During the period 1962 to 1966 Safeway out-advertised its closest competitors by a factor of two to one.

Another type of behaviour which has been suggested relates both to vertical integration and barriers to entry.

A Canada Safeway employee has been reported to have said that when Safeway sells one of its retail outlets, the sale arrangement stipulates that the new owner must purchase a part or all of its supplies from Safeway's wholesale operation, MacDonald's Consolidated.[12;p.Fl] If this is true, this type of conduct would certainly be discouraging to new entrants and it reinforces the importance of vertical integration in grocery retailing.

3.4.6 Retail Sector Summary

The Alberta grocery retailing sector has become a highly concentrated industry, dominated by retail chain stores. The following are reasons why a few stores have significant market power: retail chains are able to take advantage of multi-plant scale economies in advertising; there are strong entry barriers to new entrants; the more powerful retailers are integrated as far back as the food processing stage.

3.5 Summary

This chapter has considered the competitive nature of each sector in the Alberta hog marketing industry. The producing sector may be regarded as a competitive industry. The meat packing and retailing industries are both oligopolies and oligopsonies in which considerable market power is held by a few firms. A number of reasons why these sectors

have their particular structure have been noted. They include the presence or absence of barriers to entry, economies of scale, diversification, vertical integration and the behaviour exhibited by the dominant firms.

NOTES TO CHAPTER THREE

1. Deloitte Haskins and Sells Associates (1985) reported that the Fletcher's plant in Red Deer, Alberta has a practical one-shift slaughter capacity of 20/22,000 head per week. They stated that the Gainer's plant in Edmonton has a practical one shift slaughter capacity of 18/20,000 head per week.[16;p.23]

2. The Canadian Pork Council argued that if one packer purchased ten percent of the hog lots offered in one week, then this packer should be responsible for about ten percent of the increases in market price. It should also be responsible for about ten percent of the halts in market price declines. In percentage terms, if a packer had a greater effect on price than its share of hog lot purchases, then this packer exhibited price leadership. This idea was represented by the following ratio:

% market price raises % total lots purchased

For two packers this ratio was 1.29 and 1.11 for the period May 9th to 12th, 1977.[10;pp.7.23-7.25]

3. For the actual evidence see Leavitt, Hawkins and Veeman, <u>An Evaluation of Pricing and Operational Efficiency</u> <u>Within the Alberta Pork Producers Marketing Board</u>, Occasional Paper No. 8, (1983), pages 19-21. While market shares remained stable, the volumes actually varied substantially. Also during this time period, when one packing firm closed its Calgary plant in 1975, its market share apparently went to its remaining plant in Edmonton and to one other packer.

4. On May 25, 1987 Canada Safeway Ltd. purchased the twenty-six Woodward's Food Floors. After the deal Canada Safeway cut off some former Woodward's Food Floors suppliers such as Associated Grocers Ltd. Investment Canada approved the deal under the condition that Safeway divest itself of twelve of its stores - five in Edmonton, one in Red Deer, one in Lethbridge and five in British Columbia.[12;p.F1]

5. Essentially West (1981) tested to see whether stores in a particular market exhibited random ownership. Under market pre-emption, which firms owned a certain store will depend on the ownership of neighbouring stores. Market pre-emption may be indicated when store ownership is concentrated in a market amongst a few firms. Hence, the distribution of ownership would not be random.

6. For example, Steinberg's Ltd. has a meat processing plant in Montreal and Canada Safeway's wholly owned subsidiary, Lucern Foods Ltd., operates a meat processing plant in Winnipeg, among other businesses.
CHAPTER FOUR

THE ALBERTA PORK PRODUCERS' MARKETING BOARD

4.1 Introduction

The Alberta Pork Producers' Marketing Board represents hog farmers as the sole hog selling agent in the province of Alberta. Hence, it holds an important position in the Alberta hog marketing industry. The purpose of this chapter is to discuss the nature of the Board - its composition, marketing powers and marketing policies. This chapter will be more descriptive than analytical and aspects of the Board which are deemed unimportant to this study will not be discussed. It is intended to serve as preparation for chapter five in which the vertical relationships of the Alberta hog marketing industry will be considered. A more analytical approach will be taken towards the implications of the Board's presence in chapter five.

4.2 Formation of the Board

The Alberta Pork Producers' Marketing Board went into operation on October 31, 1969.[1] Its formation was the result of producers' and producer organizations' concern regarding the existing pricing and marketing system of hogs in Alberta. The majority of producers felt there was a need for some form of hog marketing agency.[2] In 1965 Alberta's Marketing of Agricultural Products Act was amended to allow for marketing commissions, marketing boards and the Alberta Agricultural Products' Marketing Council. All marketing Board's in Alberta are regulated under this Act. The Marketing Council governs all boards or commissions and any proposals for "control, regulation and promotion within Alberta of the marketing" of an agricultural product, must be submitted to the Council.[61;p.848]

Almost immediately following this event, different producer organizations submitted various plans to the Marketing Council for some form of marketing agency. The matter was put to a producer vote and the majority of farmers indicated they were in favour of a hog marketing Board.[3]

4.3 The Board's Composition and Funding

The Board is composed of nine directors (the Board of Directors), representing nine different districts of hog production in the province. This group elects the Board's Chairman and Vice-Chairman from its own members. In addition to a director, each district has five delegates which advise the Board of Directors. Both directors and delegates are producers elected by their peers for a two year term. They cannot serve for more than six consecutive

years. The Board also employs other staff necessary for its day to day operations.[32;p.24]

The Marketing of Agricultural Products Act allows the Board to place a levy on producers to finance its services. The amount of the levy per hog has increased over the years. It was initially set at thirty cents per hog. In November 1985, it was one dollar per hog.[32;p.24] The Board will obtain other necessary funding through regular banking channels.

4.4 Functions and Powers of the Board

The primary function of the Marketing Board is to sell hogs and transfer payments to producers.[32;p.36] The major objectives of the Board are to secure for Alberta hog producers a competitive and fair market value for their product, and to deliver a consistent flow of hogs to meat packers.[32;p.13] To achieve these goals the Marketing Council bestowed upon the Board the authority to regulate, control and promote the marketing of hogs produced in Alberta. The details of the authority delegated to the Board by the Council are outlined in Alberta Regulation 230/69, "Regulations Relating to the Implementation of the Alberta Hog Producers' Marketing Plan, 1968." Here it is stated that a regulation made by the Board has no effect until it has been approved by the Council, or by a vote of registered producers.[61;p.848]

The specific regulation governing the Board is the "Alberta Hog Producers Marketing Plan, 1968" (Alberta Regulation 195/68). In its original form the stated purpose of the plan was as follows:

 to provide facilities enabling producers to offer for sale or sell hogs in an efficient manner, including pre-delivery sales, through competitive bidding,

 to provide a selling mechanism which will be available to

- i) individual producers,
- ii) co-operative livestock shipping associations,
- iii) livestock selling agencies operating on public livestock markets,
 - iv) other accumulators of hogs at rural points, and which will enhance the selling process, including the sale of hogs in transit,

3) to provide relevant educational information and to conduct or assist in the carrying out of studies and research relating to the production, marketing, quality improvement and consumption of pork products,

4) to establish conditions of sale which are compatible with and consistent with hog trading practices,

5) to provide prompt and accurate information services to assist in promoting orderly marketing procedures, including the possible implementation of an automatic phone-in service,

6) to encourage the improvement of assembly, transportation and handling facilities for hogs,

7) to co-ordinate and improve understanding within the swine industry and between the swine industry and other related industries,

8) to work with marketing boards or other agencies having similar objectives which are established in other regions,

9) to provide for all buyers of hogs to have equal opportunity to bid on hogs sold by or through the Board.[60;pp.451-452]

There have been important amendments to both Alberta Regulations 195/68 and 231/69. These include a 1974 amendment to regulation 231/69 authorizing the Board to negotiate directly with buyers for the sale of hogs without having previously offered them for sale through packer bids. Three significant amendments were made to regulation 195/68 in 1981. One allowed the Board to acquire shares or the entire business of a company that is involved in processing and selling pork products. A second enabled the Board to use any portion of the service charge placed on producers or similar capital sources to finance such acquisitions. The third gave the Board the power to establish a fund that stabilizes market returns to

4.5 Hog Marketing

4.5.1 Dutch Auction

The Board's first sales system employed a teletype machine to sell hogs by Dutch auction. Buyers had teletype equipment installed in their offices both to receive sales information from the Board's central system and to make their bids. Producers with hogs to be marketed notified the Board by telephone, stating the size and make-up of the lots they wished to sell on that day. They also specified the time these lots could be delivered. The Board then used its teletype system to communicate this information to buyers. Simultaneous messages describing the lot were printed out on each buyer's machine. Buyers then commenced bidding for the lot.

The teletype relayed the asking price for one lot of hogs using tapes that descended over a one dollar range five cents at a time. Buyers pressed a button on their machine to signal their wish to buy. The system was sensitive enough not to allow two simultaneous bids. The Board chose a particular tape based on the Alberta hog supply, a demand estimate, prices in other North American markets and price level on previous days. If a tape received no bids, a lower priced tape was started or the lot was taken off the market to be offered again at another

4.5.2 Advanced Buyer Bidding

On March 17, 1978 the Board introduced a new selling system. Under this system producers committed their hogs for sale after buyers had made their bids. In other words, hog farmers were aware of the approximate price they would receive for their product before putting it on the market. This method of sales has been called advanced buyer bidding.

Bidding began after the Board informed packers over the teletype that they would consider offers to purchase hogs in specific volumes. The Board ranked packer bids from highest to lowest and calculated the expected average price producers would receive.[4] Producers, informed of this range, decided whether or not to offer their hogs for sale. Once hogs were committed to market, orders with the highest bids were filled first.

4.5.3 Domestic Contracts

Along with hog sales by bid acceptance, the Board introduced hog sales by contract. Domestic contracting involved a formal arrangement between a particular producer and a packer or between the Board (representing all producers) and a packer. The first two domestic contracts were arranged in 1978. Fletcher's Ltd. and the APPMB signed a two year agreement worth nearly \$60 million. Approximately 300,000 hogs were delivered to Fletcher's each year. The Board and Burns Foods Ltd. formulated an agreement worth \$55 million. Burns received 180,000 hogs annually for three years.[32;p.19]

4.5.4 Export Sales

The Board has also negotiated the sale of live hogs to packers in the United States. Sales have been made on a spot market basis when the Alberta hog supply was in a surplus situation, and through contracts covering a specific time period. The majority of Alberta slaughter hogs exported to the U.S. have been sold to West Coast States and the prices received are based on current prices in those markets.[32;p.13] The Board also attempts to develop export markets in addition to the U.S.. During the seventies contracts were made with Japan and Korea.

A key player in the sale of hogs to extra-provincial customers is the Alberta Hog Trading Company Ltd.. This enterprise was formed in 1978 and is a wholly owned subsidiary of the APPMB. The Trading Company purchases hogs in direct competition with Alberta packers. It has also imported hogs to Alberta. Profits accruing to the Trading Company are turned over to the Board under a service contract agreement.[32;p.22]

4.5.5 Further Changes to the Selling System

On February 28, 1980 the sales process was changed such that offers to buy hogs could be received by telephone, telex, letter, sealed bid, through the existing teletype network or otherwise. This replaced the exclusive use of the teletype as the bidding mechanism. On May 23, 1984, a rebid session was implemented whereby buyers were allowed to offer a second bid if their initial bids were refused and if the hog volume was large enough. The advanced buyer bidding system was altered on October 1, 1984 such that the Board specified a price range for acceptable bids, and offers below this range were refused.

