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Technical Report No. E/I 2
**The Economics of Canadian Dairy
Industry Regulation**

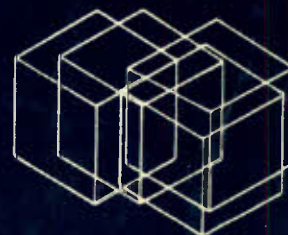
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TECHNICAL REPORT NO. E/I 2

THE ECONOMICS OF CANADIAN DAIRY
INDUSTRY REGULATION

by

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Department of Agricultural Economics
University of British Columbia



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.

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

* Already published

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Résumé

La production laitière est la troisième plus importante source de recettes agricoles marchandes au Canada. Au cours des dernières années, la croissance des marchés de la plupart des produits laitiers a été à peu près nulle. La productivité de ce secteur s'est lentement améliorée, mais le Canada accuse un retard considérable par rapport à de nombreux pays industrialisés, et au cours de la dernière décennie, l'écart à ce chapitre entre les États-Unis et le Canada s'est encore élargi. Les revenus nets des producteurs laitiers canadiens sont plus stables, mais moins élevés que les revenus moyens des autres agriculteurs. Depuis plus de trente ans, le nombre de fermes laitières a constamment diminué.

Le marché du lait de transformation est réglementé par des politiques fédérales mises en oeuvre par la Commission du lait. Elles visent notamment à recommander les prix du lait, à soutenir les prix du beurre et de la poudre de lait écrémé, à assurer l'administration des quotas accordés aux producteurs (en coopération avec les offices de commercialisation provinciaux) en vue de limiter la production, de distribuer des subventions directes aux producteurs, et d'exercer diverses fonctions commerciales. Au Canada, les marchés du lait de consommation

sont réglementés par les gouvernements provinciaux, ordinairement par le truchement d'offices de commercialisation. Normalement, les prix sont établis au moyen d'un régime de prix imposés, qui permet la discrimination des prix des produits laitiers afin d'assurer de meilleurs prix pour le lait de consommation.

Les régimes de réglementation fédéraux et provinciaux provoquent dans l'industrie laitière, des distorsions dans le mouvement des ressources qu'elle absorbe, de sorte qu'il en résulte une perte de bien-être (ou de productivité) de plus de 20 millions de dollars par année. Outre ces pertes sociales, la politique laitière canadienne entraîne des transferts de revenus considérables : les contribuables financent la réglementation laitière au rythme d'environ 300 millions de dollars par année par le truchement de subventions directes aux producteurs laitiers qui bénéficient également d'un transfert de revenus d'environ 670 millions de dollars; mais dans ce groupe, les sommes versées vont dans une large mesure à ceux qui éventuellement vendent leurs quotas de lait de consommation ou de lait de transformation. Ceux qui les achètent subissent une perte qui annule dans une large mesure les avantages que la réglementation aurait pu leur valoir; les consommateurs de produits laitiers enregistrent une perte de transferts de revenus de près de 700 millions de dollars; outre-mer, les consommateurs de nos produits laitiers excédentaires tirent profit de notre

programme laitier, car ils peuvent acheter ces produits à des prix inférieurs à leur coût.

L'auteur conclut que les producteurs laitiers bénéficient grandement de la réglementation laitière actuelle, mais que pour leur part, les consommateurs et les contribuables sont sérieusement lésés par ces programmes. Il analyse l'effet de six politiques de rechange par rapport à la réglementation actuelle et montre que la présente orientation de la politique laitière fédérale crée des pertes sociales de plus en plus grandes du fait que la valeur réelle de la subvention directe diminue et que le fardeau financier revêt la forme de prix de soutien plus élevés pour le beurre et la poudre de lait écrémé.

Enfin, l'auteur présente cinq recommandations générales sur la politique laitière : réduire la taille actuelle de l'industrie laitière au Canada; modifier le mécanisme actuel de fixation des prix du lait de transformation; à l'échelle fédérale, calculer la valeur du lait de transformation non plus d'après les prix de soutien, mais plutôt d'après les subventions directes; mieux répartir les avantages du programme laitier actuel entre les producteurs de lait; et enfin, modifier le processus d'élaboration de la politique laitière.

SUMMARY

Milk production is the third largest contributor to farm cash receipts in Canada. Markets for most milk products have shown little or no growth in recent years. Dairy production productivity performance has been slowly increasing, but Canada lags well behind many developed countries and the gap between productivity performance in the U.S. and Canada has increased over the past decade. Net incomes of Canadian dairy farmers are more stable but lower than average incomes of other farmers. There has been an unabated decline in the number of dairy farms for over thirty years.

The industrial milk market is regulated by federal government policies through the agency of the Canadian Dairy Commission. These policies include recommending milk prices, supporting prices for butter and skim milk powder, administering producer quotas (in cooperation with the provincial marketing boards) to limit production, distributing direct subsidy payments to producers, and undertaking certain trade and marketing functions. The fluid milk markets across Canada are regulated by provincial governments, usually through provincial milk marketing boards. Prices are, typically, set by a system of administered prices, which allows the practice of price discrimination in milk products to provide higher prices for fluid milk.

The federal and provincial regulatory programs in the dairy industry cause distortions in the flow of resources to and within the industry such that a welfare (or productivity) loss is incurred of over \$20 million per year. In addition to these welfare losses, there are substantial income transfers associated with dairy policy in Canada: taxpayers fund dairy regulations to the tune of around \$300 million per year through paying direct subsidies to dairy producers, dairy producers benefit by an income transfer gain of about \$670 million, although within this group the benefits largely fall to those

who eventually sell their fluid milk and/or industrial milk quotas. Purchasers of their quota suffer an offsetting loss to leave them largely devoid of any regulatory benefits; consumers of milk products suffer an income transfer loss of almost \$700 million; and overseas consumers of Canada's surplus milk products benefit from the dairy program by being able to purchase dairy products at below their cost.

Barichello concludes that while milk producers benefit handsomely from present dairy regulation, milk product consumers and taxpayers are seriously harmed by such programs. He analyses the impact of six alternative policies compared to the present system of regulation and shows that the current direction of federal dairy policy is creating increasingly greater welfare losses as the real value of the direct subsidy declines and the burden is shifted into higher support prices for butter and skim milk powder.

Five general recommendations on dairy policy are presented: the current size of the dairy industry in Canada should be reduced; the present mechanism for pricing industrial milk should be changed; federal industrial milk should be moved away from the use of price supports and more toward use of the direct subsidy; the benefits of the current dairy program should be redistributed among milk producers; and the process by which dairy policy is formed should be changed.

CHAPTER I

INTRODUCTION

Government regulation of the Canadian dairy industry extends as far back as the 1930's, and this report is another attempt to communicate and analyze that regulation. It is spawned by the general criticism of regulation throughout the economy which has generated the Regulation Reference, and its objective is to describe and quantify the costs and benefits of milk industry regulations.

Today, government involvement has permeated the dairy industry. Milk output, allocation and pricing are all determined by a complex of regulatory instruments, and these have been devised by both federal and provincial levels of government.

In good part because of the protection afforded by this regulation, the dairy industry has assumed an important position in terms of its substantial size. Milk production accounts for thirteen percent of Canadian farm cash receipts (Statistics Canada, 1980), dairy farmers number eighteen percent of all farmers (Statistics Canada, 1976 Census of Canada, Agriculture: Canada), and the milk production and processing sectors together account for about one percent of Canadian gross national product (Stonehouse, 1979). On the consumption side, Canadians spend almost one-sixth of their total food budget on milk and dairy products (Stonehouse, 1979), most of which are produced in Canada.

When the industry is as large as this, its extensive regulation can be expected to have important effects on the national economy. However, in this particular case the regulation has, as well, a profound effect on the Government of Canada because of the large government expenditures it incurs.

On the basis of these taxpayer costs alone, the dairy industry is unique in Canadian agriculture. A larger proportion (30 percent) of

the federal agriculture budget is spent on this industry than on any other farm commodity.¹ When government expenditures are considered relative to the size of the industry (in terms of farm cash receipts), the federal government contribution to the dairy industry is startling. On this relative basis, it contributes more than twice as much to the dairy industry (25 percent) than to the next largest recipient group, the grain sector (10 percent).

Consequently, there are strong reasons for investigating the effects of this expensive and complex regulatory package. Although the taxpayer costs are evident and large, the effects on national productivity or national income, milk producers, and milk consumers may also be large but are presently not known with any accuracy. Curiously, such an investigation has apparently not been previously undertaken for Canada and this study is an attempt to fill that gap.

The objective of this analysis is to identify, as far as possible, the various effects of these several policy instruments. Whenever feasible, quantitative measurement of the effects, the costs and benefits, will be undertaken. Otherwise, the qualitative effects will be simply pointed out but not precisely quantified. When measurement is feasible, the effects of the regulation will be summarized to two groups of estimates, the social efficiency or national productivity effects, usually noted as welfare costs, and the distributional effects, noted as transfers. The welfare costs will give us a measure of one element of the price or cost to the country of following a particular policy. The transfers occasioned by that policy will offer a measure of who gains, who loses and by how much.

The scope of this study is necessarily limited to the more important elements of regulation, including only the major policy instruments of the National Supply Management Program and some provincial fluid milk programs. Many detailed elements of these programs

¹ Even when all grain production is summed, federal government expenditure on this total grain sector (including the Western Grain Stabilization Act, accounting for 29 percent of all federal agriculture spending) is still less than on the dairy industry. These data are calculated from Brinkman (1980), Table 41.

will not be addressed, and many other regulations of Agriculture Canada, covering health standards and product grading, for example, will be ignored. Similarly, because the data used for the analysis have numerous limitations, the results should be interpreted with some caution. Although many of the results are quite robust, they should be treated as only approximately accurate rather than precisely measured. Future estimates of these costs and transfer will likely permit substantial refinement.

The report begins in Chapter II with a description of various characteristics of the Canadian dairy industry. These include price and production patterns, income levels and changes in the number of dairy farmers. Chapter III reviews the development of Canadian dairy policy and describes key elements of the present regulatory framework for fluid and industrial milk production. In addition, some mention is made of policy objectives and participants in the policy formation process. The economic effects of present regulation are analyzed in Chapter IV and these include estimates of welfare costs and transfers generated by federal industrial milk policy and provincial fluid milk regulation. These results are evaluated and alternative regulations are considered in Chapter V. Finally, Chapter VI offers a summary of the report with a variety of recommendations for future policy directions.

CHAPTER II

THE STRUCTURE AND CHARACTERISTICS OF THE DAIRY INDUSTRY

There can be no question that the dairy industry is an important component of Canadian agriculture, whether one is concerned with the physical number of farm operators engaged in producing milk or with the market value of milk production. This industry is also important to consumers for nutritive and budgetary reasons and to taxpayers for their large contributions to its economic health. But the purpose of this chapter is to illustrate various characteristics of the dairy industry in the context of the agricultural sector.

One of every eight dollars of farm cash receipts in Canada comes from the sale of dairy products (Statistics Canada, 1980, p. 31). This makes milk the third largest contributor to farm revenue among agricultural commodities, exceeded only by beef and grain production. In 1979, dairy product sales across Canada accounted for a total of \$1.723 billion in farm cash receipts. Important as this sales volume is in the aggregate, these numbers mask the unequal distribution and importance of dairying in the various provinces, shown for 1976 in Figure 1. Almost three-quarters of this production occurs in Ontario and Quebec, with Quebec leading all provinces in the value of milk production at \$644 million. Within Quebec, dairying occupies a position of particular importance. Although 12.6 percent of all farm revenues in Canada arise from the sale of dairy products, in Quebec, 35.9 percent of farm receipts come from dairying, making milk production relatively more important in Quebec than in any other province. In contrast, dairy products account for less than four percent of farm receipts in the Prairie provinces.

The 1976 Census of Canada (Statistics Canada, 1976 Census of Canada, Agriculture: Canada, Table 31) offers more detail. In that year, among those farms with sales of at least \$2500, 47,924 farm operators were classified as dairy farmers. This represented almost

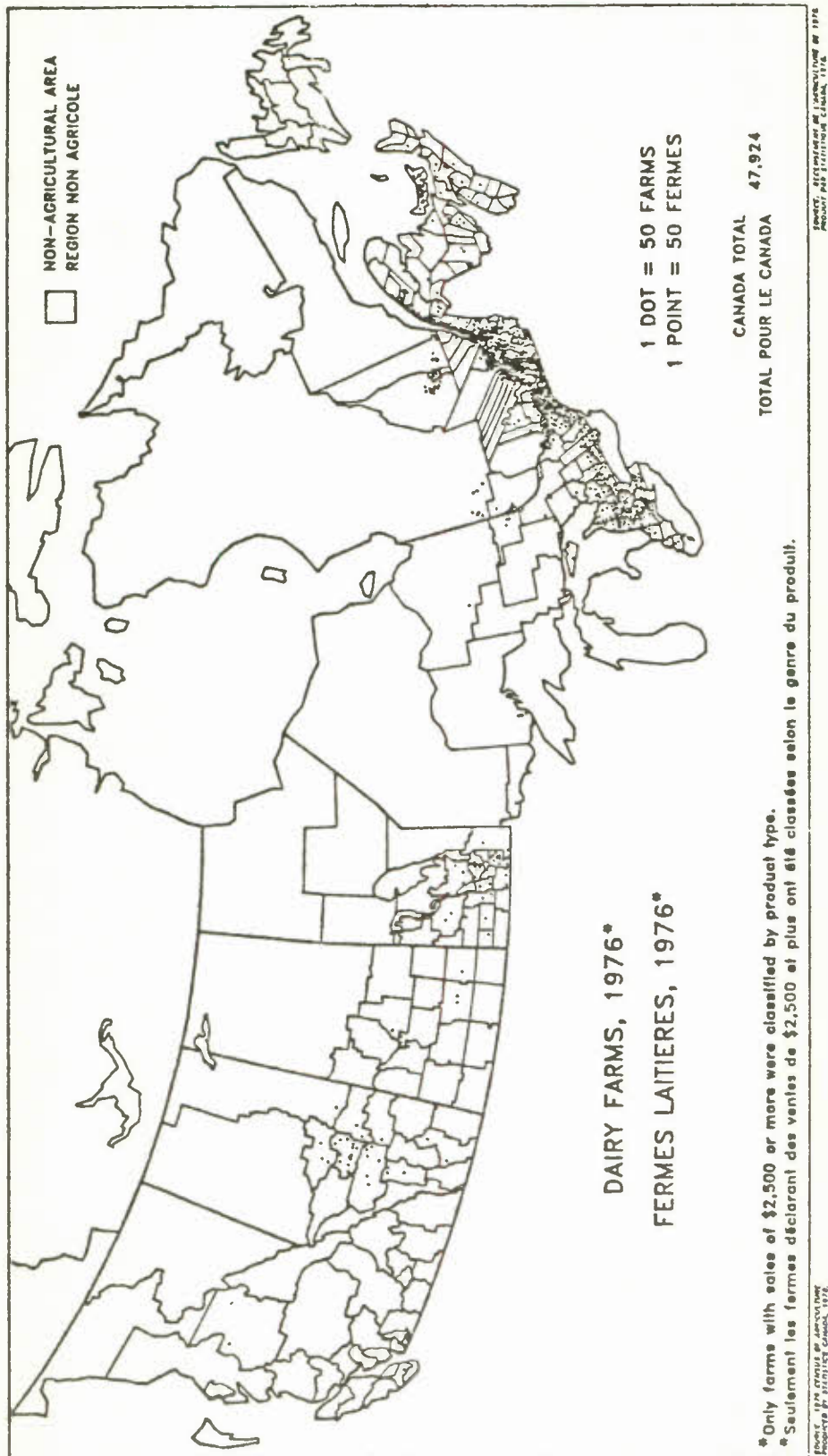


Figure 1

eighteen percent of Canadian farmers or more than one in six farm operators who produced primarily milk products. These dairy farms featured an average capital investment (excluding marketable quotas) of almost \$160,000, eighty percent of the corresponding value for all farms, due mostly to a relatively smaller land holding. Dairy farms appear to be more labour-intensive than other types of farms in Canada. They are about one-third more likely to employ hired labourers than non-dairy farms and dairy farm operators are much less likely to work off their farm holding. Specifically, dairy farmers are only half as likely to engage in off-farm employment as other farm operators, and when they do work off their farm holding, they do so for fewer days each year.

