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Economic Intervention and Regulation in the Beef and Pork Sectors

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TECHNICAL REPORT NO. E/I 1

ECONOMIC INTERVENTION AND REGULATION IN THE BEEF AND PORK SECTORS

by

Larry Martin
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The findings of this Technical Report are the personal responsibility of the author, and, as such, have not been endorsed by members of the Economic Council of Canada.

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Preface

This Technical Report was jointly sponsored by the Economic Council of Canada and The Institute for Research on Public Policy. It is one of a number of studies on regulation and government intervention in Canadian agriculture prepared for the Economic Council's Regulation Reference and the Institute for Research on Public Policy's Regulation and Government Intervention Program.

Analysis of public policy issues are inevitably coloured by the discussant's own beliefs and values. This is all the more likely in a highly controversial area such as agricultural policy, where quantitative information is incomplete and an important element of judgement is required to come to terms with many of the basic issues. This need not detract from the usefulness of the analysis, but it does require the reader to exercise particular caution in assessing the assumptions and the argumentation of those advocating a particular policy perspective. It also adds to the importance of the Council's usual disclaimer that "the findings ... are the personal responsibility of the author and, as such, have not been endorsed by members of the Economic Council of Canada." Similarly, "Conclusions or recommendations in The Institute's publications are solely those of the author, and should not be attributed to the Board of Directors, Council of Trustees, or contributors to The Institute."

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FOREWORD

This study is one of a series commissioned jointly by the Economic Council's Regulation Reference and the Institute for Research on Public Policy which deals with various aspects of agricultural regulation. These studies do not profess to cover the whole field of agricultural regulation but they do focus on several important areas of concern.

The following is a list (alphabetically by author) of agricultural studies expected to be published in this series:

Arcus, Peter L., Broilers and Eggs

Barichello, Richard R., The Economics of Canadian Dairy Industry Regulation

Brinkman, George L., Farm Incomes in Canada

Forbes, J.D., Institutions and Influence Groups in the Canadian Food Policy Process

Forbes, J.D., D.R. Huges and T.K. Warley, Regulation and Government Intervention in Canadian Agriculture

Gilson, J.C., Evolution of the Hog Marketing System in Canada

Harvey, D.R., Government Intervention and Regulation in the Canadian Grains Industry

Josling, Tim, Intervention and Regulation in Canadian Agriculture: A Comparison of Costs and Benefits among Sectors

*Martin, Larry, Economic Intervention and Regulation in the Beef and Pork Sectors

Prescott, D.M., The Role of Marketing Boards in the Processed Tomato and Asparagus Industries

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* Already published

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Résumé

Le présent document étudie l'incidence sur l'économie de la réglementation dans les secteurs de la production du boeuf et du porc au Canada. La Loi sur la stabilisation des prix agricoles, avec ses amendements, principal instrument de réglementation dans ces secteurs, est au centre de l'analyse de l'auteur. M. Martin conclut que cette loi n'a pas encore atteint et ne réalisera pas les objectifs visés, et ce, pour plusieurs raisons. D'abord, le programme est annuel, et pourtant les producteurs peuvent connaître une période de faibles revenus au cours d'une année et ne pas être éligibles aux paiements de stabilisation. Deuxièmement, le niveau de soutien n'est pas annoncé à l'avance, de sorte que le producteur ne peut prévoir quel sera ce niveau, ou même si le gouvernement fournira un appui quelconque au cours de l'année en question. Et troisièmement, pour réaliser à la fois les objectifs de stabilisation de l'approvisionnement et des prix des aliments, et d'augmentation des exportations d'aliments, il faudrait que le programme provoque un accroissement de l'offre. Mais la structure actuelle du programme ne donne pas suffisamment de confiance aux éleveurs pour qu'ils augmentent leur production de boeuf et de porc. Indépendamment de ce fait d'ailleurs, le programme aura peu d'effet sur les prix ou l'offre puisque le marché du bétail englobe l'ensemble du continent nord-américain et non seulement le Canada.

Le rapport présente une analyse quantitative des répercussions d'autres programmes de stabilisation possibles. Les faits démontrent que les programmes se fondant sur l'insuffisance des prix ne sont pas efficaces comme moyen de stabiliser les marges bénéficiaires des éleveurs, alors que les programmes se fondant sur l'insuffisance de la marge bénéficiaire, bien que plus onéreux du point de vue des dépenses publiques directes, ont pour effet de stabiliser les marges.

L'auteur fait cinq recommandations pour améliorer le programme de stabilisation.

Martin s'oppose à un programme complet de gestion de l'offre pour le boeuf et le porc comme instrument de stabilisation parce qu'il serait trop coûteux pour les consommateurs et les contribuables et parce qu'à long terme, il aurait des répercussions désavantageuses sur le système de production de viande rouge au Canada.

Summary

This report examines the economic impact of regulation in the beef and pork sectors in Canada. The author focuses his analysis on the amended Agricultural Stabilization Act (ASA) as being the major regulatory instrument in these sectors. Martin draws the conclusion that the amended ASA does not and will not attain its objectives: the program is annual and, yet, producers may experience a period of low returns within one year but not benefit from stabilization payments; the level of support is not announced in advance and, thus, the producer has little or no idea of what the support level will be, if any, until after the fact; the objectives of stabilizing both food supplies and prices, and encouraging expanded food exports, depend on the program eliciting a supply response. The way it is structured, it does not inject sufficient confidence into the livestock system to bring forth significant additional supplies of beef and pork. Irrespective, it will have little impact on price or supply as the livestock market is on a North American basis.

A quantitative analysis of the impact of alternative stabilization programs is presented in the report. Price deficiency programs are shown not to be effective in stabilizing livestock producers' profit margins whereas margin deficiency programs, although more costly in terms of direct government expenditure, do have a margin stabilizing influence.

The author offers five recommendations to improve the stabilization program.

Martin rejects a comprehensive supply management program for beef and pork as a stabilization instrument because it would be too costly for consumers and taxpayers, and would have a detrimental longer-term impact on the red meat system in Canada.

Economic Intervention and Regulation in the Beef and Pork Sectors

Larry Martin

1.0 INTRODUCTION

In this introductory section, we begin by presenting data on the red meat sector which is intended to show the fundamental importance of the red meat sector in Canadian agriculture and, more importantly, to the Canadian economy. With this as background, current issues regarding policy intervention are briefly outlined and the objectives of this study are delineated.

1.1 Importance of the Red Meat Sector

The importance of the red meat sector in Canadian agriculture is reflected in a number of variables. Farm cash receipts from the sale of cattle and hogs increased by nearly 400 percent from 1965 to 1978 and have represented from 30 to 35 percent of total farm cash receipts (Table 1.1).

International trade in beef and pork has increased significantly in recent years (Tables 1.2 and 1.3). Of particular note is the fact that Canada has moved increasingly toward a net export position for both sectors. In the case of beef, the ratio of exports to imports for both live animals and dressed meat has increased steadily since 1975. In the case of pork, Canada was a net importer in 1975, moved to a modest net export position in 1978, exported 2.4 lbs. for each pound imported in 1979 and has exported 8.7 lbs. for each pound imported thus far in 1980.

Table 1.1: Farm Cash Receipts from Sales of Cattle and Hogs, Selected Years 1965-1978, Canada

	1965	1970	1975	1978
Farm Cash Receipts From Sales of Cattle and Calves ($ Mil.)	772.58	969.21	1,767.98	2,957.54
Percent of Total Cash Receipts	22	23	19	25
Farm Cash Receipts From Sales of Hogs ($ Mil.)	328.40	836.47	886.47	1,136.73
Percent of Total Cash Receipts	10	12	9	10

Sources: 1965
1970-1978

Table 1.2: Canadian Trade in Beef, Selected Years 1970-1979

	1970	1975	1978	1979	1980*
Canadian Exports					
Cattle and Calves (Thous. Head)	120.0	152.4	376.6	297.7	194.4
Dressed Beef and Veal (Mil. lbs.)	90.2	34.0	76.1	94.6	77.9
Canadian Imports					
Cattle and Calves (Thous. Head)	52.1	41.9	55.8	19.4	19.5
Dressed Beef and Veal (Mil. lbs.)	144.1	139.8	158.0	135.9	78.9

Source: Agriculture Canada, Livestock Market Review, Annual.
* Through September 13, 1980 (preliminary estimate).

Table 1.3: Canadian Trade in Pork, Selected Years 1970-1979

	1975	1978	1979	1980*
Canadian Exports				
Live Hogs (Thous. Head)	9.1	130.0	72.0	109.4
Pork (Mil. lbs.)	95.3	123.9	175.0	192.5
Canadian Imports				
Pork (Mil. lbs.)	98.3	116.3	72.1	22.1

Source: Agriculture Canada, Livestock Market Review, Annual.
* Through September 13, 1980 (preliminary estimate).

Production of cattle and hogs results in a substantial domestic multiplier because of investment and employment in ancillary industries. While this includes the input industries (compound feed milling, pharmaceuticals, construction and equipment) the multiplier effect is likely most dramatic in the slaughtering and processing sector, which is the third largest manufacturing and largest food processing industry in Canada.

Data in Table 1.4 suggest the trends and magnitudes of the number of firms, the number of employees, the level of investment and the value added by this sector. While by all measures, the absolute value of the meat processing sector to the Canadian economy has been greater in the East, it is relatively more important in the West. In 1976, the sector was the largest manufacturing industry in Manitoba, Saskatchewan and Alberta, while it was fifth in Quebec and the Maritimes and seventh in Ontario.

Consumption of beef and pork have trended upward, with beef leading the way (Figure 1.1). Beef is the largest single item in consumers' food expenditures. A recent estimate [8] placed expenditures on beef at 12 percent of total food expenditures in 1976, while expenditures on pork

Table 1.4: Number of Firms, Employment, Net Investment and Value Added in the Meat Processing Sector, Selected Years 1965-1978

	1965			1970			1975			1978		
	East	West	Canada	East	West	Canada	East	West	Canada	East	West	Canada
# of Firms	289	110	389	319	134	453	320	157	477			
# of Employees (Thousand)	19.1	10.9	30.0	20.0	11.1	31.1	20.3	12.7	33.0			
Annual Net Investment ($Mil.)	5.0	1.9	6.9	5.4	7.9	13.3	7.0	5.4	12.4			
Value Added ($Mil.)	171.0	96.3	267.3	226.7	135.9	362.6	444.6	266.9	711.4			

Source: Statistics Canada, Catalogue #32-221.

were 6 percent.

1.2 Objectives of the Study

The foregoing data emphasize the importance of the red meat sector to the Canadian economy. To reiterate: sales of beef and pork represent over 30 percent of farm cash receipts; the meat packing industry is the third largest manufacturing industry in Canada and the largest in Western Canada; expenditures on beef and pork represent nearly 20 percent of consumers' total food expenditure and exports of live animals and dressed meat have contributed positively to Canada's balance of payments during the past five years.

Because of this pervasive importance, the nature and effects of government intervention in the markets for beef and pork have impacts on all Canadians. Government intervention in these markets has increased markedly since 1970, primarily in the form of stabilization programs and trade restrictions, and due mainly to increased uncertainty. Further intervention is being or has been contemplated by the federal government. This includes: alterations to the Agricultural Stabilization Act; the enactment of a statutory beef import law; and establishment of supply management programs for both beef and pork.

These alternatives may have widely differing impacts on the marketplace and on the Canadian economy. What is the nature of these impacts? How would the impacts be distributed among producers, consumers, and processors? It is with these questions that this study is concerned.

The study has two objectives. The first is to analyze the impacts of alternative policies on market participants. The second is to provide suggestions which may improve performance of the red meat sector.

In order to reach these objectives a number of intermediate steps are required. First, the economic nature and problems of the red meat sector must be understood in order to determine the possible response to changes in government policy. Hence economic relationships in the beef and pork sectors are investigated in section 2.0.

Second, it is necessary to describe the nature of economic intervention by government in the recent past and to more fully specify the alternatives which are currently at issue. This is accomplished in section 3.0, part of which is devoted to a discussion of the policy making process and a description of alternatives.

The analysis of alternatives is contained in part in section 3.0. However, a quantitative analysis of alternative approaches to improving the Agricultural Stabilization Act is contained in section 4.0.

2.0 THE COMMODITY SECTORS

Dramatic changes in the markets for red meats occurred during the 1970's. These changes resulted in unprecedented uncertainty for producers and in increased involvement in regulation by governments. In order to understand the nature of the markets for these commodities and to illustrate the increased uncertainty of the 1970's, this section investigates in some detail recent events in the livestock sector and outlines the broad parameters of the production system and the demand for livestock products.

2.1 The Beef Production Sector

Production in the beef sector can be characterized generally as taking place in two stages. The breeding herd is concentrated on range land - e.g., the foothills of Alberta and, to a lesser extent, in Eastern and Northern Ontario - the value of which is marginal for field crop production. The cow-calf operator makes the basic decision regarding beef production by deciding on the number of cows that will be bred. Because of weather conditions the bulk of the herd is bred to produce a calf crop in the spring. The progeny are then sold, usually in the fall of the year they are born (at 300-500 lbs.) or the succeeding year (at 600-800 lbs.), to feedlot operators. Feedlots are relatively capital intensive and tend to be concentrated in grain producing areas. Cattle feeders raise cattle to market weight (1000-1200 lbs. for steers and 900-1100 lbs. for heifers) on rations consisting of concentrates, grain and/or forages. These weights are reached at roughly two years of age.

The dominance of Western Canada in beef production is illustrated by Figures 2.1a and b which contain inventories of breeding animals and cattle slaughter since 1965 for the two regions. While the size of the

Figure 2.1a: Cattle Inventories and Slaughter, Western and Eastern Canada, January 1, 1965-1978

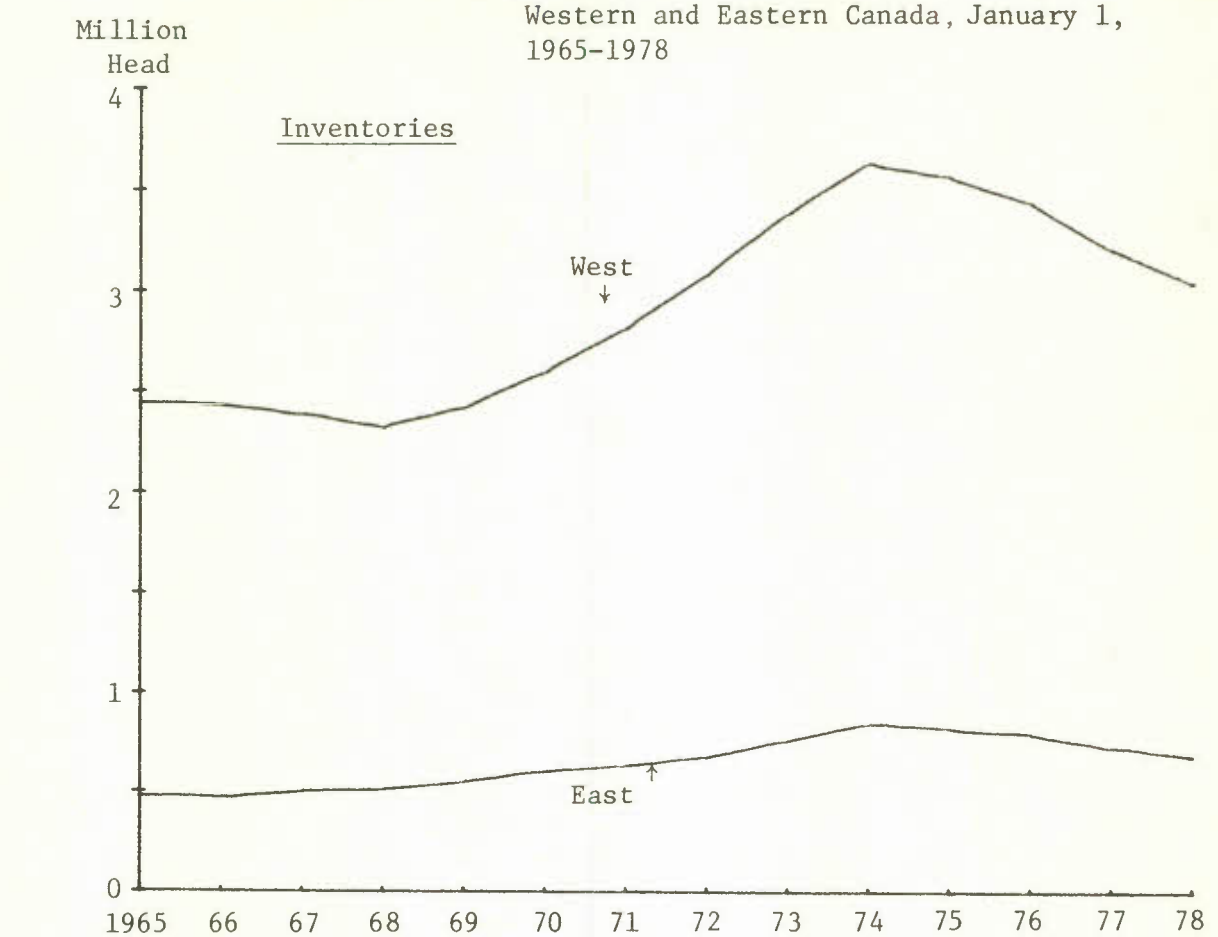
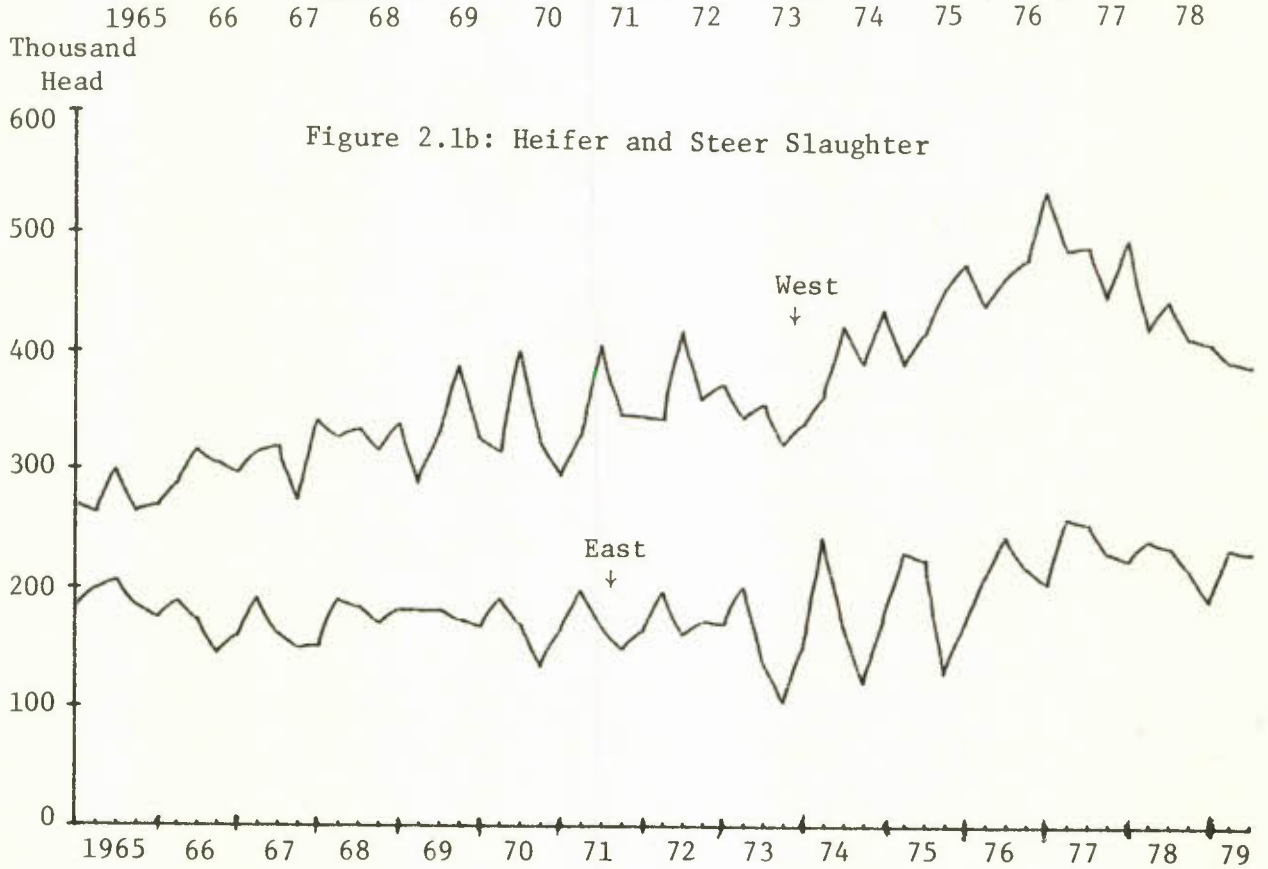


Figure 2.1b: Heifer and Steer Slaughter



Source: Agriculture Canada, Livestock Market Review, Ottawa, Annual

beef herd is dissimilar in the two halves of Canada, both have experienced cyclical change and particularly uncertain times during the mid-1970's. It is to these issues that we now turn.

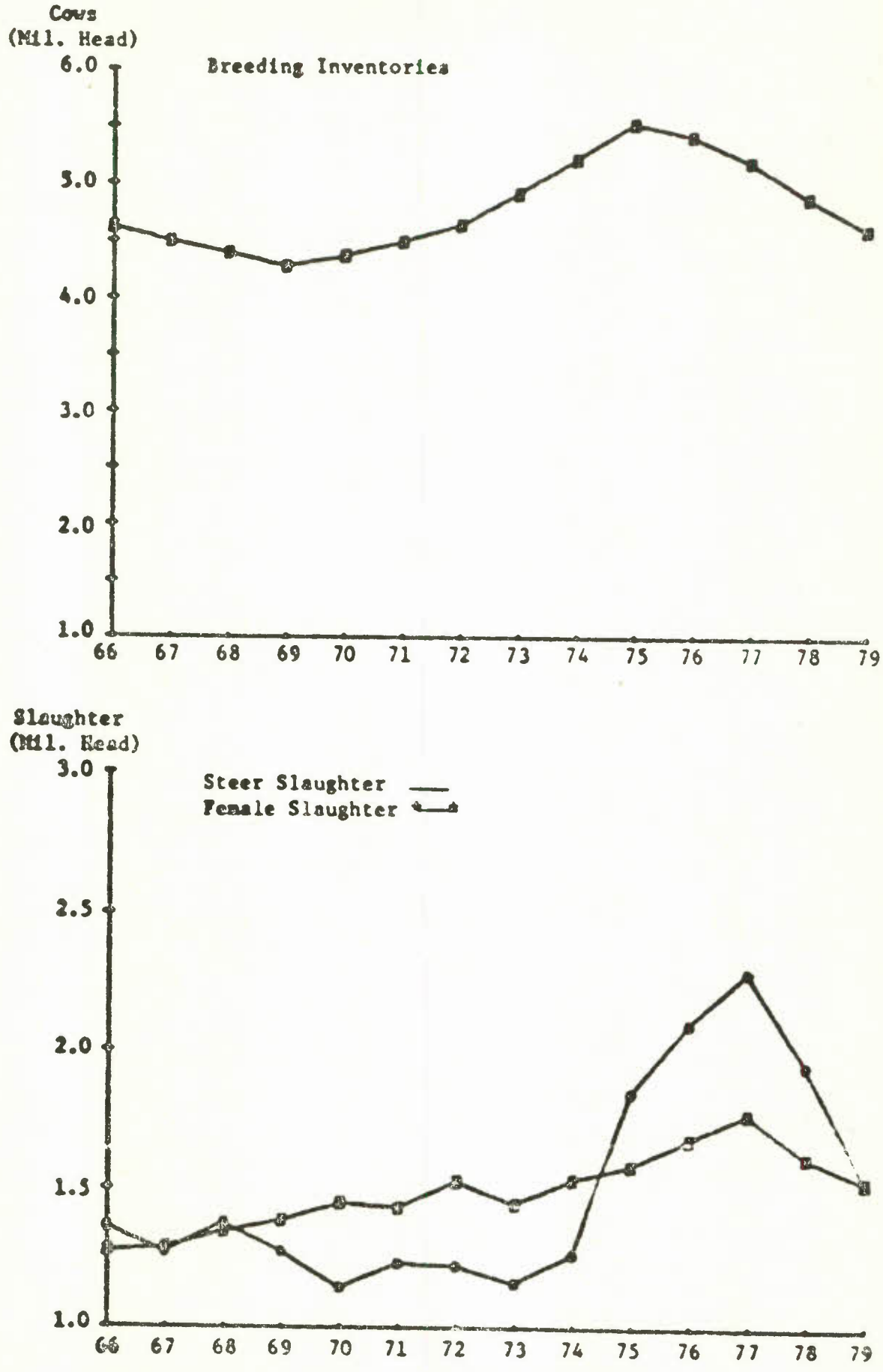
The Beef Cycle

The Canadian beef cycle since 1966 is illustrated in Figure 2.2. The upper graph contains Canadian cow inventories at January 1 of each year. Note that cow inventories reached a cyclical low point in 1969 (the previous peak occurred in 1965). Subsequently, inventories increased each year until 1975. Since then inventories have fallen until in 1979 they were back to approximately the same level as 1972. While the inventory cycle has occurred regularly at 8-10 year intervals for as far back as data are available, the 15 percent decline from 1975 to 1979 is the largest percentage decline since the Great Depression and the largest absolute decline ever recorded. The reason for this will become apparent below.