4.6 Pork Promotion

Another of the Board's marketing policies which is noteworthy for the purposes of this study is pork promotion. The goal of the promotion programs has been to expand the demand for pork products. The 1979 advertising campaign, "Put Some Pork On Your Fork," is an example of the Board's activities in this area. Generally speaking the Board has an annual advertising campaign which lasts five to seven weeks, usually in the spring and early summer. Retail grocery stores have participated in the programs by featuring pork items two to three times annually, and making the Board's pork recipe brochures available at their stores.[32;p.26]

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4.7 Vertical Integration By The Board

In February of 1981 the Board purchased one hundred percent of the shares of Fletcher's Ltd. With this transaction the Board became owner of a processing plant in Vancouver, B.C. and a hog kill plant in Red Deer, Alberta. The cost for this acquisition was \$14.5 million. Funding was obtained through a \$15 million loan arranged through regular banking channels and an increase in the producer levy to three dollars per hog.[32;p.33]

The Board has kept the Fletcher's operation at arms length, appointing a separate Board of directors to oversee slaughter and processing activities. More recently the Board put forth a proposal whereby ownership of Fletcher's would go to a producer trust. Producers would be issued units in the trust based on their 1981 hog marketings.[32;p.33] The majority of producers are in favour of this proposal.

In the fall of 1985 the Board accepted a grant offered by the Alberta government to pay off the remaining debt incurred by the purchase of Fletcher's. This grant was offered as a means of removing the extra levy placed on producers.

4.8 The Board's Position In the Hog Marketing Industry

All hogs produced in Alberta are sold through the Alberta Pork Producers' Marketing Board. This would

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seemingly make the Board a monopoly within the Alberta hog marketing industry. However this is not the case, because the Board does not control the hog supply. Producers are free to increase or decrease their output and to enter or exit the industry at will. Packers within Alberta can obtain and have obtained hogs from sources outside the province. For example, in 1978 the Saskatchewan Hog Commission sold in excess of 8,000 hogs to Alberta packers.[65;p.19] Packers may also acquire live hogs and hog carcasses from the United States. National packers have traded hogs and hog carcasses between their own plants. Therefore, the APPMB is not the only source of pigs for Alberta packers.

This is not to suggest the Board does not have considerable market power in the industry. The Board's present selling system is an exhibition of pricing power in that it sets a lower limit for the price of hogs. The effect of this power will be considered in the next chapter.

NOTES TO CHAPTER FOUR

1. Originally the Board's title was The Alberta Hog Producers' Marketing Board. The name was changed in 1979 to the Alberta Pork Producers' Marketing Board. The name change was part of an attempt to increase consumer awareness of the product it buys at the grocery store.

2. The reasons for producer concerns will be discussed in chapter five.

3. For details regarding the formation of the Board see Hawkins and Higginson's, 1986 edition of <u>Development</u> and Operation of the Alberta Pork Producers Marketing Board.

4. Four days before the advanced buyer bidding system was implemented, the Board started daily producer price averaging. Under this system the price producer's receive for their product is the average weighted price of all domestic sales on that day.[32;p.9] Producer price averaging was necessary for the implementation of advanced buyer bidding, given that hog offerings were allocated to packers in descending order - from the highest to the lowest bid.

CHAPTER 5

VERTICAL RELATIONSHIPS

5.1 Introduction

In chapter three each sector of the Alberta hog marketing industry was considered. The discussion adduced reasons for the structural and behavioural circumstances that have existed in these sectors in the past and that are present today. Whereas the material in chapter three attended mostly to the features and developments within each sector, in this chapter the ways in which these sectors have interacted with each other over time will be examined. Information regarding the Board presented in chapter four will be directly relevant here.

Significant changes have taken place in the vertical relationships within the Alberta hog marketing industry and market power exists today where it did not in the past. These changes have altered the process of price determination to some degree. The objective of this chapter is to note structural and behavioural changes in vertical arrangements, and to speculate about the impact these changes have had on price formulation within the industry. In the attempt to achieve this objective, the producer/packer and packer/retailer interfaces will be appraised.

5.2 Producer/Packer Interface

The most significant change in the way hog farmers and meat packers determined the price for hogs came with the institution of the Alberta Pork Producer's Marketing Board. It therefore seems appropriate to consider the evolution of the market relationship between producers and packers on a pre-Board/post-Board basis. The discussion of circumstances before the Board will refer to the years 1955 to 1969.

5.2.1 Pre-Board Interface

Selling Agents

In the literature review some indication was given of the nature of the market between producers and packers before the Board. The impression was that there existed more than one arrangement for the sale of hogs and in fact there were many. If producers did not take their pigs to market themselves, they relied on a variety of agents to do so.

One such agent was a fellow producer who owned the necessary means of transporting hogs to the stockyard. Once hogs were at the yard, manifests and payment distribution responsibilities were undertaken by representatives of commission firms or packing plants transacting at the yards. There were also truckers, private shippers and shipping associations who were in the business of taking hogs to market. Truckers generally provided only an assembly and transportation service. Private shippers assembled hogs in a particular area, tattooed them for identification, filled out manifests and delivered hogs and manifests to the stockyards or directly to packers. Shipping associations were owned and operated as producers' cooperatives and most were affiliated with the Alberta Livestock Cooperative. Their services varied from basic transportation to activities on par with those of private shippers.

Payment to the shipper or trucker was usually made by the packer. The packer would deduct freight charges from the farmer's payment and award this amount to the agent upon delivery of the hogs. Sometimes payment came direct from the farmer.[52;p.7] The private shipper was commonly an agent of a packing firm, and was therefore also paid a commission for his services. In some instances he would receive a bonus for time specified deliveries or for continuing patronage.[44;p.7]

The most common intermediary in the sales process was the full-time livestock dealer who was bonded and licensed by the provincial government. Operating on a larger scale than other agents, dealers collected hogs from farmers at assembly points located throughout the province and arranged their delivery to packing plants. Dealers paid farmers for their pigs out of bulk payments they received

from packers. Often this settlement involved an advance payment to farmers once the dealer had received the hogs. The balance less handling charges was paid after the final price had been determined by the weight and grade of the slaughtered animal.

Dealers did not buy and sell hogs, they handled them for a commission.[52;p.8] The commission firm, another agent, also operated in this manner. Commission firms carried out their business at the stockyards, buying and selling hogs. Their presence was important because their activities determined the stockyard price of hogs.

In summary, there were a number of ways for hogs to flow from producer to packer in the decade prior to the Board. The producer himself may have delivered his hogs to a commission firm operating at the stockyard or to the packing plant. The producer could engage a fellow producer, trucker, shipper or shipping association to take his hogs to a commission firm or packing plant. Lastly, the producer may have had his hogs delivered to a dealer who in turn negotiated the conditions of sale with the packer and had the hogs delivered to the plant.

The Base Price

(i) Stockyards

The price established for hogs at the stockyards was the base on which the value of all other slaughter hogs

sold in the province was negotiated. Therefore, to understand sales arrangements throughout the province, the circumstances regarding the pricing of hogs auctioned at the stockyards should be considered.

Alberta had three stockyards, located in Edmonton, Calgary and Lethbridge. Of these three, Calgary had the most competitive terminal, and for a number of reasons. Calgary stockyard regulations made it compulsory that all hogs consigned to the yard must be sold by public auction. This was not the case on the Edmonton yard and consequently less than half the hogs sold at the Edmonton terminal were auctioned.[44;p.7] A second reason relates to the Calgary packers' use of the Calgary stockyard as a supply Manning (1967) reported that six packing plants source. purchased hogs on the Calgary exchange; three were located in Calgary and three were located in British Columbia. There were also several commission firms selling and buying hogs.

Edmonton packers had a weak relationship with their local yard. The majority of hogs that were auctioned on the Edmonton exchange were sold by the Alberta Livestock Cooperative, and were bought by one British Columbia packing plant.[44;p.14] Using various agents, Edmonton packers received most of their hogs direct from producers and they operated buying stations along all the major routes into the city for direct deliveries.

The Lethbridge terminal was closely linked to the Calgary stockyard. It represented the weakest market because fewer hogs passed through this stockyard than the others and the local demand for livestock was much smaller. A large share of hogs produced near Lethbridge went to the Calgary yard, because no hogs were slaughtered in Lethbridge. Hogs purchased on the Lethbridge terminal were usually obtained by sealed bid. [44;pp.8-9]

Partly for these reasons the stockyard in Calgary was the more important price setting centre. The Calgary yard auctioned its hogs first, at 1:00 p.m.. Pigs started selling at around 1:30 p.m. in Edmonton and 2:30 p.m. in Lethbridge. Prices established at the stockyards were similar which suggests groups operating on the terminals were in contact with one another.[39;p.45] As a result, the Calgary yard price tended to set the tone for prices established at the other yards.

(ii) Stockyard Transactions

According to Poetshke (1960) there were three different kinds of transactions which took place on the stockyards. The first involved hogs being billed through to a destination outside of the province. These hogs stopped at the yards only to be fed and watered and they were not involved in the pricing process.[52;p.8] Manning (1967) stated that in 1965 close to half the hogs using the

Calgary and Edmonton stockyards were "through billed" and their price was negotiated beforehand.[44;p.6]

The second type of transaction was characterized by commission firms with standing orders to purchase all the hogs they received from truckers and shippers. The majority of hogs taken to these commission firms were never offered for sale. Instead, they were through billed and given the price prevailing at the yards that day. This transaction was especially common at the Edmonton stockyard.

The last exchange featured commission firms who auctioned their hogs on the terminal market. This occurred more regularly at the Calgary stockyard and it was this supply of hogs that determined the daily market price through competitive bidding. [52; p.8]

(iii) Bidding on the Yards

The value of hogs sold directly to packers was based on the price established at the terminal. Packers were therefore interested in keeping the stockyard price down for two reasons: to pay less for hogs bought at the yards and to pay less for hogs purchased directly from producers. As a result, bidding for hogs on the stockyard was less than competitive.

Poetshke (1961) suggested the packer representatives at stockyard auctions took a non-aggressive attitude when bidding for hogs.[52;p.33] Manning (1967) stated that it was common for packers not to bid actively against one another, and frequently only one or two of them purchased all the hogs.[44;p.14]

Also worthy of note is that the national packers had branch plants in British Columbia and Calgary, and representatives from both locations bid on the Calgary yard. The interest of the firm usually took priority over those of the plant. Therefore, bidding between these buyers was not as aggressive as it might have been without this association.

In summary, some key points stand out regarding the determination of the base price for slaughter hogs. The Calgary stockyard exhibited the most competitive bidding of the three Alberta terminals and set the standard for pricing at the other yards. However, bidding at the Calgary terminal was certainly not aggressive. Almost half the hogs using the Edmonton and Calgary stockyards were "through billed". The number of pigs actually auctioned at the yards was small giving the base price a tendency to rise. Packers dealt with this by either not participating - as in Edmonton - or by bidding with subdued competition - as in Calgary.