Farm production of milk in 1979 was 6.9 million kilolitres or 15,600 million pounds, a decrease of twelve percent from 1971. Total milk production in Canada peaked in 1965 and has declined slowly since that time, although subject to irregular year-to-year changes and diverse patterns of increase and decrease by individual province. Indications are that this trend will continue in the future, and U.S. evidence is consistent with such a prediction. Given the present dependence of dairy policy across Canada on production quantity controls which relate to domestic consumption (e.g., of fluid milk and butterfat), these milk production patterns largely reflect patterns of milk product demand which is forthcoming at policy-determined milk product prices. In general, fluid milk consumption has not kept pace with population growth, offering only small increases in the demand for milk. Manufactured milk products have also experienced declining demand with the exception of increased consumption of some cheeses and ice cream. In spite of recent (1979-80) evidence of a one-year increase in butter and fluid milk consumption, the net effect of these changing patterns of consumption is not particularly promising for producers of dairy products. A continuation of the long term trends would suggest a declining market for milk products in total, and hence a continuation of the decline in total milk production.

There are few prospects to avoid this domestic scenario by considering trade in milk products. Low world prices for many dairy products combined with widespread protectionist measures for most countries' dairy industries leave little hope for export markets for Canadian dairy products on a sustained and sizeable basis. Trade patterns in fact have been quite stable and are largely policy determined. Canada allows 45 million pounds of cheese imports per year, while exporting small quantities of cheese and evaporated milk. Recent increases in exports of evaporated milk have reduced the traditionally large volume of skim milk powder exports which are surplus to domestic demand. Nonetheless, skim milk powder exports continue to be Canada's largest item of trade in dairy products and those are made at a considerable loss, jointly financed by Canadian taxpayers and milk producers. Foreign sales of this surplus product are made at world prices which, although stronger in 1980, are still much below domestic prices.

Comparisons with the United States and other countries offer some indications of the productivity of Canadian dairy farms. On an animal efficiency basis, average annual milk production per cow in Canada (3916 kg.) is similar to the average milk yield across all developed economies and has grown at the rate of one-sixth per decade (Dairy Farmers of Canada, 1980). However, Canadian production per cow lags some thirty percent behind U.S. yields, and this difference has been increasing since the 1940's. More importantly, labour productivity information shows Canada to fare even less well in comparison to the U.S. Comparing New York State with Ontario dairy farms, two regions of similar production conditions, New York State farms feature 48 percent more cows per man and almost double the milk sold per man.² Although these figures must be interpreted and generalized to other regions with caution, they suggest at least that there is considerable opportunity for a number of Canadian dairy farms to achieve large gains in labour productivity and production per cow.

² Data from New York State farms is reported in Young (1980) and the Ontario sample of dairy farms arises from the Ontario Dairy Farm Accounting Project.

One important feature of the Canadian dairy industry is the level and path of milk prices. First, using the consumer price index and its components, the retail price of dairy products has risen faster since 1971 than the overall index itself. That is to say, since 1971, dairy products have become relatively more expensive than an average array of consumer goods, or their real price has risen. By September 1980, dairy products had risen in price 18 percent more than the CPI. Secondly, since 1974, Canadian dairy product prices have risen by twice as much as those in the United States. Prior to 1974, dairy prices in the two countries moved closely together. This subsequent divergence occurred mainly in 1974 and 1975 with the removal of a Canadian fluid milk subsidy and the substantial manufacturing milk price increases arising from changes in the federal dairy program.

Producer prices, too, have risen faster than the rate of inflation. Prices received by producers for fluid milk have risen 16 percent faster than the consumer price index since 1971 and producer prices for industrial or manufacturing milk, excluding any subsidies or levies, have risen 56 percent faster than the CPI (Agriculture Canada, Dairy Market Report).

It is disturbing to find that in spite of the importance of dairy policy to the federal government, no current data is available on the incomes of Canadian dairy farmers. By using farm taxfiler records, however, some dated observations can be made. In 1974, using Ontario data (Darcovich and Gellner, 1978), average total net income was \$9923 for all farm taxfilers, yet only \$7825 among dairy farmers. Although this measure of income ignores capital gains (and dairy farmers have received capital gains on both land and quota holdings), these data suggest that incomes of dairy farmers are less than those of other farmers. Data from the 1976 taxation year showing provincial averages for net income per farm taxfiler are consistent with this conclusion. Quebec has a much larger proportion of dairy farmers among its farm population and total net income among Quebec farmers is 14 percent less than the Canadian average. These numbers must be

interpreted with caution, because personal and family characteristics may be different between dairy and other farm operators, causing the difference in income. For example, dairy farmers have lower education levels on average than other farmers across Canada, causing them to earn less income for reasons apart from milk production per se.³ Nevertheless, it is noteworthy, if not astonishing, to find that despite the large tax payments and income transfers to producers generated by present dairy policy, their average incomes are still apparently less than those of other farm operators.

The composition of net income among dairy farmers is also worth noting. Again drawing on 1974 Ontario farm taxfiler data, we note that off-farm sources of income account for only 27 percent of total net income among dairy farmers, while among all farm taxfilers, off-farm sources generated 71 percent of total net income. This reflects the smaller participation of dairy farm operators in off-farm jobs reported earlier. Whether this observation arises from lower schooling levels and less remunerative off-farm employment prospects of dairy farm operators or the greater demands for their time on their farms, it still means that they are less likely to use the effective instrument of off-farm employment to generate larger and more stable family incomes.

Finally, a brief comment can be made about the stability of dairy farmer incomes. Although no time series on net incomes of dairy farmers is available, we can examine the time path of farm cash receipts by commodity to obtain some evidence on income variability. Figure 2 illustrates the coefficient of variation of farm cash receipts for six major commodity groups over the decade 1966 to 1976, and shows that dairy revenues were relatively stable over the period. In fact, dairy revenues show the second smallest degree of variability of all commodities. These data offer prima facie evidence that the net farm income of dairy farmers are relatively more stable than those of other farm commodities.

³ Dairy farm operators possess an average (across provinces) of 4 percent fewer years of schooling than other farmers, according to unpublished 1971 Census data. In turn, these data show additional years of schooling by farm operators to generate significantly larger net farm incomes and off-farm earnings (Barichello 1979).

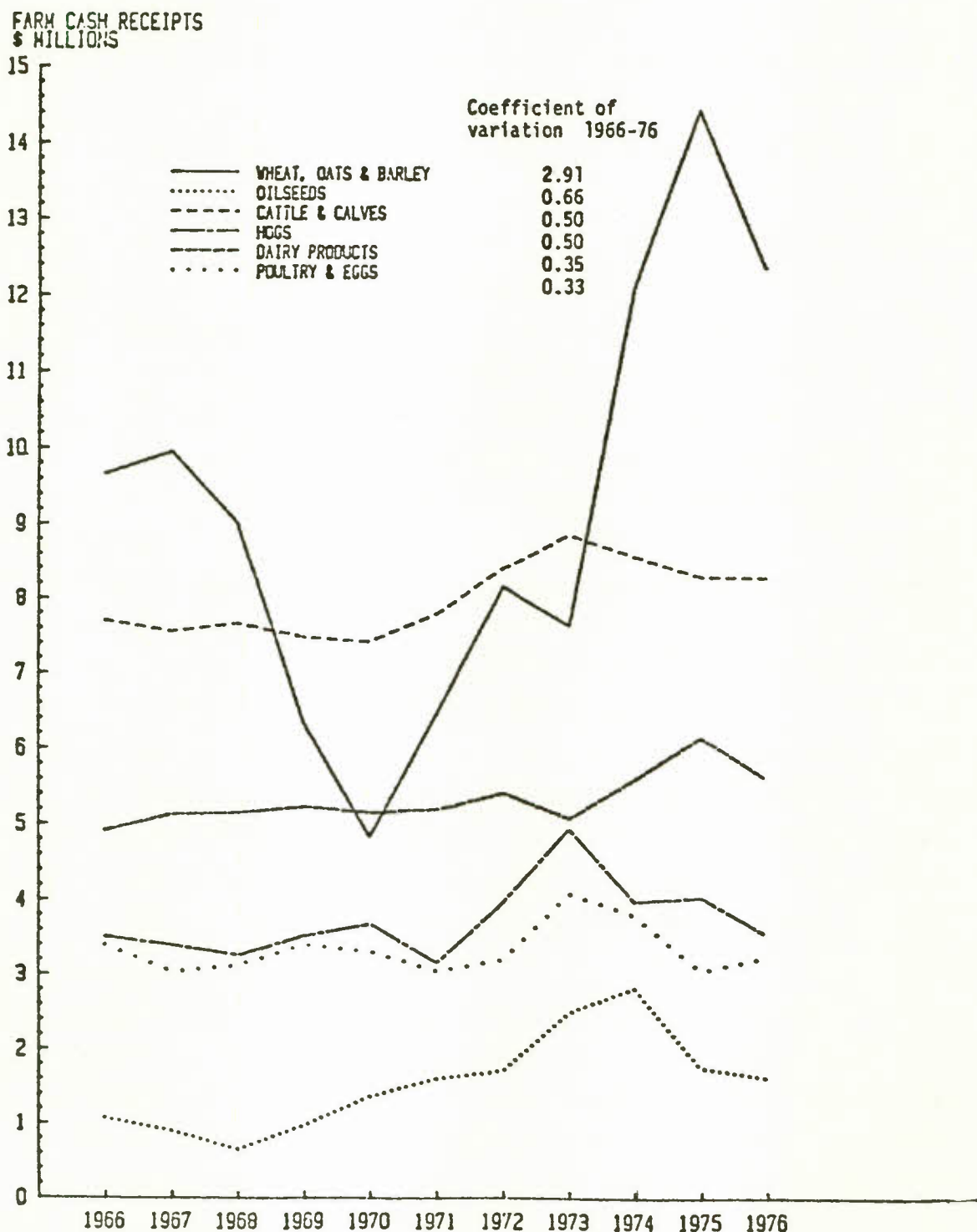


Figure 2. Variation in farm cash receipts (in constant dollars) from the sale of farm products by major commodity groupings, 1966 to 1976, Canada

Source: Brinkman, 1980, p. 114

One of the most important features of the dairy industry is the substantial and sustained decline in the number of farms. The outflow of farmers from production has continued unabated throughout Canada from (at least) 1961 to the present and, if anything can be inferred from more recent data, the process has accelerated in the years since 1975. Census data documenting this trend is shown in Table 1.

Drawing from Table 1, over the period 1961 to 1976 the number of farms with more than two cows declined, on average, 8.7 percent per year. Among farms with eight or more cows, the rate of decline was 6.4 percent per year. The table also indicates that this decline occurred entirely among those farms with less than 33 cows. For comparative purposes, the number of U.S. dairy farmers with more than four cows declined by 5.1 percent per year from 1959 to 1974 (U.S. Bureau of the Census, Statistical Abstract of the U.S.). Canadian Dairy Commission registrations of dairy farmers show a decline of 8.6 percent per year from 1971 to 1979, and a more pronounced decline, 11.1 percent per year, over the period 1976 to 1979. In British Columbia, where dairy farmers are fewer in number, larger in both size and various measures of physical productivity, and where fluid and industrial milk production is largely integrated (virtually all dairymen supply both fluid and industrial milk), there has been an outflow of dairy farms over the decade of the 1970's at an annual rate of 4.0 percent per year (British Columbia, The Milk Board, Annual Report).

This dynamic element of the dairy industry is not unique to Canada and appears little affected by changes in policy over these two decades. It is caused by steady improvements in milk production technology coupled with competition among milk producers. Because farm numbers have declined significantly, but total milk production has remained stable, average farm size among milk producers has grown. Table 1 documents the clear movement of farmers over this thirty year period into larger herd size groups as they try to remain competitive by exploiting the apparent economies of size in milk production.

TABLE 1

NUMBER OF CENSUS FARMS REPORTING COWS AND HEIFERS
2 YEARS OLD AND OVER, MILKING OR TO BE MILKED,
CANADA, 1961-1976

	1951 ^a	1956 ^a	1961 ^b	1966 ^b	1971 ^c	1976 ^c
Farms reporting	455,068	398,604	308,980	221,850	129,770	91,261
1-2 milk cows	134,463	101,309	65,356	47,449	26,455	21,489
3-7 milk cows	180,907	135,662	95,904	55,997	21,892	11,526
8-12 milk cows	85,250	83,972	64,595	39,006	17,119	7,357
13-17 milk cows	31,001	39,692	36,519	26,529	13,887	6,109
18-32 milk cows	20,758	32,799	37,866	38,636	30,972	21,320
33-47 milk cows	2,003	3,964	6,424	10,002	12,941	13,616
48-62 milk cows	428	823	1,522	2,786	4,164	5,787
63-77 milk cows	117	220	422	788	1,284	2,076
78-92 milk cows	55	92	180	327	489	944
93 milk cows and over	56	71	192	330	567	1,037

^a Dominion Bureau of Statistics, 1961 Census of Canada, Agriculture: Canada, Table 9;

^b Statistics Canada, 1971 Census of Canada, Agriculture: Canada, Table 10;

^c Statistics Canada, 1976 Census of Canada, Agriculture: Canada, Table 10.

These changes in the number of dairy farmers coincide with a change in the structure of the dairy industry. Producers can be allocated into three groups, fluid milk producers, manufacturing milk producers and cream shippers. Fluid milk producers supply milk specifically for the fresh milk market and usually produce some manufacturing milk as well. Manufacturing milk producers sell milk for use in the manufacture of dairy products other than fresh milk. The number of producers in this latter category has declined substantially since the mid-1960's, consistent with both federal and provincial government efforts to encourage the integration of all producers into a single pool producing milk for both fluid and manufacturing uses. The third group of producers, those who separate cream from their milk and only market this cream production, has declined most sharply, as farm uses for skim milk have become increasingly uncompetitive with federal support prices for skim milk powder.

To this point the dairy industry has been described only from the farm level. The processing sector is, however, a significant component of the dairy sector, purchasing raw milk, processing and packaging fluid milk and such other dairy products as cheese, butter, skim milk powder, evaporated milk, ice cream and yogurt. In 1977, the value-added in dairy processing was \$727 million, one-half the value of farm cash receipts from milk production and double its value of a decade earlier (Statistics Canada, 1977, p. 4). Increasingly this sector is being dominated by large multi-product processing plants. Small local dairies, cheese plants and creameries are becoming less competitive for both technological and regulatory (milk supply) reasons, forcing their exit from the industry like the case of small farms. Large processing plants which are farmer-owned cooperatives have become very important in this sector, sharing the manufacturing milk market with independent companies and the fluid milk market with retail food chain-operated processing plants.

To summarize, the Canadian dairy industry is sufficiently large to be a very important component of Canadian agriculture. It

is the third largest contributor to cash receipts among agricultural commodities at the national level, but milk is the most important farm product in the provinces of Quebec and Nova Scotia and the second most important in British Columbia and New Brunswick. Furthermore, the production of milk is concentrated in central Canada with three-quarters of Canadian production occurring in Ontario and Quebec. Relative to other farm operators, dairy farmers typically employ more hired labour, spend less time in off-farm jobs, specialize more in milk production to the exclusion of other farm and nonfarm activities, and possess fewer years of schooling.