The lower graph contains annual Canadian slaughter of steers as well as females (cows and heifers). Note that steer slaughter has been relatively constant over time, lagging cow inventories by about two years. For example, steer slaughter declined slightly during 1971 following the low point in cow inventories during 1969[1]. Steer slaughter peaked in 1977 following the peak in cow inventories during 1975 and has declined since. The lag of two years is consistent with the length of time required to raise steers.

Female slaughter, on the other hand, has been highly variable and inversely related to cow inventory. During the period when the herd was expanding (1967-1974), female slaughter was less than steer slaughter, but as the herd declined after 1975, this liquidation was reflected in

FIGURE 2.2: The Canadian Beef Production Cycle, 1966-1979

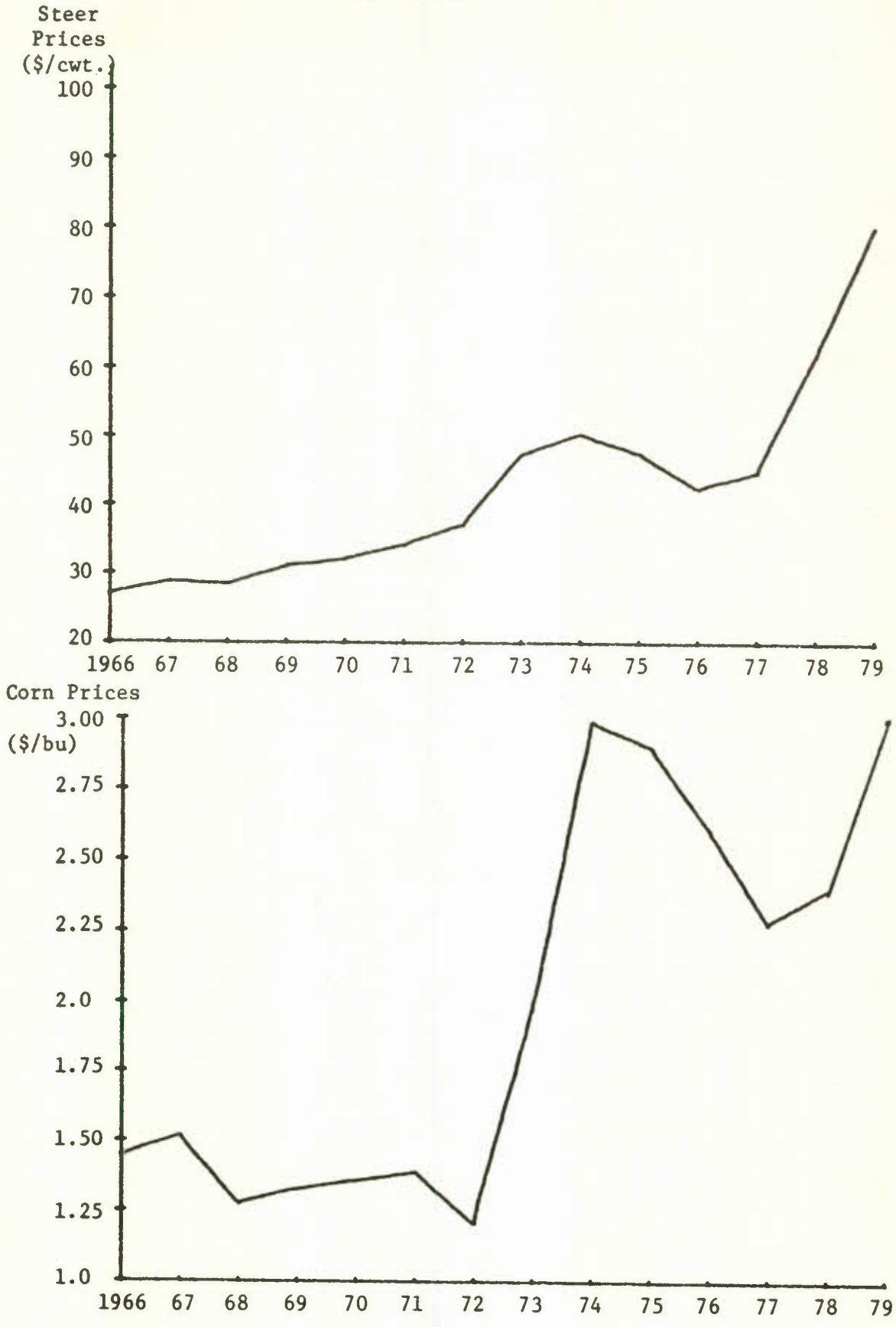


large female slaughter. It is quite clear from the graphs that the beef supply cycle is mainly reflected in female slaughter.

The relationship between the supply cycle and steer prices can be seen by comparing the lower graph of Figure 2.2 to the upper portion of Figure 2.3 which contains annual prices of steers. Note that as demand expanded along with modestly increasing beef supply through 1972, steer prices increased steadily, but slowly. Then in 1973 and 1974 prices increased substantially. This was likely caused by two factors. In April 1973, the U.S. government announced a price freeze on all meats at the retail level as part of President Nixon's anti-inflation program. Steer prices increased modestly during the summer and U.S. beef producers withheld cattle from the market in anticipation of higher prices when the freeze was lifted. Then in August, President Nixon lifted the freeze for pork and poultry prices, but not for beef. Pork and poultry prices promptly rose, providing an incentive for beef producers to withhold more cattle from the market. As a result, steer prices rose dramatically both in the U.S. and Canada. In October the freeze on beef prices was lifted, the backlog of cattle was slaughtered and steer prices fell dramatically. But the unweighted average presented in the graph reflects the high price period during the summer.

In 1974, steer prices remained below 1973 levels in the U.S. In April of that year the Government of Canada announced that U.S. cattle and beef that could not be certified as free from diethyl stilbesterol (DES), a growth hormone, could not be imported into Canada because of its danger to the health of Canadians. For all practical purposes, this precluded beef imports into Canada from the U.S., and Canadian steer prices were higher relative to those in the U.S. than at any other time in history. Hence, the higher price for 1974 at Toronto.

FIGURE 2.3: Steer and Corn Prices, Ontario, 1966-1979



During 1975-1977 steer prices fell, reflecting the liquidation of the breeding herd and increased female slaughter. Since 1977, steer prices have again risen dramatically as both steer and female slaughter declined in the face of an apparently robust demand for beef.

It is noteworthy that while steer prices declined from 1975-1977, they did not fall below the levels prior to 1973, despite the large increases in beef supply. Why then the dramatic liquidation in the breeding herd after 1974 which has been noted?

The answer to this question lies in the lower graph of Figure 2.3, the price of feed. Prior to 1973, corn prices were relatively stable in the range of $1.00 to $1.50 per bushel. Thereafter, grain prices increased dramatically and became highly variable. After the cost of feeder calves or cattle, the largest cost incurred by a beef feedlot operator is that of feed. The increased and highly variable cost of feed occurred at roughly the same time that steer prices were beginning to decline.

These two factors combined to dramatically reduce the profitability of cattle feeding. This is indicated in Figure 2.4 which contains a series reflecting the feeding margin per hundred weight of steers.[2] The reader will note that, despite only a modest decline in steer prices after 1974, the feeding margin from 1974 through 1976 fell to levels not experienced since 1966-67, because of higher feed costs. At the same time, other production costs were much higher than during the 1960's.

To a certain extent, feedlot operators can withstand this sort of pressure by passing it on to cow-calf operators through bidding lower prices for feeder cattle. This they did as is illustrated by Figure 2.5 which contains feeder calf prices. Note again that, like the feeding margin, the feeder calf price series is more variable than steer prices,

FIGURE 2.4: Feeding Margin for Steers, Ontario, 1966-1979

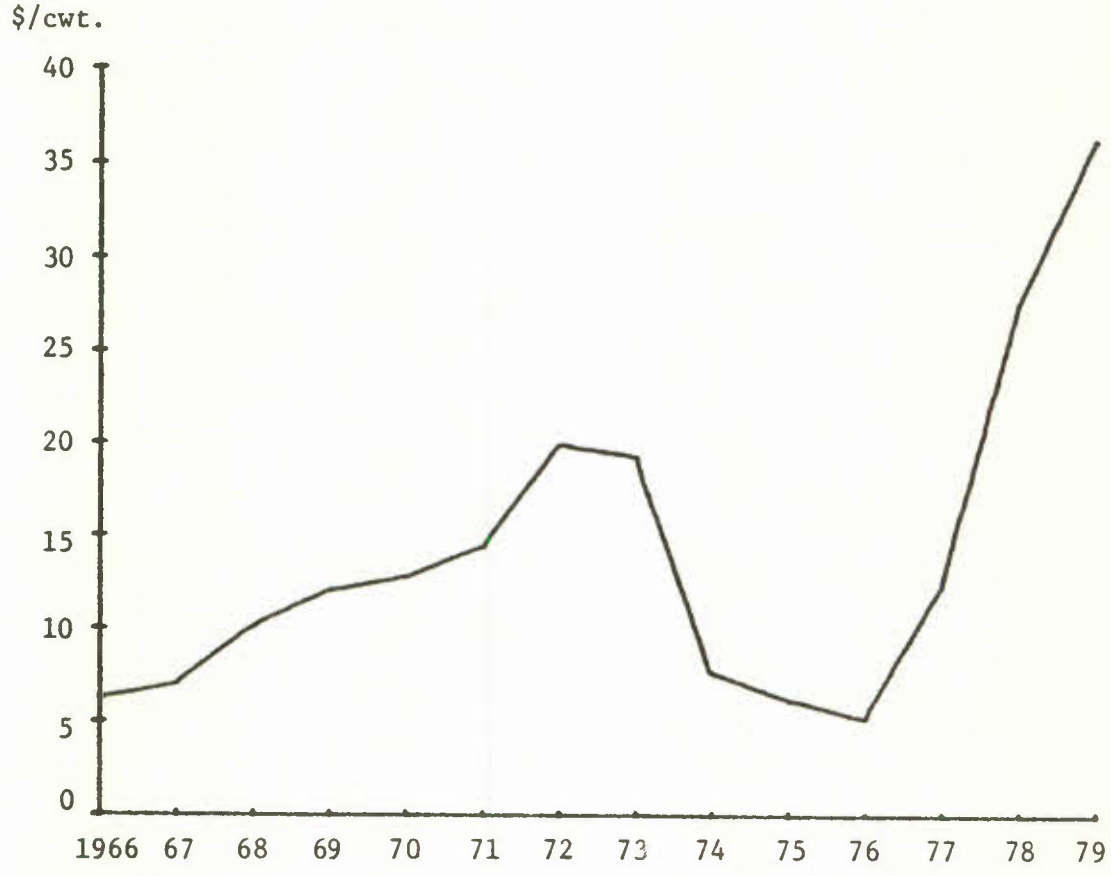
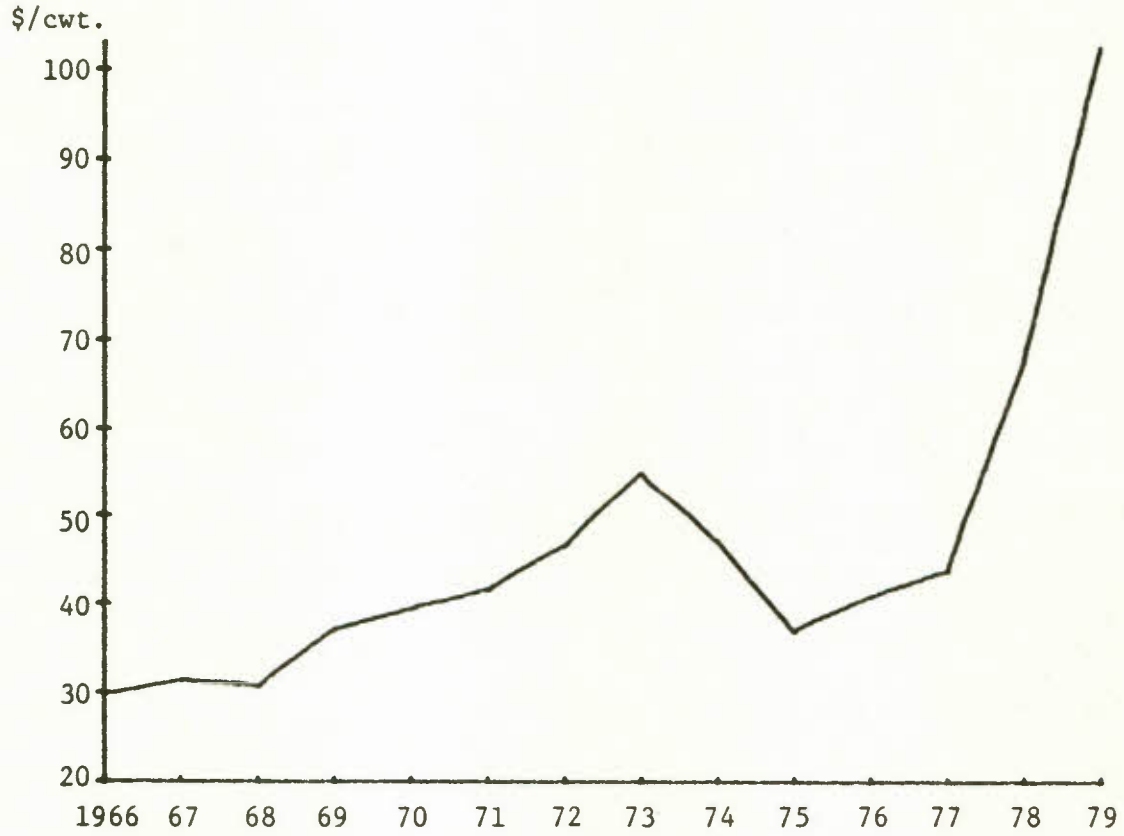


FIGURE 2.5: Feeder Calf Prices, Ontario, 1966-1979



going higher during 1973-74 and lower during 1975-77.

Now by looking back at the various graphs, we begin to see cause and effect in the beef cycle of the 1970's. Rapidly rising steer prices during 1973-74 resulted in increased feeding margins and feeder calf prices during this period. Higher feeder prices were an incentive for cow-calf operators to rapidly increase the breeding herd from 1972 through 1974. But higher grain prices and lower steer prices beginning in 1974 resulted in lower feeding margins and, subsequently, in lower feeder prices. These, in turn, resulted in decisions by cow-calf men to liquidate the breeding herd, which could only be accomplished by slaughtering females. This added further pressure to cattle prices and exacerbated the inclination to liquidate the breeding herd. It is also worth noting the length of time between cause and final effect. The large increase in feeding margins of 1972-73 did not result in a large increase in supply until 1976-77, a lag of four years. This is the time required to make the decision to increase the breeding herd, breed the female, take her through the nine-month gestation period and raise her progeny to market age. Clearly, the lower feeding margins of 1974-1977 did not result in reduced beef supplies until 1978-79 and will continue to do so through 1981. There is thus little possibility of increased beef supplies and lower beef prices until 1982 or beyond.

Beef producers have successfully coped with the beef cycle throughout history. It is a biological phenomenon and part of their economic environment. However, during the 1970's two additional factors were added to the environment. The most important was increased and unstable costs. The second was the retail price freeze in the U.S. which backfired, caused steer prices to increase and encouraged accelerated expansion of the beef herd. This masked the reality of rising grain prices and exacerbated both

their effect as well as the natural beef cycle. This period of unprecedented uncertainty had profound effects on beef producers, their expectations of regulation by government and finally on government policy. These will be addressed in section 3.0.

2.2 The Pork Production Sector

The pork production sector is characterized by less specialization of activity than is the beef sector. Some producers specialize in producing weanling pigs for sale to specialized finishing operations. But a large proportion of hogs marketed are produced by farrow (birth) to finish operations.

Perhaps the most dramatic change in Canadian pork production over recent years is the shift in its geographic location. Table 2.1 contains the percentage of national pork production which was produced in Western and Eastern Canada and Ontario and Quebec from 1967 through 1979.

Table 2.1: Percentage of Total Pork Production, Western and Eastern Canada, and Ontario and Quebec, 1967-1968

Year	West	East	Ontario	Quebec
1967	36	64	34	26
1968	38	62	33	25
1969	37	63	34	26
1970	41	59	33	23
1971	46	54	30	20
1972	45	55	30	22
1973	44	56	30	21
1974	42	58	30	24
1975	35	65	31	28
1976	33	67	33	30
1977	32	68	33	32
1978	29	71	33	34
1979	29	71	34	34

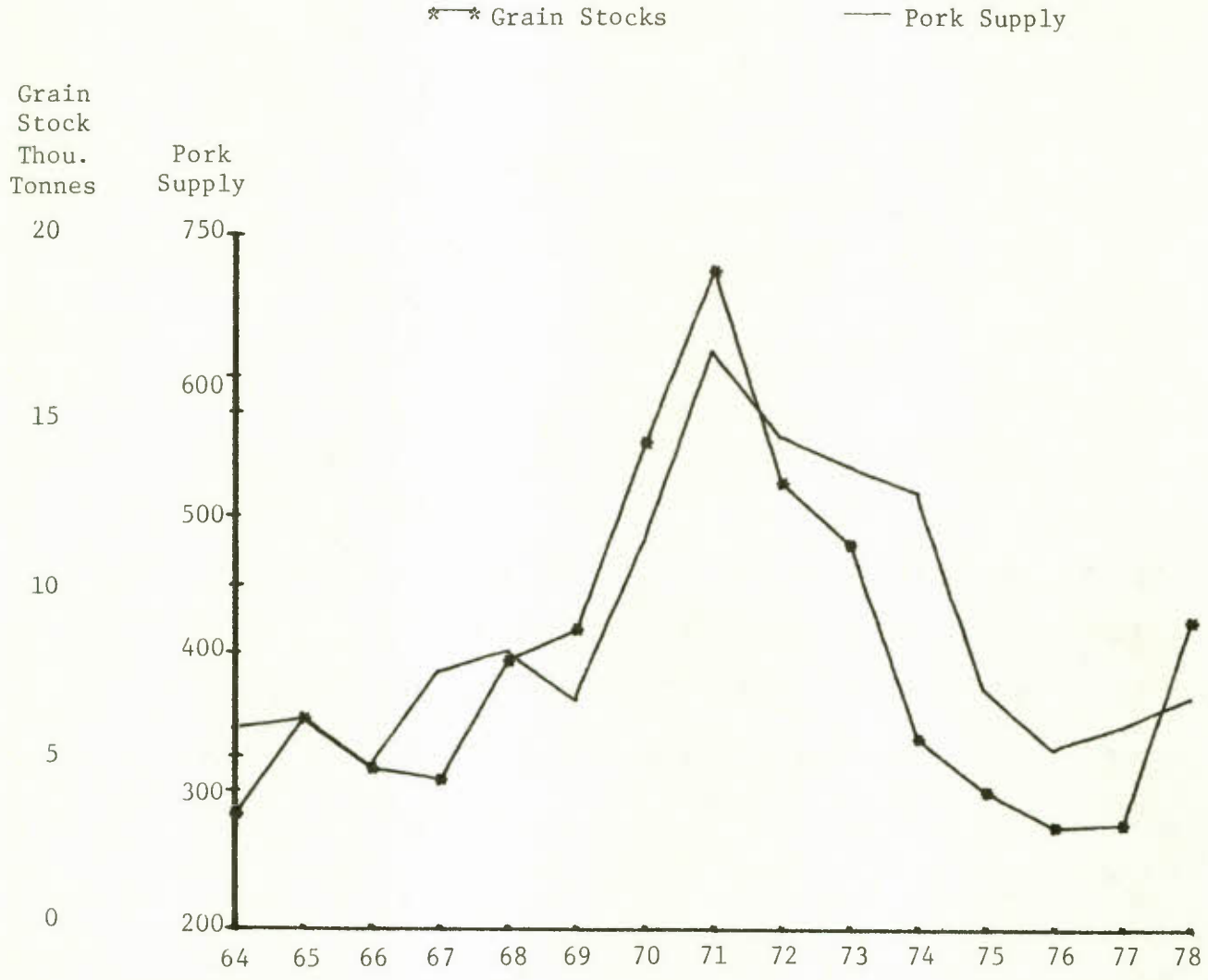
These data indicate that, through 1971, Western Canada's share of the Canadian market increased. However, since then, the Western share has dropped dramatically. Ontario's share has remained relatively constant, with only a small decline during the early 1970's when Western production was high.

The major change in Eastern Canada has taken place in Quebec, which has gone from being a distant second to Ontario as late as 1973, to roughly parity in 1977-1979.

Why have these changes occurred? A number of explanations have been presented. The most reasonable distill into opportunity costs. In Western Canada, most hog production takes place in areas where wheat and feedgrains are also produced. Hog production has traditionally been regarded as a residual market for feedgrains: when feedgrains were in surplus, they were marketed through hogs and vice versa when feedgrains were in short supply. In the past, this relationship has been exacerbated by Western feedgrain policy, Canadian Wheat Board sales policy and limitations on the ability of the grain handling system to move large quantities out of the prairie provinces.

The result of all this is that the large increases in hog production (and market share) of Western Canada during the early 1970's was a result of grain surpluses during the late 1960's. Similarly, the subsequent decline in Western hog production, and market share, was a result of buoyant grain markets and the absence of surpluses during the early to mid-1970's. This is illustrated in Figure 2.6 which contains Western pork production and stocks of wheat, oats, and barley on farms in Western Canada lagged one year. Farm stocks reflect surpluses or lack thereof for grains. Note that the two series are highly correlated, with approximately a one-year

FIGURE 2.6: Western Pork Supply and Stocks of Wheat, Oats and Barley on Farms One Year Earlier, 1964-1978



lag between a change in grain stocks and a change in pork supply.

In Eastern Canada, the explanation is somewhat different. Soil and climatic conditions do not make specialized grain production as attractive an alternative as in the West. Hence, Eastern agriculture has tended to specialize in livestock production: particularly swine, poultry and dairy. Since the early 1970's, entry into production of poultry has been limited by supply management programs. The same has been true for the dairy industry, particularly in Eastern Ontario and Quebec where reductions in industrial milk production have had substantial impacts. As we have seen, beef production has not been an attractive alternative since 1973.

The foregoing implies that hog production has been one of the few alternatives for entry of new capital and new producers during the past seven years. Furthermore, hog production enjoyed an unparalleled period of profitability from late 1974 through early 1979. Hence, it is not surprising that Eastern pork production has increased. In Ontario, many new producers with large investments of capital have entered production since 1975. In fact, a long period of declining numbers of hog producers has been reversed (OPPMB) and hog production increased by over 50 percent from 1975 through 1976.

While in Ontario much of the increase in production has been accomplished by independent producers, a substantial portion of the increase in Quebec has resulted from vertical coordination by feed companies. Alternatives for increased feed sales have been limited by the same factors which have limited producers' alternatives. Feed companies noted that hogs provided a way to increase feed sales and that surplus farm labour was available in Quebec due, in part, to industrial milk policy. To take advantage of both opportunities, these companies have invested heavily in sow farrowing

facilities, from which the weanling pigs have been supplied, along with feed, on a contract basis to farmers. As a result, Quebec's hog production increased by slightly over 100 percent from 1973 through 1979.

The result is a very different production pattern in the East (Figure 2.7) compared to the West (Figure 2.6).

The Hog Cycle

The hog cycle is similar in nature to the beef cycle. Specific differences between the two cycles result from differences in the biology of the animals. The pork cycle is shorter, because the required gestation and growing period is shorter for hogs. Pork supply can change by large amounts in short periods of time because sows give birth in litters, while cows rarely give birth to more than one calf.

The Canadian hog cycle since 1964 is presented in Future 2.8. The data are presented in percentage changes from the same quarter one year earlier. The solid line is the year-to-year percentage change in pork supply. The dotted line is the year-to-year percentage change in hog prices.

The two series are inversely related: when pork supply increases prices fall and vice versa.[3] Generally, the percentage change in price is greater than the percentage change in pork supply. This implies that demand for pork is price inelastic - i.e., consumers are reluctant to change consumption habits, so that a relatively large change in price is required to induce consumers to adjust consumption when a given change in supply reaches the market.

The figure also indicates producers' response to changes in price. Low prices in 1963-64 led to reduced production in 1965-66; higher prices in 1965-66 led to increased production in 1967-68, and so on.