Direct Sales Pricing

(i) Direct Sales

In the decade before the Board, the major packers were obtaining fewer and fewer hogs from the stockyards. In 1957 the top three Alberta packing firms purchased less than four percent of their hog supply on the exchanges.[52;p.23] In 1965 the combined stockyard purchases of the eight major Alberta packing plants was 1.8 percent.[44;p.11] The remaining percentage was acquired from private shippers, shipping associations, dealers and direct from producers.

Again, the primary reason why packers avoided the terminals was their fear of bidding up the base price for hogs. Inherent in this reasoning was the association the national packers had with the wholesale pork market in Toronto. Much of the pork they processed from Alberta swine was shipped to this market. The major packers desired to pay a price for Alberta hogs that would allow their wholesale products to be competitive in Toronto.

For this reason packers purchased the majority of their hogs through direct sales and avoided competing with one another on the basis of price. Packers advertised to encourage the delivery of hogs direct to their plants and buying stations. Bonus payments to the various agents were also used by packers to attract a greater supply of hogs.[52;p.27]

(ii) Agent Bargaining Strength

The agents involved in taking hogs directly to packers competed with one another for producer's business. Their ability to arrange a better deal for their client depended greatly on the strength of their bargaining position with packers. Some agents controlled the marketing of hogs in a particular area, putting them in a better position to secure a higher price for their clients and a higher commission for themselves. Other agents managed the marketing of very few hogs and were not able to press packers for prices much higher than the base price.

Perhaps the most significant agent was the Alberta Livestock Cooperative (A.L.C.). The vast majority of shipping associations were affiliated with the A.L.C.. The cooperative was reported to have handled approximately 22 percent of hog marketings in 1957 and about 20 percent in 1965.[52;p.27][39;p.54]

The A.L.C. operated as a commission firm at the stockyards and also sold hogs directly to packing plants. With regard to direct sales, the A.L.C. implemented a number of policies. In 1955 the cooperative started to auction contracts to packers for the hog supplies of some of the shipping associations it represented. This move was to ensure the competitive position of the shipping associations as marketing agents. The contracts established a price differential between the stockyard price and the price for hogs received direct from the country. They required that hogs sent directly to packers receive the price prevailing at the stockyards at the time the shipment was made, adjusted for the price differential which had been agreed upon. To compete with the bonuses offered to private shippers, the A.L.C. requested that packers pay the freight costs and a service charge of twenty-five cents per cwt. This program ended in October 1958.[52;p.28]

For most of 1965 the A.L.C. again sold hogs directly to plants in the Edmonton area on an auction basis. However, in November 1965 the cooperative began new contract sales based on a formula price. Packers were to pay forty cents per cwt dressed above the Edmonton stockyard price, less shipping costs from the hog's country point of origin. In some instances the higher of the Edmonton or Calgary terminal price was used in the formula, but in either case the base price could not be more than two dollars below the Winnipeg terminal price quota-In the Calgary area direct sales by the tion.[44;p.10] A.L.C. to packing plants in 1965 were also contractual. The packer paid the Calgary stockyard base price plus a handling charge.

Packer Payments and Producer Receipts

The numerous sales methods involving different agents of unequal bargaining strengths meant the disbursement to individual producers was not equal. The net price received by the producer who sold his hogs on the stockyard was the base price less stockyard user fees, commission fees and transport expenses. Producers who had their hogs taken to the stockyards generally received the lowest price. Producers whose livestock was taken directly to packers usually received a higher return, but there was still great variability. The return depended on the bargaining position of the agent and also on the portion of the agent's bonus that was passed on to the producer. If a dealer or shipper was in close competition with other agents, he was more likely to pass on most of the benefits he received to maintain and attract producers' business.

Just as there was no common return to producers, there was no standard payment by packers. What the packer paid varied with different methods of purchase. Generally speaking, the packer paid a base price plus a bonus for the incentive to have hogs taken to their plant or buying station, sometimes at a specified time. Often they would arrange the transportation or pay the trucking costs. The base price which was used to calculate the price paid for hogs delivered direct was determined in one of the following ways:

- the local (Calgary or Edmonton) terminal exchange price for the day of delivery,
- the average of the local terminal exchange prices for two or three days, or the entire week,
- the local terminal price on a pre-selected day of the week,
- 4. the higher of the Calgary or Edmonton terminal exchange prices on the day of delivery,
- 5. the highest of the terminal exchange prices at Calgary, Edmonton, or Winnipeg, less \$2.00, on the day of delivery,
- 6. a choice among two or more of the above.[44; p.11]

Pre-Board Summary

The market relationship between the producing and packing sectors in the decade before the Marketing Board was complex. There were numerous players involved and a variety of pricing arrangements. Producers formed a competitive industry and sold their product to an oligopsonistic packing sector. Theoretically, this places the bargaining advantage in the hands of the packers. The circumstances just described are in support of this.

Producers had very little involvement in the actual pricing of their product beyond the choice of the agent

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that would represent them. Of all those involved, producers were the least informed. Agents were numerous and there was no one particular agent who controlled the sale of enough hogs to offset the buying power of the packers. By all appearances, the packing sector was capable of affecting the price for Alberta slaughter hogs to their own advantage.

Each of the national packers' share of hogs was large enough to influence the market price on an individual basis. Recognizing this and noting the importance of the Alberta hog price to their competitive position in the Toronto wholesale pork market, packers behaved accordingly. They limited their competition for hogs on the basis of price and secured their hog supplies through other forms of competition - notably advertising and bonus payments to agents.

The Alberta market conditions which have been described here were of concern to producers and producer organizations. In 1965 the base price for all hogs sold in Alberta was established by five percent of the hogs produced in Alberta.[44;p.9] These circumstances contributed to the formation of the Alberta Pork Producers' Marketing Board. Figure 5.1 shows the flow of hogs from producers to packing plants before the Board in 1968 and after the Board in 1970.



Percentages are based on one month's marketings by the Board.

Source: J. Dawson, A. Warrack, M. Hawkins. "Location Analysis for Alberta Hog Assembly Centers." March 1971, p. 6.

5.2.2 Post-Board Interface

The formation of the Alberta Pork Producers' Marketing Board represented an attempt by producers to gain more control over the terms of sale of their product. The Board's powers were to offset the bargaining strength of the oligopsonistic meat packing sector. The influence the Board has had on Alberta hog prices relates to its effectiveness as a countervailing power. This itself is dependent upon how the meat packing sector has reacted to the Board's sales policies.

Countervailing Power by the Board

The pricing policies implemented by the Board have been discussed in the previous chapter. This section will consider the reasons for these programs, the reaction to them by the packing sector and their affect on hog prices.

(i) Dutch Auction to Advanced Buyer Bidding

The dutch auction method of hog sales implemented by the Board when it began its operations was a more competitive sales system than that which existed prior to the Board. All Alberta slaughter hogs were now bid for, rather than just a small percentage of the total, and producers were now dealing from an informed position. Farmers sold their hogs through only one marketing agent, the APPMB, instead of a variety of agents whose bargaining power with packers varied considerably. This sales system was much more cost efficient than that which existed before the Board, providing greater net returns to both producer and packer.

Despite the improvements yielded by the dutch auction, the Board changed the sales procedure to the advanced buyer bidding system in March 1978. This system gave producers the opportunity to decide whether or not they wished to sell their hogs for the price anticipated on a particular day.[3;1978;p.14]

By allowing producers the ability to respond to packers bids, additional strength was given to the bargaining position of the hog farmers. Under the dutch auction sales method, bidding took place after hogs had been committed for sale. This bidding process seemingly forced a more competitively determined price, yet packers still set the prices and producers remained price takers. Under the advanced buyer bidding system hogs were committed for sale after packers made their bids and only if producers found these bids to be agreeable. Producers remained price takers, but to a lesser degree.

The change in sales policy was needed if the Board was to successfully reduce the buying power of the major packers. Though the dutch auction was an improvement from the producer view point, it had actually failed to increase the price competition between the major packers. The

specific reaction by the large packers to the dutch auction is evidence of this fact.

Upon the formation of the Board and the implementation of the dutch auction, the major packers involved themselves in a pricing conspiracy. Between December 1969 and December 1974, the plant managers, provision managers and hog buyers of four firms conspired to determine a price range within which each company's bids would stay. Plant managers from the four companies held meetings in hotels to discuss the range of prices to be paid for hogs bought through the Board. Day to day price communication was the responsibility of the provision managers. Every day, before the commencement of the dutch auction, provision managers contacted one another to determine the common price range. Provision managers then informed their hog buyers of the bids they could make.[1]

Even after the pricing conspiracy, while the dutch auction was still in use, producers expressed unhappiness regarding the bids they were receiving from packers. According to the Board, bids were not in line with the market conditions in Alberta at that time. The Board responded by asking producers to refrain from taking their hogs to market. This attempted boycott was an expression of frustration and suggests that, from the producer viewpoint, sales by dutch auction had failed to offset the market power of the packing sector.

The change to the advance buyer bidding system was only the first step taken by the Board to neutralize the market power of the packing sector. As events would indicate, the market relationship between these two sectors became one where the Board developed its policies in response to the behaviour of the packing sector and the packers tried to adapt without conceding power. The more significant of these events are discussed below.

(ii) Domestic Contracting

The next sales innovation introduced by the Board was domestic contracting. The first contracts were signed in August 1978. Not all policies implemented by the Board were upsetting to all packers and the impression should not be taken that the Board's marketing programs necessarily benefitted only producers and the Board. In the case of domestic contracting the Board and packing firms came to a mutual agreement and the benefits of these contracts went to both groups.

However, when the first contracts were signed, a dispute developed between the Board and packers not participating in these agreements. Two eastern based packing firms, Canada Packers Ltd. and Swift Canadian Co. Ltd., contested the Board's authority to arrange contractual sales. In their view, these contracts were never seriously offered to them and the Board had favoured the packers

included in the agreements (Burns Foods Ltd. and Fletcher's Ltd.). The two firms also registered complaints concerning the Board's advanced buyer bidding system.

Their protests eventually went to court in November 1979. This was the first court case initiated by the major packers and its purpose was to determine whether the Board's method of selling hogs went beyond its legislated powers. However, Canada Packers discontinued its court action in late 1979 and Swifts did the same a few months later. Swifts also entered into a domestic contract in November 1979.[32;p.28] As a result, the legality of the domestic contracts and the advanced buyer bidding system was not tested.

(iii) Packer Boycott

Relations worsened again in February 1980. On February 12th the Toronto market price for hogs was \$54.50. On the same day no bids were made above \$53.00 for Alberta hogs. The Board was concerned the Alberta price was tending towards a freight under Toronto level when it should not.[2] It therefore temporarily set a price range with a minimum of \$54.00. Bids received within this range were regarded as acceptable, bids below the range were refused. This action resulted in three packers boycotting the market to various degrees. Swifts did not purchase any hogs, Canada Packers purchased less than their capacity would allow and Gainers bought only for the export market.[32;p.28]

Gainers began purchasing regular hog volumes a week later, but the other two firms continued their partial boycott. When the Board received bids from two firms below \$50.00 it discontinued its exclusive use of the teletype network for taking bids. On February 28, 1980 the Board received offers to buy hogs by telephone, telex, letter or by the existing teletype network.