Examining the recent time path of milk consumption, production and inputs, one must conclude that neither performance nor prospects are particularly rosy. The market for most milk products in Canada appears to offer little growth at best and, on a per capita basis, with the exception of cheese and yogurt, domestic consumption of all milk products is declining. Although physical measures of dairy productivity are slowly improving in terms of average milk yield per cow, Canada lags behind many developed economies and is falling farther and farther behind the average yield per cow in the U.S. Labour productivity on Canadian dairy farms appears to be much lower than on U.S. dairy farms. The total net incomes of dairy farmers appear to be more stable but lower than average incomes of other farmers. Finally, due largely to changes in the technology of milk production, there has been a sustained decline in the number of dairy farms over the past several decades. As part of this process, remaining farms have been expanding to take advantage of apparent economies of size. The same process has been occurring in the milk processing sector where large multi-product processing plants are out-competing small operations to become the dominant element in this important economic activity. The adjustments which these processes continue to force, particularly at the farm level, have led in part to the policy intervention and regulation described in the following chapter.

CHAPTER III

THE FRAMEWORK OF DAIRY POLICY

Of all the characteristics of and factors influencing the dairy industry described in the last chapter, little attention was given to the role of government or the degree of regulation which affects the industry. Yet, it is the widespread nature of milk regulation that has spawned this study and hence some attention to the nature of government intervention is warranted. In fact, the many regulations governing Canadian milk production are so complex that for even a modest measure of understanding, some description and interpretation is necessary.

Dairy policy can be divided into two sets of regulations to cover the fluid milk and manufacturing or industrial milk markets. This division is largely due to differences in jurisdiction between federal and provincial governments. For reasons of trade, the industrial milk market is regulated by federal government policies, presently through its agency, the Canadian Dairy Commission (C.D.C.). These policies include recommending milk prices, supporting the prices for butter and skim milk powder, administering producer quotas (with the cooperation of provincial milk marketing boards) to limit production, distributing direct subsidy payments to producers, and undertaking certain trade and marketing functions. For example, the C.D.C. is the sole importer of butter, buys and exports those dairy products (mostly skim milk powder) which are produced in excess of domestic demand, and taxes producers with a system of levies to help finance these exports.

The fluid milk markets across Canada, involving about one-third of total Canadian milk production, are regulated by provincial governments, usually through provincial marketing boards. These boards restrict access to the fluid milk markets with the output control instrument of quotas. This limits the number of entrants to the fluid milk market

and the amount which each producer may supply. Prices are typically set by a system of administered prices, which allows the practice of price discrimination in milk products to provide higher prices for fluid milk.

In practice, these types of dairy policies take the form of many variations and extensions to encompass virtually every policy instrument used in the agricultural sector. The basic intentions of these policies can be appreciated by referring to stated government objectives of dairy policy, although goals held by other participants in the regulation process are also important and will be touched upon later. Following Stonehouse (1979), we can summarize recent (post-1967) federal dairy policy objectives as:

- (1) to ensure a reasonable degree of self-sufficiency in processed dairy product supplies
- (2) to procure price stability for both producers and consumers
- (3) to ensure that efficient Canadian industrial milk producers receive a reasonable return on their resources
- (4) to provide Canadian consumers with adequate and continuous year-round supplies of high quality processed dairy products at reasonable real price levels.

It is useful to note in passing that these objectives may represent only intermediate and not ultimate or national goals and that some are more nearly means than ends.

The present regulations which attempt to meet these objectives have been developed over a period of time, and to unravel some of their complexities, the historical development of the present policy framework can be outlined by drawing on the extensive surveys of Hiscocks (1979) and McCormick (1972).

Federal government subsidies for certain dairy products (e.g., cheese) were initiated during the mid-1930's to minimize price instability and offer producers some relief from the depressed

prices of manufacturing milk products of that period. To maintain milk production and keep consumer prices down during the war years, subsidies were re-introduced in the early 1940's for both fluid and manufacturing milk. Following the war, a federal commitment to support farm prices and incomes introduced the policy instruments of deficiency payments and offers-to-purchase to the dairy industry, albeit to provide temporary, not permanent, assistance. Nonetheless, the federal government maintained an active role in the export and trade of dairy products and established provisions for product acquisition and storage.

Although the Agricultural Stabilization Act of 1958 provided a systematic structure for agricultural price support, dairy support measures continued to be decided annually and only when a perceived need arose. In the early 1960's, however, dairy farmers pressed for more centralized regulation of the dairy market, for a national authority in the form of the Canadian Dairy Commission. It became operative in 1967 with the objective, stated in the Canadian Dairy Commission Act of 1966,

"To provide efficient producers of milk and cream with the opportunity of obtaining a fair return for their labour and investment and to provide consumers of dairy products with a continuous and adequate supply of products of high quality."

The commission was endowed with a wide range of tools to achieve its objectives, including offer-to-purchase programs, any storage, processing and disposition activities desired including import controls, deficiency payments to producers, dairy product promotion activities, powers to investigate the production, processing and marketing of any dairy product, and the power to deduct levies from individual producers. With these broad powers it was necessary for the C.D.C. to mediate the interests of dairy farmers throughout the country, governments at both the federal and provincial levels, as well as processors and traders of milk products.

The policies followed by the C.D.C. in its first years had characteristics which distinguished them from previous efforts.

Although earlier policies stressed support prices for butter and cheese with irregular subsidy or deficiency payments being made, the C.D.C. introduced a direct subsidy to industrial milk and cream producers, regardless of the use made of that milk or cream. To reconcile this increased milk price with domestic consumption two measures were adopted. A "holdback" or charge deducted from subsidy payments was introduced to finance the export of any surplus dairy products. More importantly, a system of quotas was adopted for the first time in the industrial milk market initially to limit the growth of subsidy payments but eventually to keep milk production within the bounds of commercial outlets.

Gradually, this milk policy came to embrace all manufacturing milk across Canada, including the milk produced by fluid milk shippers which is not consumed as fresh milk. Increasing attention was given to aligning production, by means of quotas, with domestic consumption net of exports and imports (a "market requirements" or self-sufficiency approach) and to application of levies or charges to finance the growing export losses on skim milk powder sold at depressed world prices. In addition, support prices for milk products became centered on butter and skim milk powder, effectively determining the price for the fat and non-fat solids components of milk, making support prices on other products (such as cheese) redundant.

In 1975, another important iteration of federal dairy policy took place with the establishment of the "long term dairy policy", the policy which remains in effect today. This policy reaffirmed the commitment to self-sufficiency in manufactured milk products, although a reduction in the long-run level of self-sufficiency was envisioned by some at the time. More specifically, after allowing for specific cheese imports, Canadian production was set (by the Market Share Quota) at a level sufficient to supply all demands for butterfat from Canadian consumers. This Market Share Quota is an essential feature in balancing supply and domestic demand and illustrates the choice of a complicated quantity control rather than a simple price mechanism to accomplish a market equilibrium.

Because at present prices Canadians consume more butterfat than non-fat solids, the resulting excess skim milk must be exported as skim milk powder, at world prices which are substantially below Canadian support prices. Losses incurred are financed in part by a levy from producers' subsidy payments.

The price paid to producers for their industrial milk is no longer determined by ad hoc methods, but is now determined by a formula. This "returns adjustment formula", presented in detail in Table 2, incorporates changes in consumer prices, input costs and a judgement factor to determine the "target return" on industrial milk, beginning with a base period price of \$25.00 per hectolitre of milk on April 1, 1975. Given this target return level, the government uses two tools to attain the desired price. There is a choice of some combination of direct subsidy and processed product (butter and skim milk powder) support price levels to reach the target return (although varying the processor margin can also have small effects). Since 1975, it has been the government's intention to reduce the contribution of the direct subsidy. Accordingly, the direct subsidy has remained fixed in nominal terms with all increases in the target return coming from increased support prices of butter and skim milk powder. This process is illustrated in Figure 3.

The last important element of the program is a desire to avoid surpluses of milk products. A committee formed from representatives of provincial milk marketing boards, the C.D.C. and Canadian dairy farmers (through their lobby organization, the Dairy Farmers of Canada), the Canadian Milk Supply Management Committee, is charged with this responsibility. After estimating domestic consumption levels, they recommend a total level of Market Share Quota and determine its allocation among the provinces. To deter excess production, a system of differential prices or penalties is used. About 95 percent of an individual producer's Market Sharing Quota is eligible for the supported price and the full direct subsidy. The remaining five percent of his MSQ ("sleeve" production) is denied the full direct subsidy, and any

TABLE 2
INDUSTRIAL MILK TARGET RETURNS ADJUSTMENT FORMULAE

Component:	Consumer Price Index (Imputed Labor Earnings)	Dairy Cash Input Price Index	Judgment Factors
Index Base:	1971 = 100	1970-1972 = 100	-
Weight:	0.35	0.45	0.20
Subcomponents (Dairy Cash Input Price Index, based on Farm Input Price Index for Eastern Canada)			
	Dairy Ration, 16%	13.4	
	Hired Labor	6.6	
	Other Materials and Services	7.8	
	Artificial Insemination	0.6	
	Machinery Repairs	3.1	
	Petroleum Products	2.0	
	Custom Work	0.4	
	Fertilizer	3.1	
	Seed	1.9	
	Building Repairs	1.4	
	Property Taxes	2.8	
	Electricity	1.9	
	Total	45.0	
INDICATED TARGET RETURN	= Base Target Returns Level ^a + Cumulative Change Due to Returns Adjustment Formulae		
CUMULATIVE FORMULA CHANGE	= (Change in Cash Inputs x Weight x Base Target Return ^a) + (Change in CPI x Weight x Base Target Return ^a)		

^aBase Target Returns Level = \$25.00 per hL of milk on April 1, 1975

Source: Stonehouse (1979), p. 3.

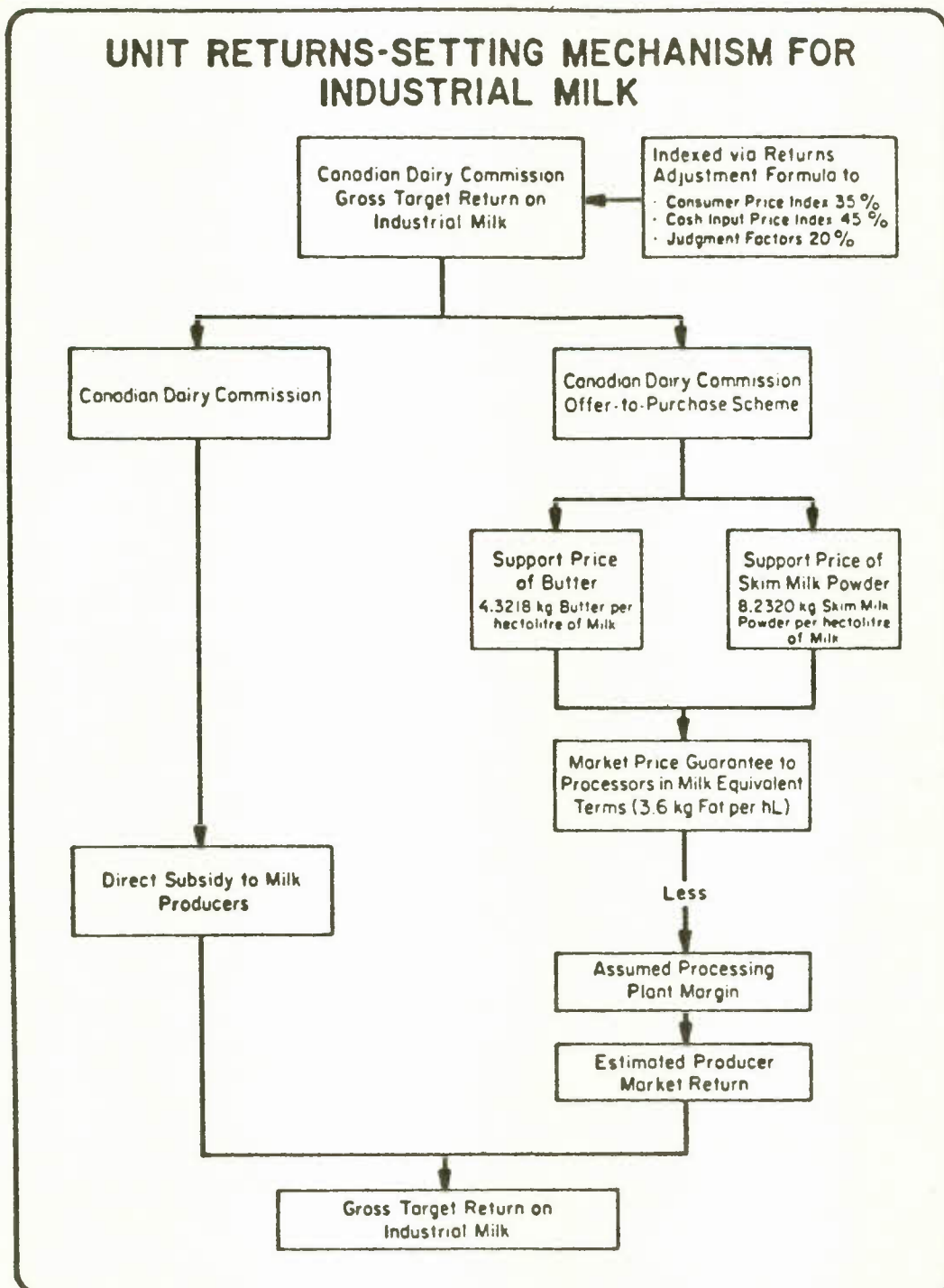


Figure 3

Source: Stonehouse (1979), p. 5.

production in excess of his total MSQ suffers a still larger over-quota penalty to reduce further his price. This system of penalties, holdbacks and subsidy is illustrated in Figure 4.

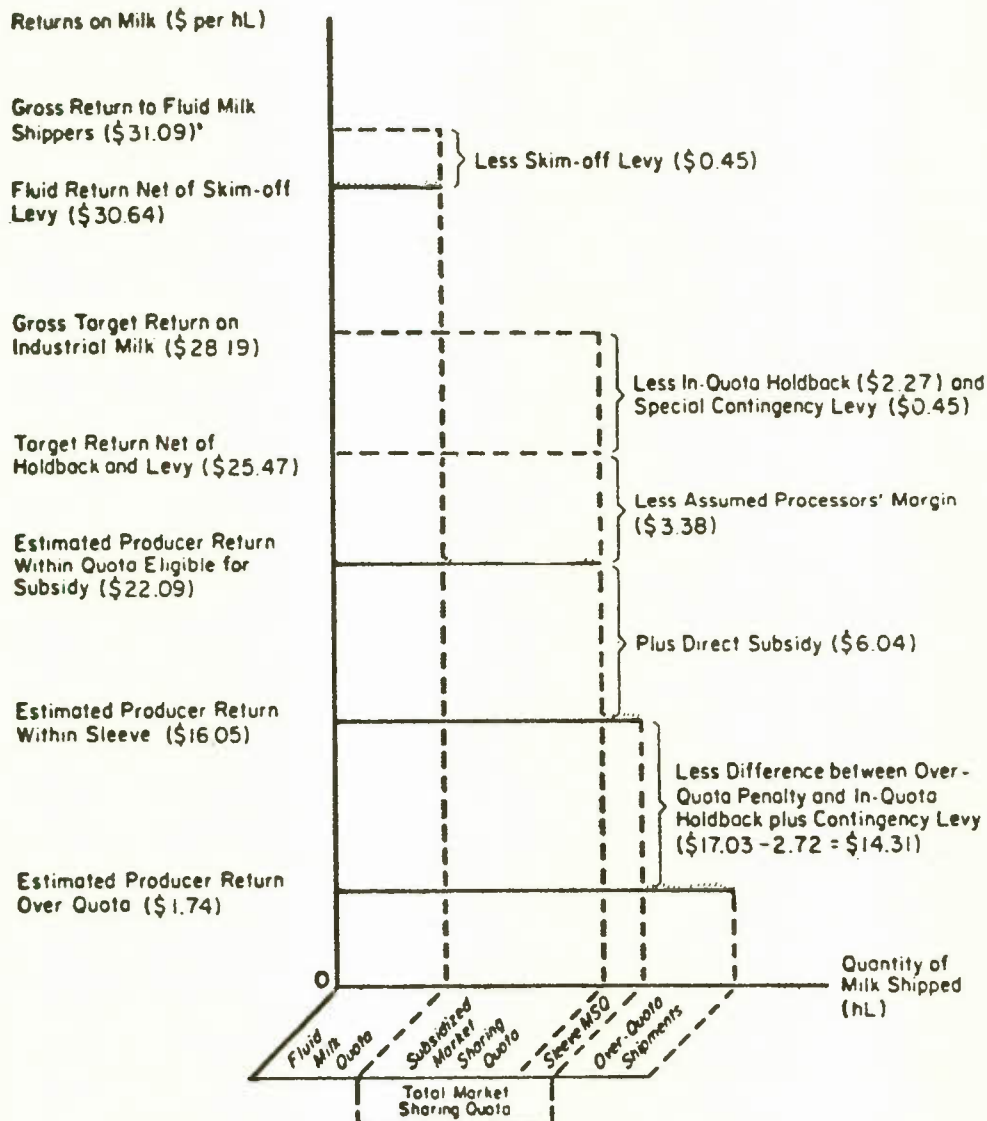
Finally, it must be obvious that the success of such a program will vanish unless foreign competition can be controlled or excluded. Import tariffs now apply to all dairy products except butter, supplemented since 1951 by quantitative import controls (quotas). The C.D.C. itself has exclusive responsibility for butter imports.