Figure 2.7: Eastern Canadian Pork Production, 1964-1978

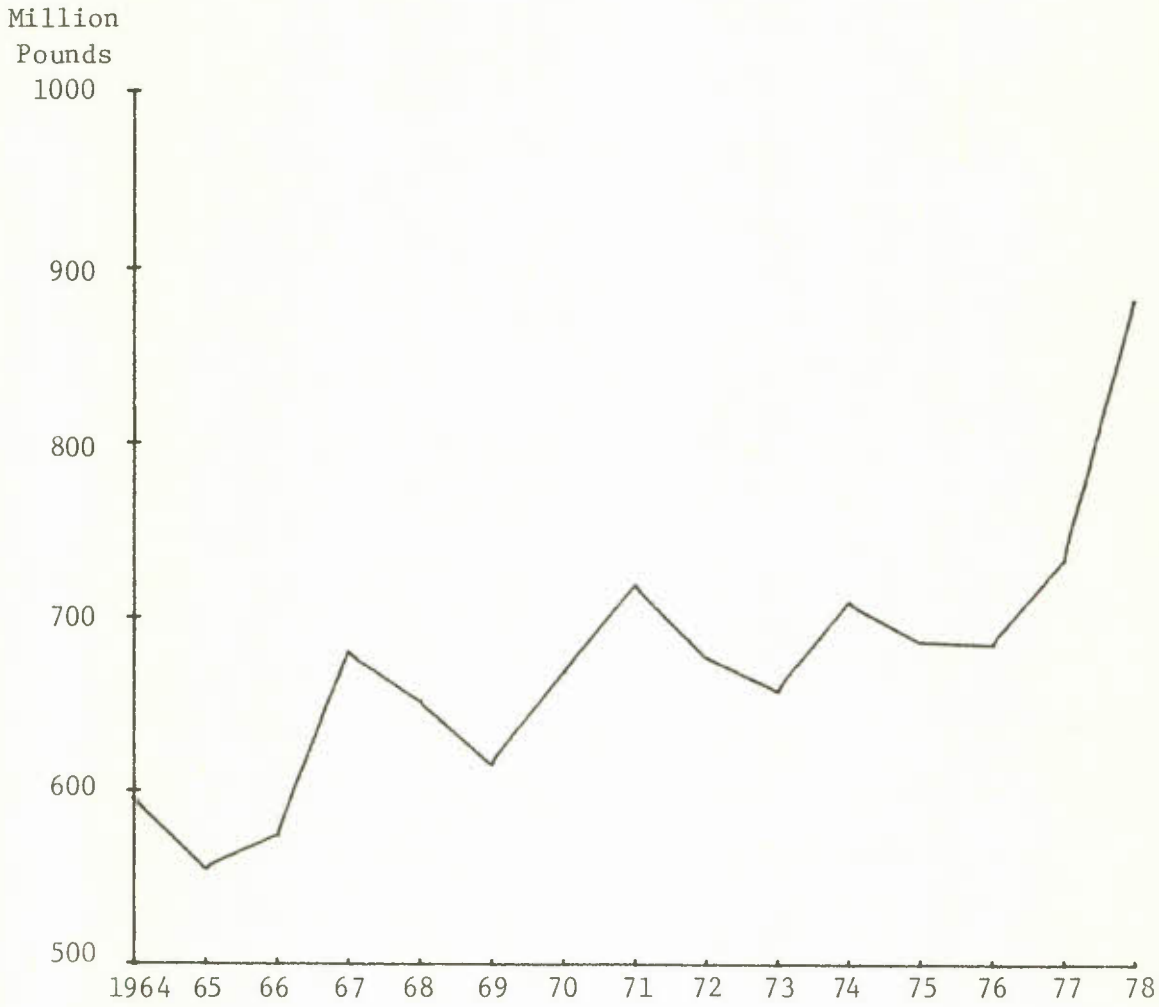
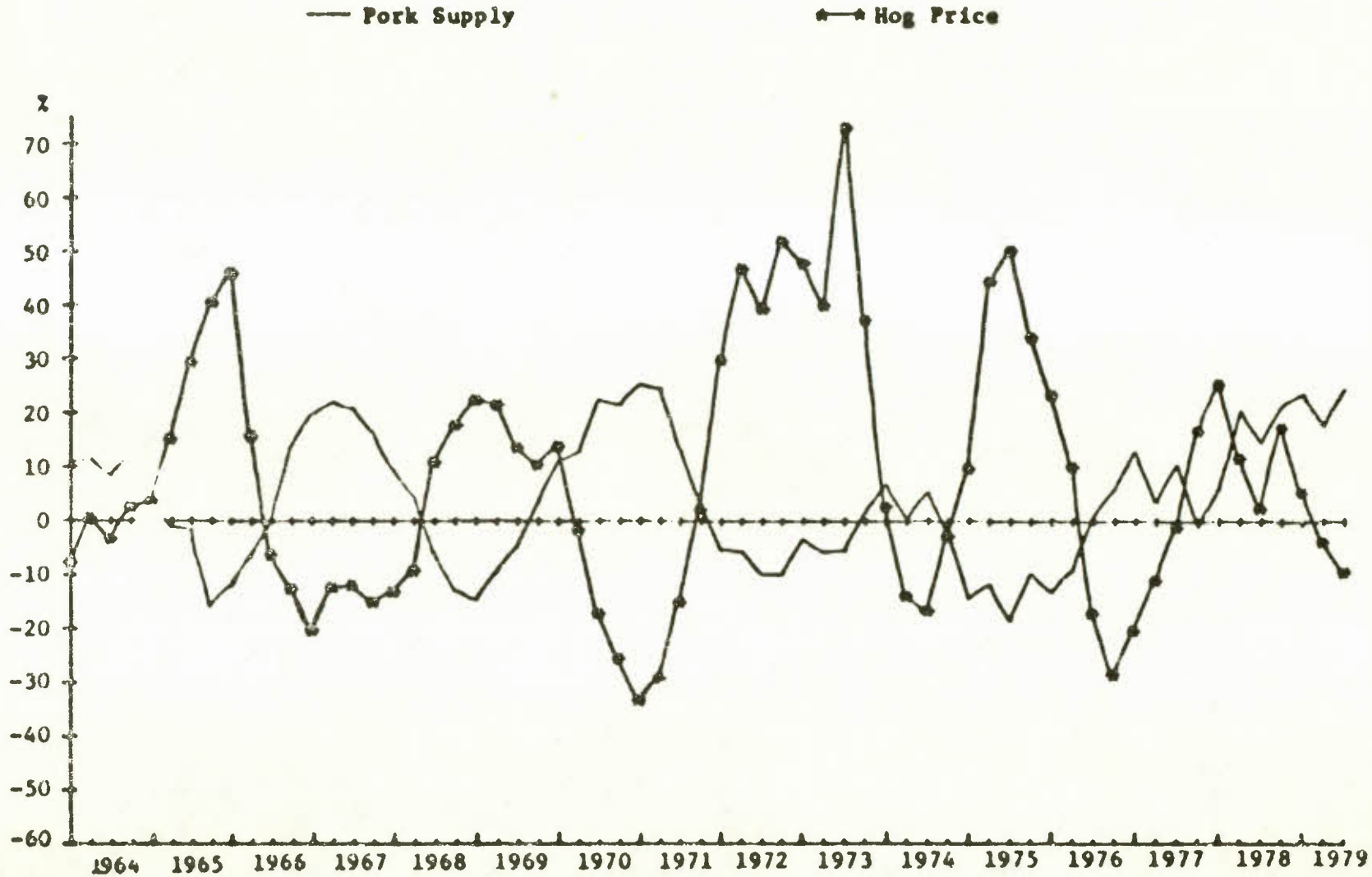


FIGURE 2.8: Year-to-Year Percentage Change in Pork Supply and Hog Prices, Canada, 1964-1979



Throughout the 1960's, the cycles were relatively consistent: increased (decreased) prices led decreased (increased) production by 1½ to 2 years, resulting in a cycle of 3½ to 4 years. However, during the 1970's the cycle has been very irregular. Pork production trended downward from 1971-1975, with only a modest expansion in 1974. Since mid-1976, production has trended steadily upward. The reasons for this are the same factors which have been cited earlier in the discussions of the beef cycle. During the 1960's, feedgrain prices were relatively stable and so was the hog cycle. In 1973, Mr. Nixon imposed his freeze on retail prices, which resulted in the largest ever year-to-year percentage increase in hog prices during the third quarter of 1973. Grain prices rose dramatically after 1972. Feeding margins for hogs in 1974 were the lowest since 1960. This lack of profitability in raising hogs, coupled with high grain prices, encouraged many Canadian producers to focus their efforts on the grain markets. As a result of the rather massive decline in hog production both in Canada and the U.S. from 1972 through 1975, hog prices and feeding margins were bid to record high levels after mid-1975. These margins, as well as the institutional factors affecting opportunity costs discussed earlier, brought with them a continuous expansion in Eastern Canadian pork production after mid-1976.

As with beef, we see that the grain market situation during the 1970's has had a substantial impact on the pork sector. While pork producers did not experience the degree of economic pain that beef producers did during the mid-1970's (because the biological lag for hogs is shorter than for cattle), there was tremendous uncertainty.

2.3 Some Common Factors in Beef and Pork Markets

With the exception of a few short periods of time when trade was restricted, the Canadian markets for beef and pork have been part of a

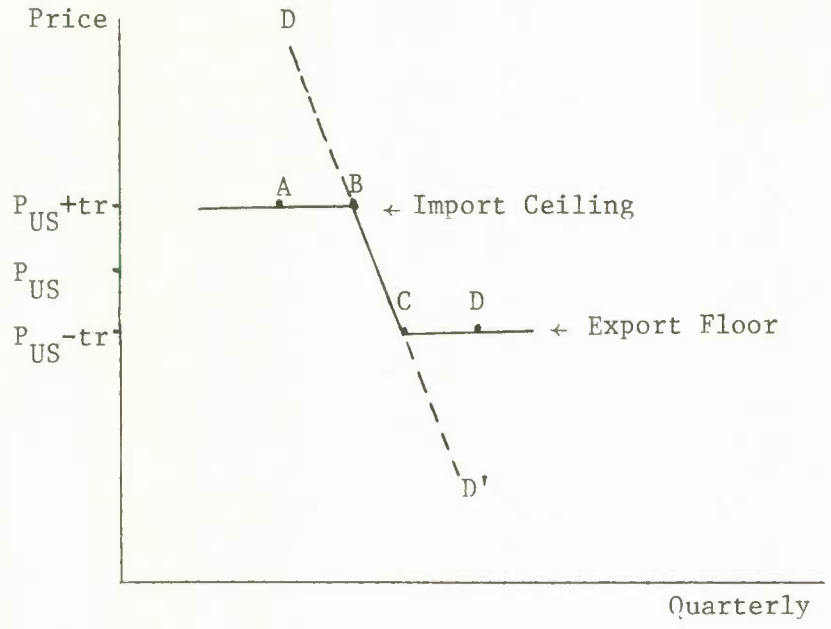
larger North American market. The U.S. and Canadian markets are separated only by small import duties. Canada produces approximately 10 percent of North American production. Thus changes in supply and demand in Canada have little impact on the North American price level. At a given point in time, the usual range of possible Canadian prices is the midwestern U.S. price plus transfer and tariff charges to Canada (the import ceiling) on the one hand, to the midwestern U.S. price less transfer and tariff charges from Canada to the U.S. (the export floor) on the other.[4] Whether Canadian prices are at either of these extremes depends upon whether Canada is exporting to the U.S., importing from the U.S. or self-sufficient at current prices.

This factor is fundamental to understanding many of the conclusions which follow regarding the impacts of alternative policies. Hence it may be worthwhile to show the implication the relationship with the U.S. has on the demand for Canadian red meat products. In Figure 2.9, the demand for product by Canadians is illustrated as DD'. Price P_{US} denotes the price of product in the U.S.; $P_{US}+tr$ is the U.S. price plus transfer costs from the U.S. to Canada (the import ceiling); and $P_{US}-tr$ is the U.S. price minus transfer cost from Canada to the U.S. (the export floor).

The latter two points on the price axis represents the limits of the range in which Canada's price will normally occur relative to that of the U.S.

The Canadian demand function is represented by a broken line above the ceiling and below the floor, and horizontal line segments have been drawn in at those two points. The segment at the floor (CD), indicates that when the price in Canada falls to the point at which Canadian product

Figure 2.9: The Demand for Red Meats Faced By Canadian Producers with Unrestricted Trade



can compete in the U.S. market, the demand facing Canadian producers is the domestic demand plus demand in the U.S. for Canadian product. Segment CD is horizontal on the assumption that the U.S. market is so large that variations in Canadian exports will not affect the U.S. price.

At the import ceiling, segment AB indicates that when the Canadian price rises to the level at which U.S. product can compete in the Canadian market, any reduction in Canadian supply to a level less than B, would be immediately replaced by U.S. imports with no effect on prices. Segments AB and CD are drawn horizontally because of the overwhelming size of the U.S. market.

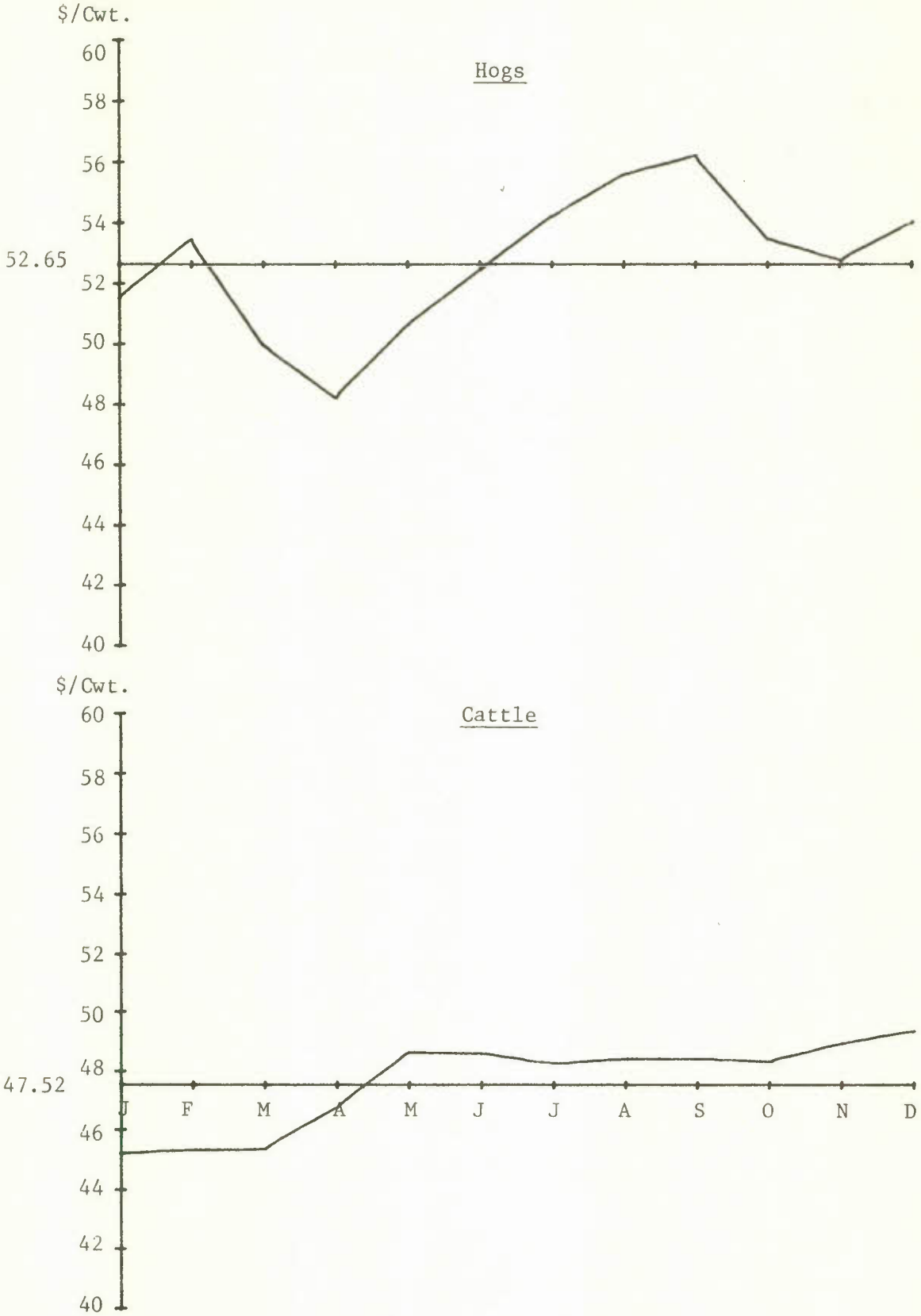
The importance of this diagram lies in its implication that variations in Canadian supply within only a narrow range of quantities can have any impact on prices received by Canadian producers. If the price in Canada is at the export floor, Canadian production greater than quantity

C will be exported with no effect on price. Similarly, if the price in Canada is at the import ceiling, Canadian production of less than B will be replaced by imports from the U.S. with no effect on prices. Variations in Canadian supply only between the quantities B and C will affect prices since, in this range, there is no incentive for trade to take place.

This diagram is, of course, oversimplified. The modest tariffs which have existed will increase the spread between the floor and ceiling. Transport costs may increase with the quantity traded. Canadian pork is acknowledged to be higher in quality and leaner. Thus it may command a price premium. Most trade is in cuts, so there is a supply and demand relationship for each which determines the direction and magnitude of trade. Finally, it is not likely that demand is horizontal at the import ceiling and export floor, but rather a small amount of slope exists - i.e., variations in Canadian supply likely have a small effect on prices. However, we would contend that the diagram is a reasonable approximation of reality. For example, of the 192.5 million lbs. of pork Canada exported during the first nine months of 1980, 124.4 million were exported to the U.S. During this period, the U.S. consumed approximately 12.1 bil. lbs. It is likely that if the one percent which came from Canada had not been produced, U.S. or Canadian prices would not have been altered substantially.

A second factor common to both markets is seasonal price variations which occur in both markets due to seasonal variations in demand and supply. Seasonality is a relatively greater factor for hogs than for cattle. This is shown in Figure 2.10 which contains average prices of hogs and cattle at Toronto for each month over the past ten years. The ten-year average for both commodities is indicated by the horizontal.

Figure 2.10: Ten-Year Average Monthly Prices for Hogs and Steers at Toronto



Both the seasonal patterns and the relatively greater seasonal variation for hogs are fairly obvious.

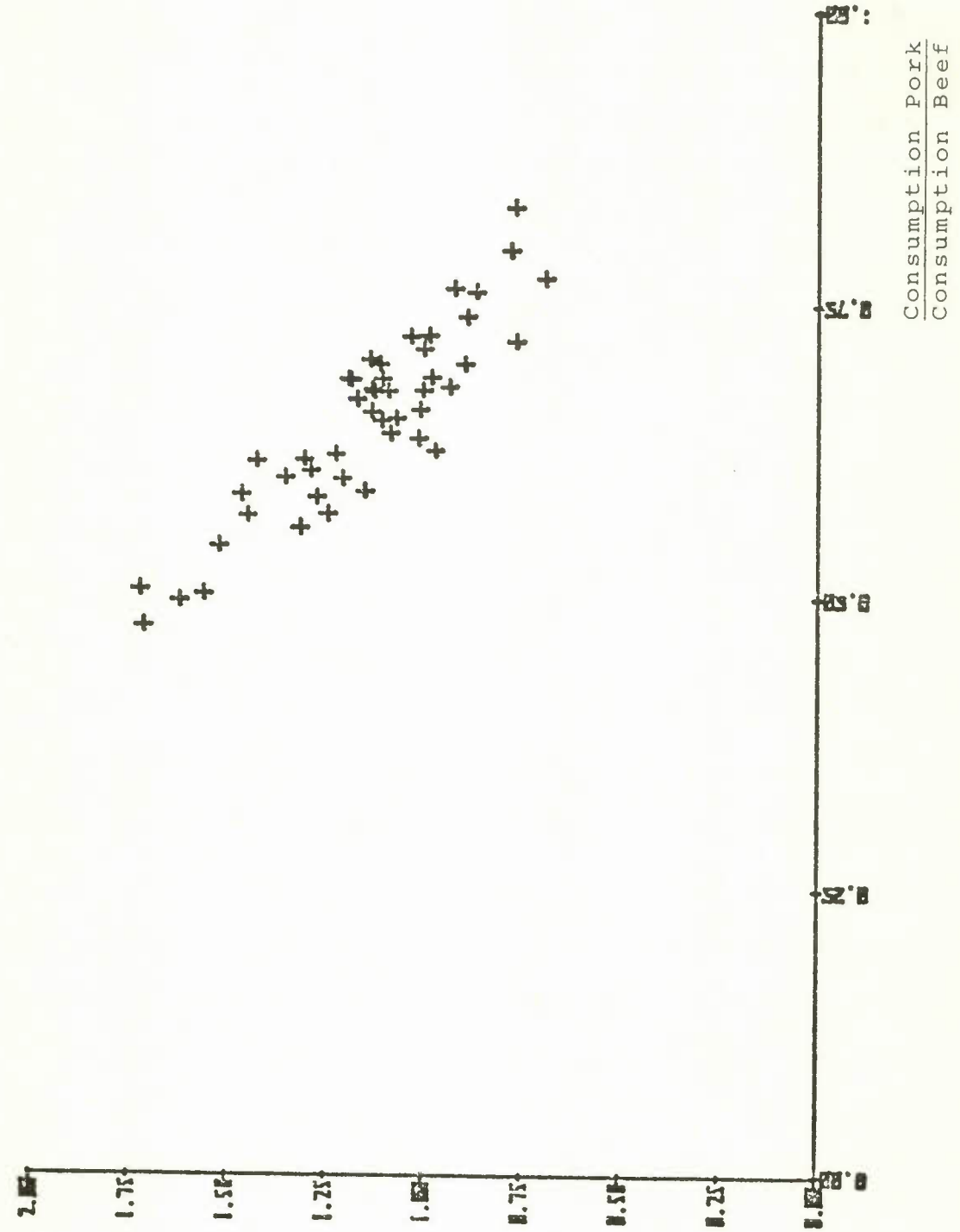
2.4 Demand for Beef and Pork

There are several determinants of demand for beef and pork. These include population, consumers' incomes, the price of the product and prices of substitute products. Demand expands with population and income but increased income has a greater impact on the demand for beef than for pork. Previous research using time series data indicates that for pork, a one percent increase in per capita disposable income leads on average, to a .3 or .4 percent increase in demand, while for beef, a one percent increase in income results in a .6 or .7 increase in demand.

As was implied in previous sections, the demand for beef is more responsive to a change in the price of beef than is the demand for pork to a change in the price of pork. Previous research has shown that a one percent increase in the price of steers results in a .5 or .6 percent decrease in demand for beef, while a one percent increase in the price of hogs results in a .3 or .4 percent decline in demand for pork. Hence, the demand for beef is more responsive to a change in its own price. This implies that a greater change in the price of pork is necessary to induce consumers to clear the market of a given change in supply than is the case for beef. This is one reason that pork prices are more variable than beef prices.

Chicken broilers, beef and pork all compete for the consumers' food dollar. Consumption of any one type of meat depends on the relative price of its substitutes. The relationship between the demands and relative prices of beef and pork is illustrated in Figure 2.11. When the

FIGURE 2.11: Ratio's of Hog to Steer Prices and Per Capita Pork to Beef Consumption; Canada, 1965-1976 (Quarterly)



price of hogs is high relative to the price of cattle, consumption of pork is low relative to the consumption of beef, and vice versa.

Note that, while there is an inverse relationship between relative prices and relative consumption, it is not symmetric. Data in the figure indicate that when the price of hogs is 1½ times the price of steers, consumption of pork is approximately 60 percent of beef consumption. But when the price of steers is 1½ times the price of hogs (i.e., when the ratio of hog to steer price is .67), consumption of pork increases to only 80 percent of beef consumption. This implies that consumers are more willing to substitute beef for pork when the relative price of pork increases than they are to substitute pork for beef when the relative price of beef increases.

The foregoing discussion of consumer response to income, own price and the price of substitutes indicates that the demand for beef is more responsive to changes in all three factors. The reason for the differences in response is that consumers prefer beef to pork.

3.0 POLICY BACKGROUND AND THE POLICY FORMULATION PROCESS

Public regulation and involvement in the beef and pork sectors takes many forms. Perhaps the most important types of regulations are the least controversial. These include mandatory federal grade standards, federal and provincial health regulations and inspection of packing plants and meat products, provision for and supervision of public stockyards, provision of current market information and outlook information, regulations regarding terms and conditions of sale and payments, and, in the case of pork, provincial regulation of producers' marketing boards.

The more controversial types of public regulation and involvement are measures to support prices and/or income and stabilization programs. While these programs have been developed by government, this development has taken place in an environment of debate and criticism by producer organizations. Before addressing the policy instruments that have been used, it may be of value to discuss the various actors which make inputs into the policy debate.