Relations between the packing and producing sectors deteriorated to the extent that on March 14, 1980 the Marketing Council filed Alberta regulation 99/80 which transferred control of the Board's operations to the Marketing Council. Much displeasure was voiced by producers and Alberta regulation 99/80 was repealed on April 25, 1980.[3]

(iv) Vertical Integration by the Board

In February of 1981 the Board purchased the shares of Fletcher's Ltd. and became the owner of a hog kill plant in Red Deer, Alberta and a processing plant in Vancouver, B.C.. Fletcher's was also affiliated with Britco Packers Ltd. The reason for integrating was to help the Board achieve its objective of "fair" hog prices that reflected market conditions in Alberta.[32;p.33]

The structure of the Alberta hog marketing industry

was altered by the Board's vertical integration. The purchase of Fletcher's also took place during an important time period in the packing industry's history. In the late seventies and early eighties the industry experienced a period of rationalization. Firms were closing part and sometimes all of their Alberta operations.[4] The reasons for this were out-dated multi-storey facilities, high fixed costs, low throughput volumes and high labour rates.[16; In 1986 only two large scale plants (over 500 hogs p.23] slaughtered per day) slaughtered hogs in Alberta - Gainers Inc. and Fletcher's Fine Foods Ltd.[5] This circumstance adds greater significance to the Board's integration, given that it would own one of the two remaining plants that purchased a major share of Alberta swine.

Packers were distressed by the Board's move into their industry. Concern was expressed regarding the possibility of Board favouritism towards Fletcher's and the loss of an equal opportunity to purchase hogs. Gainers Inc. presented a discussion paper to the Marketing Council and the APPMB outlining this point. The paper also mentioned the Board's ownership of the Alberta Hog Trading Company and Fletcher's affiliate Britco Export Packers Ltd (45% ownership). Gainers felt the APPMB might unfairly favour the sale of hogs to these companies over Gainers and other packers.[25;pp.7-8]

(v) Setting a Price Range

On October 1, 1984 the Board modified its selling system in response to what it felt was a period of unjustifiably low hog prices.[3;Fall,1984;p.70] The Board returned to its policy of setting a price range, but on a permanent basis. Packer bids that were below the range were refused.

Gainers felt the Board's revised sales system went beyond its powers and initiated a court action to prevent the modification. On November 20, 1985 the case was decided in favour of the APPMB. The judge stated the Board had the right to refuse bids if it found them unacceptable.

Post-Board Summary

Since the inception of the Alberta Pork Producers Marketing Board, the producing and packing sectors have struggled over the pricing of slaughter hogs. The dutch auction was the first policy the Board implemented to increase the competition among hog buyers. After various modifications to the sales process, the Board now sets a price range within which it will accept bids. To further increase competition for the purchase of hogs the Board bought the meat packing firm, Fletcher's Ltd. The Board also arranged long term contracts with some packers to secure what it regarded as a fair price. The major packers responded to the Board's initiatives with price collusion,

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market boycott and court proceedings.

It is apparent that each time the Board implemented a new marketing policy, including vertical integration, it was attempting to further increase competition for the purchase of hogs. The Board was limited to these methods of offsetting the packing sector's market power, because supply management is not within the Board's authority. Though the Board's powers are considerable, it is not a monopoly. The difficulty it has had in forcing hog buyers to be more competitive may be evidence of this fact.

The degree to which the Board has influenced pricing in the Alberta hog market has been considered in other studies. The empirical evidence indicated no definite conclusion could be drawn in this regard.[6] However, given the steps the Board has taken in the pursuit of more competitively determined hog prices, the Board arguably has had some affect. If a comparison were made between hog prices (in real terms) under the Board's presence and prices without the Board, all other factors (supply, demand, etc.) remaining the same, it is likely that prices would be higher with the Board. It seems reasonable to suggest that the Board has had some success in making the purchase of hogs more competitive and therefore has influenced hog prices to some degree.
5.3 Packer/Retailer Interface

Over the past three decades there is one salient structural change at the packer/retailer interface. It is the increase in market power of the retailing sector. This power was created through increasing concentration and vertical integration as described in chapter three. This section will consider how the price determination process for wholesale pork products has been affected by these two factors.

5.3.1 Retail Market Power

Packers were perhaps first beginning to notice the market power of retail chains in the 1950's. In 1956 the Meat Packers' Council of Canada made the following comment:

> Chain store organizations, with centralized meat buying departments, are now potent factors in the domestic meat distribution picture. Unquestionably their influence will be increasingly felt in the future. [8;p.312]

The increasing concentration of the retailing sector altered the bargaining structure between packer and retailer. Initially the market for wholesale pork comprised oligopolistic sellers and decentralized, competitive buyers. As retail chains evolved, the market became an association between an oligopolistic packing sector and an oligopsonistic retailing sector. The power of the retailing sector in the wholesale pork market is related to the packing sector's incomplete control over its supply to the wholesale market, retail volume buying and upstream integration by retailers. Each of these features will now be considered.

The Packing Sector's Incomplete Control Over Supply

Regardless of the structural changes within the retailing sector, there has always been one limiting factor to the market power of packers. That is the packing plant's lack of complete control over the amount of pork (and other meat) products that moves on to the wholesale There are two reasons for this. First, the supply market. of hogs available to packing plants is controlled by producers. Of course packers can choose to purchase as little or as much input as they wish. Realistically, however, packers try to purchase as much livestock as they reasonably can, because a profitable plant operates as close to capacity utilization as possible. This fact diminishes the plant's authority over its input flow, which in turn reduces its ability to regulate its output flow. Second, pork is a perishable product and must be moved to the market quickly so as not to spoil. Freezing pork provides only so much economy and cooler space is expensive.[44;p.5] It is therefore difficult for packers to hold back their wholesale pork as a bargaining tactic. This increases their vulnerability to bargaining pressures

from retailers.

Volume Buying

Much of the retail chains' market power originates with their ability to purchase large volumes of wholesale pork. Their volume buying is rewarded with discounts and their business to packers is substantial.

Initially, the sizeable purchases made by large retail chains was regarded by packers as a benefit. Instead of having to sell and distribute their product to numerous small independent grocers, packers began selling a large portion of their product to a few large chains. This reduced both their sales and distributive costs. The following is a portion of a letter circulated between management staff at Canada Packers Ltd., dated March 6, 1956. The letter makes reference to the lower sales and distributive costs of a competing firm (Skyline) that has resulted from large volume sales to a retail chain store.

The reason for this terrific difference [in costs] is, of course, that Skyline has a large chain store volume which averaged with his distributive business, reduces his selling expenses and his delivery cost.[8;p.316]

The sales of large volumes to dominant retail chains became worrisome to packers as they realized their dependence on this arrangement. Discounts given to retailers purchasing greater volumes meant small indepen-

dent grocers were paying more for wholesale pork than the large retail chains. This likely contributed to the growth of chain store market power. This concern was expressed by a former Canada Packer's Vice President in the letter below. The letter is dated March 30, 1955.

> We are becoming very aware that the increasing dominance of a few large accounts is a threat to our business; this is not alone because of their size, but even more so because so much business swings with the whims and prejudices of one or two persons.

> I am sure all concerned would wish to see independent retailers and smaller chains retain at least the share of the business they now have.

> Yet we are following pricing policies that seem specifically designed to put small retailers out of business as rapidly as possible.[8;p.317]

The volume purchased by the retail chains is a substantial portion of packer business, therefore they can pressure individual packers to drop their prices by threatening to take their business elsewhere. An excerpt from a March 1959 letter written by Canada Packer's Calgary plant manager to the Vice President attests to this fact. Reference is made to Safeway, historically a powerful retailer in Western Canada.

> There have been two main factors behind this loss [on sausage]. One has been volume. We have had periods when we ran into trouble with Safeway, and have actually been cut off in order to try and drop our price. When we lose Safeway, our volume drops badly.[8;p.320]

Hawkins and Norby (1977) commented that Safeway has allocated its business to Alberta packer-processors on a rotating basis. However, the way in which Safeway offered its business was very tactically minded. It was alleged to Hawkins and Norby that Safeway offered to purchase from a packer if he dropped his price to meet that of a claimed alternative seller, whose price was one or two cents less. Accordingly, the packer was placed in a difficult position; he either lost the business or met Safeway's demands and was stretched to the limit trying to fill the order. Small packers simply could not compete in this kind of con-Hawkins and Norby went on to remark that test.[33;p.18] packers were often forced to buy hogs and pork from competing packers who did not have the business. Packers also had to be careful to refrain from grabbing extra market share, because the reaction by competing firms would be damaging to the entire sector's revenues.

Upstream Integration

Upstream integration by retailers is another concern to the packing sector. It was mentioned in chapter three that some retailers have integrated back to the processing stage. This may be through ownership of a processing operation or through contractual arrangements with packers. In either case retailers have pork processed to their own specifications and sell it under their own brand name.

This is commonly known as a private label program. Such house brand retail products are often priced more cheaply and given more shelf space than the branded products of packers.

Private label programs reduce the market alternatives for the packing sector's output, making it a little more vulnerable to retailer bargaining pressures. By integrating vertically, retailers improve their bargaining position and acquire a more secure supply source.

5.3.2 The Reaction of the Packing Sector to Retail Power

Packers cannot profitably avoid doing business with powerful retail chain stores. Other buyers, such as independent retailers, hotels and restaurants, are not large enough to absorb the entire output of a large packing plant. If packers do pass up the business of major retail firms and then find themselves unable to sell all their product, they may have to concede further price concessions to get back the business of the retail chain.

To offset the market power of the retail chains, one course of action for an oligopolistic packing sector is price collusion. Evidence was provided in the 1961 RTPC report that during the late 1950's packers on occasion consulted one another with regard to their selling prices. The following communication between management at Canada Packers taken from the report is an example of this Following yesterday's firm decision to advance prices in line with costs, our present idea on next week's price for Steinberg is ... 36 cents. I feel sure our friends' ideas will be at least as high. We shall clear definitely with you Monday afternoon or Tuesday morning by wire. [8;p.323)

Evidence of a similar kind indicated that relations between packers was not all that popular a course of action. For example,

> Perhaps we have tied our hands too tightly by having a working arrangement with our socalled friends. In my experience, this never works except to our disadvantage.

I think it is possible to discuss prices and policies in a general way with such people but if one's hands are tied, it frequently creates artificial positions from which we cannot maneuver.[8;p.322]

More recent information regarding selling price collusion by packers comes from the combines investigation trial, "Her Majesty the Queen Against Canada Packers Inc. and Intercontinental Packers Ltd.," which was decided in January 1988. Evidence provided at this trial indicates that representatives of large packing firms did discuss the price at which they sold pork products. These discussions took place at meetings or over the telephone. The testimony of those involved in these conversations indicated divergent views regarding their purpose and results. Some suggested pricing agreements were arrived at while others stated the opposite. Many viewed the meetings as opportunities to obtain information. Perhaps the most telling statements were made by two Canada Packer's employees. The first stated that he would price his product at the levels discussed, but found competitors often undercut these prices. The second stated that a general agreement was of little consequence, because packers would say one thing and do another.[11;p.24]

This evidence indicates packers have been uncomfortable making deals with regard to wholesale pork prices, and little faith has been placed in agreements that were made. It is likely that this inability to successfully conspire is related to the strength of the dominant retailers who are able to play one packer off against another when buying large volumes of pork.