Although there are a number of policies, programs and special arrangements which further complicate the dairy program, the foregoing elements constitute the essence of Canada's industrial milk regulation.

The regulation of fluid milk, as noted above, is the responsibility of provincial governments or their agencies, mostly because each province produces its own fluid milk and no interprovincial trade occurs. They, too, appear to seek similar objectives as those noted earlier for the federal government ("Self-sufficiency in and year-round continuity of supplies, seasonal price stability, and adequacy of real returns to producers", Stonehouse 1979). The regulatory framework is, however, simpler. Although the provinces differ in the details of their programs, the general framework across provinces is similar. Prices for fresh or fluid milk are typically formula-determined, where the arguments of the formula are mainly input cost and price indices. To insure adequate supplies, the quotas used to meet fluid milk demand exceed those demands by one-fifth or one-quarter. Consequently, these fluid milk shippers, in producing their fluid quota, are actually providing fluid milk plus some industrial milk. The price for milk supplied to this fluid quota pool is usually a weighted average (blend) of the formula-determined fluid price and the federal government support price-determined industrial milk price. Health standards for fluid milk shipments are sometimes more stringent than those for industrial milk, but as

IMPACT OF DAIRY POLICIES ON MILK PRODUCERS' RETURNS

(April 1, 1978 Values* Used as an Illustration)



* Source: Dairy Farmers of Canada, *Dairy Facts and Figures, 1978*, Ottawa, 1978

^b National average minimum price paid to fluid producers, f.o.b. processing plant - Source: Agriculture Canada, *Dairy Produce Market Report*, Vol. 53, No. 11, Ottawa, April 1978

Figure 4

Source: Stonehouse (1979), p. 9.

integration of these markets occur, health standards are increasingly uniform across both milk markets.

The prices for fluid milk set in each province are typically higher than industrial milk prices, making access to this fluid market desirable. These higher prices have made fluid quota a very desirable and valuable asset, whether it is independently traded or not. The high values which fluid quotas have assumed in some provinces (such as British Columbia) have become from time to time a significant issue in the regulatory activities of those provinces.

This system of fluid quotas in each province prevents the interprovincial movement of fluid milk in Canada, as well as any fluid milk shipments across the U.S. border. Consequently, according to local pricing regimes, fluid milk prices to producers and consumers differ markedly across provinces. These closed and self-sufficient provincial (and in some cases, intra-provincial) markets do not arise for reasons of fresh milk perishability, because the technology of milk transportation now permits long distance shipments and less perishable fresh milk substitutes are now marketed. These local milk markets are closed because of existing regulations and, whatever their historical origins, they now serve to prevent competition among different fluid milksheds and balkanize domestic fluid milk production. Of course, the fluid market is not entirely unique in this regard because industrial milk production is also allocated by province, with limited opportunities for the regional movement of market sharing quota.

Although federal and provincial regulations cover farm production in the first instance, the processing sector is by no means a free market. Both the C.D.C. and provincial milk marketing boards variously intervene to determine prices, allocate product and otherwise alter the distribution of milk and milk products. For example, in its offer-to-purchase program for butter, the C.D.C. pays all storage and freight costs for butter across Canada, an advantage not offered to cheese processors and a disadvantage to local butter processors outside central Canada (who no longer enjoy the cost

advantage of lower transportation costs relative to central Canada). Provincial marketing boards sometimes control the quantity of milk allocated to different processing plants and determine the processor to which individual producers can sell their milk. The price differentials across processed products are often regulated by provincial boards and in some instances retail prices are also regulated, effectively determining the processors' margins.

Interest Groups and the Policy Formation Process

Particularly when contemplating analysis and recommendations for dairy industry regulation, the process by which policy becomes formulated becomes very important. In addition, the goals of the participants in the policy process offer valuable insights into policy evaluation and the prospects for policy change.

The general process of regulatory intervention and adjustment in the agricultural sector is insightfully described by Arcus (1980). In the case of the dairy industry, the applicant group seeking regulation is the organization representing milk producers, the Dairy Farmers of Canada (D.F.C.). However, this organization is much more than an applicant group, because it is instrumental in both the formulation and the operation of dairy policy in Canada. Not only does the D.F.C. make representations to the federal Cabinet, the Minister of Agriculture and Members of Parliament, but they maintain a close working relationship with the federal agency responsible for dairy policy, the Canadian Dairy Commission. In addition, they participate in the deliberations of the Canadian Milk Supply Management Committee, the body which determines one important element of dairy policy, the aggregate level and provincial distribution of industrial milk quota (MSQ). These relationships offer obvious advantages to the D.F.C. by at least keeping them informed of policy changes. However, it also gives them the opportunity to influence government policy in a substantial manner. A comparison of policy statements of the Dairy Farmers of Canada with subsequent policy changes by Agriculture Canada since 1975 reveals the substantial amount of

success which the D.F.C. has had in persuading the federal government to adopt its recommendations.

No other interest group would appear to approach the influence of the D.F.C. in federal dairy policy. The National Dairy Council and the Consumers' Association of Canada represent dairy processors and consumers, respectively, and both provide representation to Cabinet ministers and Members of Parliament. In addition, a representative of the National Dairy Council sits as an ex-officio member of the Canadian Milk Supply Management Committee. However, the role of these organizations is more one of reacting to policy than one of proposing, creating and implementing policy. The Canadian Dairy Commission plays a rather mixed role in this process, representing the federal government (and, indirectly, Agriculture Canada) to the farm community, but from their close working relationship with the D.F.C., representing the dairy farm community to government departments such as Agriculture Canada. Depending on the balance of power from time to time, this would raise the undesirable possibility that the main government agency overseeing federal dairy policy may become more the child of the dairy industry than the child of the government. More evidence on the role of both the Canadian Dairy Commission and the Dairy Farmers of Canada in influencing Canadian dairy policy is found in Forbes (1980).

Aside from questions of unbiased information and adversarial checks and balances in policy formation, the influence of the D.F.C. on dairy policy is important if they hold objectives or goals different from those espoused by the government. From policy statements over the past decade, some important objectives of dairy farmers in national dairy policy can be inferred. A list of four may be incomplete, but it may at least convey the flavour of dairy farmers' interests in dairy policy.

It may go without saying that dairy farmers seek to increase their incomes from their dairy enterprise, and hence advocate instruments (or lower level goals) such as higher milk prices, fair

or reasonable returns to their resources employed in dairying and a degree of market power with which to confront those to whom they sell their product. A second objective is to maintain the size of the milk industry. This goal suggests some interest in maintaining the number of dairy farmers with its public emphasis on a rural industrial strategy and the maintenance of the rural production and employment base across Canada (Dairy Farmers of Canada, 1979, p. 4). Implicit also is a desire to slow the adjustment process toward larger farms and a desire to maintain more family-sized farms.

A third goal is price and output stability. This desire to increase certainty and reduce risk is sought by not only reducing the variability of price and quantity, but also by obtaining more predictable changes. One advantage of a formula-determined price is not just that it smooths the price path, but also that it allows the price to be predicted with greater accuracy. Similarly, by tying production to net domestic consumption, the feasible level of production is known to change with some predictability. The unexpected admission of large import quantities or unanticipated cutbacks in government support fade in importance, leaving producers some security into the future that the domestic market will be preserved for them.

A fourth goal would appear to be more distributional in nature, that dairy policy be equitable across individuals and across regions. Were such a goal not sought, the pressures from different groups and individuals to break up this successful national coalition of dairymen would become difficult to withstand. Therefore, the long term viability of this organization requires that this goal of distributional equity be reasonably attained.

The interaction of these producer interests with those of the government by means of the policy formation process described earlier yields the present complex of regulation in the dairy industry. We now examine the main elements of that regulation to determine the costs and income transfers which they generate.

CHAPTER IV

ECONOMIC EFFECTS OF PRESENT REGULATION

Having outlined the nature of regulation in the dairy industry, we now turn to the economic implications of those policy rules. For some of those regulations, we can derive numerical estimates of their effects and for others we must be satisfied with a qualitative description of their consequences. When measurement of the effects is possible, we will summarize them into two groups, a resource allocation or welfare effect and an income transfer effect.

When a policy alters the allocation of resources in an otherwise undistorted market, there is generated an economic loss to Canada for which there is no offsetting economic gain. With this fall in national productivity, incomes in total will be reduced by the amount of the economic loss because the gains by groups who benefit from the policy (e.g., producers) will not be sufficient to cover the losses incurred by those groups who are harmed (e.g., consumers and taxpayers). This is called a social efficiency or welfare loss and it describes the loss in total national income which arises from the policy.

This loss is important because, unlike federal government expenditures made, for example, through the Canadian Dairy Commission, these 'appropriations' of the nation's resources are not reviewed by Parliament through the budgetary process. Therefore, no accounting is presented to the public. More importantly, these non-budgetary costs (social losses) of regulation are shown later in this chapter to be almost as large as the appropriations of funds by the Canadian Dairy Commission.

Of course, the policy under consideration may generate certain social benefits or transfer income in a desirable way to make the welfare loss it causes well worth paying. However, it is necessary to know these costs to determine if the policy's advantages are worth the price and to examine if there are alternate, less expensive means to accomplish the same end. The following exercises are an attempt to provide this kind of information.

Industrial Milk Regulation

In order to ascertain and quantify the effects of industrial milk regulation, the policies discussed in Chapter III are translated into a model of industrial milk production and consumption relationships. In such a supply-demand framework, appropriately modified to portray the details of present national dairy policy, a competitive market without distortions or government regulation is used as the standard of reference. It provides a useful point of comparison for alternate policy scenarios without arguing the desirability of non-intervention. The prevalence of price setting and quantity controls do make the concept of a free market elusive, but it is when these institutional complications are combined with the paucity of appropriate data that the task of analyzing this dairy regulation becomes imposing. These circumstances may provide the explanation for the scarcity of studies like this which attempt measurement of the aforementioned costs and transfers. This shortage of good data for determining the shape and position of supply and demand curves leads us to present the results for an array of varying elasticity values and other assumptions.

The details of the analysis are found in the Appendix, but some of the key elements and data values can be summarized briefly. The data that are required are mainly prices and quantities, and both are sought from recently available data. Price data generally apply to the second quarter of 1980 while quantities are from the 1979 calendar year. Financial data from the C.D.C. are most recently available for 1977-78.

In the market for industrial milk, the demand elasticity is assumed to be -0.7 and the supply elasticity, $+1.0$. The resulting market price without price supports and output restrictions would be \$23.50 per hectolitre (hl.) (or \$10.35 per hundredweight (cwt.)) and production would be 41 million hectolitres (M. hl.) (or 93 M. cwt.). In turn, the model shows the farm gate price for butterfat (in milk equivalents) would be \$14.01/hl. (\$6.17/cwt.) and for skim milk, \$9.48/hl. (\$4.17/cwt.). These values can be contrasted with present (second quarter 1980) annual production of 44 M. hl. (100 M. cwt.), a total farm

gate milk price including subsidy and levy of \$31.04/hl. (\$13.68/cwt.), a butterfat price of \$13.31/hl. (\$5.86/cwt.) in milk equivalents and a skim milk price of \$14.00/hl. (\$6.16/cwt.).

In a nutshell, the present dairy program for industrial milk results in a higher farm gate milk price, a higher skim milk price and a lower butterfat price than would otherwise prevail in an unregulated domestic market. In addition, present dairy policy encourages more Canadian milk production than would otherwise be obtained. The presence of output quotas (MSQ) does not result in a contraction of production as one might assume, but rather prevents production from increasing in response to the favourable farm milk prices to an even larger level. Without the present regulatory process, although farm gate milk prices would fall, the ensuing increase in consumption would be modest and would be swamped by the fall in production, resulting in the aforementioned fall in total milk output.

From knowledge of the industrial milk regulations and the model of the industrial milk market in Canada described above we are now in a position to take stock of the present regulatory process. We can begin by noting the following social efficiency or welfare costs to the Canadian economy generated by these regulations. First, present policy increases milk production in Canada beyond the point of an unregulated domestic industry equilibrium. Because the cost of producing the extra milk exceeds the value of the milk products it yields, a welfare cost is incurred, and this net loss is measured by the difference between the incremental cost and incremental value of the additional milk produced. For our base case, using the parameter values noted in Table 3 this cost item is \$5.95 million, the smallest value of the four measured components.

A second welfare cost is caused by the support prices for butter and skim milk powder. At current levels these prices curtail domestic consumption of nonfat milk solids causing a surplus of skim milk powder which is exported at world prices substantially beneath Canadian domestic prices. Consequently, the value of Canadian industrial milk production as it is actually consumed and exported, is less than the

value placed on it by domestic consumers. Because the exported skim milk powder could be supplied to Canadians we have a misallocation of nonfat solids, generating a welfare cost valued at \$74.40 million.

The third source of loss is found in Canada's import barriers to milk products. These international trade restrictions protect producers from the relatively low world prices which exist for dairy products, but they hurt consumers by denying them access to these low prices. Consequently, consumers reduce their consumption of milk products from the level that would prevail with free trade in milk products. Producers are encouraged to produce more milk than with the low milk prices implied by free trade, and welfare costs are incurred on both counts. This net loss is \$65.72 million.

Fourthly, there is a component of resource cost which arises from the activities of the regulatory agency, the Canadian Dairy Commission. Its costs of administration and marketing certain dairy products are resource losses to the economy which must be included in any overall assessment of the present scheme, and they amount to \$31.70 million in current (1980) dollars.

When added, these four measurable cost components total \$178 million, our estimate of the annual productivity loss which Canada suffers due to federal milk regulation. It is very much a minimum measure of the program's total resource cost, however, because it is so incomplete. For example, keeping within the farm sector, the present regulations lead to an allocation of production (quota) across provinces that is arbitrarily determined and bears little relation to comparative advantage in the production of milk. Similarly, within all provinces except Quebec and Ontario, production is allocated across farms by quotas on the basis of factors which again bear little if any relation to the costs of producing milk. Both these elements of quota allocation policy mean that Canadian milk production is not secured from its least expensive sources. The result is an increase in milk production costs, decreased productivity and an addition to the \$178 million in welfare costs noted above.