3.1 The Actors in the Policy Formulation Process

For beef cattle, the most important set of producer organizations is the official provincial beef producers' organization and their national body, the Canadian Cattlemen's Association. Provincial organizations are made up of county or regional associations which identify and deal with local issues. The county organizations elect delegates to the provincial association's annual meeting and are part of larger regional organizations. The number of directors and delegates from a region or county depends upon the number of cattle marketed therein. Provincial associations are organized in accordance with provincial authorizing legislation which also

provides for funding. This is obtained by a fee charged per head of cattle marketed which is deducted by sale barns and packers and forwarded to the provincial associations. The fee is paid voluntarily in that producers may apply to have it refunded if they so desire. Provincial associations, in turn, provide funding for the Canadian Cattlemen's Association.

Provincial Associations deal with matters of concern to their members, while the Canadian Cattlemen's Association deals with national and interprovincial issues. The lines of responsibility often blur since national and interprovincial issues are often also issues within a province. Cattle producers associations deal with provision of market information to producers and negotiate on behalf of their membership with cattle buyers, other elements of the marketing system and governments. In matters relating to government policy, they provide information to their members and provide a mechanism for members' concerns to be reflected to government.

In carrying out this two-pronged task, the associations also develop positions on policy matters and lobby with government for the acceptance of these positions. In general, they have opposed government intervention in the market via price, income and stabilization measures except, in recent years, for a strongly expressed desire for legislation to control imports of manufacturing quality beef from offshore sources. They have also opposed the establishment of mandatory marketing boards for beef cattle.

As with any democratic organization, these policy stances reflect the majority of the voting membership and likely a majority of beef pro-

ducers. Naturally there is also a minority which do not conform to the majority view, the size and vocalness of which tends to depend upon the economic conditions of the moment.

For pork the major producer organizations are provincial marketing boards in Alberta, Manitoba, Ontario, P.E.I. and New Brunswick. In Saskatchewan there is a pork producers commission.[5] The remaining provinces have voluntary producer associations similar in structure to the cattle producer associations.

While the county-provincial structure and election procedure for pork marketing boards is similar to that of the cattle producers associations, the major difference in structure is that provincial pork marketing boards have responsibility for developing and implementing a marketing plan which is mandatory for all producers within the province.

Pork producers' marketing boards do not exert control over either the supply or price of hogs. Rather, their efforts have been aimed at developing an efficient mechanism for marketing and pricing hogs. In Ontario this entails a teletype auction system as well as a network of assembly yards and/or regulation of direct shipment from producer to packer. The remaining marketing boards also have developed an assembly/collection system but their current pricing mechanisms are formulae which include prices in the U.S. and Toronto as well as transportation costs. In varying degrees the provincial marketing boards are also involved in the following aspects of marketing: development of export markets; product promotion in the domestic market; production and marketing research; and provision to producers of market and research information. Like their counterparts in the beef sector, the provincial organizations also represent producer interests in policy debates. Their positions have

generally been lukewarm toward price, income and stabilization efforts and opposed to supply management. Import restrictions have not generally been an issue.

A national pork producers organization, the Canadian Pork Council, also exists and has a voice in policy debates. This organization is made up of representatives from the provincial boards and associations as well as the Canadian Federation of Agriculture.

In addition to beef and pork producers' organizations, policy debates are also joined by a number of other organizations. These include: the Canadian Meat Packers Council, the trade association representing packers and processors; consumer groups; departments of provincial governments; several departments of the federal government; and the general farm organizations - the Canadian Federation of Agriculture (C.F.A.), the Christian Farmers Federation (C.F.F.) and the National Farmers Union (N.F.U.).

The C.F.A. is the largest and likely has the most impact in policy discussions. It is the perception of this writer that the C.F.A. and the N.F.U. have a basic policy stance which is somewhat more in favour of public intervention and/or supply management than the beef and pork producers' organizations.

As we have seen, the mid-1970's were a time of dramatic uncertainty in the beef/pork sector. We shall see below that the policy response to events of this period were varied and short-run in nature. We shall conclude that this policy response likely had little positive stabilizing impact on the market. The foregoing discussion of the actors in policy debates indicates that there are many actors speaking with many voices

which are often contradictory - particularly when there is a tendency toward the formation of both formal and informal splinter groups of producers when they are subject to economic hardship. When governments attempt to listen and respond to such a cacophony, it is not surprising that policy measures are short-term and variable. Under such circumstances democratically elected governments are caught in the classic squeeze between responding to short-run pressure with a view to maintaining support in the next election and effecting policy instruments which, at once, reflect long-term industry objectives and cushion adjustment to short-term market pressures.

We turn now to a discussion of the nature and effects of government intervention in the beef/pork sector.

3.2 Price and Income Policy

Direct price and income support or stabilization programs at the federal level which affect the beef/pork sector date back to 1958, when the Agricultural Stabilization Act (A.S.A.) was first passed. Under the A.S.A., deficiency payments were made to producers if the average market price in a given year for market hogs and slaughter cattle fell below 80 percent of the average market price during the previous ten years (the prescribed price). The deficiency payment was to be equal to the difference between the market and prescribed prices.

This program had little impact as market prices trended upward reflecting increased production costs. The A.S.A. was amended in 1975 (the amended Act will be discussed below). After 1973, price and income policy has included a combination of deficiency payments and, for beef cattle, a series of import restrictions. The measures taken have been changed on numerous occasions as is evident from the list of Canadian

and U.S. federal policy steps which are enumerated for beef cattle in Appendix 1. This list does not include a series of provincial programs affecting both sectors during the mid-1970's.

Before discussing the likely impacts of the measures taken, it may well be of value to discuss and analyze the underlying legislative framework from which the measures originated.

3.2.1 The Amended Agricultural Stabilization Act

Several major changes were made to the A.S.A. in 1975. These include:

1. The base period for calculation of the prescribed price was decreased from the previous ten to the previous five years.
2. The percentage of the base period was increased from 80 to a minimum of 90 percent (the percentage can be higher but not lower).
3. The prescribed price (90 percent of the previous five years average) is adjusted to reflect changes in cash costs in arriving at the support level. The Act does not specify the costs to be included nor the method of calculation. These have not been made publicly available.
4. The Act empowers the Governor in Council to establish limits on the quantity and value of a commodity elegible for support. No guidelines are included for the establishment of these limits.
5. The Act allows the Agricultural Stabilization Board to

> enter into agreements with provinces and/or producer groups whereby a higher support level than the federal level may be guaranteed. Under such agreements the provincial government or producer groups would provide part of the costs of the program.

Clearly, the amended Act provides the basis for a much higher level of support than did its predecessor and for protection against increases in costs. However, it also contains elements of uncertainty for the producer: the percentage of the five year price can be 90 per cent or greater; the method of calculating costs is not known; and the eligibility limits can vary. For example, from 1974 through 1977, the actual level of support for the beef stabilization program was at various times based upon 90, 95 and 100 percent of the five-year average, the number of cattle on which a producer could claim stabilization payments varied and payments in some years were based on annual prices and costs while in others they were based on quarterly prices and costs.[6]

In addition, the operational nature of the program provides more uncertainty. While it is known that a program exists for a given year (recently a year has been April 1 - March 31), the actual level of support is not announced until after the year is concluded. Hence, the actual combination of percentage of the five-year average price, cost adjustment and eligibility limit is not known until farmers' production and marketing decisions are a *fait accompli*.

3.2.2 The Potential Economic Costs of Instability

Before addressing the potential impacts of the A.S.A., it may be

of value to discuss the potential costs of instability. Such costs defy empirical measurement: but they can be enumerated in a general way. This may aid in better understanding the reasons for the rather extraordinary emphasis which has been placed on agricultural stabilization programs in Canada.

Unlike many firms in the industrial sector, farm firms, because of their atomistic structure, have little control over aggregate production or prices. The latter includes the prices of purchased inputs. Thus, at base, the economic environment leads many to a desire for security simply because the individual has so little control over his economic destiny.

Rather than exerting control over their economic environment, farmers can only react to it. It is in these reactions that the potential costs of instability lie. Producers' reactions to instability depend, in part, on their inherent ability to handle risk and uncertainty. But the latter is conditioned by the farm's financial structure. Two farmers may feel inherently the same about risk, but if one has little debt while the other has large debt servicing commitments, the two may react very differently to a period of low market returns: reactions of the producer with little equity may be dictated by his creditors.

Another factor which conditions producers' reactions to instability is their resource base. A producer with limited quantities of land (or land with limited production possibilities) and specialized capital facilities does not have much leeway to make changes in his product mix.

The foregoing implies that a number of possible reactions may be made to unstable market returns. If returns fall, the specialized producer who has minimal debt servicing commitments may do little beyond

tightening his belt and riding it out. The specialized operator with large debt commitments may reduce output by selling inventories to service his debt or, at the extreme, exit from production. Producers with a flexible resource base may change their product mix. The majority of livestock producers are land based -- i.e., they grow their own feed-grain. Feeding grain to livestock is simply one among several alternatives they have for selling grain. When the opportunity cost of selling grain directly exceeds the returns earned by feeding it, some producers will sell it directly, thereby reducing livestock production.

Conversely, when market returns are increasing specialized producers with a small debt load may not change their operations, or they may expand them. New producers will borrow capital and enter production. Producers with flexible operations may reduce direct sales of grain and increase livestock production. In the aggregate, lower market returns lead eventually to lower output: higher returns lead to higher output.

The costs to producers include two factors. First, there is considerable dislocation for those who are forced out of business. The costs of dislocation are the direct loss in equity and the indirect cost of employing one's resources in alternative pursuits. It would seem that these costs are exacerbated by a distinct tendency for producers not to learn that cycles do exist and, therefore, to overreact to them. This has been apparent during the past several years. Beef producers enjoyed favourable market conditions from the late 1960's through 1973. Many people in the industry as well as interested observers felt that the beef cycle was a thing of the past. This promoted increasing optimism so that breeding herds were built up at record rates in 1973 and 1974. As we have seen, the beef cycle was not a thing of the past. When economic

conditions turned poor in 1975, producers began to liquidate and the more they liquidated the worse conditions became. So they liquidate at a more rapid rate....ad nauseum.

A similar phenomenon occurred in the pork sector where returns were high in 1975, early 1976 and from 1977 through mid-1979. Again, the longer high returns were received, the more optimistic producers became and the more rapidly output expanded. The inevitability of the opposite part of the cycle was once again proven during late 1979 and early 1980.

That this type of behaviour exacerbates the adjustment costs of instability is evident in the fact that breeding herds expand most rapidly just before prices begin to fall. This means that a large number of newly financed producers are faced with debt servicing commitments precisely when market returns are lowest.

Many people ask why cycles continue; why don't producers learn about them and react accordingly? This writer can think of only two explanations. First, producers have short memories.[7] Second, young producers constantly replenish existing farmers and provide the grist for the mill of production and price cycles.

The second type of cost may occur if there are significant economies of specialization and if one response to instability is diversification of producers' enterprises. Under these conditions, production costs would be higher than if producers felt secure in specializing their activities.

It should be noted that there are positive aspects of varying returns. Most obviously varying prices indicate changes in consumer demand, thereby providing the signal to producers to reallocate resources.

Second, periods of low market returns cleanse the industry of high cost producers, while periods of high returns attract new capital and producers to the industry. Through time, market forces lead inexorably to progress and efficiency. Negative social costs of adjustment occur with extreme variation in returns and with extreme reactions to them.

There are also secondary costs of instability which are absorbed by industries associated with farm production; e.g., the meat packing sector. Goddard [8] has shown that net investment and employment in the meat packing sector is directly related to the level of livestock production. This means that plant capacity and the labour force is increased during periods of expanded production thereby causing excess capacity, layoffs and plant close-downs during subsequent periods of declining production. Clearly then the same type of adjustment costs occur in related industries as in farming, and these adjustments ripple through the economy at the interface of various types of firms.

3.2.3 Objectives and Potential Impacts of the A.S.A.

The foregoing suggests that the chief costs of instability occur at the extremes of price cycles and the extreme reactions to them. Thus it seems to follow that for stabilization programs to reduce these costs, they should have as their chief objectives the dampening of the extremes, thereby dampening the reactions to them. Below, the apparent objectives of the amended A.S.A. and its ability to meet them are examined.

In fact, the objectives are not clearly stated but Martin [11] has attempted to infer them from documents such as the February 1974 Speech from the Throne which preceded the introduction of the amendments to the

A.S.A. The inferred objectives are:

1. to support farm incomes during periods of low market returns;
2. to stabilize supplies of food;
3. to stabilize consumers' food prices;
4. to encourage expanded food exports.

These objectives are, to some degree, theoretically attainable and consistent under the amended A.S.A. By its very nature, the A.S.A. provides for income support when market returns are low relative to cash costs and relative to the past. As we have seen in the analysis of the beef and pork cycles, production declines after periods of low returns. If the stabilization program provides price and income support during such periods, it may be effective in holding some producers in production. As a result domestic production would be stabilized. Cyclic changes in supply would not be as great as has historically been the case. It should be noted, however, that because Canada is a relatively small part of larger international markets for beef and pork, the benefits to consumers in terms of more stable supply would be marginal at best even if domestic production was stabilized significantly. Supply to consumers is domestic production plus or minus imports or exports. An effective stabilization program in Canada would have little impact on market prices and production in the rest of the world. Hence, supply to consumers would not be affected over time.

Similar arguments can be made regarding the objective of stabilizing consumer prices. While a more stable domestic supply could be effective in stabilizing prices if Canada was not part of the international market,

again the general price level would not be much affected given the existence of international trade. However, two factors suggest that an effective stabilization program would add a small degree of stability to Canadian Consumer prices. First, as indicated in section 2.0, the potential price range at a point in time for Canadian cattle and hogs is the U.S. midwest price plus or minus transfer costs to or from Canada - the import ceiling and export floor. With current transfer costs, this translates to roughly an $8-$10 per cwt. range around U.S. prices for Canadian cattle and hogs. If a stabilization program could induce sufficient supply response to maintain Canadian prices at the export floor - instead of varying between the floor and the ceiling as has been the case - this could add stability. But this would hold variations in Canadian market prices only to the same variation experienced in the U.S. market.

Second, instability of production has negative impacts on meat packers. These firms have large fixed costs of capital and equipment as well as labour since most packers are unionized, and must guarantee a minimum number of hours of work per week. When packing plants can operate at or near full capacity, their overhead costs per unit of output are relatively low. When packers must operate at a fraction of capacity, their unit costs are higher. For example, Ericksen [5] reported in a 1966 study in Nebraska that in-plant processing costs for a beef slaughter house were 36 percent higher when a plant operates at 60 percent of capacity than when it operates at 100 percent of capacity. The cost differential is likely higher in 1980 and may be higher for pork processors because more processing is done for pork than for beef.

When packing plants are not operating at capacity, a portion of their higher costs are likely passed on to retailers in the form of higher margins and on to consumers as higher retail prices; and vice versa when they are able to operate at capacity. It follows that when domestic supply is variable, capacity utilization and margins are variable. Therefore, so are retail prices. If a stabilization program could effectively reduce cyclical variation in supply, packers' unit overhead costs would be stabilized and this would reduce retail price variability. Again the aggregate impacts would likely be small because price variations will still be related to the U.S. cycle.

It is perhaps with respect to the final objective of the A.S.A. - to encourage expanded food exports - that the largest potential benefits may accrue. We have seen that both the beef and pork sectors are cyclical in nature. Canadian cycles are closely related to those of Canada's trading partners - i.e., periods of low market returns occur simultaneously in the U.S. and Canada, which subsequently causes reduced production and increased market returns. If Canada's stabilization program were to provide some Canadian producers sufficient protection to discourage herd liquidation, then Canada would be producing more in subsequent periods of high market returns. This would tend to force Canadian prices toward the export floor and either reduce imports (foreign exchange expenditures) or increase exports (foreign exchange earnings).

3.2.4 Actual Impacts

The foregoing presents the potential benefits of the A.S.A. We turn now to a discussion of its actual impacts, given the nature of the program.

While it is clear that the program may support incomes during periods of low market returns, it is also clear that it may not and, if it does, it is not possible to anticipate at what level. The first point results in part from the annual nature of the program. Periods of low market returns are sometimes of less than one year in duration and/or they do not coincide with the year as defined by the A.S.A. As a result producers may experience a period of six to nine months of poor returns but receive no support from the program because average returns for the year exceed the support level. For example, hog prices were relatively low during the first half of 1974, but recovered during the second half and during 1975. Feeding margins for hog producers during the first half of 1974 were at their lowest level since at least 1962. Feeding margins improved during the fourth quarter of 1974 and during 1975. The hog stabilization program for that year included the period from April 1, 1974 through March 31, 1975. By March 31, hog prices recovered sufficiently to result in a negligible payment under the stabilization program. Hence, producers received no support during a nine-month period of heavy losses.

The second point results from a number of factors. The level of support (90, 95 or 100 percent of the five-year average price) is typically not announced until after the program year. The method used to calculate cash costs is not known, the method used in calculating the support price (annual average or quarterly weighted average) is not announced until after the program year. Hence, the producer has little idea what the support level will be, if any, until after the fact.[8]

Attainment of the remaining three objectives depends upon the ability of the program to elicit a supply response. This depends in turn

upon providing support during periods of low market returns and upon providing assurance to producers of the level of support at the time producers make production decisions. As we have seen, the program does not do this. Even if a substantial payment is made, it is not known until after the fact. A producer who is losing substantially on his hog enterprise from February through August of one year is not likely to adjust his production decisions based on the hope that he will receive a deficiency payment of unpredictable magnitude in April of the following year. He may well have long since liquidated his herd (or gone bankrupt) and moved on to alternative activities. The producer who can ride out a prolonged period of losses is likely to perceive any ex poste deficiency payment as a windfall which does not affect his production decisions.

In short, the current program, as structured, appears not to add stability, but rather it appears to be a further source of uncertainty in an already uncertain world.

3.2.5 Suggestions for Improvement

This writer has made suggestions for changes in the stabilization program which would likely improve its ability to attain the objectives.

1. Base the level of support on margins - i.e., price per cwt. less the variable cost of producing a hundred lbs. of product - instead of prices.

As we have seen, it is not changes in price alone which cause variations in supply: it is the relative profitability of production. Profitability can decline even when product prices rise, if input prices rise faster. Thus, if the objective is truly to provide income support

and stabilize production decisions during short-run periods of low market returns, then the margin is the variable which should be stabilized.

However, note that the suggestion calls for support on the basis of margin net of variable costs: not total cost. There are two reasons for omitting fixed costs. First, the philosophy of the program is to protect farmers against the risk of short-term adverse market conditions; not to ensure a long-run return on investment. Support on margins net of variable cost would accomplish this while allowing long-term adjustment to remain consistent with growth in demand.

Second, if fixed costs were covered, any payments from the stabilization program could be capitalized into the value of land and capital assets, thereby causing the program to be self-defeating. This is, if program payments were large enough to cover all costs and make farming attractive, they would attract more people to farming and/or provide existing farmers an incentive to expand. This would increase the demand for land and capital assets, thereby increasing the prices of these assets. With prices of these assets included as costs in the stabilization program, an increase in asset prices would cause a decrease in the margin, thereby reducing the support price.

2. Rules of the game should be made public and producers should know the support level before the fact.

This means that the variables included in the margin, their weights in the calculation, the percentage of margin to be supported, and any eligibility limits should be public so producers will know the level of support and on how many units it will be available before the period over which support is guaranteed. If this were done, producers would have a

"worst possible" scenario upon which to base their expectations and production decisions. This would induce some producers to remain in production during times of low market returns.

It is likely that, as part of this suggestion, the level of support should not vary over time. While it may be tempting for government in some instances to raise the support level from 90 to, say 100 percent of the five-year average margin for political or compassionate reasons, it is likely of little benefit if such actions raise producers' expectations for the future. Recent history has shown that constraints such as those imposed by changes in government policy with respect to concerns like fiscal restraint will likely result in a lower support level subsequently. The market place presents sufficient uncertainty without the uncertainty of an unstable stabilization program. For the program to have an impact on production decisions, it should be stable and the level of support should be easy to calculate.

3. For slaughter cattle and hogs, the program should be quarterly, not annual.

An annual program may not provide protection against relatively short-run periods of depressed returns. A quarterly program would provide such protection at the time it is needed. A producer who has substantial debt commitments needs support immediately if he is to ride out adverse short-run situations. It is this sort of certainty that will aid in making production decisions.

One element of some concern in a margin program is that there is seasonality in supply and prices. This seasonality exists for economic reasons and it may be of value to preserve it in the stabilization program. This can be accomplished by adjusting the base (five-year) period for seasonality in arriving at the support level for a given quarter.

4. Eligibility limits should be standardized on the basis of production in earlier years

This suggestion is made for two reasons. First, part of the cyclical variation in production is caused by so-called "inners and outers"; those producers who enter production when profitability is high, cause production to increase, thereby contibuting to lower prices and profitability subsequently and then leave production . It is questionable that this behaviour should be rewarded with stabilization benefits.

Second, as we have seen, existing producers often expand production in response to periods of high profitability. Limiting eligibility for payments to a fraction of past production (where the fraction could obviously be 100 per cent of the past year or average of the past two years' production) guarantees support for a base herd but leaves the producer to absorb the risks of expansion. In other words, the market would allocate resources at the margin in the short-run. Long-run adjustment would be facilitated because the consistent producer would be supported and because the individual's eligibility limit would expand with the size of his enterprise. To illustrate the latter point, if a producer marketed 1000 hogs last year, 2000 this year and 3000 next year, his eligibility limit would be 1000 this year and 2000 next year, assuming that the base is 100 percent of last year's production.

It should be noted that his suggestion does not preclude the establishment of an absolute upper limit if the size of transfer payments is of concern. Nor does it preclude establishment of a one time only eligibility limit for bona fide new producers.

To the foregoing suggestions, we would add the following.

5. Programs should be voluntary and could be contributory

Some producers do not appreciate government interference in the market place and maintain that they can stabilize their incomes with their own investment programs. They should be allowed to do so.

Producers can gain from stabilization programs in two ways. First, they receive deficiency payments during periods of low market returns. Second, if deficiency payments assist in holding them in production during such periods, they then are able to sell more during subsequent periods of improved market returns. As we have seen, the benefits to consumers of the stabilization program would be marginal. Hence, government may find it of value to make the program contributory - i.e., to have a portion of the program costs financed by producers.

3.2.6 The G.M. 100 Alternative

During early 1979, a proposal for changes in the A.S.A. was made by Agriculture Canada. These changes were discussed with producer groups across Canada. Reactions to the proposal and the current government's intentions regarding the proposal are not known. Eyvindson [6] has described the proposed changes. They include:

1. Include 100 percent of the five-year average gross margin net of cash costs as the basis for support.

   The advantages given for this proposal are that the program would contain a clearer connection between current cash cost and the support price; the margin guarantee could be announced at the beginning of the support period; and producers would have certainty about minimum returns to labour, capital and management.

2. The program would allow for voluntary participation and cost sharing.

In discussing this Eyvindson expressed concern about developing rules and procedures as part of which he proposed that eligibility limits be based on historical production levels.

3. A mandatory program be instituted for beef cow-calf producers.

At present, mandatory programs exist for slaughter cattle and hogs. There have been cow-calf programs, but they fall under the "designated" category of the Act - i.e., a commodity may be designated for support when economic conditions so warrant.

4. Programs for slaughter cattle and hogs should be quarterly.

The arguments in support of this suggestion are similar to those presented above.

Most of these proposals are fully consistent with those presented earlier by this writer. There are only two questions regarding the Agriculture Canada proposal that need to be addressed. First, while Eyvindson has clearly specified that the proposed program base support on gross margin net of variable cost, he has not specified what is included as variable cost. There is danger of capitalization of program benefits and the self-defeating aspect alluded to earlier if variable costs are defined to include the costs of feeder cattle and weaner pigs.

To illustrate, assume that a stabilization payment of $2.00 per cwt. is made to beef feedlot operators. For an 1100 pound steer, this means that feedlot operators would receive $22 more to invest in production. If the entire $22 were used to buy replacement (feeder) cattle weighing 450 lbs., the feedlot operator could bid $4.89 per cwt. more than he would have in the absence of the program. If this occurred and

the price of feeders was included in the calculation of the margin for support purposes, it would lower the support level in a subsequent period.

While this example represents an extreme, it does illustrate the point. As was shown in section 2.0, the price of feeders is directly related to the price of steers. With an ongoing, consistent stabilization program, feedlot operators would likely come to regard the support level as the minimum price they would receive for steers and, if market prices were lower than the support level, part of the difference would be bid into feeder prices. Haack [9] has shown that on average a 10 percent increase in steer prices results eventually in a 13 percent increase in feeder calf prices. Martin and Young [13] have shown that on average a 10 percent increase in slaughter hog prices eventually results in a 15.8 percent increase in weaner pig prices. The potential for capitalization should be clear.