5.3.3 Packer/Retailer Interface Summary

In summary, the one major change in the market relationship between the packing and retailing sector is the shift in the balance of market power to the retailing sector. This change was the consequence of the packing sector's incomplete control over pork supply, increasing retail concentration and retail vertical integration. Large retail chains, especially Safeway have been able to secure price concessions from packers through volume

buying. Integration, that has resulted in private label programs, has enhanced the market power of the dominant retail chains and made their bargaining position with packers stronger. Attempts by packers to sell pork products at agreed prices to counter retail power have not been successful. This suggests the dominant retailers (such as Safeway) have been able to prevent the packing sector from presenting a unified front in the sale of wholesale pork.

Given the growth in market power by the retailing sector, it is likely the price of wholesale pork has been lower than it would have had the retailing sector been more competitive.

5.4 Summary

To summarize, in this chapter the structural changes at the producer/packer interface and the packer/retailer interface have been considered. The formation of the Alberta Pork Producers' Marketing Board and forward vertical integration by the Board were the most significant structural changes at the producer/packer interface. The increasing concentration and backward vertical integration are the salient structural changes at the retailer/packer interface. The most conspicuous behavioural trait was exhibited by the meat packing sector; a pricing conspiracy to lessen the competition for the purchase of slaughter

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hogs.

It was felt that the presence of the Board and vertical integration by the Board very likely influenced the price of slaughter hogs. Specifically, the fact that the Board existed and was integrated meant prices for slaughter hogs were higher than they otherwise would have been. It was concluded that the growth in retail market power - represented by increased concentration and vertical integration - meant wholesale pork prices were lower than they would have otherwise been. In the following chapter the effects of these structural changes on retail pork prices will be considered and tested empirically.

NOTES TO CHAPTER FIVE

1. After a two year inquiry that began in February 1980, five packing firms were charged under the Combines Investigation Act with conspiracy to lessen unduly competition for the purchase of slaughter hogs and in the sale of pork products. These firms were Burns Foods Ltd., Canada Packers Inc., Eschem Canada Inc. (formerly Swift Canadian Co. Ltd.), Gainers Inc. and Intercontinental Packers Ltd..

On December 9, 1983 Burns, Eschem and Gainers pleaded guilty to the charges of price collusion in the purchase of slaughter hogs from December 9, 1969 to December 31, 1975. Each was fined \$125,000. In 1986 Intercontinental Packers pleaded guilty to the same charges. The Attorney General of Canada entered a stay of proceedings in relation to the charges regarding the sale of pork products. Canada Packers Inc. was cleared of all charges on January 15, 1988.

2. According to economic theory, when trade takes place between two markets, the price spread between these markets should equal the total cost of transferring the product from one market to the other. Up until the late 1970's much of Alberta's surplus pork was shipped to Quebec and Ontario. Therefore, the price for hogs in Alberta should have been close to the Toronto price less the cost of transporting pork to that market. This price is termed "freight under Toronto." However, Quebec became pork self sufficient by about 1977 and much less pork was moving eastward. Arguably the price for Alberta pork should be less related to the Toronto price since 1977. That is to say, reasons for the Alberta price to be freight under Toronto became questionable.

3. For more details on Alberta Regulation 99/80 see Hawkins and Higginson, "Development and Operation of the Alberta Pork Producers' Marketing Board," pp. 29 -30.

4. In 1969 the following large packing plants (more than 500 head per day) slaughtered hogs in Alberta:

BurnsEdBurnsCaCanada PackersEdCanada PackersCaGainersEdIntercontinentalReSwiftsEdGrande Prairie PackersGr

Edmonton Calgary Edmonton Calgary Edmonton Red Deer Edmonton Grande Prairie Circumstances changed dramatically in the late 1970's and early 1980's. In 1977 Canada Packers stopped killing hogs in Calgary. In 1984 Canada Packers closed all slaughtering and processing operations in Edmonton. Grande Prairie Packers went completely out of business in 1983. Fort MacLeod Meat Processors Ltd. (a somewhat smaller firm) shut down in 1983. Burns closed its Calgary plant in 1984. Intercontinental sold its Red Deer facility to Fletcher's. Swifts operations were purchased by Gainers in 1980. [16;pp.22-23]

5. See first note to chapter three.

6. See the Leavitt, Hawkins and Veeman 1983 study, "An Evaluation of Pricing and Operational Efficiency Within the Alberta Pork Producers' Marketing Board" and Baah's 1984 thesis, "Pricing Efficiency in the Alberta Hog Industry."

CHAPTER SIX

AN EMPIRICAL INVESTIGATION INTO THE EFFECTS OF STRUCTURAL CHANGE ON RETAIL PORK PRICES

6.1 Introduction

In the last section of the previous chapter, four significant developments within the Alberta hog marketing industry were noted with regard to their effect on the retail price of pork. They include the institution of the Alberta Pork Producers' Marketing Board, vertical integration by the Board, the increased market power of the retailing sector, and price collusion by the packing sector. The first three are definitely structural changes, while collusion by the packing sector is a behavioural trait which is a function of this sector's structure. It is the purpose of this chapter to determine whether statistical evidence indicates these features have affected the retail price of pork.

6.2 Methodology

This section states in a deliberately highly summary manner the overall nature of the econometric work that will follow. Subsequent sections will provide more extended discussion of the individual components that comprise the model. The empirical investigation involves a simple ordinary least squares equation in which a variable representing retail pork prices in Alberta is regressed on eight explanatory variables. The time period studied is 1950 to 1985. The equation is shown below.

RP = c + b1(NSP) + b2(HP) + b3(BRP) + b4(CP) + b5(RR) + b6(DHB) + b7(DVI) + b8(DPC)

The variables are defined as follows: RP is the average retail price of pork in Alberta, NSP is the net surplus position of pork in Alberta, HP is the price of Alberta slaughter hogs, BRP is the average retail price of beef in Alberta, CP is the farm gate price of live chickens, RR is the retail grocery chain store share of Alberta retail grocery sales, DHB represents the presence of the Alberta Pork Producers' Marketing Board, DVI represents the period of time the Board has been vertically integrated and DPC stands for the period of price collusion by packers. The following sections discuss each of these variables in turn.

6.2.1 Dependent Variable (Retail Price of Pork: RP)

The dependent variable, RP, is an unweighted average of the prices of the following three different retail pork cuts: pork chops, boston butt roast and cured bacon. The price of each cut is the city of Edmonton's average annual price per kilogram in 1981 dollars. An average price was used to give a more general portrayal of retail pork price

movements.[1]

The formulation of RP was based primarily on the availability of data. Ideally the prices of more retail cuts would have been included in the average to give a better composite measure. However, a consistent data set for the time period covered was possible only for the retail cuts that have been used.

6.2.2 Independent Variables

Net Surplus Position (NSP)

The explanatory variable NSP is called the net surplus position of pork in the province of Alberta. It represents both the supply and demand for pork in Alberta. NSP is determined by subtracting Alberta pork demand from Alberta pork supply. The supply of pork is calculated by multiplying the annual number of hogs slaughtered in federally inspected plants in Alberta by the average cold trimmed weight of a slaughtered hog for the same year.[2] The demand side of NSP was calculated by multiplying the average annual per capita consumption of pork in Canada by the yearly population of Alberta.[3] Both the supply and demand for pork were converted to kilograms per year.[4]

NSP is included in the equation, because the supply and demand for pork in Alberta should affect Alberta's retail pork prices. Given that NSP is Alberta's net supply of pork, as NSP increases (decreases) the retail

price of pork should fall (rise). Therefore, the expected sign of NSP's coefficient is negative.

There is some doubt regarding how well NSP represents the net supply of pork for the Alberta market. Alberta packers ship a significant quantity of pork to markets across the country. NSP will include pork products that are to be exported and likely were never intended for the Alberta market. Therefore, NSP probably over estimates the supply of pork available to the Alberta market.

Slaughter Hog Prices (HP)

The term HP is the average annual price of Alberta produced slaughter hogs in real 1981 dollars per cwt. Theoretically, hog prices will affect the cost of producing wholesale pork products and will therefore have some relation to wholesale prices. Similarly wholesale pork prices will affect costs at the retail level and will consequently have some impact on retail pork prices. Thus a change in the price of slaughter hogs is likely to alter pork prices at the retail level. For this reason the price of slaughter hogs was included in the equation. Foodwest Resource Consultants (1980) found a correlation coefficient of .84 between unbranded retail prices and Alberta hog prices in 1979. So there is previous support for this hypothesis.

It is also possible that the relationship between

retail pork prices and slaughter hog prices begins at the retail level. That is to say, a change in retail pork prices may cause a change in slaughter hog prices. The demand for hogs is indirect, because it depends on the demand for pork at the retail level. Prices at the retail level may increase in response to higher pork demand. This increased demand may work its way back through the system and cause slaughter hog prices to rise. It is probable that cause and effect flow in both directions. Thus, causality is an important issue to bear in mind with respect to HP.

Given the theoretical reasons for including HP in the equation, the estimated coefficient for this variable should be positive. A positive sign would support the theory that as slaughter hog prices increase, so will retail pork prices, and as hog prices fall, retail prices will also fall.

The slaughter hog price data used is an average of the value of hogs sold on the Calgary and Edmonton stockyards. In the previous chapter it was noted that, prior to the Board, the stockyard price was lower than the price paid for hogs sold directly to packers, and an increasing number of hog sales were made by direct delivery. However, the actual price paid for direct sales was not attainable, therefore stockyard prices were used. This circumstance will not apply to hogs sold after the formation of the

Retail Beef Prices (BRP)

The variable BRP is the unweighted average of the prices of six retail beef products in the city of Edmonton. These products include sirloin steak, round steak, prime rib roast, blade roast, stewing beef and regular ground beef. Individually these prices are an annual average in 1981 dollars per kilogram.[6]

There are two reasons for including retail beef prices in the equation. First, consumers view beef and pork as substitute products. Therefore, if the price of beef rises then the demand for pork should increase (depending to some extent on beef elasticity of demand). Increasing the demand for pork is likely to push retail pork prices higher.

The second argument relates to the relative amounts of beef and pork grocery meat departments have on their shelves. Foodwest Resource Consultants (1980) stated that the volume of beef is greater than that of pork and there are more beef "specials" than pork "specials". It is their contention that pork has always taken second place to beef and that historically retailers "tend to add higher margins on pork to offset the low beef margins to cover meat department costs." [23;p 30] This statement seems to suggest that the margins lost on beef as a result of trying to move beef through specials (i.e. discount prices) are recovered by increasing the price of pork. If this is the case, beef and pork prices will (when this strategy is employed) move in opposite directions.