There are other resource costs which this program has incurred. Program rules and regulations have sometimes been introduced suddenly and with little warning to milk producers. Although this problem was particularly acute in the early and mid-1970's period, it draws attention to an institutional source of risk which has undoubtedly increased as a result of the present highly regulated dairy program. Although all risks in milk production may not have increased with the current dairy program, at a minimum this increased institutional or policy risk partially or completely offsets the reduction in price risk which the program is alleged to have caused.

In addition to these resource costs at the farm level of the dairy program, there are a host of regulation-induced welfare costs associated with the dairy processing, distribution and retail sector. These distortions will be discussed in more detail later, as will a number of more subtle dynamic resource costs which are likely to be gradually manifested over a period of time. Both these groups of distortions, if measured, would add more welfare costs to our earlier "total" of \$178 million.

In order to arrive at our welfare cost estimate of \$178 million it was necessary to make a number of assumptions about certain parameters. Because our knowledge of these numbers is rather imprecise, it is only reasonable to show how sensitive our cost estimates are to these assumptions. Sensitivity tests for four different parameters are presented in Table 3 in comparison to our base case result already mentioned. Whether we vary consumers' responsiveness to the price of dairy products (the demand elasticity), producers' milk production response to milk prices (the supply elasticity), or the price at which producers would just be willing to supply the present volume of domestic milk production (the supply price), the estimate of welfare costs does not vary greatly and stays within the range of \$150 to \$210 million. Changing the world price of these products (admittedly by an initial forty percent) does exert much leverage on the welfare cost estimates. It is therefore worth noting that our base case results are obtained with a world price value which is the mean price of world

TABLE 3

ANNUAL WELFARE COSTS OF INDUSTRIAL MILK PROGRAM:

BASE CASE AND ALTERNATE PARAMETER VALUES

(in millions of 1980 dollars)

<u>Assumptions</u>		<u>Welfare Costs</u>
1. Base Case ^a		178
2. Demand Elasticity		
$\eta = -0.9$		198
$\eta = -0.5$		158
3. Supply Elasticity		
$\epsilon = +1.5$		207
$\epsilon = +0.5$		150
4. Supply Price		
$P_s = \$27.97/\text{hl.}$		203
$P_s = \$22.56/\text{hl.}$		157
5. World Price		
$P_w = 8.55$	\$19.43/hl.	104
$P_w = 5.10$	\$11.59/hl.	324

^aDemand elasticity (η) = -0.7; supply elasticity (ϵ) = +1.0; supply price (P_s) = \$25.26/hl.; world price (P_w) = \$16.13/hl.

Source: See Appendix for details on calculations.

dairy products for the years 1978, 1979 and 1980, a period featuring both low (1978) and high (1980) price levels.

These estimates all include the cost of our present highly restrictive policy towards imports of dairy products. If we delete that item we can examine the welfare costs of our present policy relative to an unregulated domestic market yielding the same degree of milk product self-sufficiency which Canada presently experiences. In that case the resource loss of the present dairy program is reduced but still significant, an annual cost of \$112 million. This figure is more robust for different parameter values and is, of course, much less affected by changes in world dairy product prices.

The national dairy program not only incurs these varied welfare costs, but also generates important transfers of income among different groups in the country. Although our earlier attention to welfare costs was important because those costs affect the size of the national income pie, the question of income transfers is one concerned with how the income pie is divided among various groups and individuals. Because we know that the national dairy program raises the price of dairy products it is not surprising to note that this program improves the fortunes of milk producers and harms the consumers of those products. In addition, the large taxpayer contribution to this program alluded to in the opening chapter makes it clear that taxpayers also suffer substantial losses as a result of this federal regulation.

Our previous modelling of the industrial milk market permits us to quantify the income transfers described above, and the results, for our base case assumptions outlined in Table 3, are tabulated in Table 4. It is striking to see how large are these transfers of income. The largest transfer accrues to milk producers and they collectively enjoy a transfer gain of \$420 million per year. Consumers suffer an income loss of almost equal magnitude, a negative transfer of -\$406 million, which fortuitously is equally divided between consumers of butterfat and nonfat milk solids (skim milk) products. Both these transfers are very large because of the great difference between the

TABLE 4
ANNUAL INCOME TRANSFERS OF INDUSTRIAL MILK PROGRAM
(in millions of 1980 dollars)

Industrial Milk Producers	+ 420
Consumers of Industrial Milk Products	- 406
Taxpayers	- 303
Sellers of Industrial Milk Quota (MSQ)	+ 256
Buyers of Industrial Milk Quota (MSQ)	- 256
Overseas Consumers of Skim Milk Products	+

Source: See Appendix for details on calculations.

prices which producers receive or consumers pay within Canada and the prices that each would face with open access to the world market.

Should we consider the transfers generated by present industrial milk regulation relative to an unregulated domestic market (i.e., maintaining present international trade restrictions), we find their magnitude would be reduced. For example, producers would still enjoy positive income transfers but their gains would be reduced to +\$310 million, a still sizeable sum. By this different yardstick, consumer losses are much reduced to -\$111 million because unregulated domestic prices would still be substantially above world prices. When decomposed to consumers of butterfat and nonfat solids products we find for this comparison that present regulation causes an income transfer loss of -\$140 million to nonfat solids consumers, but an actual transfer gain to consumers of butterfat (+\$29 million).

From Table 4 we can note the other groups which are also affected by this program. The loss to taxpayers is \$303 million, a loss that is large both in absolute terms and relative to taxpayer contributions

to other farm products (see Ch. 1). There is an unmeasured gain to overseas consumers of our exported surplus skim milk products. This latter group benefits because Canadian exports (skim milk powder and evaporated milk) permit additional consumption at present world prices than would otherwise be possible.

Finally, there is an important transfer of incomes that occurs within the group of industrial milk producers. Because of competition among producers, the producer income gains noted above become capitalized into the price of farm assets. The program benefits at the margin of production get translated into increased prices of industrial milk quota, a process that is visible (and separable from other farm assets) in those provinces where this MSQ is allowed to trade among farmers. This quota must change hands over time as some (typically older) producers choose to leave dairy farming and others (typically younger) choose to enter the business. As a consequence of selling this valuable asset, many of the income gains transferred by the program to producers are captured forever by those who initially held the quota when they choose to sell it. If the program benefits remain unchanged and quota values do likewise, eventually these programs benefits rest in the hands of those who sell their quota. Those who buy that quota incur an equal and offsetting loss, and the size of this long-run transfer from seller to buyer, \$256 million, is shown on the fourth and fifth lines of Table 4. This capitalization phenomenon is discussed at greater length later in the chapter.

Changing the assumed parameters from our base case model alters the size of these income transfers for consumers and producers. The results of these sensitivity tests are shown in Table 5, and as for the welfare costs of Table 3, the income transfer measures are quite robust for alternate parameter values. The assumed supply elasticity does have a large effect on the producer transfer. To the extent that producers are unresponsive to milk prices and have few alternatives for their resources (e.g., with a supply elasticity of 0.5), the present program transfers some \$470 million to them. Alternatively, if they are

TABLE 5
ANNUAL INCOME TRANSFERS OF INDUSTRIAL MILK PROGRAM:
BASE CASE AND ALTERNATE PARAMETER VALUES
(in millions of 1980 dollars)

Assumptions	Income Transfer to:	
	Producers	Consumers
1. Base Case ^a	+420	-406
2. Demand Elasticity		
$\eta = -0.9$	+420	-406
$\eta = -0.5$	+420	-406
3. Supply Elasticity		
$\epsilon = +1.5$	+301	-406
$\epsilon = +0.5$	+539	-406
4. Supply Price		
$P_s = 27.97$	+380	-406
$P_s = 22.56$	+470	-406
5. World Price		
$P_w = 19.43$	+394	-281
$P_w = 11.59$	+395	-579

^aDemand elasticity (η) = -0.7; supply elasticity (ϵ) = +1.0; supply price (P_s) = \$25.26/hl.; world price (P_w) = \$16.13/hl.

Source: See Appendix for details on calculations.

responsive to the milk price in their production decision and have alternatives to employing their resources in the dairy industry (e.g., with a supply elasticity of 1.5), they enjoy an income transfer of \$380 million.

The world price of industrial milk products has the greatest leverage on the consumer transfer. When world prices are low, present policy denies consumers dairy imports which cost only a fraction of domestic dairy products. The measure of this loss in income is a formidable \$579 million. By contrast, high world prices mean that consumers are denied fewer opportunities to buy inexpensively from abroad, measured as a transfer loss of only (!) \$281 million.

These data make several points clear. First, the economic impact of present industrial milk policy is very large indeed. Welfare costs and income transfers to producers, away from consumers and away from taxpayers are all in the hundreds of millions of dollars per year. Secondly, the program is sufficiently wasteful to reduce national income or productivity by almost \$200 million per year. Finally, although we cannot readily observe all the data points one would like to have in order to conduct an analysis such as this, our estimates of these costs and transfers are generally little affected by the values assumed for the important but unobserved parameters.

Fluid Milk Regulation

As was noted earlier, the industrial milk market is not the only scene of government regulation in the Canadian milk industry. The regulation of fluid milk markets by provincial government marketing boards has profound effects on both producers and consumers, and hence merits some attention. Being provincial in nature, these regulations vary by province in their details. The following analysis will be done in terms of the largest fluid milk market in Canada, that of Ontario, and then generalized to the rest of Canada excluding British Columbia. The B.C. fluid milk market will be analyzed separately and its results added to obtain an estimate of the effects of fluid market regulation for the country.

The regulation in this market involves two important instruments, a formula-determined price above competitive levels, and a fluid milk quota to control access to the market. A third important regulation in most provinces is the effective prohibition of interprovincial (not to mention international) trade in fresh or fluid milk. These restrictions on fluid milk consumption and interprovincial trade generate the major welfare costs in this market. However, like the Grubel and Schwindt (1977) examination of the B.C. fluid milk market, we only succeed in measuring the former (and probably much smaller) component.

The fact that this market involves essentially one product has helped researchers to secure consistent and reliable estimates of the demand elasticity (between -0.3 and -0.4). For the following analysis, a value of -0.35 has been chosen along with a supply elasticity of (once more) +1.0. Sensitivity tests are conducted for both this supply elasticity and for the price at which producers are just willing to supply the fluid quota level of milk production (the supply price).

Our measure of the welfare cost has two components, a loss due to consumption foregone in response to the higher price (\$20.10 million) and a loss from the administrative costs of managing the system (\$10.37 million). Total resource costs due to fluid milk regulation are then \$30.5 million, shown as the base case welfare cost in Table 6. This estimate varies between \$24 and \$43 million depending on parameter values chosen, increasing as the supply elasticity and the supply price fall. Once more these estimates are very much lower bound values because important regulatory distortions remain unmeasured. No account is made of the prohibition of trade in fresh milk between provinces or between Canada and the United States. Rather than let comparative advantage within Canada determine where fluid milk be produced, provincial regulations balkanize domestic production with costly provincial self-sufficiency. Within provinces which do not permit trade in quotas, similar resource costs are imposed because the farm (or regional) allocation of production bears little relation to production efficiency.

TABLE 6
FLUID MILK MARKET WELFARE COSTS AND INCOME TRANSFERS
FOR ALTERNATE PARAMETER VALUES, CANADA
(in millions of 1980 dollars)

Assumptions	Welfare Costs	Income Transfer ^b to:	
		Producers	Consumers
1. Base Case ^a	30	+250	-280
2. Supply Elasticity			
$\epsilon = +1.5$	27	+223	-257
$\epsilon = +0.5$	43	+318	-336
3. Supply Price			
$P_s = \text{max.}$	24	+190	-229
$P_s = \text{min.}$	29	+350	-335

^aDemand elasticity (η) = -0.35; supply elasticity = +1.0; supply price = mean value: Ontario, \$28.10/hl., B.C., \$19.81/hl.

Source: See Appendix for details on calculations.

Although this minimum estimate of \$30 million in foregone income is substantial, fluid milk regulation costs are dwarfed by the previously noted costs of the industrial milk program, almost six times larger.

The income transfers associated with fluid milk programs are not so easily dwarfed. Again producers enjoy a large income transfer due to this component of milk regulation, specifically some \$250 million per year. This value is quite stable as supply parameters are altered.

It falls as both the supply elasticity and the supply price are increased. Consumers lose almost as much from the fluid milk regulation as from the industrial milk program. They suffer an income transfer of -\$280 million annually under present fluid regulations, and this magnitude is also robust with respect to the levels of supply parameters. As we found earlier for industrial milk, both the consumer and producer transfers (and, indeed, the welfare costs) would be larger if international trade (in fresh milk) was considered. That is, if trade in fresh milk could occur, U.S. milk imports would be sufficiently competitive in at least some Canadian fluid milk markets to lower Canadian milk prices, increasing the producer gains and consumer losses which arise from present policy.

In contrast to the expensive industrial milk program, taxpayers are little affected by fluid milk regulation. Although they pay administrative, compliance and licensing costs in some provinces, different financing arrangements exist in other provinces. Consequently, we undertake no measure of the taxpayer cost due to fluid market regulation.

Finally, an important transfer occurs within the group of fluid milk producers because their transfer gains become largely capitalized into the price of fluid milk quota. As a result, those who sell their quota (and who paid nothing or a much reduced price for it) garner most of the benefits of the program. Those who buy that quota lose an equivalent amount, leaving them on balance with few of the benefits that the program initially sought to provide. In the case of the fluid milk sector, sellers of fluid milk quota gain over the long run an income transfer of \$176 million per year while purchasers of that fluid quota suffer a transfer loss of the same amount. This transfer is exactly the same in its nature as the transfer between buyers and sellers of industrial milk quota (MSQ) described in the previous section of this chapter.

Summary of Costs and Transfers: All Milk Products

By summarizing our results for the industrial and fluid milk markets we can arrive at a more complete assessment of dairy regulation in Canada. This summary is displayed in Table 7.

TABLE 7
WELFARE COSTS AND GROSS TRANSFERS DUE TO REGULATION,
FLUID AND INDUSTRIAL MILK MARKETS, CANADA
(in millions of 1980 dollars)

Welfare Cost	208
Income Transfers to:	
Milk Producers	+671
Milk Product Consumers	-686
Taxpayers	-303
Sellers of Industrial Milk Quota	+256
Buyers of Industrial Milk Quota	-256
Sellers of Fluid Milk Quota	+176
Buyers of Fluid Milk Quota	-176
Overseas Consumers of Skim Milk Products	+

Source: Tables 4-6.

Without question the present regulation of Canada's dairy industry is expensive in terms of lost productivity and national income foregone. More than \$200 million per year is lost, mostly due to the inefficiencies of the federal industrial milk program. This sum of money is unreviewed by Parliament yet is more than half as large as the reviewed budget allocated by Parliament to the Canadian Dairy Commission. Even if we ignore the possibilities for international trade in dairy products and maintain our present strategy of domestic self-sufficiency, present policies still unnecessarily reduce national income by \$142 million.

The transfers of income among different groups in the country are even larger than this aggregate income loss. Producers as a group benefit by an income transfer gain of \$671 million although within this group the benefits largely fall to those who (eventually) sell their

fluid milk and/or industrial milk quotas. Purchasers of those quotas suffer an offsetting loss to leave them largely devoid of the program benefits. Consumers of milk products suffer an even larger income loss, a transfer of -\$686 million. The other group to incur a large financial loss is taxpayers. This income transfer of -\$303 million is incurred by federal taxpayers in financing the industrial milk program. Finally, overseas consumers of Canada's surplus milk products (largely skim milk powder and evaporated milk) benefit from being able to purchase those quantities at prices below their costs.

When we add the fluid market results to those of the industrial market, we find them to be more robust to variation of the assumed parameters. The increased stability of our welfare cost and transfer estimates gives us added confidence in their magnitude, and the sensitivity test results are shown in Table 8.