The second point is related to the first and also relates to Eyvindson's proposal that a mandatory stabilization program be developed for cow-calf producers. If, as suggested above, part of any stabilization benefits to feedlot operators are transmitted to cow-calf and sow-weaner producers, this means that the latter will benefit indirectly from a program aimed at feedlot or weaner to finish operators. Hence, one could question whether a program aimed directly at cow-calf or sow-weaner operators is necessary.

The counter argument to the above is that while some program benefits may be transmitted to cow-calf and sow-weaner producers through the pricing system, there is no guarantee that the resultant feeder or weaner prices will provide a margin equal to producers' average margins during the previous five years. Hence, a cow-calf program will provide

additional certainty which may help Canada avoid a breeding herd liquidation such as occurred from 1975-1979. This is a reasonable argument: but it raises one further question. That is, if the argument holds for cattle, does it not also hold for hogs? Since it does, one must wonder why Eyvindson did not make a companion proposal for a mandatory sow-weaner program.

3.2.7 Provincial Stabilization and Support Programs

In addition to the A.S.A., several provincial programs have been developed. These range at one extreme from support programs which cover full production costs in British Columbia where agriculture is a relatively small portion of the provincial gross domestic product. The implicit political judgement is that the provincial treasury can afford the relatively large and escalating costs of such a program as its benefits are capitalized into asset costs. At the other extreme, some provinces have only partial or nearly no such programs except for sometime and unforecastable support for commodities which experience short-term market problems.

In between are provincial programs containing various degrees of price and income support. These programs are described rather extensively in the Workshop Proceedings Issue of the Canadian Journal of Agricultural Economics, March 1976 [3] .

The resulting plethora of federal and provincial programs result in two potential problems. Most basically, for commodities which are produced across Canada, varying degrees of support may mask market signals and cause inefficient resource allocation. Second, "high support levels (in some regions)[9] could cause problems with Canada's international

trading partners as they reacted to what they might see as unfair subsidies on Canadian products." (Eyvindson [6] p. 25). If such reactions include import restrictions for Canadian products, provincial programs could be costly in the extreme.

Some of the provincial programs have been developed in response to the ineffectiveness of the federal program. If the proposals made here and by Eyvindson were accepted in the A.S.A., it should be more effective. Hopefully individual provinces would then phase out their own programs.

3.3 Beef Import Restriction

While much of the government intervention in the Canadian livestock sector during recent years has been via stabilization programs, there has also been increasing intervention in the beef sector through imposition of import restrictions. The progression of restrictive actions after 1974 is outlined in Appendix I. It is interesting to follow it. First an import surcharge was levied in late 1973 which was phased out in early 1974. Then in April 1974 the D.E.S. certification program was instituted which protected Canadians from carcinogenic contamination (and kept Canadian cattle prices higher than in the U.S.).

In August 1974, the Canadian government unilaterally established import quotas for live cattle and beef based upon average imports during the previous five years. This caused a mini-trade war as the U.S. government retaliated by imposing import quotas on Canadian live cattle, beef, hogs and pork in November. These import restrictions continued until August 1975 when both countries removed them. Then Canada announced quotas on only dressed beef for the remainder of the year. This was aimed at controlling imports from Oceania and had little effect on trade with the U.S. Import restrictions on dressed beef and veal were subsequently imposed from

1976 through 1979.

Like activities surrounding stabilization, beef import restrictions reflected ad hocery rather than a long-term policy. Canadian import restrictions have never been carried out under a planned legislative framework. However, there has been maturation of the process over time. As the uncertainty of the mid-1970's began, trade restrictions were placed on beef or cattle in response to pressures of the moment - witness the import surcharge, the D.E.S. restrictions and the August 1974 restrictions on cattle and beef from all sources. *The danger in such an approach is obvious in the retaliatory action of the U.S.* Such actions and reactions can cost Canada more than the U.S. because a) in most years Canada exports more cattle and beef to the U.S. than the U.S. does to Canada, b) since Canada's market is much smaller than that of the U.S., actions taken by Canada have relatively small impacts on the U.S., while actions taken by the U.S. can have major impacts on Canada.

Since 1975 Canada's import restrictions have concentrated solely on beef and not on live cattle, thereby allowing the North American market's normal price relationships to remain intact. An effort has been made to make Canada's trade restrictions on dressed beef consonant with the U.S. meat import law. This was likely achieved by 1978 and 1979. Furthermore, the Conservative government in 1979 prepared specific legislation which would have been fully consistent with the revised U.S. law. That legislation died before reaching the House of Commons when the government was defeated in December 1979.

There are currently two issues of long-term significance regarding beef import restrictions. Both relate to imports from non-North American

sources and to the U.S. meat import law. To understand them, it is necessary to relate more about the nature of the market for beef.

There are two distinct types of beef, with different demands, in North America. The high quality market (steaks and roasts) is provided for primarily from grain-fed steers and heifers. This market is relatively price elastic - i.e., consumers respond rapidly to price changes. The low quality market (predominantly hamburger) is beef which comes from cows, bulls, trim and imports. The latter is mainly grass-fed beef from Australia and New Zealand although some imports originate in Argentina and other South American countries. Demand for low quality beef is price inelastic - i.e., consumers do not respond much to a change in price. But demand for low quality beef has grown rapidly during the past decade with the advent of the fast food business. While the nature of demand for each type of beef is as indicated, the two types are obviously substitutes, so that a change in price of one shifts demand to or from the other, thereby causing prices for both to be interrelated.

Typically, Eastern Canada imports high quality beef and grain-fed cattle from the U.S. as well as low quality beef from offshore. Western Canada typically exports low quality beef and live cows to the U.S. The U.S. also imports low quality beef from offshore.

The U.S. meat import law was passed in the early 1960's. In its original form, it allowed beef import restrictions to be triggered if imports reached a fixed percentage of domestic production. It did not restrict live cattle imports from Canada, but it could restrict imports of Canadian dressed beef. Import restrictions were not mandatory; the law gave the President power to restrict imports at the trigger level or to

waive the restrictions depending upon his judgement of the market situation. In most years, when the trigger level was reached, restrictions were waived but because the President's decision was never known beforehand, the import law may have been a psychological barrier to imports. However, in 1976 import quotas were invoked.

The first of the two current issues is that offshore imports have negative impacts on Canadian cattle prices - particularly in years like 1976 when Canadian beef exports to the U.S. were restricted and Oceanic imports increased substantially. This contention arises not only because increased offshore imports increase the supply of beef in Canada, but also because of the effects of the U.S. import law. The oceanic countries were undergoing the same, or worse, cyclic problems as North America: during 1976 they had large volumes of beef available for export. Because of the U.S. import law, the Oceanic countries controlled the flow of beef to the U.S. and simultaneously encouraged exports to non-U.S. destinations. In fact, Australian exporters were given the right to ship beef to the U.S. only by first making sales to other countries, like Canada, during part of that period. The result was that the U.S. became a premium price market while Australian beef was being offered at substantially lower prices in Canada. These two factors together are alleged to have put downward pressure on cow prices during 1976 and, through the interrelationship between the high and low quality markets, downward pressure on steer prices.

Past research (Freebairn & Rausser [7], Woods [15] and Broadwith and Hughes [2]) has suggested that, in fact, offshore imports have only a marginal impact on North American prices because they represent a small portion of total supply. While offshore imports to North America increased

significantly in 1976, they had a very small impact on supply when compared to the increase in domestic supply that year.

Within Canada the increase in imports during 1976 represented a larger proportion of domestic supply than did North American imports as a proportion of total North American supply. Furthermore, it is true that Canadian exports of dressed beef to the U.S. were curtailed by the U.S. import law. However, live cattle exports were not restricted, and these increased substantially. Hence, increased imports of offshore beef to Canada were offset by increased exports of Canadian cows to the U.S. Once again, the volumes involved were large relative to the Canadian market, but small relative to the U.S. market where they were absorbed with little effect on North American market prices. In essence, Canada provided a "back door" for Oceanic beef to enter the U.S. market.

The second issue arises from the response to the first. While it can be argued that imports from offshore have little impact on market prices, experiences like that of 1976 tend to "disrupt normal trade flows" within North America. This is evidenced by the substitution of offshore beef with increased exports of Canadian cattle and is implied to cause strained trade relations between Canada and the U.S.

One must at first wonder whether even this issue is a red herring. No matter where offshore beef reaches North America and no matter how it or its substitute reaches the U.S., the volumes involved will have only a marginal effect on U.S. prices. "Disruption of normal trade flows" should cause "strained trade relations" only if the trade involved has a significant impact on the price level. However, whether such trade has a real impact on prices, it is true that many producers *perceive* an impact.

The result, as was clearly true in 1976, is that producers become irritated over trade flows. The reader may recall the television coverage given to U.S. beef producers in 1976 who picketed border points in Western Canada and stopped truckloads of Canadian cattle from entering the U.S. Under such circumstances, producers put pressure on government and government may be forced to respond to the political impact of increased imports even if there are only marginal economic impacts.

Herein lies the danger to Canada. If the U.S., in responding to producer pressure, restricted imports of live cattle from Canada, then the economic impacts to Canada could become significant. Canada, with no import restrictions, would then be faced with increased imports from offshore and the U.S. market would be unavailable as an outlet to relieve this pressure. Hence Canadian prices could be depressed significantly.

With the amendment to the U.S. meat import law of 1979, this danger could become magnified in the future. The 1979 amendment includes a provision for establishment of import quotas on a countercyclical basis - i.e., imports would be allowed to increase as the U.S. cycle enters a period of reduced domestic supply while the herd is being built up, but would be reduced when domestic supplies are large and the herd is undergoing a liquidation phase.

Under this regime, one can easily imagine a situation in 1985 or 1986, when the next liquidation phase of the North American cycle can be anticipated, wherein offshore imports to Canada increase and Canadian cattle exports to the U.S. increase at precisely the time when U.S. beef import quotas reach a statutory low point. If this were to occur there would be tremendous pressure on the U.S. government to limit live cattle

imports from Canada and Canadian beef producers could suffer dearly.

Given this possible scenario, the decision of the federal Conservative government to develop a Canadian beef import law consistent with that of the U.S., appears to be a wise one. Such a development is recommended and at as early a date as possible. The issue of the price effects of beef imports is not likely to have currency again until the mid-1980's. If a law were developed now it could be done in an atmosphere devoid of emotion and recrimination. Long-term objectives relating to protection of both producers and consumers could be accommodated. The industry could proceed into the 1980's with certainty about imports, which could assist in stabilizing the cycle. And exporting nations, such as Australia, New Zealand and Argentina would have a basis for future planning. Perhaps over the next two or three decades, this would help to de-synchronize the beef cycle of the Southern hemisphere vis-a-vis that of the Northern hemisphere so they would compliment each other, rather than the current situation wherein beef production and prices rise and fall together around the world.

3.4 Supply Management

Supply management has never been seriously considered as a solution to the problems of instability by the majority of beef and pork producers. However, during periods of depressed market returns it has been considered by a vocal minority of producers and by some politicians. Hence it will be addressed here. It is assumed that a supply management program for cattle or hogs would be philosophically similar to those existing for the poultry sector. Supply management programs for the poultry industry include administered prices. Administered prices are keyed on expected

production costs plus a "fair return on investment". Production or marketing quotas are then established based on the quantity the marketing agency forecasts will be demanded at the administered price. Below we draw several inferences regarding the effects of a similar supply management program for cattle and hogs. These inferences result in part from an analysis of supply management for the beef sector (Martin and Haack [14]). Since the actual levels of costs and benefits of a supply management program depend on the decision rules followed by the marketing agency (and its competitors if all red meat and poultry sectors were supply managed) and since it is inconceivable that the decision rules would not change in some unpredictable manner through time, no attempt is made to place costs and benefits in a numeric sense here. For the same reasons, no econometric analysis of supply management is undertaken in the section to follow.

The inferences are as follows:[10]

1. Supply management for beef and pork would be difficult and costly to implement.

The degree of practical difficulty in controlling supply for pork and beef is much greater than for poultry. We can start with two basic facts. The life span of a chicken broiler is very short and a hen can produce up to 300 offspring per year. The first fact implies that a poultry marketing board does not need to forecast far ahead when assessing potential demand for quota allocation: broiler marketing boards establish quota levels qpproximately six months in advance of the time marketings occur.

When a broiler is marketed, less than three months have elapsed from the time the egg from which it emerged was laid. When a hog is

marketed, approximately 10 months has elapsed since its mother was bred. And for a steer the time from breeding to market is about 2½ - 3 years. Furthermore, as was noted in section 2.0, the actual time lag between a change in profitability and the resulting change in marketings has historically been 1½ - 2 years for hogs and approximately four years for cattle.

The point to be made is that, to be effective, a supply management program for hogs and cattle would necessarily be administered by relatively prescient marketing agencies. These agencies would find it necessary to forecast population growth, consumer incomes, prices of substitutes (the pork agency would need to forecast the actions of the beef and broiler agencies; the beef agency would need to forecast the actions of the pork and broiler agencies; the broiler agency, with obvious foreknowledge of the pork and beef agencies' quotas would constantly be able to adjust supply and prices to increase their share of the market for meat), in order to anticipate demand at a given price. In order to establish the price, the agencies would need to forecast feed costs, labour costs, interest rates, costs of capital equipment, etc., at the time hogs or cattle are to be marketed. This in turn implies that they would need to forecast weather conditions, feedgrain acreage and government feedgrain policy around the world from 1½ to 4 years in advance, not to mention macro economic policies, the rate of inflation and other factors influencing demand and input prices. Looking back over the recent past one must wonder what marketing agency in 1970 or 1971 could have forecast that corn prices would increase from $1.30 per bu. in those two years to $2.00 in 1973 and over $3.00 in 1974. The reader will no doubt be familiar with

the track records of professional economists in forecasting many of these variables even six months to a year ahead.

The fact that a hen may produce up to 300 offspring per year is also important. Because of this, if a broiler marketing agency decides to decrease or increase future broiler supply causing some existing parent stock to be slaughtered or pullets to be added to the parent flock, these actions have little impact on broiler supply. A sow, raised under good management conditions, may produce 20 pigs per year. A beef cow produces on average .85 - .90 live calves per year: and, as we have seen, female slaughter thus is a significant portion of total supply. Clearly, if a pork or beef agency decides to change future supply, it will also have a substantial impact on current supply as females are added to or liquidated from the breeding herd. In other words, if the future brings abrupt changes in costs or other major market factors, as has the past, it would be very difficult for a marketing agency to effect other than abrupt changes in supply.

The problems of control do not stop here. Most broilers in Canada are produced under reasonably homogeneous technological conditions. Supply is controlled by the amount of pen space that can be used during a production cycle. Many, but by no means all, hogs are raised under confinement. But the variety of technology is manifold. Further, some producers raise weaners, others buy weaners and finish them. At which point in the production system does one place quotas and how are they to be enforced?

The same question applies to beef. But very few beef cows are raised under confinement - they are raised on extensively grazed pasture

land. Many feeding operations are confined, but many are not. Hence the problems of control are difficult. Other control factors are of importance. First, many calves born in Western Canada are currently exported to the U.S. If quotas were placed on the breeding herd and Canadian prices increased, one would expect a larger portion of Western calves to be finished in Canada, thus increasing beef supply. Second, beef can be produced from dairy breeds. Hence a beef marketing agency would find it necessary to control cattle - especially males - from the dairy herd. Third, beef supply can be altered by feeding cattle to heavier weights (currently average carcass weights are approximately 655 lbs.; in 1975 they averaged 525 lbs., a difference of 14 percent per carcass). How does one control this?

This writer concludes that for marketing agencies to effectively control the supply of pork and beef, they would need to be prescient, omnipotent and financially endowed very well indeed.

2. Supply management, even if it were effective domestically would have little impact on market prices without import controls.

This point is obvious from the overwhelming impact of the U.S. market on Canadian prices. If Canadian production were restricted in an attempt to increase prices, it would merely reduce Canadian exports and/or replace Canadian product in the domestic market, with imports. Since Canada produces roughly 10 percent as much beef and pork as the U.S., a reduction of 20 percent in Canadian supply would reduce North American supply by less than 2 percent. It is doubtful that this would have a substantial impact on price.

This rather fundamental fact, and its implications seems to have eluded those federal and provincial politicians who espouse supply management for the pork sector as a means of increasing hog prices. As indicated in section 1.0, Canada exported approximately 192.5 million lbs. of pork during the first eight months of 1980. Also, as indicated, the nature of export demand is such that no or little impact on Canadian prices would occur unless the export quantity were removed from the market. Hence a supply management program in 1980 would have to have removed at least the quantity currently exported in order to have a measurable impact on prices (see Figure 2.9).

How many hogs does 192.5 million lbs. of exports represent? This is difficult to say because the quantities traded are reported in product weight. The majority of the exports (105.7 million lbs.) were in high value cuts such as hams, loins and backs. Some exports of these cuts are shipped bone-in, the majority are deboned and closely trimmed. Thus it is difficult to work back to an equivalent number of hogs. However, we do know that the weight loss from the live hog to a chilled carcass basis is estimated by Agriculture Canada to be 23 percent and that the weight loss in trimming the carcass is a further 3 percent. Hence before the carcass is cut, there is a 26 percent loss in weight. Further cutting, deboning and trimming into the cuts which are exported will reduce weight further. For example, the weight loss involved in deboning and trimming a ham to export specifications is in excess of 35 percent.

Hence it does not seem unreasonable to use a conversion factor of .4 or .5 to convert the quantity exported to live hog equivalents. Using .4 and assuming a hog weighs 215 lbs., 192.5 million lbs. of pork represents

2.24 million hogs. Using .5, 192.5 million lbs. of pork converts to 1.79 million hogs. Thus, from 1.75 to 2.25 million hogs would have to have been removed from the market during the first five months of 1980 before Canada stopped being an exporter, and before Canadian prices could be expected to increase relative to U.S. prices.

During the first eight months of 1980, 9.37 million hogs were slaughtered in Canada under federal and provincial inspection [1]. Hence, with supply management, from 19 to 24 percent of the hogs marketed would have to have been removed before any appreciable impact on prices would have been achieved.

What would have been the foregone foreign exchange earnings if these hogs had not been marketed? Again it is difficult to place a representative price on the exports. To obtain an estimate, consider the following. Prices for wholesale cuts at Montreal during the weeks ended May 8 and September 18 were as indicated in Table 3.1. The May 8 prices are for a week when hog prices were slightly less than they averaged from January through May and are therefore slightly low as an average.

Table 3.1: Prices of Wholesale Pork Cuts, Montreal, Week Ending May 3, 1980 ($/lb.)

Product	Price		Product	Price	
	May 8	Sept. 18		May 1	Sept. 18
Ham, bone-in	$ .75	$1.18	Loin, trimmed	$1.22	$1.53
Shoulder Cuts			Boneless Back, trimmed	1.70	2.20
Coupe - Montreal Style	.72	1.10	Boneless Back, short cut	1.86	2.26
Coupe - New York Style	.73	1.11	Tender Loin, trimmed	3.15	3.53
Picnic - Hock off	.69	1.03	Spare Ribs, side	1.19	1.43
Boston Butt	.75	1.17	Back Ribs, tail off	2.33	2.68
Belly Skinless	.66	.96	Hock Shoulder	.30	.46

Source: Agriculture Canada, Canadian Livestock and Meat Trade Report, May 8 and Sept.18/80.

Of the 192.5 million lbs. exported to date in 1980, 64.1 mil. were hams; 61.0 mil. were backs and loins; 19.2 mil. were bellies; 40.1 mil. were shoulder cuts; and 4.8 mil. were ribs. A further 2.6 mil. were processed products which would have a higher value than the fresh cuts listed above. In addition, a large portion of the ham exports are shipped boneless and trimmed. Wholesale prices for these products have ranged from $1.40 - $1.80 per lb.

Given the above, it does not seem unreasonable to estimate an average F.O.B. value of $1.50 per lb. on average for the products exported. Hence, a supply management program which successfully restricted supply sufficiently to take Canada from her current export basis would have precluded $288.75 mil. in foreign exchange earnings during this eight-month period.

While the foregoing figures are admittedly rough estimates, they are realistic enough to illustrate some of the consequences of a supply management program.

Our experience with supply management programs with prices administered on the basis of "fair returns" in the poultry sector have led inexorably to Canada becoming a net importer of poultry products. There is no reason to believe that supply management for the beef and pork sectors would do otherwise. In the case of pork, if one examines the 93 months from January 1973 through August 1980, one would be hard pressed to find 15 months when an efficient hog producer did not return a profit or at least break even. Current outlook information suggests that hog prices will continue to increase in 1981, and that Canadian exports will continue to grow. This period of seven years has been one of tremendous growth in Eastern Canadian pork production. The major pork producing

states in the U.S. are Michigan, Ohio, Illinois, Iowa, Minnesota, Nebraska and Missouri. These states have one other thing in common. They are all further from the major U.S. consuming regions in the east than is the major hog producing region of Canada.

Given these facts and the nature of the market system, does it seem good economic policy to restrict Canadian supply and preclude the possibility of export earnings to the U.S. (and other) markets(s) in order to protect a few Canadian producers from periods of losses which have not been frequent and are short-lived? At best, such a policy is misguided. At worst it is economic insanity.

3. Viewing supply management as an alternative to an effective stabilization program, a supply management program would be, de facto, a more regressive tax to consumers.

All supply management programs for poultry have eventually required trade restrictions and have resulted in Canadian prices which are generally higher than U.S. prices plus transfer costs to Canada. There is no reason to expect a different result if supply management existed for pork and beef. If this occurred, prices would rise for all consumers. A given increase in price for basic food commodities has a greater relative impact on the poor than the wealthy. Assuming that a stabilization program is funded from the general income tax, the wealthy would pay a higher proportion.

4. Long-term implications

Supply management programs with administered prices based on the principle of providing a "fair return" to producers inherently contain pressure for a reduction in the rate of growth in output. This results

from the process of capitalization which has been alluded to previously. As a program provides benefits, those benefits are capitalized into production costs - with supply management this may include quota values. Directly or indirectly, this capitalization process presents pressure to the marketing agency to restrict the rate of growth in output so product prices will cover constantly escalating production costs.

In addition to a reduced rate of growth, this results in reduced opportunities for foreign exchange earnings from the export market as has been shown above. Recent history has shown that Canada's trade balance is important to the nation's economic health. In the meat/grain complex, only grains and pork are currently contributing substantially to a positive trade balance. The contribution of the grain sector has not grown substantially in real terms during the past few years, in part because of limited physical handling capacity. Canada is currently a slight net exporter of beef. Canada is a net importer of poultry products. If supply management restricted the rate of growth in output of pork and beef, relative to competing countries, so that Canada became a consistent net importer of all livestock products, Canada would be left with only grain as a positive contributor to the balance of payments. This scenario would preclude not only the potential to export livestock products, but also implies that Canada would forego the opportunity to gain from the additional value added by processing that is inherent in meat exports versus grain exports.

This leads to a final implication. Reducing the rate of growth in livestock production would reduce the rate of expansion in investment and employment in the meat slaughtering and processing sector. Goddard [8],

using annual data from 1956 through 1976, estimated the relationship between a change in beef or pork production and investment and employment in the meat packing sector (Table 3.2). The resulting elasticities suggest that there is a positive relationship - particularly for investment since capital was substituted for labour during this period.

How important is growth in the meat processing sector to the domestic economy? No attempt will be made here to quantify its importance. However, Devine [4], in reviewing studies of input-output multipliers, concluded that the meat processing sector ranked second (behind motor vehicle manufacturing) in the magnitude of its domestic multiplier effect.

Given that some policy choices facing Canadian agriculture present the option of encouraging expansion of the livestock sector or retarding the rate of expansion in livestock production while encouraging grain

Table 3.2: Elasticities Relating Pork and Beef Production to Investment and Employment in the Meat Packing Sector

	1% Change in Pork Production	1% Change in Beef Production
Percentage Change in:		
Employment		
Eastern Canada	.17	.12
Western Canada	.09	.33
Net Investment		
Eastern Canada	1.58	1.14
Western Canada	1.37	1.40

Source: Goddard

exports, the following general conclusion of Devine's review may be of importance:

> "In summary, there is little question that more economic activity, more jobs, and more value added is produced (1) in livestock than in feed grains, (2) in meat production than in livestock production, (3) in milling than in wheat production and (4) in meat processing than in milling" [4 , page 34].

4.0 THE ECONOMIC IMPACTS OF ALTERNATIVE POLICIES IN THE BEEF AND PORK SECTORS

To this point the analysis has focused on the economic nature of the markets for beef and pork; the uncertainty of the mid-1970's and the extraordinary effect grain prices had in creating that period of uncertainty; and the policy response of the Canadian government to recent events. From the latter, it is clear that the three major policy instruments to be employed or considered have been price support programs, margin support programs and beef import restrictions. In this section, quantitative analysis of the impacts of several specific policies will be presented.