The "substitute product" argument would be supported by a positive coefficient for BRP, suggesting rising beef prices cause higher pork prices and falling beef prices reduce pork prices. The "beef specials" hypothesis would be supported by a negative coefficient for BRP, indicating that falling beef prices lead to higher pork prices. A negative coefficient for BRP would also suggest rising beef prices are associated with falling pork prices. This latter implication of a negative BRP coefficient might be accounted for by extending the "beef specials" theory to suggest beef prices are increased to offset lower pork margins during pork sales. However, this is a necessarily speculative theory.

It is of course quite plausible that both sets of influences (the positive ones of beef/pork substitution and the negative ones of "beef specials") have been in operation. The sign of the coefficient for BRP would then be unpredictable as it would depend on which influences (if any) had been dominant during the time period studied.

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Live Chicken Prices (CP)

It is reasonable to suppose that there is some substitution between chicken and pork by consumers at the retail level. A variable measuring retail chicken prices should therefore be included with others potentially affecting the retail price of pork.

Unfortunately, actual retail chicken prices for Alberta covering the entire period under study are not available. A proxy was therefore calculated as follows: the term CP is the average annual price of live chickens under five pounds in 1981 dollars per kilogram paid to Alberta producers. Sometimes the annual average is calculated for prices paid to Calgary producers and sometimes to Edmonton producers, as reporting of these figures has been inconsistent. Using the prices paid to producers as a proxy for retail prices assumes that chicken prices at the farm gate and at the retail level are correlated. This should not be an unreasonable supposition.[7]

If retail chicken prices have been adequately represented and there is a clear substitution relationship between chicken and pork, then the coefficient for CP should be positive. The argument is the same as the substitution argument for beef: if the price of chicken rises then consumers will switch to pork thereby causing its price to rise.

Retail Concentration (RR)

The variable RR takes account of changes in the level of concentration in grocery retailing in Alberta over the relevant period.

Over the thirty-six year period studied, concentration in Alberta's grocery retailing industry increased significantly. In chapter five it was suggested that wholesale pork prices were lower as a result of the development of the retailing sector's market power. It is possible that these lower wholesale pork prices led to a reduction in retail pork prices. If this indeed was the case, then the coefficient for RR should take a negative sign.

However, given the higher level of retail concentration, the traditional structure - conduct - performance paradigm in industrial organization would predict reduced competition among grocery stores for pork products. The reduced competition is likely to have caused higher retail pork prices. Therefore, the sign of RR's coefficient may well be positive, implying that as retail concentration has increased so has the price of retail pork. If at the same time wholesale pork prices were lower, then retailers increased their margin on pork products.

Actual concentration figures for the retailing industry in Alberta covering the period under investigation are not available. Therefore, retail chain store market share has been used. The definition of a retail chain store in this instance is an organization which owns four or more stores. As such, this measure is far from perfect. Under this definition RR will include small convenience stores which may not sell meat products, and those that do will have an insignificant market share. However, the largest portion of the sales attributable to retail chains will come from the medium to large full-line grocery stores (Safeway, Co-op, Woodward's etc). Therefore, RR will include as a majority the type of store which needs to be empirically represented. Given the lack of alternative data, retail chain store market share is felt to be a sufficiently adequate characterization of increasing retail concentration.[8]

There is evidence in the literature (see Bain, 1951) that the influence of concentration as a performance variable is not linear but operates only or disproportionately strongly at the highest levels of concentration. To accommodate this presumption of nonlinearity the retail chain store market share has been squared and it is this transformation that constitutes the variable RR.

Alberta Pork Producers' Marketing Board (DHB)

The institution of the Alberta Pork Producers' Marketing Board is one of the particular structural changes in the Alberta Hog Marketing industry which is of interest

to this study.

A dummy variable was used to measure the Board's presence because its existence is not quantifiable on a well defined scale. DHB takes a value of one for the years the Board is present, and a value of zero for the years it is absent. Recalling the discussion in chapter five, it is hypothesized that the presence of the Board has meant slaughter hog prices have been higher than they would have been without the Board. Under the assumption that retail prices respond to changes in prices at the farm gate, higher slaughter hog prices will produce higher retail pork prices. Therefore, the Board's presence, as compared to its absence, could result in higher retail pork prices. DHB's coefficient is therefore expected to be positive.

Vertical Integration (DVI)

The variable DVI is a dummy variable which accounts for the vertical integration by the Marketing Board. In 1981 the Board purchased Fletcher's Ltd., a meat packing firm with a hog kill plant in Red Deer, Alberta and a processing plant in Vancouver, B.C.. This was a significant structural event within Alberta's hog marketing industry and its possible impact on retail pork prices is worth testing.

The Board's intention in integrating was to encourage "fair" slaughter hog prices that reflected market condi-

There are two plausible hypotheses regarding the tions. effect integration has had on prices at the retail level. The first suggests that the Board's ownership of Fletcher's has increased competition in the packing sector for the purchase of hogs, which was its intention. Fletcher's would operate more aggressively and independently in its hog purchasing than under its previous ownership, bidding higher and pursuing competitive domestic contracts with the Board. Other packers would have to react to maintain their share of the hog supply. Thus hog buying would take on a more competitive nature, raising the average price of Alberta slaughter hogs and thereby inducing higher retail pork prices. Under this hypothesis the coefficient for DVI would be positive.

The alternative theory is that vertical integration allowed greater efficiency in pork production for Fletcher's. This might result from access to information held by the Board that is not available to other packers. Fletcher's would be better able to plan its operations with this information. Another advantage (pointed out by Gainer's Inc.) relates to the fact that together, Fletcher's and the Board did not have capital costs similar to other packing firms.[25;p.9] Their capital costs were underwritten by the two dollar per hog levy placed on producers to finance the purchase of Fletcher's.

These advantages would provide cost savings for Flet-

cher's and permit thèm to sell their pork products at a lower price than other packers. Competing packers would be forced to reduce their selling price to compete with Fletcher's. A general drop in wholesale pork prices would result, which could be passed on to consumers in the form of lower retail pork prices. This hypothesis is supported by a negative coefficient.

Packer Collusion (DPC)

The independent variable DPC is a dummy variable which represents price collusion by the major packers in the Alberta meat packing industry between December 1969 and December 1974. Four packing firms pleaded guilty to charges of conspiracy to prevent or lessen unduly competition in the purchase of slaughter hogs in the Province of Alberta during this period. The charges against the major packers also included conspiracy in the sale of wholesale pork products, but the Crown chose not to continue with this charge.[9] This does not necessarily rule out the possibility that packers were in fact attempting to sell pork at collusively determined prices. The admitted pricing conspiracy is likely to have affected the price paid for Alberta slaughter hogs and possibly the price of wholesale pork and as such may have influenced the price of retail pork. DPC is therefore regarded as a variable to be included in the equation.

The expected sign of the coefficient for DPC could arguably be positive or negative. If the price of slaughter hogs was reduced as a result of the conspiracy, then it is possible that retail prices fell in response to the price reduction at the farm gate. This hypothesis would be supported by a negative coefficient.

Packers claimed that their conspiracy was in reaction to the Board's insistence on an unrealistic price that is related to outside markets such as Omaha and Toronto.[4; 12/26/83;p.17] Thus the packer collusion may have been in response to relatively higher slaughter hog prices. Therefore, during the period of conspiracy retail pork prices may have been higher as a result of higher prices at the farm gate. A positive coefficient would support this theory.

A positive DPC coefficient would also be explicable in quite different terms as follows. If the packers had attempted to collude with respect to the selling prices of wholesale pork products and were to some extent successful, then these higher wholesale pork prices would have been prevalent during the five year period. In response to these increased prices at the wholesale level, retail pork prices would also have risen.[10]

6.3 Results

The results are presented in table 6.1. Equation 1 is the model specified in the previous section. Equations 2, 3, 4 and 5 are variations of this model which attempt to correct the problem of multicollinearity observed in equation 1. These equations will be considered later.

The equations were initially run using ordinary least squares. However, the Durbin Watson statistic indicated first-order autocorrelation. Therefore, the data was transformed using an autoregressive coefficient (p), which was estimated using a maximum likelihood iterative pro-In the final analysis, the DW statistic for cedure.[11] all equations indicates that at the five percent significance level the existence of autocorrelation is inconclusive. The adjusted R-squared for each equation is high at approximately .970 for equations 1, 2, 4, and 5 and at .953 for equation 3. Therefore, it appears that the independent variables explain the variation and the level of the average retail pork price quite well. The results for equation 1 are discussed below.

6.3.1 Independent Variables

Net Surplus Position (NSP)

The coefficient for the variable representing the net surplus position of pork in Alberta, NSP, is insignificant. This coefficient was expected to be significant and have a

	Kegression Results													
	Explanatory Variables													
	Constant	NSP	HP	RR	BRP	CP	DVI	DPC	DHB	SE	₹²	P	DW T	F
Equation 1	2.968 (5.424)	-0.000004 (-1.341)	0.035 (10.216) ^{**}	0.0002 (2.840)	-0.216 (-4.666)**	-0.106 (-0.527)	-0.250 (-2.923) ^{***}	0.469 (3.850)**	0.057 (0.329)	0.1702	0.9696	-0.596	2.380	125.08
Equation 2	2.789 (6.583) ^{**}	-0.000004 (-1.346)	0.033 (14.022) ^{**}	0.0003 (6.908)	-0,209 (-4.769)***		-0.263 (-3.246) ^{**}	0.481 (4.067) ^{***}	0.0002 (0.002)	0.1680	0.9704	-0.596	2.422	165.07
Equation 3	4.071 (8.940) ^{**}	-0.000005 (-1.252)	0.039 (11.586) ^{**}		-0.258 (-5.034)**	-0.599 (-5.285)**	-0.210 (-2.134) [*]	0.370 (2.727) ^{**}	0.482 (4.573) ^{***}	0.1900	0.9532	-0.509	2.076	103.00
Equation 4	2.868 (6.393) ^{**}	-0.000004 (-1.466)	0.034 (11.199) ^{**}	0.0002 _{**} (6.134)	-0.209 (-5.142) ^{***}	-0.065 (-0.419)	-0.249 (-2.963)**	0.491 (4.902) ^{**}		0.1675	0.9707	-0.597	2.402	166.92
Equation 5	2.789 (6.959) ^{**}	-0.000004 (-1.430)	0.033 (14.300) ^{**}	0.0003 (12.393)**	-0.209 (-5.210) ^{**}	-	-0.263 (-3.446)**	0.481 (5.014)**		0.1651	0.9714	-0.596	2.422	165.15

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Table 6.1

NOTE: t-statistics in parentheses: * indicates significance at the 5% level; indicates significance at the 1% level.

⁺ indicates Durbin-Watson test is inconclusive at the 5% significance level.

The dependent variable is the average retail pork price. HP = Alberta slaughter hog price; NSP = net surplus position of pork in Alberta; RR = Alberta retail chain store market share; BRP = average retail beef price in Edmonton; CP = price of live chickens paid to Alberta producers; DVI = vertical integration dummy variable; DPC = packer collusion dummy variable; DHB = Hog Board dummy variable; SE = standard error of the regression; \overline{R}^2 = adjusted R-squared; ρ = autoregressive coefficient; DW = Durbin-Watson statistic; and F = F-statistic. negative sign. The fact that it is insignificant suggests that the immediate supply/demand balance for pork in Alberta (to the extent that it is captured by NSP) had little relationship with the retail price of pork between 1950 and 1985. This otherwise surprising result perhaps becomes more understandable in the context of the high level of retail concentration. This has arguably made retail price determination less responsive to the type of influences that would have been important in a more competitively structured retail sector. However, because the accuracy of NSP in its representation of the pork supply that is actually available for Alberta is questionable, this particular interpretation of the insignificance of NSP must be regarded as at best tentative.