This table is useful for comparing our results with those of Josling (1980), a study also prepared for the Regulation Reference, but with different assumptions than were used in our base case and from a more aggregate perspective. For 1978-79, his producer transfer is estimated to be \$905 million and his consumer transfer as -\$623 million. For a supply elasticity of +0.5 his welfare cost is estimated to be \$275 million, averaged over the 1976-79 period.

Although Josling's numbers are based on lower supply elasticities and world prices than were assumed in our base case, the two sets of figures indicate much similarity and are definitely of a similar order of magnitude. By using Table 8, we can try very rough corrections for the differences in assumptions regarding supply elasticities and world prices. This shows the producer transfer and welfare cost estimates of the two studies to converge closely and our consumer transfer loss to be higher than Josling's. Because different procedures were followed in the two studies, this general similarity of results offers added credibility to the magnitudes in both sets of estimates.

TABLE 8
TOTAL (FLUID+INDUSTRIAL) MILK MARKET WELFARE COSTS AND
INCOME TRANSFERS FOR ALTERNATE PARAMETER VALUES, CANADA
(in millions of 1980 dollars)

Assumptions	Welfare Costs	Income Transfers to:	
		Producers	Consumers
1. Base Case ^a	208	+671	-686
2. Demand Elasticity			
$\eta = -0.9$	229	+671	-686
$\eta = -0.5$	189	+671	-686
3. Supply Elasticity			
$\epsilon = +1.5$	234	+534	-663
$\epsilon = +0.5$	194	+857	-742
4. Supply Price			
$P_s = \text{max.}$	226	+570	-635
$P_s = \text{min.}$	196	+785	-741
5. World Price			
$P_w = 19.43$	135	+644	-561
$P_w = 11.59$	355	+645	-859

^a Industrial milk demand elasticity (η) = -0.7; fluid milk demand elasticity = -0.35; supply elasticity (ϵ) = +1.0; supply price (P_s) (industrial) = \$25.26/hl.; supply price (fluid, Ontario) = \$28.10/hl.; supply price (fluid, B.C.) = \$19.81/hl.; world price (P_w) = \$16.13/hl.

Source: Tables 3, 5, 6.

PDR Sector

No estimate has yet been made of the costs of regulation in the processing, distribution and retailing (PDR) sector of the dairy industry. Distortions do exist, however, and they impose costs on the industry and on the aggregate economy. One example of these distortions is the plant allocation system of Ontario, where manufacturing milk is allocated to processing plants by quota on bases other than the value of the end use product (i.e., the willingness of these plants to pay for their milk supplies). This system of milk allocation affects the smaller plants by inhibiting the incentives to increase their scale of operation. In turn, this discourages the adoption of those new technologies which depend on a larger scale of operation, keeping processing costs higher than would otherwise be the case and product demand lower. In general, such a milk supply regime diminishes competition among processing plants which keeps processing costs high and adds another large set of distortions. A more detailed description of this system with some discussion of its implications and alternatives is found in Chapter III of Ontario Ministry of Agriculture and Food (1979).

An additional distortion is the C.D.C. policy of paying storage and shipping costs for butter. This gives an advantage to butter producers, the lowest value use of butterfat, and discriminates against other milk users such as cheese plants who must absorb storage, transportation and other costs of marketing their product. Furthermore, this distorts the location of butter processors by removing the transportation advantage of local plants outside Central Canada in the supply of their local markets relative to Central Canada creameries. In general, the prices these plants pay for their milk and receive for their products will often not reflect the true scarcity of the commodity. This is particularly true with respect to the relative value of skim milk and cream, where Canada's internal prices bear little relation to world prices.

All these distortions generate welfare costs and, with the large size of the dairy PDR sector (\$727 million in value-added in 1977) and the wide array of distortions, the absolute magnitude of

these losses is likely to be substantial, perhaps even as large as the welfare cost already estimated for the production side. However, they are not measured in this report and are additional to those listed in Tables 7 and 8.

Because present industrial milk regulation increases the quantity of industrial milk produced in Canada relative to free trade in dairy products or relative to an unregulated self-sufficient domestic market, the dairy processing sector is larger than it would otherwise be. Aside from the welfare costs this fact implies, it shows that Canadian firms involved in dairy product processing benefit from this element of the existing industrial milk program. The size of this income gain is not measured in this study, but in Ontario Ministry of Agriculture and Food (1979), Ch. VI, processor benefits of present regulation are estimated to be 13 percent of producer benefits. On this basis, dairy product processors in Canada may enjoy an income gain of some \$80-90 million per year from the added milk production of existing dairy regulation. Although a very rough estimate, this magnitude serves to show that processors gain from the increased size of the dairy industry, and this gain may be very sizeable. This is not to say that processors benefit from all aspects of existing policy. For example, they would certainly gain from a removal of the producer quota restriction. However, to the extent that the regulation stabilizes the pattern of production and prices, their interests are probably furthered.

Dynamic Aspects of Regulation

Some of the effects of dairy industry regulation are more subtle than those already discussed because they only become evident over a longer period of time. It is instructive to consider some of these time-related or dynamic effects of dairy regulation to complement our previous static analysis.

One of the reasons why this industry has sought government protection in the form of import quotas, subsidies and output controls is the spectre of added competition among producers from sustained

improvements over time in production technology. An unregulated domestic dairy market experiencing advancing technology will feature falling milk prices and increasing disparities within the industry between those who discover, choose and incorporate the more productive techniques or inputs and those who do not. If, in addition, the new techniques favour a larger scale of farm operation, this process is compounded, for prices will tend to fall more quickly and the additional demand of successfully managing a larger farm will be placed on those who might adopt the lower cost technology. This scenario is descriptive of the dairy industry and it has led across time and across countries to a large outflow of farmers from dairy farming. This threat of sustained out-migration from dairy farming has led the Dairy Farmers of Canada to defend present dairy policy as a means of preserving rural production, population and employment which would otherwise be lost (Dairy Farmers of Canada, 1979).

One can predict, however, that in the medium to long run, the imposition of quotas will erase any temporary advantage offered by higher prices and output controls. In fact, with markets for farms and farm assets, virtually all policies which do not deal directly with the abilities of individual dairymen to adopt improved techniques or otherwise become more efficient will in the long run fail to increase the net incomes of dairy farmers. As quotas become more valuable, their price will rise, increasing the cost of quota acquisition to purchasers of that quota, to wipe out all extra returns and ultimately leave all buyers of quotas as badly off as were the individuals producing milk before the program began. This phenomenon is noted in Table 7 as the income transfer from buyers to sellers of milk quota, and it occurs for both fluid and industrial milk quotas. Those who were granted quota will see their opportunity costs of remaining in dairy farming continue to rise until the prospect of selling the quota and farm becomes too attractive to resist. After an adjustment of perhaps a year or two, we would expect to see the out-migration of dairy farmers to continue unabated. The process will only be altered in degree by different milk supply and demand elasticities. Even if quotas are not permitted to

trade, the land market will pick up the slack and the same out-migration will continue as described above. Continuously increasing levels of support (in real terms) will be needed to prevent this process of technology-induced exit from dairy farming.

The data on exit from dairy farming in Canada over the past twenty years, which were described earlier, provide evidence to support this prediction and indicate the inability of output- and price-based policies, including present Canadian dairy policy, to maintain farm numbers, population, and employment or maintain the farm element of the "rural industrial base". The outflow of farmers from production has continued unabated from 1961 to the present and, if anything, the process has accelerated in the years since 1975 when the present, more regulated, dairy program was introduced.

These data suggest that the dynamic elements of Canadian dairy production, various new lower cost technologies continuously becoming available, leaving fewer dairy farmers able to adopt them and compete, remain with us as much at the start of the 1980's as at the start of the 1960's. This is so in spite of large sums of tax dollars allocated to the industry, in part to ease these adjustment problems, and the adoption of a highly regulated industry structure. And the data (see Table 1) are consistent with small farmers being those who leave.

Although this sustained out-migration indicates the present policies are ineffective in influencing for long the number of milk producers, it is an observation that should offer some encouragement. Even the scope, expense and vast detail of present dairy policy cannot prevent the rational and efficient net exodus of producers who wish to leave dairy farming for more rewarding pursuits from taking place.

A potentially more serious dynamic aspect of the highly regulated structure of the industry is the attraction of highly skilled managers and decision-makers to dairy farming. A side effect of increasing regulation is the reduction in the opportunities for profitable decision-making by entrepreneurial dairymen. With a number of output and price decisions removed from the farm, the dairy farm operator's opportunity for making insightful and profitable decisions can be reduced to least

cost input choices which will produce the given output level. Because the returns to schooling and farm management abilities is dependent upon the scope for and payoff from making a variety of decisions, this restriction of farm level decision-making will lower the returns to those skills and abilities in dairy farming, hence reducing the incentive for more schooled and skilled individuals to enter this sector of agriculture.

Of course, the present high and stable returns which milk producers receive is an attraction to numerous able individuals to enter this business. But the better farm decision-makers and entrepreneurs of those potential entrants will have a stronger incentive to enter activities other than producing milk, where regulations are less pervasive and numerous farm decisions can profitably be made by the operator. Some evidence to support this argument is found in the 1971 Census of Canada, earlier noted on page 9. The average level of schooling of dairy farmers (across provinces) is four percent less than that of other farmers and it is the lowest of all commodity groups. The longer term implications for the efficiency of the industry are negative on this score, and the blame falls not on specific output or price policies, but on high degrees of regulation in general.

Finally, it is often claimed that output controls in the dairy industry retard the adoption of those new technologies which expand output or require larger-sized farms to be effective. If these claims have any validity, they describe another cost incurred by dairy industry regulation. First of all, it should be emphasized that these claims should apply to scale-intensive technologies, because output controls do not remove a producer's incentive to adopt new innovations which reduce costs and operate independently of scale. However, the incentive to acquire new technologies or innovations which directly expand the dairyman's scale of operation or require a larger-scaled operation to be effective and profitable is reduced when output controls are in place. Even if output quotas are freely traded, the capital requirements for purchasing the quota in addition to the new machine or technology impose additional credit demands on the producer, reducing his likelihood of acquiring the new technology. This effect

of quotas will reduce the income potentially available to adopting dairy farmers, and will leave the industry less efficient (producing milk at higher cost) than would otherwise be the case.

This effect of regulation to bias the choice of technology can be more subtle than simply to discourage the adoption of scale-intensive techniques. Regulation can also contribute long run effects by altering the genetic choices made by milk producers in their breeding program. Peterson (1980) has shown that the system of milk pricing in British Columbia, coupled with existing fluid and industrial quota restrictions, gives dairy breeders a clear incentive to select animals which produce a maximum of milk butterfat and a minimum of milk protein. Although few consumers would probably support reduced milk protein, the present pricing regime, providing no reward for protein and paying a premium for butterfat, is encouraging a long run genetic drift in dairy breeding in exactly that direction. The implication may be even more serious for purebred breeders who presently exploit a large export market for Canadian purebreds, particularly Holsteins. With a growing number of countries pricing milk on the basis of protein content, any genetic drift among Canadian dairy cattle away from milk protein will jeopardize future cattle export sales.

These dynamic costs of present dairy regulation are unmeasured, and they are additional to those illustrated in Tables 7 and 8.

The economic effects of regulation discussed to this point have included numerous efficiency costs, at both the farm and processing levels, and the more important transfers of income to and from affected groups. Aside from the transfer gains enjoyed by some, any effects which can be termed benefits have not yet been addressed. In the following chapter we evaluate the regulation and in doing so will begin by filling this gap. The benefits of this regulation will be enumerated with the yardstick of dairy policy goals. When contrasted with a summary of the costs and transfers already outlined, we will have enough information to draw our conclusions.

CHAPTER V

POLICY EVALUATION AND ALTERNATIVES

In this chapter, we will begin with an assessment or evaluation of the set of regulations used in the milk industry. First, to get a grasp of the different program benefits, we turn to the goals earlier attributed to it. The resulting list of benefits may not be complete, and their attainment may be poorly quantified, but it offers some objective yardstick by which we can determine what the program does in order to merit its continued existence. Against this array of benefits we will review the various program costs and transfers to permit an overall evaluation or judgement of this particular regulatory package. Finally, some perspective on the present program will be gained by comparing it to a sample of alternate scenarios or rule changes.

Two sets of goals for dairy policy were set forth in Chapter III, attributed to the two major participants in federal dairy regulation, the federal government and the organization representing dairy farmers, the Dairy Farmers of Canada. Although four goals were listed for each group (see pages 16 and 26-27, respectively), the two sets of goals are very similar and can be compressed into the following list of five:

1. Increase the incomes of dairy farmers (ensure that dairy farmers receive a "reasonable" return on their resources).
2. Maintain the size of the manufacturing milk industry by using, for example, the tool of seeking self-sufficiency in Canadian processed dairy product (read butterfat) supplies.
3. Procure price stability for producers and consumers by both reducing price variability and obtaining more predictable price changes.
4. Provide adequate and continuous year-round supplies of high quality processed dairy products at reasonable real price levels.
5. Treat all dairy farmers equitably, regardless of circumstances or region, in the application of federal dairy policy.

With the wide range of regulatory tools available to the Canadian Dairy Commission and the lack of any explicit concern with costs, one should expect that the dairy program be successful in meeting the goals of these major regulatory participants, as long as there are not too many inconsistencies across the list of goals. However, our assessment is much less praiseworthy. We find only mixed success in attaining these goals, particularly considering the post-1975 period of increased regulation.

The income goal can have two alternate interpretations, to ensure "reasonable" income levels for the majority of milk producers, or to compensate small low income producers with few off-farm job market opportunities with some minimum income guarantee. The more common interpretation appears to be the former, with responsibility for the latter group assumed to be resting with the federal department, Health and Welfare Canada.

Any direct assessment of changes in income level is not possible, because there is no time series on dairy farmers' net income, particularly for recent years. However, the mechanism by which the dairy program can affect farm income is an increase in the price of industrial milk, and that increased dramatically (by 86 percent, inclusive of subsidy and levy) between 1972 and 1975 (Dairy Farmers of Canada, 1980). With no evidence to show milk production costs rising at nearly that rate, one can tentatively conclude that net dairy farm incomes increased, perhaps substantially, over that period. Subsequent increases in milk prices have been more modest, allowing little to be drawn in the way of conclusions about recent changes in net incomes of milk producers.

In spite of these large price increases, taxfiler data from 1974 (Darcovich and Gellner, 1978) and 1976 (Brinkman, 1980) suggest that dairy farmer total net income was less than the average total net income for all farmers (reported in Chapter II). These data ought to be interpreted with caution for such income comparisons, but the sustained exit of dairy farmers from milk production, also reported in Chapter II, suggests that, at least for small dairy farmers, their net incomes from dairy farming are not sufficient to keep them in the

business of producing milk. We also know that dairy farmers earn less off-farm income than other farmers and that, by remaining in milk production, they sacrifice the extensive use of that particular instrument to raise their total net family incomes.

Without question, the present program benefits large producers absolutely more than small producers. This is the result of almost all production-based support programs and the distribution of market sharing quota is consistent with this distribution of benefits. As can be seen in Table 9, sixty-four percent of Canada's 46,000 industrial milk and cream producers held industrial milk quota (MSQ) of less than 2500 kg. (5500 lbs.) of butterfat. Yet, they received only fifteen percent of all industrial milk subsidy payments. Consequently, it is not surprising to observe such sustained exit from dairy farming of small producers and to conclude that the present program is quite unequal among dairy farmers in its distribution of benefits. If

TABLE 9
DISTRIBUTION OF INDUSTRIAL MILK AND CREAM PRODUCERS AND
INDUSTRIAL MILK SUBSIDY PAYMENTS BY SIZE OF INDUSTRIAL
QUOTA HELD, CANADA, 1977-78

Size of Industrial Quota (kg. of butterfat)	Percent of Industrial Milk and Cream Producers	Estimated Percent of Total Industrial Milk Subsidy Payments
No Quota	12.4	0.0
1 - 189	4.5	0.0
190 - 2499	47.4	14.7
2500 - 4759	22.3	23.3
4750 - 7029	9.1	15.2
7030 +	4.3	11.4
	<u>100.0</u>	<u>64.7^a</u>

^aBalance of 35.3 percent paid to fluid milk producers.