4.1 The Simulation Model

The analysis is based on a simulation model of the North American beef and pork sectors. The model contains statistical equations representing production and consumption of beef and pork in Western Canada, Eastern Canada and the United States. The United States is included to account for that nations's overwhelming influence on Canadian prices. The equations are quarterly in nature. They were estimated using actual data reported from 1962 through 1979. Demand for pork in each region is specified to depend upon the current price of hogs, the current price of steers, consumers' disposable income, population and seasonal influences. Demand for beef is specified to include the same variables. The demand functions are estimated simultaneously in each region: hence the model measures the interrelationship between demand for the two products.

The supply of pork equations for each region are estimated using lagged hog and grain prices as well as seasonality. The supply of beef equations are more complicated. Beef supply in a given region and quarter

is defined to be the product of heifer, steer, cow and bull slaughter (number of head) times the average carcass weight. To obtain this, three equations are estimated. Carcass weight is a function of lagged steer and grain prices. Cow and bull slaughter is a function of lagged feeder calf prices and lagged inventories of breeding cattle. Heifer and steer slaughter is a function of lagged steer and corn prices and breeding inventories lagged two years.

Breeding inventories in turn are a function of lagged feeder calf prices; and feeder calf prices are a function of lagged steer and grain prices. In all, there are five equations for the beef supply component in each region. The progression of equations attempts to encompass the beef inventory and supply cycle as outlined in section 2.0. Equations included in the model are presented in Appendix II.

The model generates price, production and consumption of pork and beef in each region and trade between each pair of regions for each quarter over a pre-set period of time. For the present analysis, the period is from 1965 through 1979. So the model runs for 15 years or 60 quarters.

The analysis is carried out by obtaining first a base run with no policy. Then a policy is imposed and the model is run again. The impact of the policy is then assessed by comparing the results with the policy to the results in the base run. This approach allows an assessment of the costs and benefits of a policy on the following variables: market prices, production, feeding margins, net revenue to the industry, international and interregional trade, consumer surplus and treasury outlays for the program.

4.2 Limitations of the Analysis

There are a number of limitations inherent in econometric simulation models generally and in this one in particular. Econometric models represent average, aggregate response to the causal factors; they do not tend to represent well specific short term response. Econometric models tend to perform well when the data upon which they are based lie within one or two standard deviations of their means: they often do not represent response well at the extremes. This point is related to the foregoing one. Third, since they must be based on historical data, they may not represent response well in the future, even if they were adequate in the past. A fourth and related point is that rather heroic assumptions must be made regarding the response to policy changes when a policy simulation is done. In the present case, the base model is assumed to be devoid of policy response because either no policy existed or because it is the author's judgement that existing policies were ineffective and, therefore, had no impact on decisions. In the policy simulation runs of the model, distinct assumptions are made about the response to policy.

While the current model is subject to all of these limitations it has two additional ones of some note. First, international trade in Canadian beef and pork occurs with countries other than the U.S. While the U.S. is certainly the most important of Canada's trading partners and is therefore included explicitly in the model, changes in Canadian policy could have impacts on the trade of both Canada and the U.S. with third party nations. However, these nations are not included explicitly in the model: rather trade with them is included exogenously at actual levels. Hence the model will likely underestimate the trade impacts of

any policy changes.

Second, as has been noted, the market for beef has high and low quality components, and changes in trade policy will likely have a differential impact on the two components. However, beef is treated as a single homogeneous product in the model. This is done because the relationship in demand between high and low quality beef is complex and because the quality of data available is not sufficient to truly represent this relationship. Hence the impact of a beef import policy which deals only with low quality imports from offshore would likely be overestimated by the model. For this reason, no analysis of a beef import policy was undertaken.

4.3 The Policy Scenarios Analyzed

The policy scenarios analyzed are consistent with the progression of changes in federal stabilization policy. They include:

1. a price stabilization program wherein a deficiency payment is made if the market price in a given quarter is less than 100 percent of the average in the previous five years.
2. a margin stabilization program wherein a deficiency payment is made if the margin in a given quarter is less than 90 percent of the average in the previous five years.
3. a margin stabilization program wherein a deficiency payment is made if the margin in a given quarter is less than 100 percent of the average in the previous five years.

For the margin stabilization programs, margins are calculated net only of feed costs. Other cash costs are not included because there will invariably be arguments regarding precisely how these should be calculated.

Feed is the major cash cost for both cattle and hog producers and was the major source of uncertainty during the past decade. Our general objective is to determine the direction of change and the relative differences in impacts of the various policy scenarios: not the absolute magnitude of their impacts. Basing the margin program only on feed costs accomplishes this objective. We will leave the design of an operationally acceptable program to mandarins who are more qualified and have better access to data.

The specific features of the programs are as follows. For the price deficiency program, the average market price during the five years prior to a given quarter is calculated. The average price in a given quarter of the base period is the average of the prices at Calgary and Toronto, weighted by steer and heifer slaughter in Western and Eastern Canada. The resulting national weighted average price in each quarter of the base period is weighted by total slaughter in order to calculate the five-year average. Then if the market price is less than the moving average, a deficiency payment equal to the difference between the two is made.

For the margin deficiency program, the calculations are the same except that the margin net of feed costs is calculated as the market price less the cost of 800 lbs. of grain per hundred lbs. liveweight for cattle and per hundred lbs. carcass weight for hog. The latter converts to approximately 600 lbs. of grain per hundred pounds of live hog for a farrow to finish operation, thus including an allowance for sow maintenance.

There are at least three assumptions which are made implicitly in the analysis. First, it is assumed that the support price is announced at the beginning of a quarter and payments are made at the end of any

quarter that market prices and the program dictate. Second, producers respond to a market price plus a payment as they would to a market price of the same magnitude. Third, the program would have no impact on the parameters of the supply functions.

The latter two assumptions may be rather heroic. Some contend that deficiency payments would be discounted by producers and thus not elicit as much response as a market price of the same magnitude. The counter to this argument is that, over time, with absolute foreknowledge of the level of support before a quarter and prompt transfer of the payments to producers immediately thereafter, the program would present producers with a worst possible outcome. Thus the level of support would supercede the market price when the market price is lower and producers would respond to the former and discount the latter.

This gives rise to the implications of the third assumption, since the program would provide absolute certainty of the minimum returns producers will receive in the short-run. To the extent that producers are risk averse, their risk aversion will be reflected in the supply response parameters included in the model which are estimated with historical data. Provision of short-run certainty will reduce producers' risk, thereby allowing them to discount it in making production decisions. Hence, the program may well alter the supply response parameters, resulting in greater supply response than is estimated in the econometric model.

It should be noted that the programs do not include an eligibility limit, there is no provision for cost sharing and neither the price nor the margin deficiency programs are adjusted for seasonality.

Finally, the prices generated by the analysis are very similar

to actual market prices except for cattle in 1974. Import restrictions associated with the ban on cattle or beef containing D.E.S. were not imposed in the model. Hence market prices during that period were higher than those generated by the model. As a result, deficiency payments are higher.

4.4 Results of the Analysis

Each of the three programs were imposed on the model for the period from 1965 through 1979.

Steer Prices Received by Producers and Feeding Margins for Steers

Steer prices, including deficiency payments, for each program compared to the base run are presented in Figure 4.1. The price deficiency program would have made payments during the first quarter of 1965 (1965I), 1976I, III, IV and 1977, II. The 90 percent margin program would have made payments from 1974I through 1977III, while the 100 percent margin program would have made payments from 1974I through 1977IV. Hence the margin programs would have provided substantial support throughout the mid 1970's when grain prices were high, while a price deficiency would not have provided significant support until the period of depressed profitability for beef producers was nearly over. This can be seen in Figure 4.2 which contains feeding margins for each program compared to the base run.

Market Prices for Stocker Calves

As indicated earlier, increased steer prices are capitalized into the prices of feeder calves. Since deficiency payments are assumed here to be perceived as equivalent to increased steer prices, the analysis shows (Figure 4.3) that stocker prices would have increased substantially as a result of the deficiency payments. Furthermore, the timing and magnitude

Figure 4.1: Prices Received by Producers for Steers, Calgary, Alternative Stabilization Programs and Base Run, 1965-1979 (Solid line is base run)

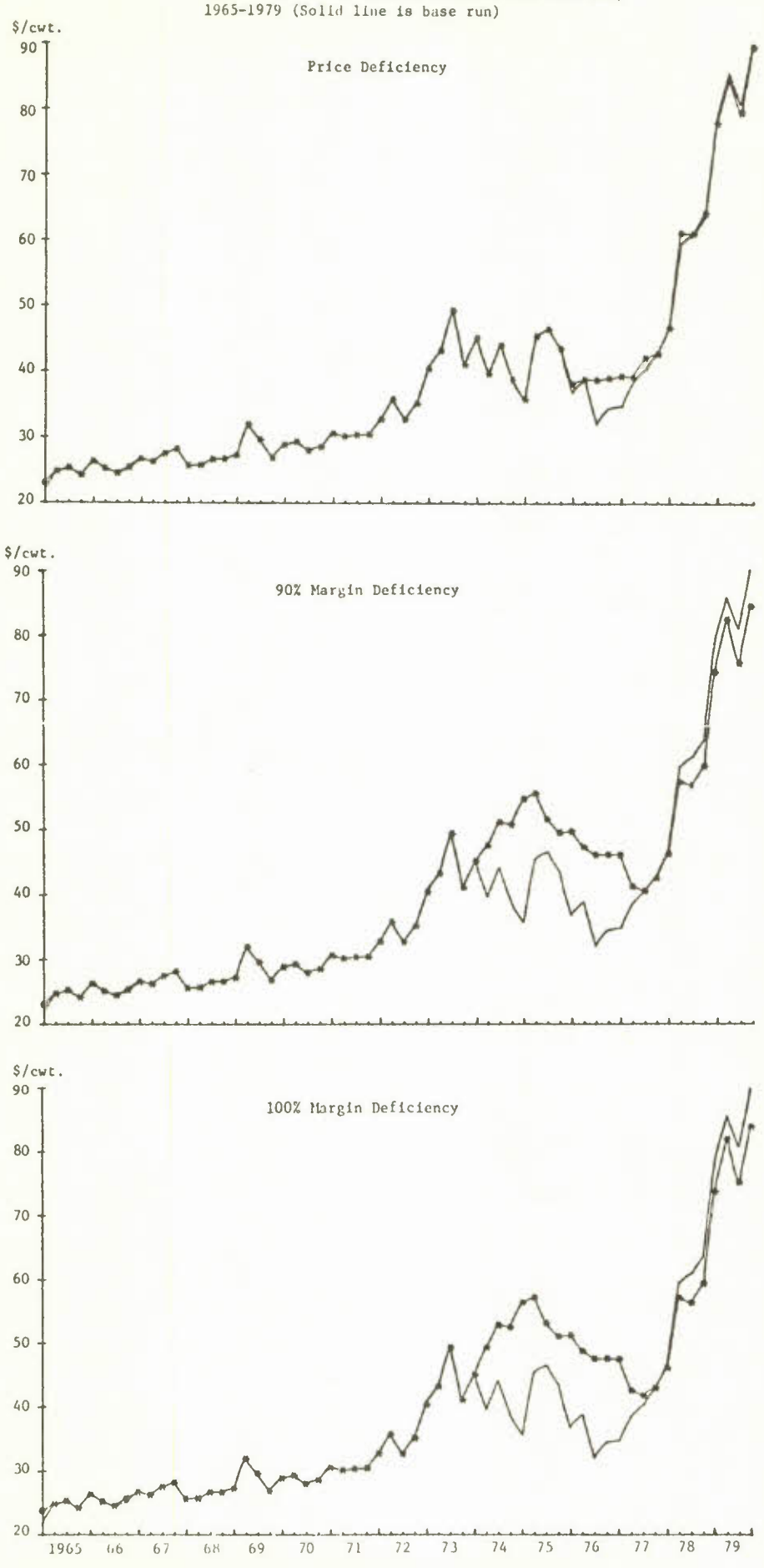


Figure 4.2: Feeding Margins for Steers, Calgary, Alternative Stabilization Programs and Base Run, 1965-1979 (Solid line is base run)

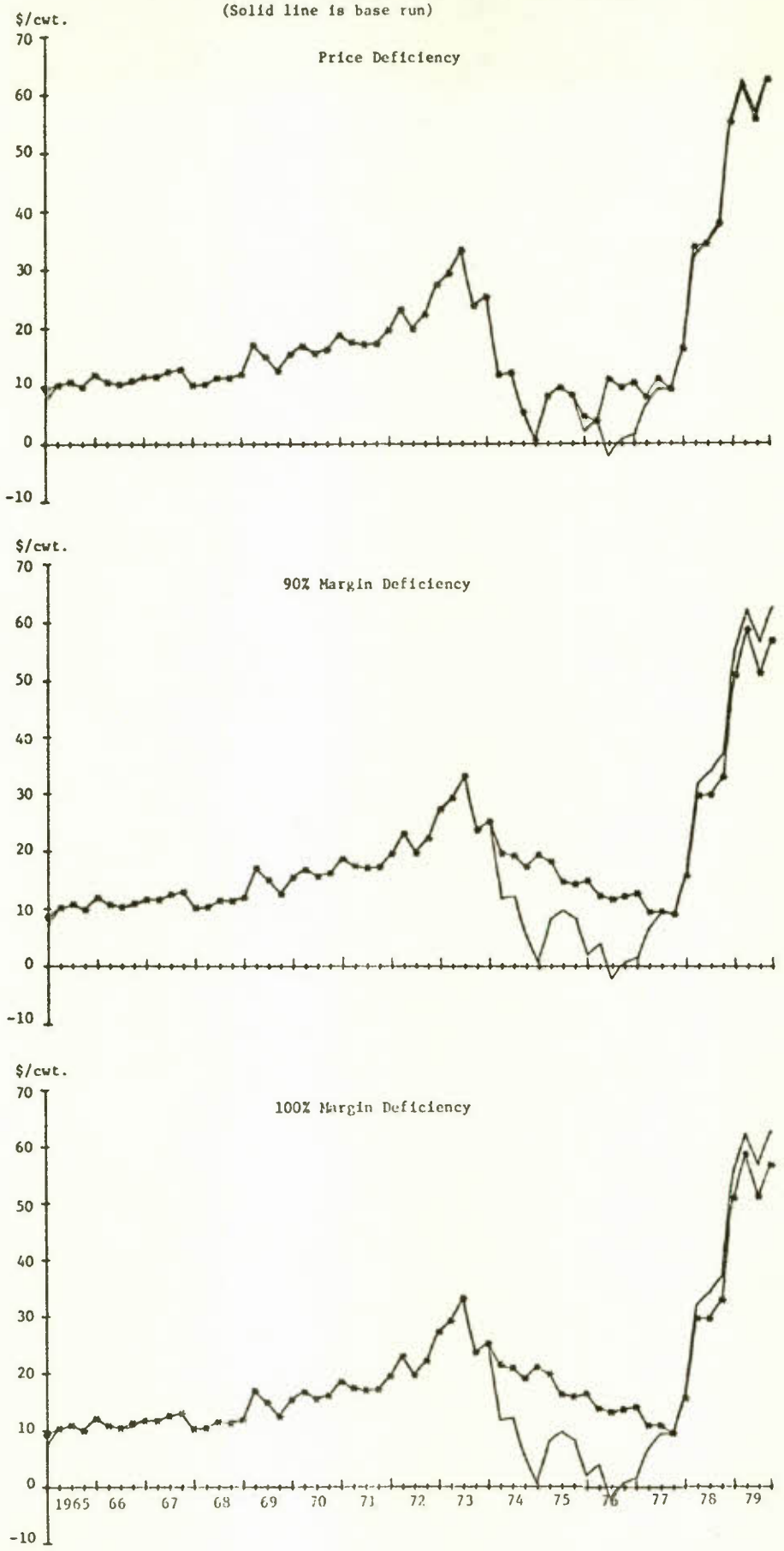
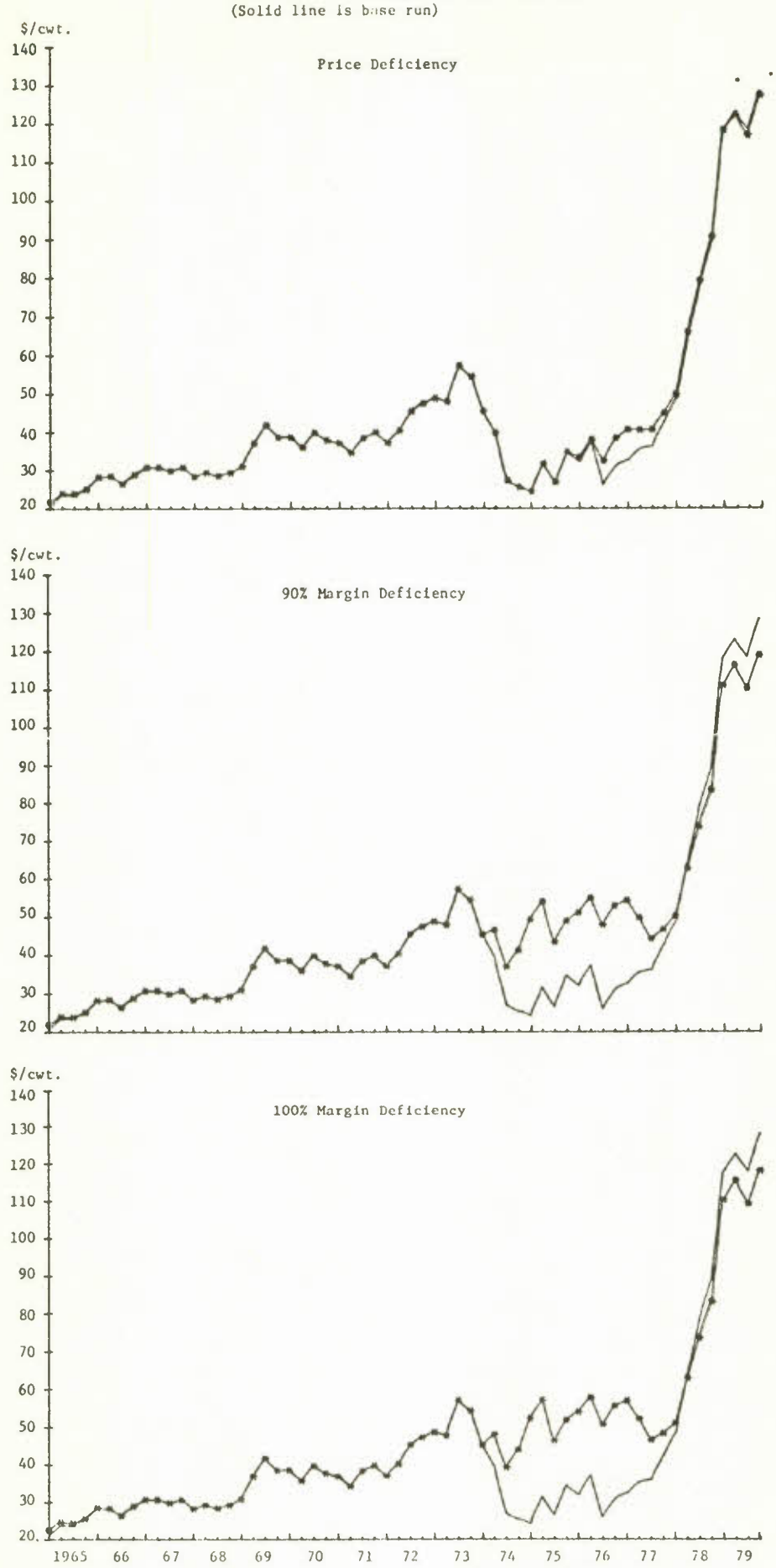


Figure 4.3: Price of Stocker Calves, Calgary, Alternative Stabilization Programs and Base Run, 1965-1979 (Solid line is base run)



of their increase are related to the timing and magnitude of the deficiency payments.

Note also that while stocker prices would have increased during the mid-1970's in response to the deficiency payments, they would have been lower during 1978 and 1979. The same is true of market prices for steers (Figure 4.1).

Inventories of Beef Cows

The impacts of the program on breeding inventories are shown in Fig. 4.4. The price deficiency program would have slightly curtailed liquidation of the breeding herd in 1977 and 1978. The margin deficiency programs would have encouraged continued expansion of the breeding herd during 1975 and 1976, instead of a liquidation. Thereafter, a moderate liquidation would have occurred. It is this effect which would have resulted in lower stocker and steer prices during 1978 and 1979. Larger than base run breeding herds from 1975 onward would have increased the supply of stockers and beef thereafter, causing downward pressure on prices in subsequent years.

Production of Beef

Beef production in Canada with each program compared to the base run is contained in Figure 4.5. As would be expected, beef production is affected less and two years later by the price deficiency program than by the margin programs. Note that production initially declines as a result of the programs, but increases subsequently. This occurs because of the nature of supply response. As payments are made and losses by beef producers are reduced during 1974-1977, the initial impact is to induce producers to hold more heifers for the breeding herd and to induce less cow slaughter. These two factors combine to reduce production, although they are offset by higher carcass weights reflecting both an incentive to hold

Figure 4.4: Beef Breeding Inventories, Canada, Alternative Stabilization Programs and Base Run 1965-1979 (Solid line is base run)

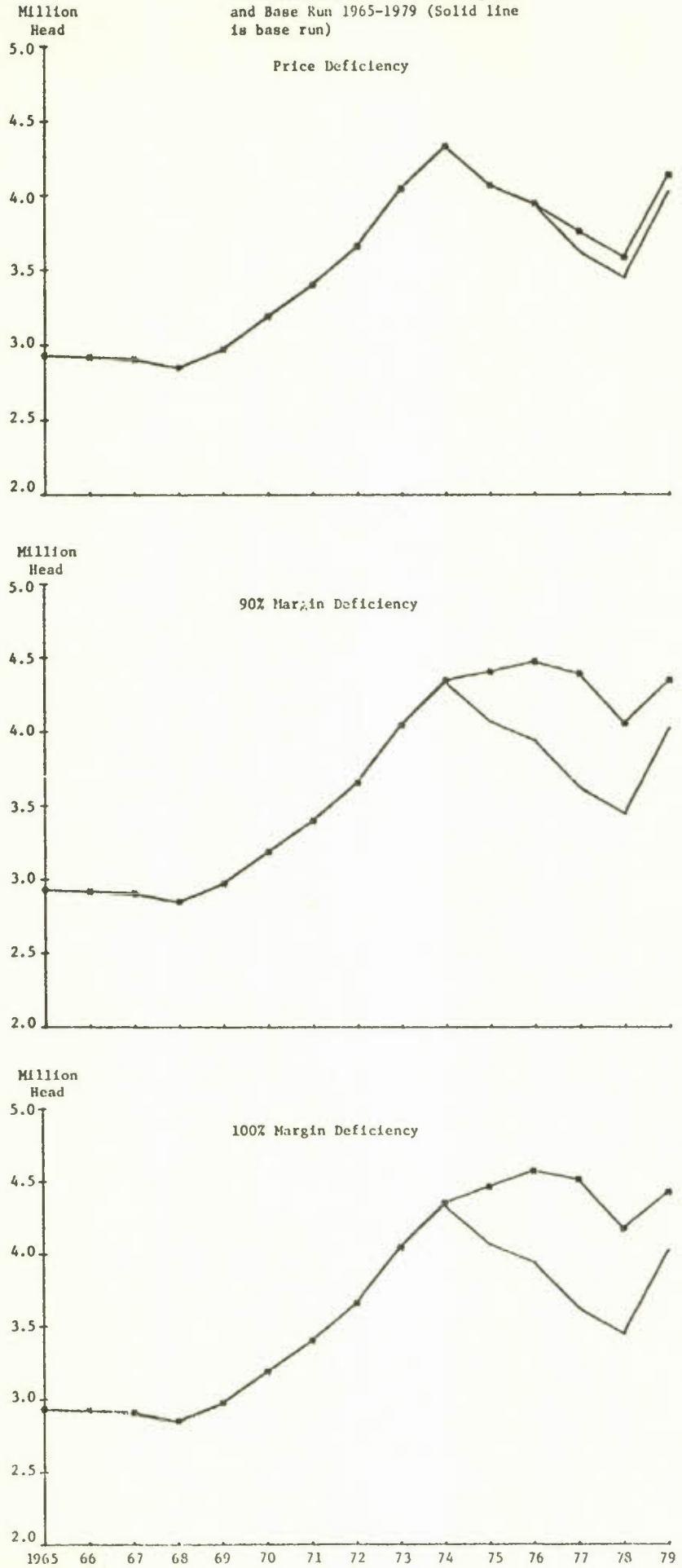
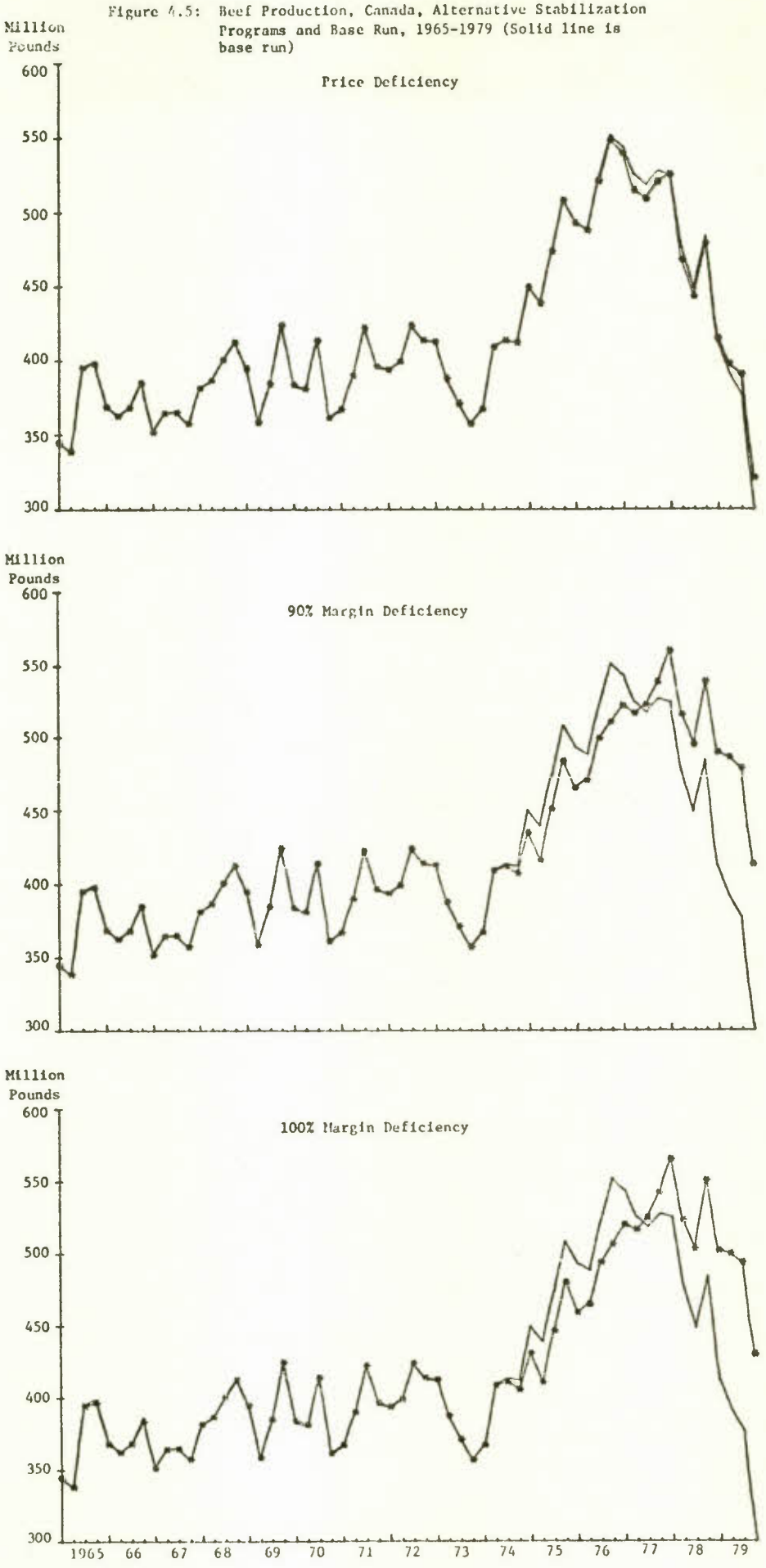


Figure 4.5: Beef Production, Canada, Alternative Stabilization Programs and Base Run, 1965-1979 (Solid line is base run)



cattle to heavier weights as well as a larger proportion of steers in the slaughter of this period.