Slaughter Hog Prices (HP)

The coefficient for HP was significant at the one percent level. As expected, its sign was positive. This result suggests that retail pork prices respond to changes in prices at the farm gate. It may also suggest that retail price changes affect the price of hogs.

Retail Beef Prices (BRP)

The coefficient of BRP was significant at the one percent level and was negative. The negative coefficient supports the "beef specials" argument discussed in the

previous section. This does not necessarily mean that the "substitute product" argument does not apply. It is perhaps more likely that during the time period studied, the effect of special discount prices on beef outweighed the impact of pork being a beef substitute.

Live Chicken Prices (CP)

The coefficient for the proxy of retail chicken prices, CP, is insignificant. Assuming the proxy is a reasonably accurate representation of retail chicken price movement, this result is contrary to expectations. The insignificance of the coefficient implies that pork and chicken were not regarded as substitutes by consumers over the time period tested; or at least it implies that retail pork and chicken prices were not related. However, the confidence in this result is dependent upon how well live chicken prices represent retail chicken prices.

Retail Concentration (RR)

The variable RR displayed a positive and significant coefficient at the one percent level. A positive coefficient suggests that the increase in retail chain store market share raised the retail price of pork. Given that retail chain store market share is a proxy for concentration, this result supports the argument that the increase in retail concentration reduced competition for the sale of pork and therefore raised its retail price.

Alberta Pork Producers' Marketing Board (DHB)

The coefficient of the dummy variable representing the presence of the Alberta Pork Producers' Marketing Board was found to be statistically insignificant. This result is contrary to what was anticipated and implies that the presence of the Board had no impact on the level of retail pork prices. Assuming that slaughter hog prices are related to retail pork prices, which is supported by these results, the indication is that the marketing Board's impact on hog prices is doubtful. This result seems to concur with the work done by Leavitt, Hawkins and Veeman (1983) and Baah (1984) which suggested that though the Board affected pricing efficiency shortly after its formation, in later periods the Board appeared to have no effect.

Vertical Integration (DVI)

The coefficient of DVI was significant at the one percent level and it had a negative sign. The hypothesis prior to estimating the equation argued that a negative or positive coefficient was plausible. The negative coefficient supports the theory that Fletcher's was able to sell pork products at a lower price than its competitors. This touched off a general reduction in wholesale pork prices, inducing a lower retail price level.

Packer Collusion (DPC)

The coefficient for DPC is significant at the one percent level and it had a positive sign. This result supports two arguments previously mentioned. The first suggested that the hog buying conspiracy was in reaction to the Board's policies which had in fact established higher slaughter hog prices. This would account for higher retail prices during the period of collusion. The second argument related to the packers' attempt at price collusion in the sale of wholesale pork. If this was successful, wholesale pork prices would have been higher causing retail prices to rise.

6.4 Multicollinearity

The results for equation 1 appear to be quite reasonable. However, after testing this equation it was discovered that variable CP was strongly correlated with RR and HP (with correlation coefficients of .81 and .71 respectively). The variable DHB also exhibited collinearity with the variables RR and BRP (with correlation coefficients of .89 and .72 respectively). This makes it difficult to isolate the explanatory power of each of these variables.

Two common ways to avoid this problem are to measure

the existing variables differently or to drop one of the correlated variables. The lack of available data for the time period studied precluded the first option.[12] Therefore, the second alternative was chosen and four additional equations were tested. In table 6.1 the results for these four equations are shown. Equation 2 excludes CP. Equation 3 is without RR and equation 4 excludes DHB. Equation 5 leaves out both CP and DHB. RR was chosen as a possible variable to drop because it exhibited the highest correlation with CP and DHB.

When a variable is dropped from an equation there is the possibility that the equation becomes incorrectly specified. This will occur if the variable dropped is related to the dependent variable and therefore should be included. From the results presented in table 6.1 there is some reason to believe that dropping variable CP and DHB does not create specification bias, but dropping variable RR does.

The coefficient for CP in equation 1 is insignificant, however, the presence of multicollinearity reduces the confidence in this result. When CP is dropped from the equation as shown by equation 2, the results change only slightly. Though t-statistics do change, all variables that were significant in equation 1 were significant at the same level in equation 2. The values of the coefficients change very little and the adjusted R-squared essentially

remains the same. It appears whether CP is included or not is of little consequence. Thus, dropping CP would probably not create specification bias.

Equation 3 is the result of dropping RR from equation 1. The results for equation 3 are significantly different from those of equation 1. Variables CP and DHB were significant at the one percent level and DVI was significant at the five percent level. The adjusted R-squared drops slightly to .953. The fall in the adjusted R-squared suggests that RR does have explanatory power and should be included in the equation. The statistical significance of CP and DHB in equation 3 is likely a result of these variables picking up some of the explanatory power of RR.

The same strategy can be used for DHB. Equation 4 is determined by dropping DHB from equation 1. The difference in results between equation 1 and 4 is almost negligible. All coefficients that were significant in equation 1 were significant at the same level in equation 4. The adjusted R-squared of equation 4 increased very slightly to .9707. It would appear that excluding DHB from equation 1 is also of little consequence.

Equation 5 is determined by dropping both CP and DHB from equation 1. The difference in results between these two equations is again very little. The adjusted R-squared is slightly higher at .9714. It seems reasonable to suppose that variables CP and DHB have little relationship

with RP. The results for equation 1 show this. It therefore appears these results were only slightly affected by multicollinearity and that the interpretation of these results may remain the same. Equation 5 is perhaps the best equation because it is free from multicollinearity.

6.5 Quantitative Implications of the Coefficients

Having decided that the results for equation 1 may stand despite multicollinearity problems, it is worth while to consider the value of the coefficients that were statistically significant. The coefficient for HP is .035. This suggests that a one unit increase (decrease) in HP, with all other variables constant, may increase (decrease) RP by about .035 units. Or a one dollar increase (decrease) in the price of slaughter hogs will increase (decrease) retail pork prices by three cents. The average 1981 dollar price of retail pork in Edmonton over the relevant time period was approximately five dollars per kilogram. Therefore, a change in the price of slaughter hogs appears, based on the results of this analysis, to produce a relatively small change in retail pork prices. This suggests that most of the increase in cost that is passed on to consumers as pork moves from the farm gate to the retail shelf is added at the meat processing and retailing stages.

A one unit increase (decreasé) in RR may increase

(decrease) RP by approximately .0002 units - a change that is essentially negligible. Over the period studied the retail chain store market share in Alberta more than doubled. The value of the RR's coefficient suggests that the impact of this increase would have been barely noticeable. If retail chain store market share is a reasonably accurate proxy for retail concentration in Alberta, this result implies that higher retail concentration has been of little significance to retail pork prices.

A one unit increase (decrease) in BRP, with other variables constant, may cause RP to decrease (increase) by about .216 units. Or a one dollar change in retail beef prices will cause a twenty-one cent change in retail pork prices. Therefore, the strength of the relationship between retail beef prices and retail pork prices found in this study is noticeable. Beef retail price movements appear to have been relatively important to retail pork price movements.

With regard to the coefficients on the dummy variables that were significant, the results indicate that during the period of time the Board was vertically integrated, retail pork prices were .25 units lower as compared to when the Board was not integrated. During the presence of packer collusion, retail pork prices were .469 units higher as compared to the absence of packer collusion. These values suggest that though vertical integration and collusion had
some effect on retail pork prices, it was relatively small.

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6.6 Summary

In summary the results produced by the empirical investigation were interesting. All of the structural explanatory variables tested, except DHB, were statistically significant and therefore, in this study, may be regarded as having influence over movements of the price of retail pork.

The results indicated that retail concentration has been related with higher retail pork prices, although given the value of the coefficient this effect is practically negligible. Given that the coefficient for DHB was insignificant in equation 1 and dropping this term from the equation had little effect, it may be said with some confidence that these results indicate the presence of the Marketing Board did not affect prices at the retail level. This result is somewhat surprising. It was expected that the presence of the Board meant hog prices have been higher and this would translate into higher retail pork prices.

The results indicated that vertical integration by the Board appears to have had a negative effect on the price of retail pork and the period of collusion by packers was related with higher retail pork prices.

NOTES TO CHAPTER SIX

1. This data was acquired from Statistics Canada's annual catalogue, number 23-203, "Livestock and Animal Products Statistics," for the years 1950 to 1977. For the years 1978 to 1985 the source was Statistics Canada's quarterly catalogue, number 62-010, "Consumer Prices and Price Indexes." The retail price data reported in "Livestock and Animal Products Statistics" is also from the "Consumer Prices and Price Indexes" catalogue.

2. The source for the number of hogs slaughtered was the annual Statistics Canada catalogue, number 23-203, "Livestock and Animal Products Statistics." The annual average cold trimmed weight was taken from Agriculture Canada's, "Livestock Market Review."

3. The source of per capita consumption was Agriculture Canada's, "Handbook of Food Expenditures, Prices and Consumption," the 1977 and 1986 publications. Alberta population figures were taken from the Statistics Canada's monthly publication, "Canadian Statistical Review."

4. Originally the supply and demand of pork were tested in the equation separately. However, because the demand variable was strongly correlated with many of the other explanatory variables, it was combined with supply to form NSP.

5. The source for this price data was Statistics Canada's annual catalogue, number 23-203, "Livestock and Animal Products Statistics."

6. This beef price data was also taken from the Statistics Canada's annual catalogue, number 23-203, "Livestock and Animal Products Statistics" catalogue.

7. The data for live chicken prices was obtained from Agriculture Canada's, "Poultry Market Review."

8. The data for RR was obtained from the magazine, "Canadian Grocer," for the years 1959 to 1985. For the years 1950 to 1958, the data was acquired from the Statistics Canada monthly catalogue, number 63-005, "Retail Trade." The break in the data source for RR resulted from the inability to acquire a complete data set from "Canadian Grocer". However, Statistics Canada figures were very close to those "Canadian Grocer" values which were retrieved. Therefore, Statistic Canada figures were considered adequate. 9. See note number one in the notes to chapter five.

10. It would have been desirable to include other explanatory variables in the equation, specifically wholesale pork prices. However, lack of available data for the entire time period precluded this.

11. To correct for first-order autocorrelation, a maximumlikelihood iterative procedure developed by Charles Beach and James McKinnon was used. See "A Maximum Likelihood Procedure For Regression With Autocorrelated Errors," Econometrica, Vol. 46 (1978), pp 51-58.

12. In an attempt to avoid collinearity the variable RR was changed to dummy variable. The presence of retail chain store market share above a certain percentage was given the value of one and below this percentage was given the value of zero. This alteration was based on the idea that concentration has an effect only at higher levels. Various percentages were tested, but it was impossible to avoid collinearity problems with three other dummy variables already in the equation.