Source: Prepared from Canadian Dairy Commission data.

it raises total net incomes of dairy farmers, it appears to do so to only a negligible extent among small producers, while we can only assume that it has a substantial and positive effect on the total net incomes of large producers.

Yet, even among large producers, any income enhancement provided by this program is likely to be only temporary in nature. Once the increased prices become evident, competition for land, quota and other dairy farm assets will bid up their prices until all the extra profits of the increased milk prices have been consumed in the higher costs of these assets. The prices of those inputs which are fixed in supply or of which any increased supply is only available at a large increase in cost, notably quota and land, will have their prices bid up the most. New entrants who purchase the more expensive land and quota will receive no more profit from their newly purchased dairy farms than they would have received had they bought their farm prior to the increased milk price.⁴ Eventually, all land and quota will change hands and the erosion of the income benefits of that milk price increase will be complete. It is for this reason that a dairy program such as this one will not raise incomes in the long run. What it will do is increase the wealth of those dairy farmers who owned the land and the quota when the price increase first occurred. The benefits of the program are then more narrowly distributed than first seemed apparent, and the program essentially affects the value of farm assets, not incomes. The only mechanisms for increasing incomes are for these milk price increases to continue to occur (without being widely predicted), or for the policy to increase the skill levels of individual farmers. Pressures will soon arise for the former course to be followed, as new entrants push for higher milk prices to offer them the capital gains which their predecessors enjoyed. This capitalization of benefits phenomenon, arising simply from competition to enter or expand production in a profitable industry, not only prevents long run increases in income from occurring in response to higher milk prices, but also adds political pressures for milk prices to be continuously pushed even higher.

⁴This process is documented for the case of a particularly clear milk price increase in the B.C. milk industry in Barichello (1981).

To summarize, the goal of raising dairy farm incomes appears to be incompletely and temporarily met by the present dairy program. The dramatic milk price increases of the 1972-75 period appear to have briefly raised dairy farm incomes, but these income gains rest with the larger farms, particularly those who owned dairy farms when these price increases occurred. The many small dairy farms have shared in only a tiny fraction of the program benefits. The exit of these farmers from milk production continues unabated, testimony to their small share in the advantages of the program. The income gains enjoyed by the larger farms soon become translated into capital gains, raising the wealth of land and quota holders of the early to mid-1970's and leaving subsequent entrants to dairy farming no better off than dairy farmers were before the program began. Consequently, the bulk of the program benefits are in the form of capital gains on quota and land holdings and they rest mostly with those larger dairy farmers who were already producing milk in the early 1970's.

The second goal of the dairy program is the maintenance of the size of the Canadian manufacturing milk industry. In the parlance of the federal government, this goal is expressed as a desire to achieve domestic butterfat self-sufficiency, itself little more than a means of maintaining the present volume of milk production and milk processing activity. This target level of milk product self-sufficiency is so important to the federal government that large surpluses of skim milk powder are tolerated, even at taxpayer costs which are periodically very high, in preference to a reduction in the size of the manufacturing milk industry. Among dairy farmers this instrument of self-sufficiency is held dear, but the goal of maintaining the size of the milk sector (and its rents) is emphasized and communicated as the maintenance of the production and employment base of rural Canada. Any suggestions to alter the desired level of self-sufficiency (for example, see Douglas, 1978) is met with immediate and strong criticism, indicating the importance and political sensitivity of this goal.

If this goal is interpreted mechanically as the provision of all of Canada's butterfat demanded at present domestic prices, it is being successfully met by the present program, hardly surprising

given such output and price regulations. The desire to maintain dairy production and processing levels has been slowly frustrated as the national consumption of butterfat has been gradually falling over the past decade. If industry size and employment is measured by the number of dairy farmers, this goal is not being met. The outflow of dairy farmers previously documented is continuing unabated, a trend which is apparently unaffected by change in policies, regulations and prices. In the past decade the number of dairy farms (registered with the C.D.C.) has fallen by about one-half, and since 1976 the rate of decline has actually increased.

To conclude, the goal of maintaining the number of dairy farmers, an important element of rural employment, is certainly not being met. The goal of maintaining the volume of industrial milk production is slowly being frustrated by declines in domestic butterfat consumption, while those domestic demands are now being largely supplied by products which are "Made in Canada".

The third goal, attaining stability, is held by all participants and presently would appear to be being met, at least for prices and quantities. But these observations of present stability may be related only spuriously to present dairy policy. The problem is that we do not know how stable an unregulated (or even less regulated) market would be. Present regulation may offer only a negligible increase in stability and there is little evidence available on untried alternatives.

The national market, hence domestic aggregate production, has changed only gradually over the past five years, and the path of prices since 1975, determined by formula, has been smooth. Furthermore, in recent years, the course of these two variables has been readily predicted. However, when the present program was being introduced in the early and mid-1970's, such stability was not present. The rapid increase in prices during the 1972-75 period did not offer stability. The introduction of the market sharing quota during these years to manage supply, including imposition of after-the-fact monthly quotas and other unpredictable policy changes,

contributed much instability to the industry at that time. These unstable patterns may have been only temporary policy adjustment problems, but they illustrate important elements of instability (often termed 'policy instability') in the national supply management program caused by the inherently inflexible and centralized nature of such a scheme.

Note that these stabilizing elements discussed above apply only to price and quantity and do not necessarily indicate stability of net returns. Other policy instruments which set price on the basis of gross margins or quota prices would be much more effective means of providing stability in net returns than the present system which focusses on price. With no data on net dairy farm incomes, we can draw no conclusions about the success of the present regulation in this regard.

We can, however, refer back to the data presented in Figure 2 to note that in terms of year-to-year variability in aggregate farm cash receipts, dairy farmers enjoy one of the most stable patterns of revenues of all farm groups. These data, from the period 1966 to 1976, indicate that, historically, the stability of fluid and industrial milk prices coupled with predictable output levels of milk have given the dairy industry much revenue stability. Although there are no comparable data from recent years to examine the more regulated period of industrial milk supply management since 1975, additional gains in stability would seem unlikely. The inherently stable patterns of farm milk production coupled with price supports for some milk products contribute much revenue stability to dairy farmers without the post-1974 imposition of rigid supply management programs.

The fourth goal, providing adequate, continuous supplies of quality dairy products at reasonable prices, involves two separate elements. Quality milk products have been continuously supplied to the market, although consumer preferences on the desired level of quality of those products are often simply assumed. This issue of breadth of choice or product diversity causes one to pause before concluding that, in this particular dimension, dairy products are

"adequately" supplied. The problem is one of a regulation-induced reduction in competition resulting in reduced product variety or choice. Because product variety and choice is synonymous with competition in the processing, distribution and retailing sector, the reduction in competition at this level, caused by regulations at various levels and argued in the previous chapter, will reduce the variety of milk products available to consumers. Casual observations of this problem abound, but specific evidence at the high quality end of the spectrum (concerning the production and sale of yogurt, ice cream and cream cheese) is found in Zimmerman (1980) for the case of a Nova Scotia Jersey farm.

Prices of milk products facing consumers, however, do not appear to be "reasonable" when one considers some of the alternatives facing Canada. Broadwith, Hughes and Associates (1976, p. 101) go so far as to claim that "producer prices for milk for the fluid market are, almost without exception, higher in Canada than in any other developed country in the world". World prices for skim milk powder and butter are almost half the levels which prevail in Canada. These price differences are, in part, a reflection of the benefits of improved technology and productivity in milk production which, when adopted in Canada, become capitalized into quota and land values and are not shared with consumers. Prices are established with no apparent reference to the interests of consumers and can be described as "reasonable" from only a producer perspective.

Finally, the goal of equity across producers in the application of federal dairy policy appears to have been met in only a certain regional sense. Policies usually appear to apply uniformly to all provinces. That having been said, the policy is unfair or inequitable across producers in several ways. Although it is reasonable and fair for more efficient producers to supply most of the product, provincial allocations of MSQ on a historical basis discriminate against producers in those provinces which can produce milk most efficiently. In spite of regulatory attempts to integrate fluid and industrial milk producers in the various programs, the fluid milk levy collected by the C.D.C.

is simply a tax on fluid milk producers and on those provinces such as British Columbia which produce relatively more fluid than industrial milk. And in addition to being unfair to more efficient milk producing provinces and fluid milk producers, the present policy by using quota restrictions is manifestly unfair across generations. The income transfer, listed in Table 8, from buyers to sellers of milk quota (or other assets) is in the hundreds of millions of dollars per year, and this is largely a transfer from the younger (entering) producer to the older, retiring dairyman. That these unfair elements of existing policy can continue to exist is simply a comment on the secure political power of the industrial milk producing provinces and the older generation of milk producers.

In the case of the fluid milk sector, the same story applies. Established producers holding large quotas enjoy most of the benefits in the form of capital gains and subsequent allocations of fluid quota. Production volume is preserved with provincial self-sufficiency restrictions, but the decline in fluid producers is sustained. Price stability is again observed, caused by present regulations or whatever, but at price levels which are very costly to consumers, and fluid supplies do meet demand throughout the year.

In summary, the present federal and provincial dairy programs provide a selective and temporary pattern of income enhancement, conveying capital gains on quota and land holdings of those larger dairy farmers who were already producing milk when those programs began (e.g., the early 1970's for industrial milk producers). Both those who are younger and who have smaller farms have shared in only a small proportion of these benefits. The size of the industry has been largely maintained in terms of production volume by virtue of the policies of fluid milk and butterfat self-sufficiency. Nevertheless, these policies have not stopped or slowed producers from leaving milk production at the rate of eight to eleven percent per year. Stability in prices and quantities is being maintained, but it is not at all evident that this arises from the present regulations. A different aspect of this goal, predictability of price and output paths, is indeed being met by pricing formulae and quota policies, a

feature of the present system which is valuable particularly to milk producers. Milk products are continuously supplied to the market, but in a variety of products and qualities that is almost certainly less than would be found in a less regulated environment. In addition, these milk products are sold to consumers at prices which are much higher than world prices would allow and which are generally even higher than an open domestic market would feature. Finally, producers across the country are only treated reasonably equitably in only a narrow regional sense. Much inequity is faced by younger dairy farmers and, in the application of the industrial milk program, fluid milk producers.

To be generous, this is a very mixed record of meeting dairy program goals. The benefits accrue almost entirely to producers, and to the more established producers at that. In fact, given the extensive controls included in Canadian dairy regulation and this selective success in meeting program goals, one suspects that either the goals noted earlier are held by groups with no effect on the setting of dairy policy or, more cynically, they serve as little more than window dressing to make the program more politically palatable among politicians, the electorate and dairymen.

Against this pattern of goal achievements or benefits we can review the varied costs of the present regulation, described in Chapter IV. This review is aided by Table 10 which summarizes the goal achievements, resource costs and income transfers denoted earlier. By means of international trade restrictions, pricing formulae, output restrictions and support prices for milk products, the flow of resources to and within the dairy industry at the farm level is sufficiently distorted to reduce productivity and cost the national economy \$208 million in foregone income per year. Even ignoring the trade restrictions, domestic regulation still costs the country an annual welfare loss of \$112 million.

But many of the distortions of present regulation are unmeasured, and the total welfare costs are much higher. For example, the allocation of MSQ by province (and within those provinces outside

TABLE 10
SUMMARY OF POSITIVE AND NEGATIVE EFFECTS OF CANADIAN DAIRY REGULATION, 1980

	Positive	Negative
A. Program Goals		
1. Increased dairy farmer incomes	- temporary income enhancement - capital gains to established producers, mostly to larger producers	- smaller producers and recent entrants share few of these benefits
2. Size of dairy sector	- production levels preserved compared to free trade - more dairy products in Canada are "Made in Canada" due to self-sufficiency policy for fluid milk and butterfat	- level of total milk production slowly falling - number of milk producers continuing to fall at steady pace
3. Stability	- production and price patterns continue to be stable - production and price patterns are more predictable	- this stability may be only partly due to present regulation - policy instability in early years of present program
4. Continuous, adequate supply of milk products at reasonable prices	- supply is continuous	- product choice narrowed - consumer price not reasonable compared to alternatives
5. Equitable across producers	- Industrial milk program rules apply to all provinces	- unfair to entering and expanding producers - unfair to fluid milk producers - unfair to producers in more efficient milk producing provinces
B. Efficiency Effects		
1. Measured welfare costs (Farm level)		- \$208 million per year
2. Unmeasured welfare costs (Farm level)		- inefficient arbitrary allocation of industrial milk production across provinces - inefficient arbitrary allocation of industrial milk production within provinces where MSQ not traded - reduced future supply to dairy farming of best decision-making (entrepreneurial) talent - biased genetic selection in dairy cow breeding - institutional policy risk of unexpected changes in policy rules
3. Processing, Distribution, Retailing Sector (unmeasured)		- inefficient milk allocation system to processing plants - reduction in competition - distorted advantage to butter processing
C. Transfers of Income (annual)		
1. Producers		
Producers selling Industrial Milk Quota	+\$671 million	
Producers selling Fluid Milk Quota	+256 million	
Producers buying Industrial Milk Quota	+\$176 million	
Producers buying Fluid Milk Quota		-\$256 million -\$176 million
2. PDR Sector		
3. Overseas Consumer of Canadian Skim Milk Products	+\$318 million	
4. Consumers		-\$686 million
5. Taxpayers		-\$303 million
TOTAL TRANSFER EFFECTS	+\$989 million	-\$989 million

Source: Table 7, text of Chapters IV, V.

Central Canada where MSQ does not trade) distorts the distribution of production away from its most efficient locations. The widespread extent of regulation reduces the opportunities and incentives for better farm decision-makers to enter the dairy industry, limiting the productivity of the industry in future years. Choices for new technology are biased by quota controls against output-based improvements, also reducing industry efficiency in future years. Finally, pricing milk on the basis of butterfat distorts the genetic choice of dairy cows against high milk protein production.

Regulations in the processing, distribution and retailing sector add more distortions and welfare costs. Some examples of these regulations which impose aggregate productivity losses are the plant supply allocation rules, the product pricing regulations facing processors, the C.D.C. storage and freight subsidy on tenderable products, and the effective subsidy on marketing costs which the C.D.C. provides to butter and skim milk powder processors. When combined these rigidities reduce competition and impose efficiency losses additional to the \$208 million noted earlier.

This program, with its narrow array of benefits and substantial productivity losses, is presently financed at extremely high cost by certain groups in Canada. Taxpayers contribute at least \$303 million per year to our dairy regulation and consumers, through higher prices, suffer an income loss of almost \$700 million, a total contribution of almost one billion dollars annually. In return for these large taxpayer and consumer costs (and for the loss in income suffered by the whole economy), the dairy program benefits established dairy farmers with the previously listed goal achievements and an income transfer of almost \$700 million. Completing this picture, calculated at the farm gate, we must note the gains of overseas consumers of Canadian skim milk exports (mostly skim milk powder and some evaporated milk). They benefit because we subsidize their consumption: they enjoy our expensive milk production yet they only pay the low world price. A measure of their gain is possible because the sum of positive transfers should equal the sum of negative transfers. By this calculation, the residual transfer

gains accruing to these overseas consumers is very large, roughly \$300 million, and similar to our taxpayer cost⁵.

Finally, beyond the farm gate, dairy processors obtain income transfer gains from the present dairy program because they enjoy a larger volume of business.