From 1977 onward, beef supply increases with the margin deficiency programs. This reflects the larger calf crops which would have been produced from 1975 onward as well as increased cow slaughter as cows would have been culled from a larger breeding herd.

Clearly, margin programs would have stabilized beef production during the 1970's, as well as breeding inventories, feeder calf prices and feeding margins.

Effect on Market Prices for Steers

One concern often expressed about a Canadian stabilization program is that it would become too "rich" - i.e. the level of payments would be high enough to induce sufficient supply to force down market prices substantially. The margin programs analyzed here are certainly rich. Quarterly payments per hundredweight of cattle for these two programs and those for Eyvindson's GM-100 proposal [6] are presented in Table 4.1 during 1974-1977. The margin programs are clearly rich. As we have seen, these payments would have had impacts on both breeding inventories and beef production from 1974 through 1979. So what are the impacts on prices?

In Table 4.2 are the average quarterly market prices of steers at Calgary and Omaha generated for the base run and the 100 percent margin deficiency program, the richest of the programs analyzed here, from 1974 through 1979. These data indicate that steer prices at Calgary would have been higher with the stabilization program from 1974I through 1977II. The average difference in $1.20/cwt., or an increase of 3 percent over the base run. The maximum difference is approximately $4.00 per cwt. during the

second half of 1976, when cow slaughter would have been reduced sufficiently to nearly eliminate Canadian exports to the U.S.

Table 4.1: Quarterly Deficiency Payments per Cwt., Cattle 90 and 100 Percent Margin Deficiency Programs and GM-100, 1974-1977 ($/Cwt.)

		90% Margin	100% Margin	GM-100
1974	I	-	-	5.56
	II	7.75	9.57	9.22
	III	7.01	8.78	6.59
	IV	11.84	13.60	2.45
1975	I	18.58	20.32	10.16
	II	6.59	8.22	1.55
	III	4.77	6.33	-
	IV	5.63	7.20	-
1976	I	11.13	12.63	2.38
	II	7.04	8.52	.39
	III	11.05	11.65	5.88
	IV	7.42	8.84	5.25
1977	I	10.91	12.30	3.43
	II	2.75	4.09	.84
	III	1.22	2.68	.42
	IV	-	.55	-

After mid-1977, the margin deficiency program would have resulted in market prices which averaged $2.30 per cwt. or 4 percent less than the base run. The maximum impact would have occurred from mid-1978 onward, when prices averaged from $4-$6 per cwt. less, although one would expect similar impacts for several additional years as the supply response to stabilization payments during the mid-1970's work through the system.

An additional part of the concern with an overrich program is that the resulting supply response will encourage increased exports to the U.S. which will disrupt traditional trade patterns and affect the U.S.

Table 4.2: Average Quarterly Steer Prices, Calgary and Omaha, Base Run and 100 Percent Margin Deficiency Program 1974-1979

		Calgary		Omaha	
		Base	100 Percent Margin Program	Base	100 Percent Margin Def.
		($Cdn.)		($U.S.)	
1974	I	$45.15	$45.18	$45.56	$45.58
	II	39.75	39.79	40.66	40.69
	III	44.02	44.10	44.38	44.43
	IV	38.85	38.96	38.89	38.97
1975	I	35.85	36.12	35.90	36.11
	II	45.43	48.98	47.76	47.86
	III	46.48	46.86	48.37	48.68
	IV	43.57	43.91	46.14	46.44
1976	I	36.92	38.63	38.74	38.99
	II	38.78	40.32	41.25	41.37
	III	32.20	35.92	37.16	37.24
	IV	34.57	38.73	39.00	39.24
1977	I	34.91	35.17	37.90	38.14
	II	38.48	38.54	40.49	40.54
	III	40.36	39.16	40.33	40.26
	IV	42.74	42.44	42.54	42.32
1978	I	46.79	46.13	45.73	45.23
	II	59.50	57.10	54.91	54.42
	III	61.00	56.43	53.56	53.08
	IV	63.55	59.41	54.74	54.10
1979	I	78.47	73.80	66.97	66.03
	II	85.47	81.80	75.93	74.67
	III	80.85	75.22	69.62	68.41
	IV	89.77	83.91	76.70	75.34

The U.S. price levels in Table 4.2 suggest that this concern is groundless. From 1974 through mid-1977, the U.S. price level would have been marginally higher with the Canadian stabilization program. The maximum increase would have been $.31 per cwt. during the third quarter of 1975. Since Canada was, in fact, exporting large quantities of live cows and cow beef to the U.S. during this period and the stabilization program would have curtailed such exports, it is unlikely that the stabilization program would

have been an irritant to the U.S.

After 1977, U.S. prices would have been marginally lower with the stabilization program. The maximum impact is $1.36 per cwt., during 1979IV. Why the smaller impact on U.S. prices than Canadian prices? In the base run, the model's solutions were such that Western Canada was not exporting beef to the U.S. and prices at Calgary were well above the export floor. With the program, increased supplies were large enough to put Canada on an export basis, forcing Calgary prices to the export floor. The increased U.S. imports from Canada placed a small amount of downward pressure on U.S. prices.

Would this trade effect cause concern and possible retaliation from the U.S.? The question is, of course, unanswerable. However, since a) the negative impacts of the Canadian program did not occur until steer prices began to increase cyclically; b) the effects, at least through 1979, would have been less than $1.50 per cwt.; c) the U.S. was facing double digit inflation during 1978 and 1979 and; d) a counter cyclical beef import law was passed in the U.S. during 1979, one would hypothesize that Canada would have faced little danger of trade sanctions.

Prices Received By Producers and Feeding Margins for Hogs

Prices and feeding margins received by producers at Toronto, including deficiency payments, are presented for each program compared to prices and margins in the base run in Figures 4.6 and 4.7. The price and margin deficiency program would have made more and larger payments during the low price periods of 1967-68 and 1970-71, than would the margin deficiency programs. The reason for this is that, while hog prices were low during these periods, so were grain prices and feeding margins did not fall as much as hog prices.

Figure 4.6: Prices Received By Producers for Hogs, Toronto, Alternative Stabilization Programs and Base Run, 1965-1979 (Solid line is base run)

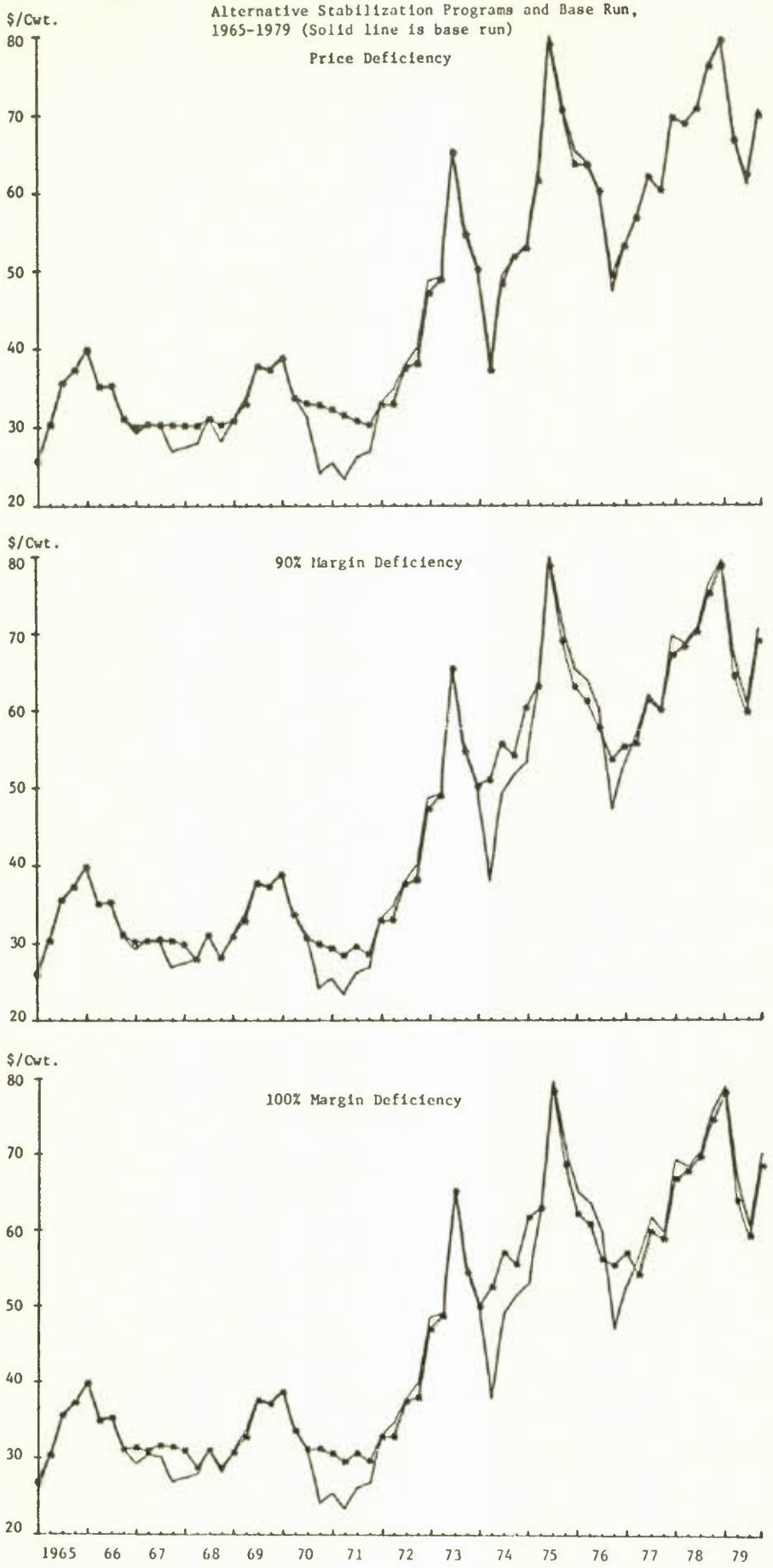
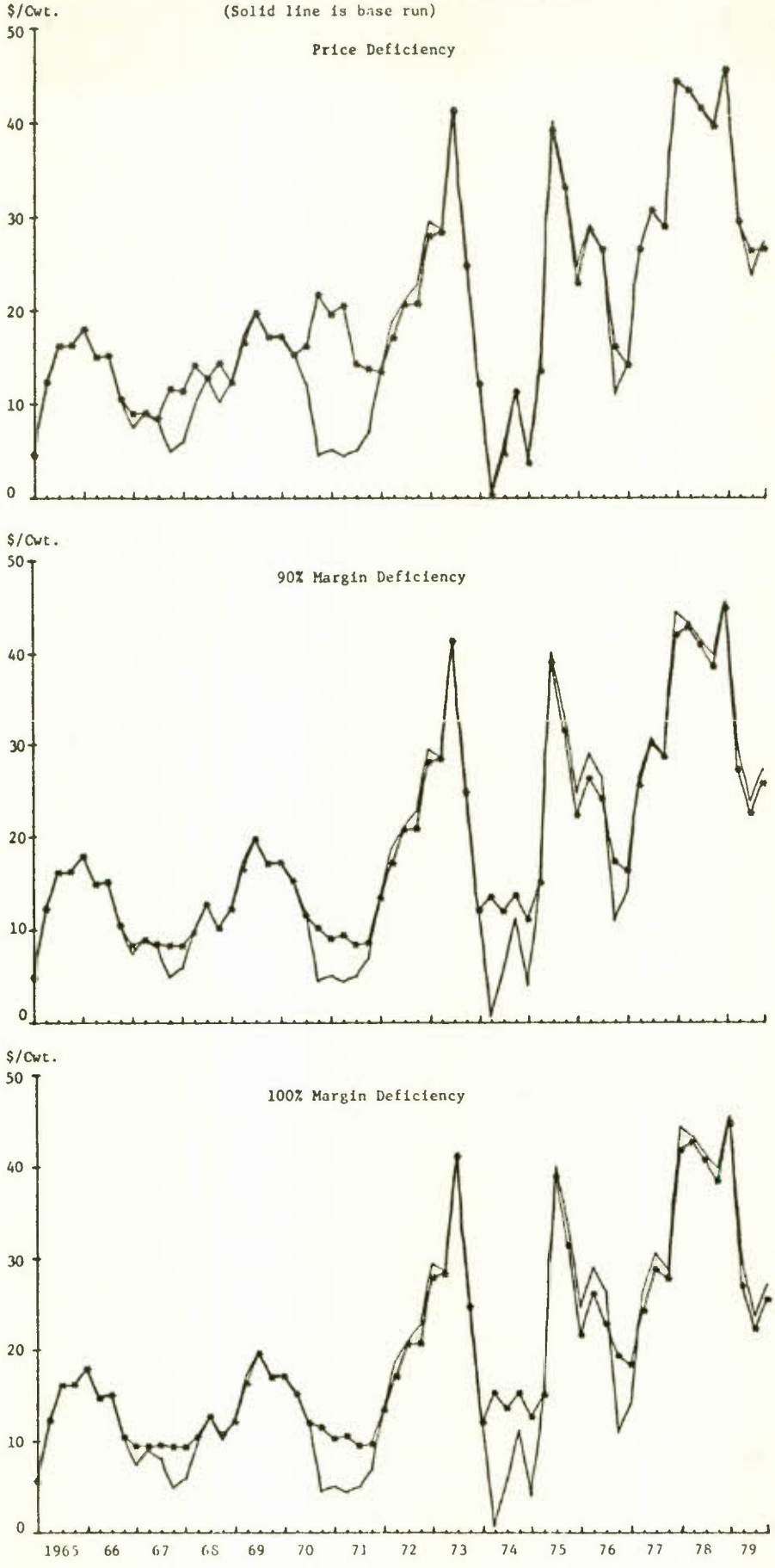


Figure 4.7: Feeding Margins for Hogs, Toronto, Alternative Stabilization Programs and Base Run, 1965-1979 (Solid line is base run)



However, the price deficiency program would have made only one small payment during 1974 ($.64 in 1974II) while the margin deficiency programs would have made substantial payments from 1974II through 1975I. During this period, hog prices did not drop substantially, but feed prices were extremely high causing feeding margins to be very low. A margin deficiency program would have provided support when profitability declined. The margin deficiency programs would also have made payments during 1976IV and 1977I when feeding margins were low.

Supply of Pork

The supply of pork would have been increased throughout the analysis after the first set of deficiency payments under each program (Figure 4.8). However, the price deficiency program would have had a major impact on production only during 1972-73 because of the large payments in 1970-71. The margin deficiency programs would have had major impacts on production in 1972-73, mid-1975 to mid-1977 and mid-1978 to early 1979, with the largest impact from 1975-1977. In each case, the majority of the increased supply would have reached the market during a period of high hog prices, approximately 1½ - 2 years after a period of low prices or feeding margins.

Effects on Market Prices

Because the deficiency payment programs would have increased Canadian pork supply during most of the period under analysis, market prices would have been slightly lower. Average quarterly prices at Toronto and Omaha are presented in Table 4.3 for the base run as well as each program. The maximum average impact is $.81/cwt. at Toronto and $.10 per cwt. in the U.S., with the 100 per cent margin program. The maximum impact of the 100 per cent margin program on market prices in a quarter is

Figure 4.8: Pork Supply, Canada, Alternative Stabilization Programs and Base Run, 1965-1979 (Solid line is base run)

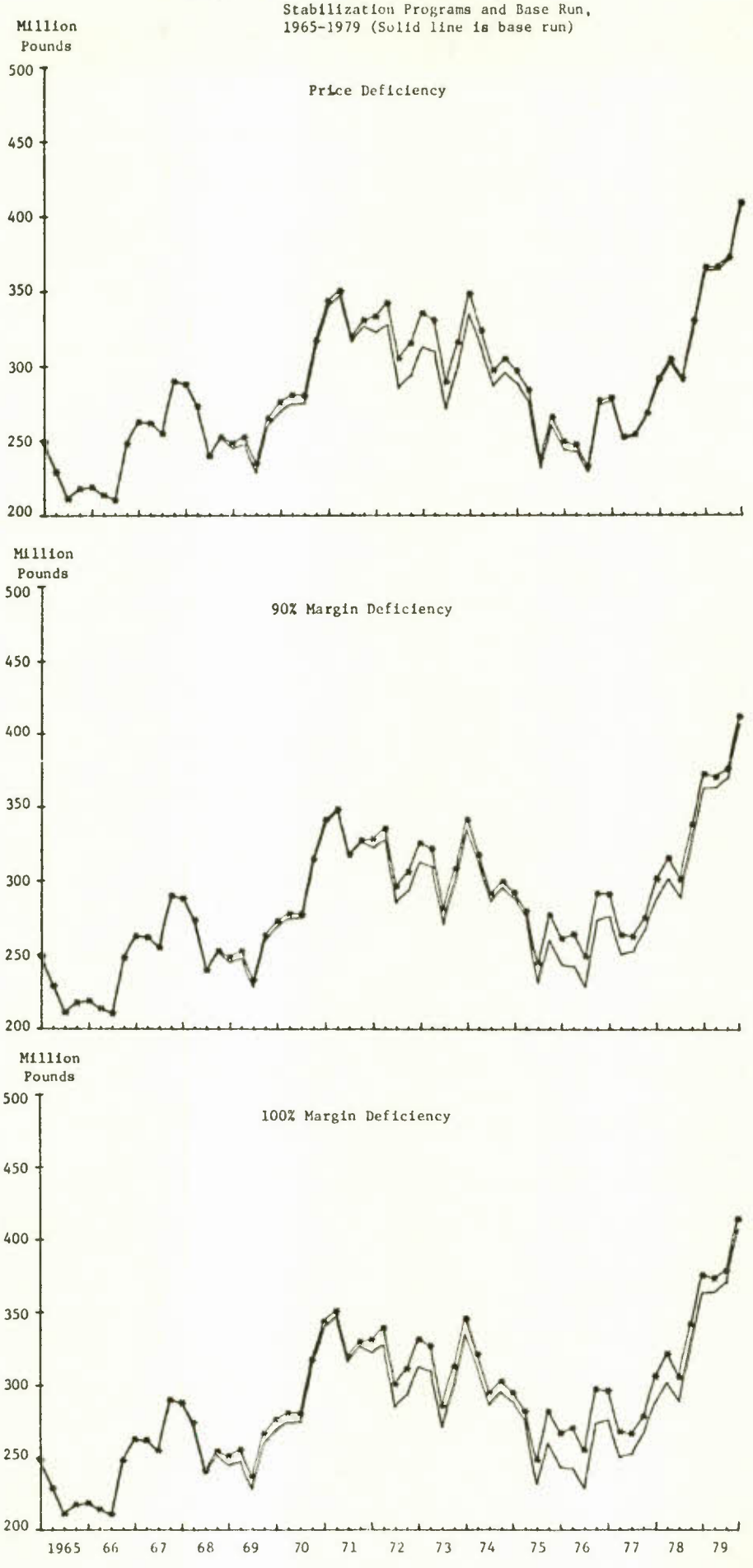


Table 4.3: Average Quarterly Market Prices for Hogs Toronto, and Omaha, Base Run and Deficiency Payment Programs, 1965-1979

	Toronto	Omaha
	($Cdn/Cwt. Carcass)	($U.S./Cwt, Live)
Base Run	$45.47	$32.05
90% Price Deficiency	45.11	32.01
90% Margin Deficiency	44.82	31.97
100% Margin Deficiency	44.66	31.95

estimated to be $3.64 per cwt. at Toronto during the third quarter of 1976 and $.50 per cwt. at Omaha during the first quarter of 1979. These maximum impacts represent a decline of five percent from the base run at Toronto and one percent at Omaha. To reiterate, the 100 percent margin program is extremely rich and has the largest impacts on production and prices. Even at this, the impacts on prices appear to be marginal.

Costs and Benefits of the Programs

In order to provide an estimate of the aggregate costs and benefits of the alternative programs, several measures were calculated. They are presented below on the basis of the average change per quarter from the base run for each program, and the ratio of benefits to costs for each category of benefits. Aggregate measures include: a) the average cost to government of deficiency payments; b) the average change in domestic production of beef and pork; c) the average change in gross revenue to beef and pork producers - this includes sales of slaughter steers, heifers, cows, bulls and hogs at the market prices generated for each program plus any deficiency payments made; d) the average change in consumer surplus from the consumption of pork

and beef; and e) the change in net trade balance for beef and pork with the U.S.

The first three lines of Table 4.4 contain average quarterly costs of the stabilization programs for beef, pork and in total. Beef production would on average have increased by less than one half million lbs. per million dollars of outlay for the beef stabilization program. However, the benefits in terms of increased production are substantially understated because the analysis was concluded at the end of 1979. Since most of the payments for cattle would have been made in 1974-1977, concluding the analysis at 1979 has two implications. First, the entire period of reduced female slaughter which would have resulted in larger breeding inventories is included in the analysis. This obviously reduced beef production from the base run. Second, the largest changes in breeding inventory, resulting from the stabilization programs, compared to the base run, would have occurred at the beginning of 1978 and 1979. The calf crops from these two years would not have been marketed by the end of 1979. Hence, the major impacts on Canadian beef production would not have occurred until 1980 and 1981. Furthermore, the impacts would continue thereafter. Given that there is little possibility of further payments under a beef program before the mid-1980's, the benefit/cost ratios for all the beef variables are grossly understated.