CHAPTER SEVEN

SUMMARY AND CONCLUSIONS

7.1 Summary

The objective of this study was to examine the major structural changes which have taken place in the Alberta hog marketing system, and to determine what effect these changes have had on retail pork prices. The study focussed on the relationships between industry structure, market power, and prices. Specifically, the study considered how structural change has altered the market power of each sector and thereby affected the price determination of slaughter hogs, wholesale and retail pork products.

7.1.1 Structure

In chapter three the hog producing sector was described as a competitive industry. Historically there have been thousands of hog producers in the province and even the output of the largest hog farm has not been sufficient to affect the price of hogs. The most significant trend in the producing sector over the last two decades has been the move towards larger production units. This trend was possible with the technological advances made in confined feeding.

It was noted that the larger hog farms take advantage

of economies of scale and have been decidedly more efficient than the smaller enterprises. However, entry into large scale hog production may be more difficult than entry at a smaller scale, because of the greater initial capital investment required. It was suggested that absolute costs may be a potential entry barrier at this level of hog production. On a smaller scale, it appears industry entry and exit have taken place almost at will.

Although scale economies have had a significant impact on the producing sector, they have not increased concentration in the industry to a noticeable degree. It was decided that the market for slaughter hogs would support numerous plants operating at the minimum efficient scale. Therefore, hog producers have held little power in the market for slaughter hogs and they have remained price takers.

Throughout the history of the Alberta hog marketing industry the meat packing sector has been a highly concentrated oligopsony and oligopoly. This sector has been composed of a few large national packers and numerous small regional packers. The study noted a number of factors which have contributed to the development of this structure; specifically, economies of scale, barriers to entry and diversification.

The meat packing sector has exhibited both plant-specific and multi-plant scale economies. These features have

given the larger firms an advantage over their smaller rivals. It was argued in chapter three that as a result of scale economies, the markets for slaughter hogs and wholesale pork would support only a few optimum plants. Scale economies arguably represent a barrier to entry, because entry of an efficient plant would substantially increase the industry's total output, raising the price of slaughter hogs and causing wholesale pork prices to fall. This price scenario would likely make entry less attractive. Other entry barriers that were noted include product differentiation for processed pork products, absolute costs and predatory pricing.

The conduct exhibited by the meat packing sector was typically that of an oligopoly. There has been evidence of market sharing and price leadership. The discussion of conduct in chapter three also described the ability of national packers to influence the business of smaller firms. In particular, the national packers have moved pork and hogs between regional markets to affect supply and demand conditions and thereby alter prices to their own benefit. The majority of the large national packers also pleaded guilty to charges of price collusion during the years 1970 to 1974.

As a result of its structure, the meat packing sector has had considerable power in the market for slaughter hogs and wholesale pork. However, its influence over wholesale

pork prices has been largely negated by the countervailing power of the dominant grocery retail firms.

Over the time period studied, the most notable changes in the structure of the grocery retailing sector have been its high level of concentration and vertical integration. The dominance of the retail chain store has been particularly significant. The oligopolistic nature of the retailing sector can be attributed to some scale economies at the store level and multi-plant scale economies. In particular the retail chains stores gain economies through mass advertising programs and volume buying.

The study noted a number of barriers in grocery retailing that prevented potential new members from joining the industry and that solidified the position of established firms. Store location is particularly important and two barriers were noted that prevented new entrants from acquiring ideal placement. The first concerned the owners of shopping centers who preferred established firms as their tenants, because they are well known to consumers. Established firms have also signed restrictive leases which prevent other stores from locating in the mall. The second involved market pre-emption whereby established firms built additional stores in markets in which they participated to pre-empt new firms from entering. Other potential barriers noted were the need to acquire a suitable wholesale supplier and the initial capital investment required when entering at a larger scale.

Vertical integration by retailers as far back as the processing stage has been a contributing factor to the development of one or two dominant firms in grocery retailing in Alberta. Their wholesale operations often supply other competing retail firms which allows them to affect the business of these firms. Integrated firms have also benefited from private label programs.

The behaviour exhibited by the grocery retailing sector in Alberta includes price leadership, predatory pricing and mass advertising. All of these factors have reduced the level of competition at the retail level. Thus, the structure of the retailing sector has allowed dominant retail firms to influence pricing in the markets in which they participate.

The last member of the industry is the Alberta Pork Producers' Marketing Board. Over time, the Board has acquired substantial influence over the price of hogs produced in Alberta. However, the Board may not be regarded as a monopoly because it does not control the supply of hogs available for the market. The Board has implemented a number of policies to offset the market power of the meat packing sector, including domestic contracts, advanced buyer bidding and setting a price range of acceptable bids.

One of the most significant moves by the Board was its vertical integration through the acquisition of the meat packing firm Fletcher's Ltd. By integrating the Board hoped to further increase the competition for the purchase of hogs in Alberta. This transaction significantly altered the structure of the hog marketing industry.

7.1.2 Vertical Relationships

The formation of the Marketing Board and its vertical integration were considered to be the most significant structural changes in the market for slaughter hogs. The study described the market relationship between producers and packers and price determination before and after the Board. It was concluded that before the Board producers had essentially no influence over the price of hogs. They were represented by a variety of agents who, for the most part, sold their hogs directly to packers. Of all those involved in the sale and purchase of hogs, producers were the least informed.

Hog prices before the presence of the Board could not be said to be competitively determined. Large packers did not compete on the basis of price, instead they used advertising and bonuses to encourage hog deliveries to their plants. Very few hogs were auctioned on the yards and the bidding for these animals was passive. The reason for this was that the price set at the terminals was the base on which the value of hogs delivered directly to packers was determined. In chapter five it was argued that the presence of the Board had likely increased the competition for slaughter hogs. It was suggested that slaughter hog prices were higher under the Board's presence than they would have been in its absence. The Board's sales policies and its vertical integration were designed to increase competition among hog buyers. Each new policy implemented by the Board was an attempt to gain more influence over the price of hogs.

The packing sector did not willingly give up any measure of their pricing power. The pricing conspiracy was evidence of this fact, but other events such as market boycott's and court cases attests to the struggle between the Board and packers over pricing.

It appears the packing sector was not able to counter the market power of retailer's in the wholesale pork market. The packers were made vulnerable by retailer private label programs which reduced the retail shelf space available for the packer's products. Packers had less control over the amount of pork moving to the wholesale market because fresh pork needs to be moved quickly to the retail shelf. Therefore, they could not hold back fresh pork supplies as a tactic to counter the power of the dominant retail firms.

The retail firms were also able to take advantage of volume buying discounts and they were apparently effective in playing one packer off against another to prevent pack-

ers from forming a unified pricing strategy. In chapter five evidence from court cases indicated packers were not able to successfully implement a common selling price that had previously been agreed upon. It was suggested that the increase in retail concentration and vertical integration had given retailers considerable power in the market for wholesale pork, and as a result of this change, wholesale pork prices were lower than they otherwise would have been.

7.1.3 Empirical Results and Conclusions

In chapter six an ordinary least square regression was tested to determine if the presence of the Alberta Pork Producers' Marketing Board, vertical integration by the Board, higher retail concentration and packer collusion had affected the price of retail pork.

The results were expected to show that during the Board's presence the level of retail pork prices was higher than it had been during the Board's absence. This expectation was based on the conclusion that the Board's policies had increased slaughter hog prices, which in turn had raised the level of retail pork prices. However, the results indicated that the presence of the Board had not affected retail pork prices.

The result concerning vertical integration by the Board supported the hypothesis that Fletcher's Fine Foods Ltd. was able to sell pork products cheaper than other

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firms because it obtained cost savings through its integration with the Board. As a result, other packers were forced to lower their prices to compete. Therefore, wholesale pork prices fell and this caused retail pork prices to decline.

The expectations regarding the impact of increasing retail concentration supported two possibilities. It was suggested in chapter five that the development of retail market power over the time period studied had caused wholesale pork prices to be lower. Therefore, it seemed possible that the lower wholesale pork prices could have been passed on to consumers in the form of reduced retail pork prices. However, the alternative possibility argued that the lack of competition at the retail level, as intimated by high concentration, caused retail pork prices to be higher than prices that would be determined by a more competitive industry. This effectively meant that cost saving's acquired by retailers as a result of market power were not passed on to consumers. It was this hypothesis which was supported by the statistical results.

The results associated a higher level of retail pork prices with the period of packer collusion (December 1969 to December 1974). This result supported two hypotheses that had been offered prior to testing the equation. The first argued that the Board had managed to increase the level of slaughter hog prices and this had resulted in

higher retail prices. The collusion by packers was in reaction to the rise in hog prices, which would account for the higher retail prices during the period of collusion. The second hypotheses suggested that, although packers were not convicted of a pricing conspiracy in the sale of pork, they had in fact colluded and wholesale pork prices were higher as a result. The higher wholesale pork prices were manifested in higher retail pork prices.

Other variables tested included the net surplus position of pork in Alberta, the price of retail beef products, a proxy for the price of retail chicken and the price of Alberta hogs. The results indicated that the net surplus position of pork and retail chicken prices were not related to the price of retail pork. However, the statistical evidence implied that the retail price of beef and the price of slaughter hogs did influence the price of retail pork. There was a positive relationship between hog prices and retail prices and a negative relationship between retail beef and pork prices.

Though the results indicated many of the variables tested were related to the level and movement of retail pork prices, the coefficients suggest there impact was small, essentially negligible in the case of retail concentration

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7.1.4 Empirical Short-Comings

With respect to the empirical work presented in chapter six, the major short-coming was the less than ideal measure of some of the variables. The retail pork price variable - the dependent variable - was an average of the prices of three retail pork cuts. A better measure would have included the prices of more retail cuts, but such data was unavailable. Retail chicken prices were represented by the prices paid to Alberta chicken producers for live chickens under five pounds. Actual retail prices would have been ideal, but this data was not available for the time period studied.

There was some doubt whether the variable which constituted the net surplus position of pork in Alberta (NSP) did in fact accurately represent the supply/demand balance. It is known that a great deal of pork moved from Alberta to other provinces during the period studied and this was not accounted for by the variable NSP. It may be that the actual supply of pork available to the Alberta market was less than that indicated by NSP. However, data for the interprovincial movement of pork is not obtainable.

Retail chain grocery store market share was used as a proxy for retail concentration in Alberta. Actual four firm concentration ratios would have been more accurate, however these figure have not been reported. It was felt the measure used was sufficiently adequate given the lack of data.

In addition to the questionable representation of some variables, the original equation exhibited multicollinearity between some independent variables. However, after testing various forms of this equation by dropping certain variables, it appeared the correlation between variables did not drastically alter the results.

Over all, the doubt surrounding the measure of some variables reduces the confidence in the statistical results. However, the outcome after testing the equation was interesting and worth noting.

7.1.5 Limitations and Further Research

The nature of this study made it necessary to synthesize a large amount of information and therefore many attributes of the Alberta hog marketing industry were covered only briefly. Many of these features could receive more detailed research, including the specific structural characteristics of each industry and the market relationship between the meat packing and grocery retailing sectors.

This study has limited its consideration of the impact of structural change to one direction - from the upstream to the downstream market. A better understanding of the industry could be gained by considering how structural conditions at the retail level affect pricing at the farm gate.

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