Despite this limitation, the benefit/cost ratios for total revenue relative to program expenditures for cattle are greater than one during the period of analysis. This occurs because producers would have received not only the payments, but also would have sold more at the relatively high prices which occurred after 1977.

Table 4.4: Average (Per Quarter) Costs and Benefits and Benefit/Cost Ratios of Alternative Stabilization Programs

	Price Deficiency	90% Margin Deficiency	100% Margin Deficiency
Costs:			
Deficiency Payments ($Mil./Qtr)			
Beef Cattle	2.69	14.64	17.38
Hogs	2.68	3.66	5.07
Total	5.37	18.30	22.45
Benefits:			
Beef Production (Mil.lbs/Qtr)			
Canada	0	4.9	5.7
Benefit/Cost Ratio (Mil. lbs/$Mil.)	0	.28	.33
Total Revenue from Slaughter Cattle Sales ($Mil/Qtr)			
West	2.24	14.28	16.24
East	.64	4.65	5.54
Canada	2.88	18.93	21.78
Benefit/Cost Ratio (Canada $Mil/$Mil)	1.06	1.29	1.25
Pork Production (Mil.lbs/Qtr)			
Canada	5.4	6.5	9.4
Benefit/Cost Ratio (Mil. lbs/$Mil.)	2.01	1.78	1.85
Total Revenue from Hog Sales ($Mil.)			
West	1.53	2.19	3.02
East	2.67	3.30	4.84
Canada	4.20	5.49	7.86
Benefit/Cost Ratio ($Mil./$Mil.)	1.57	1.50	1.55
Consumer Surplus ($ Mil.)			
Canada	.58	2.5	2.92
Benefit/Cost Ratio ($Mil./$Mil.)	.11	.14	.13
Net Trade with U.S.(Mil.lb/Qtr)			
Beef	-.2	4.4	5.3
Benefit/Cost Ratio (Mil.lb/$Mil.)	-.1	.3	.3
Pork	4.4	4.9	7.2
Benefit/Cost Ratio (Mil.lb/$Mil.)	1.6	1.3	1.4

Since deficiency payments would have been made for hogs throughout the period of analysis, the benefit/cost ratios are likely more representative than for beef, although the margin programs would have continued impacts on production beyond 1979. As can be seen, the benefit/cost ratios for gross revenues are 1.5 or higher for all three programs.

Benefit/cost ratios for consumer surplus are very low. This is not surprising since the Canadian beef and pork sectors are open. As has been indicated, any supply response resulting from a Canadian stabilization program would have little impact on market prices because it would either substitute for imported product or be exported. Hence, Canadian consumers gain little from such programs relative to their costs. While the benefit/cost ratios are likely understated because the major supply response for cattle would have occurred after 1979, it is hard to imagine that they exceed .20.

The latter point is well illustrated by the changes in trade with the United States. The averages represent reductions in net imports from the U.S. or increases in net exports to the U.S. The changes in trade resulting from the programs are nearly as large as the changes in production for both beef and pork. Hence most of the increased supply would substitute for imports or be exported. At the same time, the numbers indicate a very substantial improvement in Canada's trade balance.

5.0 SUMMARY AND CONCLUSIONS

This study has focused on the following factors. First, the nature of the market mechanism for beef and pork was described. Particular emphasis was placed on the nature of the production and price cycles for the two commodities, linkages to the world, and particularly, the U.S. markets and the impact, during the 1970's, of substantially increased and more variable grain prices. From this, the progression of policy responses made by the federal and provincial governments were described. Major emphasis was placed on the analysis of the current agricultural stabilization act as it affects the beef and pork sectors. It was concluded that the current program would not attain its objectives and the following five recommendations were made for improvement:

1. Base the level of support on margins net of variable cash costs.
2. Rules of the program should be made public and producers should know the support level before the fact.
3. For slaughter cattle and hogs, the program should be quarterly, not annual.
4. Eligibility limits for a producer should be standardized on the basis of production in earlier years.
5. Programs should be voluntary and could be contributory.

In conjunction with the analysis of the federal program, the fragmentary nature of provincial stabilization programs was briefly described, as were their potential political impacts. It was recommended that, if the foregoing suggestions regarding the federal program were accepted and the federal program was thereby made effective, provincial programs should be

phased out.

A second area of policy response has been import restrictions on cattle and beef. Like stabilization policy, trade policy for beef was fragmentary during the 1970's. However, toward the end of the 1970's, trade policy in Canada began to mirror that of the United States. In the interest of preserving a stable long-term trade relationship with the United States, it was recommended that a beef import law with restrictions on imports of manufacturing quality beef similar to that of the United States be adopted.

A third area of policy response that has been contemplated in some quarters for beef and pork, but has not been adopted is supply management. On the assumption that supply management for these commodities would be philosophically similar to existing supply management schemes for poultry products, four major limitations were presented. These are:

1. Supply management for beef and pork would be difficult and costly to implement.
2. Supply management, even if it was effective domestically would have little impact on domestic prices without import controls. Further, Canada would forgo the foreign exchange benefits of exports.
3. Supply management, taken as an alternative to an effective stabilization program, represents a regressive tax on consumers.
4. Supply management would have negative long term impacts on growth, export potential and secondary benefits for growth in the meat packing sector.

In the final section, quantitative estimates of the impacts over 12

years of three alternative stabilization programs were presented. These include quarterly programs under which deficiency payments are based on: 100 percent of the average market price in the previous five years; 90 percent of a margin above feed costs in the previous five years; and 100 percent of the margin above feed costs in the previous five years.

This analysis contributed the following information. First, the price deficiency program would not have added significantly to the stability of producers' profit margins. The margin deficiency programs would have provided support to beef producers during 1974-1977 and to hog producers during 1974 when profits were restricted primarily by feed prices. The price deficiency program would have contributed little and its contributions would have been much later.

As a result of the foregoing, a price deficiency program would have had less impact on production during the 1970's. It would have done little to reduce the rate at which the beef breeding herd was liquidated after 1975, while the margin programs would have reduced the rate of liquidation substantially. Similarly, the price deficiency program would have had only a small impact on pork production during 1975/76 when actual production was at a low level, while the margin deficiency programs would have had substantial impacts during this period.

While the margin deficiency programs were much more costly than the price deficiency program during the period analyzed, the results for hogs suggests that this may not always be the case. The price deficiency program would have resulted in larger payments than the margin programs during 1967/68 and 1970/71. During these periods both hog and feed prices were relatively low. Hence profitability did not

fall as much as prices - which is the reason for smaller payments by the margin triggered programs. The relatively greater costs of the margin programs occurred after 1973 when hog prices did not fall as much as did profitability because of high feed costs.

This outcome implies that government has a clear choice in deciding whether a stabilization program should focus on stabilizing prices of margins. In this writer's view, stabilizing the latter will have the greatest social returns. Thus the foregoing recommendations regarding changes in the Agricultural Stabilization Act.

All three stabilization programs would have had positive impacts on production of pork and beef, revenue generated by the pork and beef sectors and Canada's balance of trade with the U.S. Revenue benefits would have exceeded the program costs because the programs would have resulted in more product being marketed in periods of higher market returns after the stabilization payments would have been made. This occurs in turn because of the biological lags in the market which are included in the model.

The benefit/cost ratios presented likely understate the true ratios for several reasons. First, as has been noted, much of the supply response in beef from the payments during the mid-1970's would occur after 1979 when the analysis was concluded. Second, over time the programs, particularly the margin programs, would reduce the risk and uncertainty faced by producers. This in turn would be expected to shift supply functions to the right, thereby inducing a larger supply response to a given market price or payment. Hence, while the costs to the federal treasury of the margin programs likely are much higher than

those which can be reasonably expected under a proposal such as GM-100, the supply response may be nearly as great to GM-100 as to the programs analyzed here.

Third, the model used for the analysis includes only North American endogenously. With this, the market price effects of the program are marginal. In reality, a larger and more stable production pattern such as that produced in the model would allow more product to be exported to non-North American destinations. This would imply that additional product could be absorbed with even less impact on market prices than would occur in only the North American market. In this case the revenue generated and the trade impacts would be greater than those resulting from the analysis.

Fourth, no account is taken of the secondary benefits which would arise in the meat packing and feed milling sectors as a result of the increased beef and pork production resulting from the programs. And, of course, the third round multiplier effects of these sectors is also not included.

A fifth inference from the analysis is that benefits to Canadian consumers are small. Again this result obtains because much of the increased production induced by the programs would substitute for U.S. imports, or be exported, with small impacts on market prices. The relative benefits to producers and consumers arising from the programs underscores the suggestion made above, that any such program could include contributions by producers.

Throughout the foregoing analysis, the role of feedgrain markets in the livestock sector was addressed. Also, in discussing the costs of

instability, it was noted that the major costs are incurred when there are extreme fluctuations in the profitability of raising livestock and the resulting extreme adjustment thereto.

In retrospect, it is obvious that most of the extreme variations in livestock production during the 1970's occurred in response to highly variable grain prices or supply.[11] Hog production increased in record quantities during 1970/71 in response to low grain prices and surplus grain inventories in 1968/69. The beef breeding herd experienced record large liquidation from 1975-1977 because of record high grain prices in 1974 and 1975. Hog production declined by the largest proportion on record from 1973-1975 because of high grain prices. The very substantial increase in hog production after 1976 can be in part attributed to declining grain prices, although, as noted in section 2.0, other factors contributed.

These relationships imply that any attempt to stabilize the livestock sector must necessarily take into account the instability of the grain sector. This can be accomplished by cushioning the effects of variations in the grain sector, as in the margin stabilization programs analyzed here. Or, alternatively, the livestock sector could be stabilized by an international program which stabilized the grain sector.

FOOTNOTES

1/ During the late 1960's and early 1970's, Canadian steer slaughter did not correspond directly to lagged inventories because of an expansion in feedlot capacity in Western Canada which reduced exports of feeder calves and cattle to the U.S.

2/ This is calculated rather crudely by assuming that 800 lbs. of feed are required to produce one hundred lbs. of steer. The cost of 800 lbs. of corn is then deducted from the price per cwt. of steers to obtain the feeding margin.

3/ 1978 presents a clear exception to this generalization. Hog prices rose that year, in spite of increased pork supply. This occurred because: 1) Canadian and U.S. prices are closely tied (see below) and U.S. production did not increase in 1978; 2) as we have seen, beef prices increased in 1978 lending support to hog prices.

4/ This is assuming exchange rate parity. If the Canadian dollar is worth less than the U.S. dollar, Canadian prices will be higher than the above in Canadian currency.

5/ The difference between the Saskatchewan Commission and the marketing boards in other provinces is that Directors are appointed by the provincial government in Saskatchewan while they are elected in the other provinces. The remaining comments below regarding provincial marketing boards apply also to the Saskatchewan Commission.

6/ Examples are used here from the beef stabilization program because payments have been triggered for hogs under the amended A.S.A. only in 1980.

7/ The historian Toynbee is purported to have said that the major lesson one learns from a study of history is that people fail to learn the lessons of history, or words to that effect.

8/ This writer had occasion to speak at several county beef producers meetings in Ontario during 1975-1977. A question asked many times was, "what do you think the government payment will be this year?" The speaker had no more idea than the audience!

9/ The bracketed phrase is mine.

10/ Reviewers of earlier drafts of this paper contend that many of the problems of supply management discussed in this section could be overcome with experience. Of the four points discussed, I would concede that effective control of pork supply may be possible over time. I am not convinced that control of beef supply is feasible. Beef production is accomplished by relatively extensive operations, distributed over great amounts of space, and conducted under heterogeneous technology by quite individualistic people. The costs of attempting to control it would have to be fantastic.

I cannot but reject the comment on the remaining points. So long as supply management is conducted by producers on their own behalf, it leads inexorably to a loss of export markets, can have little impact on market prices without import restriction and has negative long-term secondary impacts on the economy and ancillary industries. The only way that more positive impacts would result is if supplies were managed by a public agency for the public benefit.

11/ The exception to this was the record increase in beef breeding herds in 1973 and 1974, in response to the U.S. ceiling on retail meat prices.

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APPENDIX I

Political Events Affecting the Beef Sector 1974-1976

1974 Events:

January 13	Canadian government reduces import surcharge on live cattle to 2 cents per pound and 4 cents per pound on fresh and frozen beef.
January 27	Canadian government reduces import surcharge on live cattle to 1 cent per pound and 2 cents per pound on fresh and frozen beef.
February 10	Canadian government eliminates import surcharge on live cattle and fresh and frozen beef.
March 18	Canadian government implements Beef Quality Premium Program of 7 cents per pound liveweight on Canadian cattle for Canadian consumption grading A1&2 retroactive to March 4, 1974.
April 1	Canadian government amends Beef Quality Premium to cover all slaughter cattle that grade A, B, or C on the basis of 5 cents per pound liveweight. Program excludes cows and mature bulls.
April 9	Canadian government establishes import certification program for dressed beef, lamb or mutton and live cattle and sheep indicating the meats and animals have not been treated with the hormone Diethylstilbestrol (DES).
April 29	Canadian government reduces Beef Quality Premium program to 3 cents per pound liveweight for all slaughter cattle grading A, B, or C.
August 2	Canadian government and United States government agree on Diethylstrilbestrol (DES) certification programs to allow entry of U.S. beef and cattle into Canada.
August 2	Canadian government announces Beef Stabilization Program commencing August 12 to August 11, 1975.
August 2	Canadian government announces a global import quota effective August 12, 1974 to August 11, 1975 of 82,835 head of live beef cattle and 125.8 million pounds of fresh and frozen beef and veal equivalent to the preceding 5 year average of imports.

August 12	Canadian government begins phase-out of Beef Quality Premium by reducing premium to 2 cents per pound for live cattle grading A, B, or C.
August 19	Canadian government reduces Beef Quality Premium to 1 cent a pound for live cattle grading A, B, or C.
August 25	Canadian government terminates Beef Quality Premium program.
November 16	United States government announces import quotas on Canadian live cattle (17,000 head) live hogs (50,000 head) beef and veal (17 million pounds) and pork (36 million pounds) for the year August 12, 1974 to August 11, 1975.
December 13	Canadian government announces Cow Beef Stabilization Program for November 16, 1974 to April 30, 1975.
December 13	Canadian government announces Ground Beef Promotion Program.
December 13	Canadian government announces the planned extension of Beef Stabilization Program past August 1975.
December 13	Canadian government announces establishment of a Food Aid Program, the product to be known as Canadian Beef Loaf packed in 12-ounce cans labelled "Gift of Canada".

1975 Events:

April 30	Canadian Cow Beef Stabilization Program which commenced November 16, 1974, terminates.
May 9	Canadian government announces the deficiency payment of $5.08 per hundredweight under the Cow Beef Stabilization Program covering the period November 16, 1974, to April 30, 1975.
August 7	Canadian government announces the removal of import controls on live slaughter cattle.
August 7	United States government announces the removal of import quotas on Canadian live cattle, hogs and dressed pork.
August 11	Canadian government announces quota on the level of dressed beef imports into Canada from all countries for the period August 12 to December 31, 1975.

Appendix II

The equations estimated for the beef-pork simulation model are presented in this section. The equations were estimated with data from 1962-1979. All demand for consumption and demand for stocks equations were estimated simiultaneously within a region using two stage least squares, while all production and supply equations were estimated using ordinary least squares.

Table II.1 Beef Demand Equations* (t-values in parentheses)

	Constant	Quarter 1	Quarter 2	Quarter 3	Hog Price	Log of Per Capita Disposable Income	Steer Price	D.W.
U.S.A.	15.28 (33.52)	-.04 (-.12)	.52 (1.62)	1.00 (3.10)	.04 (1.89)	15.31 (19.00)	-.34 (-13.13)	.73
Western Canada	16.90 (47.01)	-.43 (-1.48)	.24 (.80)	.82 (2.79)	-.01 (-.57)	9.95 (16.00)	-.23 (-11.54)	.78
Eastern Canada	16.67 (53.46)	-.26 (-1.05)	.09 (.37)	.76 (3.09)	.01 (.84)	9.50 (17.98)	-.21 (-13.82)	1.05

* Meaningful R^2 cannot be calculated because of simultaneous estimation.

Table II.2 Demand for Stocks of Beef Equations* (t-values in parentheses)

	Constant	Quarter 1	Quarter 2	Quarter 3	Offshore Imports	Trans-actions Demand	"Nixon" Dummy	Steer Price	Lagged Dependent Variable	D.W.
U.S.A.	1.70 (.08)	-42.14 (-3.92)	-62.39 (-5.92)	-74.84 (-7.27)	.25 (4.88)	.02 (3.10)	91.03 (4.25)	-1.82 (3.24)	.67 (9.08)	1.41
Western Canada	-.92 (-.62)	-1.25 (-1.59)	-3.74 (-4.93)	-4.25 (-6.59)		.09 (4.26)		-.01 (-.19)	.45 (4.48)	1.79
Eastern Canada	.23 (.04)	-4.87 (-2.47)	-10.06 (-5.31)	-12.61 (-6.76)	.32 (6.68)	.04 (1.28)		.09 (1.16)	.57 (9.37)	1.76

* Meaningful R^2 cannot be calculated because of simultaneous estimation.

Table II.3 Heifer and Steer Supply Equations (t-values in parentheses)

	Constant	Quarter 1	Quarter 2	Quarter 3	"Nixon" Dummy	Cow Inventory (lagged 8)	Corn Price (lagged 4)	R^2	D.W.
U.S.A.	-1350.6 (-4.95)	61.24 (.70)	203.2 (2.29)	302.7 (3.52)	-1023.1 (-5.16)	.23 (19.59)	-614.76 (-5.84)	.93	1.49
							Grain Stocks (lagged 4)		
Western Canada	-50.62 (-3.18)	16.28 (1.97)	.63 (.08)	23.99 (3.08)	-28.18 (-1.58)	.16 (12.43)	.34 (5.19)	.92	1.77
							Feed Availability (lagged 4)		
Eastern Canada	85.94 (5.64)	5.92 (.88)	35.30 (5.10)	26.07 (3.93)	-62.90 (-4.19)	.25 (3.49)	.01 (1.19)	.68	1.50

Table II.4 Cattle Carcass Weight Equations (t-values in parentheses)

Table II.9 Ending Stocks of Pork Equations (t-values in parentheses)

	Constant	Quarter 1	Quarter 2	Quarter 3	Steer Price (lagged 3)	Corn Price (lagged 3)	Carcass Weight (lagged 1)	R^2	D.W.
U.S.A.	211.67 (5.19)	3.46 (1.29)	-3.61 (-1.28)	-13.59 (-4.85)	1.18 (5.63)	-12.97 (-5.31)	.63 (8.85)	.91	1.85
					(lagged 2)	Barley Price (lagged 2)			
Western Canada	211.77 (4.88)	8.86 (3.21)	2.05 (.69)	-8.30 (-2.78)	.80 (5.07)	-.24 (-3.56)	.59 (7.18)	.81	1.98
					(lagged 2)	(lagged 2)			
Eastern Canada	210.28 (4.99)	9.10 (3.33)	.48 (.17)	-9.53 (-3.30)	.92 (5.26)	-.28 (-3.87)	.60 (7.48)	.83	2.11

Table II.5 Cow and Bull Slaughter Equations (t-values in parentheses)

	Constant	Quarter 1	Quarter 2	Quarter 3	Feeder Calf Price	Breeding Inventory	Lagged Dependent	R^2	D.W.
U.S.A.	-1598.8 (-3.80)	-394.6 (-7.25)	-266.5 (-4.89)	2.25 (.04)	-7.74 (-2.84)	.05 (4.59)	.77 (15.06)	.91	1.85
Western Canada	-7.70 (-.38)	-45.56 (-6.15)	-53.25 (-8.11)	-26.95 (-4.01)	-1.43 (-3.41)	.04 (4.27)	.43 (4.20)	.73	1.93
Eastern Canada	99.89 (1.52)	-34.9 (-8.88)	-23.46 (-6.89)	-12.50 (-3.61)	-.36 (-1.46)	-.02 (-.76)	.67 (6.59)	.72	1.76

Table II.6 Feeder Calf Price Equations (t-values in parentheses)

	Constant	Quarter 1	Quarter 2	Quarter 3	Steer Price	Corn Price (lagged 2)	Lagged Dependent	R^2	D.W.
U.S.A.	-4.17 (-3.75)	2.55 (2.96)	1.51 (1.71)	-.70 (-.81)	.82 (10.53)	-5.91 (-8.64)	.64 (13.84)	.98	1.17
						Barley Price			
Western Canada	-.98 (-.57)	-.78 (-.56)	-1.43 (-1.01)	-2.31 (-1.65)	.87 (6.60)	-.19 (-5.09)	.54 (6.61)	.96	1.31
Eastern Canada	1.60 (1.13)	.29 (.27)	-.11 (-.10)	-2.94 (-2.69)	.73 (8.62)	-.16 (-6.90)	.60 (9.86)	.97	1.66

Table II.7 Beef Cow Inventory Equations (t-value in Parentheses)

	Constant	Weighted Feeder[1] Calf Price	Lagged Dependent	R^2	D.W.
U.S.A.	6200.51 (2.83)	92.77 (2.08)	.75 (9.80)	.93	.39
Western Canada	307.48 (2.29)	14.22 (3.28)	.73 (9.74)	.96	.58
Eastern Canada	49.49 (1.79)	4.70 (4.68)	.66 (9.21)	.97	.68

[1] Weights:

	Previous Year		Current Year	
	Quarter 3	Quarter 4	Quarter 1	Quarter 2
U.S.A.	.17	.43	.25	.15
Canada	.08	.62	.16	.14

Table II.8 Pork Demand Equations* (t-values in parentheses)

	Constant	Quarter 1	Quarter 2	Quarter 3	"Nixon" Dummy	Steer Price	Lag of Per Capita Disposable Income	Hog Price	D.W.
U.S.A.	-14.32 (45.57)	-.50 (-2.74)	-1.19 (-6.60)	-.95 (-5.13)	1.62 (3.55)	.08 (5.75)	5.51 (8.20)	-.27 (-10.59)	1.21
Western Canada	11.89 (70.66)	-.33 (-2.42)	-.92 (-6.59)	-.72 (-5.30)		.07 (9.60)	3.58 (9.55)	-.14 (-11.49)	1.55
Eastern Canada	12.42 (60.67)	-.22 (-1.47)	-.80 (-5.18)	-.66 (-4.32)		.07 (7.65)	4.36 (10.92)	-.16 (-13.06)	1.30

* Meaningful R^2 cannot be calculated because of simultaneous estimation.

Table II.9 Ending Stocks of Pork Equations* (t-values in parentheses)

	Constant	Quarter 1	Quarter 2	Quarter 3	Hog Price	Lagged Dependent	D.W.
U.S.A.	123.6 (4.77)	-1.46 (-.11)	-30.81 (-1.98)	-136.4 (-8.54)	-.25 (-.59)	.71 (8.03)	1.86
Western Canada	2.76 (2.36)	2.68 (3.03)	.07 (.08)	-5.83 (-5.94)	.01 (.13)	.78 (9.91)	1.98
Eastern Canada	1.05 (.86)	4.29 (4.86)	1.19 (1.26)	-3.15 (-3.35)	.04 (1.76)	.76 (9.94)	1.95

August 11	Canadian Beef Stabilization Program which commenced August 12, 1974, terminates.
September 22	Canadian government announces the deficiency payment of 0.48¢ per hundredweight under the Beef Stabilization Program covering the period August 12, 1974, to August 11, 1975.
October 23	Canadian government announces a Beef Stabilization Program for the period August 12, 1975, to December 31, 1975.
December 31	Canadian Beef Stabilization Program which commenced August 12, 1975, terminates.
December 31	United States government terminates import quotas on dressed beef and veal.
December 31	Canadian government terminates import quotas on dressed beef and veal.

1976 Events:

July 7	The Canadian Government announced a price agreement with the Governments of Australia and New Zealand related to shipments of beef and veal into Canada.
October 9	The United States Government, under the Meat Import Law, limited the total quality of fresh, chilled, or frozen meat that may be imported into United States during calendar year 1976 to 1.23 billion pounds.
October 18	The Canadian Government announced an import permit plan applied to all countries limiting the volume of beef and veal imports, from October 17, 1976 to year end to 17.5 million pounds.
December 23	The Canadian Government announced import restrictions on fresh, chilled and frozen beef and veal into Canada from the United States, Australia and New Zealand to a level of 144.75 million pounds in 1977.
December 23	Canadian Government announced export restrictions of beef and veal to the United States to a level of 75 million pounds in 1977.

1977 Events:

January 4	Minister of Agriculture announced details of a federal cow-calf stabilization program for 1977 estimated to cost $70 million.

January 25	The Minister of Agriculture announced the 1976 stabilization program for slaughter cattle.
February 28	Minister of Agriculture announced further details of the 1976 support program for slaughter cattle.
April 29	Minister of Agriculture says the first cheques are now being sent to beef producers for the 1976 slaughter cattle stabilization program.
July 18	Minister of Agriculture announced that new import restrictions have been imposed by the United States on Canadian cattle.