Any public debate about present dairy regulation is ultimately resolved in the political arena, but an examination of these costs and benefits are small for the staggering costs presently imposed. This is all the more so when one considers the various additional costs and distortions not quantified and, hence, not included in the numerical cost estimates. Furthermore, the benefits of the program are almost entirely appropriated by the producers of milk. Although a bias in favour of producers is not surprising, particularly after we consider the mechanism by which policy is determined (see pages 25-27), the degree of imbalance among the major participants in the milk industry and the magnitude of the transfers are truly startling.

This state of affairs may be acceptable to the government because it only pays for the taxpayer costs and those costs have shown a tendency to decline in recent years. It does not have to pay the consumer transfer involved and the productivity loss to the Canadian economy is income that only could have been earned. As long as the program is successful in meeting their political re-election concerns, the government may accept these large tax costs with the program in spite of resulting large costs to consumers and the aggregate economy.

But the interests of producers are more diverse and to simply say they benefit grandly is misleading. An income transfer of some \$700 million per year is received by producers in total, but many producers' interests are not being served by the present program. First and most clearly, new entrants are being heavily taxed by large initial capital costs (for example, for the purchase of quota), offsetting the benefit from the income stream which present prices initially created. That is taken from the industry by retiring farmers who sell their assets.

⁵To check, this is approximately the product of our skim milk exports (~13 M.hl.) and the unit subsidy on these exports (~\$22/hl., the difference between the cost of that Canadian milk production and its world price).

Secondly, this large financial burden on new entrants makes more difficult the continued success of the family farm. It gives advantages to corporations, which are more able to raise large sums of capital than are farm families, and to those farm families which are sufficiently asset-rich to enable financing such an expensive enterprise. Finally, it is in the interests of producers that the industry remain viable into the future, and this viability is enhanced by increased levels of economic efficiency. Yet, present regulations discourage the adoption of scale-intensive new technologies and the inflow of superior farm decision-makers which would make future milk production less costly and more efficient. And finally, fluid levies and provincial allocations of industrial milk quota work against the interests of fluid milk producers and those producers in the more efficient milk producing provinces.

At the very least we can conclude that the present pattern of dairy regulation is much more costly than it need be in order to provide the benefits it does. It is clearly in the interests of consumers, taxpayers, and anyone concerned with economic growth to seek lower cost alternatives to the present dairy regulation, and it would appear to be in the interests of producers to seek alternative policy arrangements which meet their objectives without some of the present disadvantages.

Effects of Alternative Regulations

In this section, six alternative regulatory scenarios will be considered with estimates of their welfare costs and transfers. Not all represent viable alternatives, but all are chosen to offer useful information about policy change in specific directions. With the exception of the first two alternatives, the emphasis is on changes in federal industrial milk policy rather than fluid milk regulation.

Alternative 1: Deregulate the Domestic Market and Remove International Trade Restrictions

This alternative provides the most extreme departure from present policy. Even though it is unrealistic as a serious policy alternative, it offers insights about the general economic effects of moving in the direction of free trade. The numbers presented must be interpreted with some caution because we are not sure of exactly how

much the Canadian industrial milk sector would shrink when faced with such a price. In other words, our supply and demand elasticities are used with less confidence as we move farther away from our present range of production and consumption. The assumed world price is most important in this analysis, and its determination is described in detail in the Appendix. Because New Zealand and Australia are considered to be the "marginal" source of supply for industrial milk products, New Zealand export prices, averaged over the three most recent years (1978-1980), were translated into Canada dollars for product landed in Montreal. Accounting for the influence of increased Canadian demand on the world market price (an increase estimated as just over one-third), the resulting world price in milk equivalents at the farm gate in Canada was calculated to be \$16 per hectolitre. The resulting fall in Canadian industrial milk production would be quite dramatic, estimated here to be one-third of present industrial production. Total milk production including fluid supplies would fall to about eighty percent of the present level.

The effect on costs and transfers is also quite dramatic. National income would increase by at least \$208 million per year due to the saving of present welfare costs. Taxpayers would save \$303 million, but consumers would enjoy an annual income transfer gain of \$686 million. Overseas consumers of our nonfat solids products would suffer some losses, but producers as a group would suffer the largest loss of \$671 million. Although this policy change might reduce the stability of milk prices and output, there is no evidence to support a claim of significantly increased instability. Finally, the structure of the industry would change greatly as one-third of current production would be lost to imports, many producers would exit from the industry and remaining farms would expand in size.

This adjustment, including the exit of less efficient producers, would be costly to those concerned, in many cases leading to a temporary fall in their incomes. Because departing farmers would probably be older and engaged in smaller farming operations, their incomes are likely to be smaller to begin with. This accentuates

the problem of a fall in their revenues and their subsequent movement to other pursuits. Indeed, one might well argue that some compensation for these individuals is in order.

However, all would not be as bleak or disastrous as is often heard in a defense of current policy. First of all, dairy farmers are much more mobile in their employment opportunities than has been previously assumed. Tung and McClatchy (1980) show an impressive amount of mobility of Quebec dairy farmers between 1971 and 1976. Almost half the 1971 dairymen had left the industry by 1976, one-third of whom had moved to other types of farming and 2/3 to nonfarm pursuits. Only two in seven of this latter group were over 64 years of age, suggesting most were seeking other employment, not retiring. Results for Ontario, reported in Cumming (1980), are very similar, emphasizing the large degree of mobility over this period and the considerable movement of dairy farmers (not to mention other family members) into off-farm employment.

From these data one observes that few dairy farmers are "trapped" on their farm without opportunities for employment activities other than dairying. This is true even in rural Quebec where many regions exhibit higher than average rates of unemployment. Not only is there a surprising amount of movement both into and out of dairy farming, to alternatives which include other types of farming as well as off-farm pursuits, but the transition to these other activities appears predictable, gradual and well planned by producers. The reality is that many dairy farmers are sufficiently skilled and aware to seize existing opportunities for alternative employment when their interests are served by doing so; the paternalistic myth is that most dairymen have no alternative to producing milk short of joining the ranks of the unemployed.

Secondly, if dairymen leave the industry for nonfarm pursuits, they have the opportunity to sell their assets, including land and quota, which have likely appreciated in value since purchase. This rewards those leaving the business with capital gains which, although often unmeasured, constitute an important income source ("pension fund")

among farmers who leave agriculture. Thirdly, the adjustment cost is a once-and-for-all expense. Once paid for, it does not recur. It should be contrasted with the stream of welfare cost savings, estimated earlier to be at least some \$200 million per year.

Finally, there are some positive farm level effects from deregulation. Production decisions would become more flexible and quota values would no longer bar the potential entrant. Observations of the productivity and accessibility of the New Zealand dairy industry provide clear evidence that an open and less regulated dairy industry does not lead to disaster for producers.

Alternative 2: Remove Domestic Regulation but Retain Import Controls

This alternative essentially involves moving to an unregulated domestic market for both fluid and industrial milk, but unlike the free trade alternative above, this scenario restricts international trade, as at present. Under this alternative, the farm price of industrial milk is estimated to fall to \$23.50/hectolitre (from the present net price of \$31) and industrial production is reduced seven percent from the present 44 to 41 million hectolitres. Including both fluid and industrial sectors, this results in an annual welfare cost saving of at least \$143 million. Consumers gain by \$391 million, taxpayers again benefit by \$303 million, and producers lose \$560 million. Under this alternative, farm incomes would clearly suffer in the short run, but not nearly so much as in Alternative 1, and although exit from the industry would be increased in the short run, total production would fall by only 4.5 percent. Stability implications are once more unclear. Because quotas would no longer be used, production would be more flexible and the barriers to entry or expansion from present quota restrictions facing young and expanding producers would be gone.

A variant of this alternative (2A) is to consider deregulating only the industrial milk market. The saving in welfare costs (productivity gains) would be at least \$112 million, while consumers would enjoy a transfer gain of \$111 million, taxpayers a gain of

\$303 million, and producers a loss of \$310 million.

Alternative 3: Define Domestic Milk Requirements in Terms of Nonfat Milk Solids Rather Than Butterfat

Changing the notion of self-sufficiency to nonfat milk solids, given current support price levels, would require imports of butter and permit the elimination of surplus skim milk powder exports. This proposal is essentially that suggested by Douglas (1978), where he showed substantial efficiency gains would be enjoyed if Canada moved to such a policy. The analysis reported here shows this proposal does indeed offer efficiency gains, but at a lower level than Alternatives 1, 2 and 5 (see Welfare Cost column in Table 11). This proposal can also be seen as a move to simply increase imports (of butterfat) by a specified amount. It is assumed that the net producer price would rise (the within-quota levy to help finance export losses would no longer be needed) to \$33.53/hl., that production would occur at the present level of nonfat solids requirements, 31 million hectolitres of milk, and that support prices and direct subsidy levels would remain unchanged. Efficiency gains occur from having no costly surplus to dispose of, from reducing milk supplies that are produced at costs in excess of market values, and by profiting from the importation of inexpensive butter. However, this proposal, by maintaining net milk prices and reducing MSQ, would raise the value of market sharing quota substantially (more than twofold).

Specifically, welfare costs are reduced by \$80 million per year. Because price supports are unchanged, consumers' fortunes are unaffected. Taxpayers are assumed to enjoy the profits from importing inexpensive butter and this helps deliver a transfer gain of \$174 million to that group. Remaining producers receive a higher net price for industrial milk, generating a transfer gain of \$64 million, but the total rents received by producers better reflect the accompanying fall in industrial milk production, and despite the transfer gain rents fall by \$55 million. Of course, the costs of this adjustment in industry size are important, and they apply to this alternative as they did to Alternative 1. In a case like this, adjustment costs are probably kept lowest when the change in regulation occurs gradually. This would require a gradual reduction in MSQ to its ultimate level. In addition,

some or all of the annual net social gains (the \$80 million) could reasonably be spent to aid the adjustment of the industry.

Alternative 4: Remove Direct Subsidy and Raise Price Supports to Compensate

Without explicitly manipulating output levels of the Canadian industrial milk industry, existing pricing and payment mechanisms can be varied with large effect. Because the "target" milk price to producers is achieved by the use of a direct subsidy and price supports for butter and skim milk powder, it is possible to vary the contribution of each of these two instruments without changing the "target" level of producer milk prices. Alternative 4 is an extreme position, removing the direct subsidy entirely and using only price supports to affect the producer milk price, while Alternative 5 is the opposite extreme.

In the case of removing the direct subsidy, we assume that the support prices for butter and skim milk powder are both increased, and increased in the same proportion. This leads to a 22% increase in the two support prices. However, as butterfat consumption declines in response to this price change, domestic requirements will therefore fall to reduce the level of domestic production. By our butterfat demand elasticity, this generates a fall in production of almost 28 percent, leaving total industrial milk output at 32 million hectolitres (compared to the present 44 M. hl.). Industrial milk quota will become much more valuable as outstanding MSQ declines by this 28 percent, causing its price to increase to more than twice (about 2 1/3 times) its present level.

On balance, this alternative represents a less productive allocation of resources than the present regime. Efficiency losses on the consumption side far outweigh the gains on the production side, resulting in a net increase in welfare costs of \$45 million. This is the only policy alternative of the six considered here where efficiency losses are actually greater than under the present regulation. Producers who stay in production actually enjoy an income transfer gain of \$20 million, but due to the large reduction in production, total producer rents fall by \$94 million. Because of the substantial increase in support prices it comes as no surprise that consumers fare badly

under this alternative. Their income transfer loss is \$68 million compared to present circumstances (which already involve a transfer loss of almost \$700 million). The largest group of beneficiaries from this policy proposal is taxpayers. By avoiding the payment of a direct subsidy, taxpayers save \$280 million compared to the present regulation. Finally, due to the large increase in quota values, this proposal would bestow large capital gains on existing industrial milk quota owners and further tax both new entrants and subsequent purchasers of quota.

Alternative 5: Remove Price Supports; Raise Direct Subsidy to Compensate

This alternative is a cousin to the previous one: it maintains the same price to producers but by the opposite mechanism. It removes the price support system, allowing domestic market forces to determine the price of butterfat and nonfat solids, and supplements those market returns by an increased subsidy to keep producer milk prices at their "target" level. This proposal is consistent with the same level of production as at present because current policy sets the quota level at the market-clearing quantity, given the butterfat support price. It would result in a much lower price of skim milk powder (nonfat solids), just less than sixty percent of the current level. The direct subsidy would therefore have to almost double to \$11.95/hl. in order to maintain the same target price (\$33.31/hl.) as is presently received.

The largest change arising from this policy change is the elimination of surplus nonfat solids. Export costs and levies would disappear, generating a large efficiency gain. Welfare costs would drop by \$104 million, the third largest resource saving of all the six alternatives considered. Additional efficiency gains would be earned from the PDR sector following removal of this domestic price distortion between butterfat and nonfat solids. Producers would gain \$100 million from the elimination of the within-quota levy, and consumers would also enjoy a transfer gain, measured at \$183 million per year, compared to the present situation. Of course, not everyone can be better off among the transfer recipients and it is the taxpayers which lose from this one. They would lose by paying an additional \$231 million per year.

However, a variant of this proposal could reduce the taxpayers' obligation. Rather than raise the milk price to the target price, it could be raised to the present net-of-levy milk price to leave producers unaffected by the change. This variation would only alter the producer transfer, which would become unchanged from present regulation, and the taxpayer transfer, which would only increase to \$131 million. This variation also has the advantage of keeping quota prices at their present level. Otherwise, with an increase in the producer price the quota price would rise.

The procedure does have a disadvantage to producers. The direct subsidy is a very visible means of supporting producer incomes and increasing the taxpayer payment will only make this support more visible. As a result, the subsidy will be more subject to attack by critics, and the arrangement will be less acceptable to producers than a more subtle, less obvious form of support, such as price supports.

Alternative 6: Abandon Pricing Formula; Price According to Quota Value

This alternative involves change in only one of the present regulations, the abandonment of the pricing formula. Instead of being formula-determined, prices would be varied, however gradually, to keep the value of the industrial milk quota (MSQ) at or near zero. Pricing by this mechanism would presently lead to a fall in the farm gate price, by our estimates to \$25.25/hl. Assuming that the drop in price would be accomplished by reductions in the direct subsidy, price supports remaining constant, the subsidy would fall by \$5.80/hl. No other changes would be generated by this policy. The in-quota levy, MSQ levels, exports and imports would all remain the same.

This scheme, channelling all the price fall into reducing the direct subsidy, would have no efficiency effects in the aggregate, hence would generate no change in welfare costs. Similarly, consumers would be unaffected by this change.

What would happen is a simple, albeit large, transfer of income from producers to taxpayers. Specifically, producers lose \$256 million annually and taxpayers gain by a like amount. Because quota values would now be zero, potential new entrants would be helped by not having to acquire the MSQ. This means the present sizeable

transfer from buyers to sellers of MSQ would be eliminated.

Alternatively, reducing the milk price could be accomplished by a decrease in the support prices for nonfat solids and butterfat. This would generate welfare cost savings as long as the nonfat solids price was reduced, and would transfer income from producers to consumers. If the target price is reduced only by lowering the nonfat solids support price (68 in Table 11), welfare costs drop by \$104 million, consumers enjoy a transfer gain of \$180 million, taxpayers gain \$100 million from elimination of the in-quota levy, and producers still lose \$256 million as in 6A.

Although producers suffer a large transfer loss from this scheme, there are some production advantages. Because the industrial milk quota would now become irrelevant, producers would enjoy the flexibility of being able to produce whatever level of milk output they wished. In addition, this scheme removes the disincentive of present regulations against choosing new technologies or innovations which require a larger scale of operation. This in turn will generate a fall in welfare costs when producers make increased use of these lower cost techniques and innovations.

This alternative may appear to suggest that an unstable price path will result. However, given that quota prices respond to net returns in production, this pricing rule actually results in more stability in net returns (income) than the present system. In fact, milk prices will vary directly with costs from pricing according to this alternative in a manner which is far more accurate than any cost of production formula.

The results of the six alternatives are summarized in Table 11. Short of removing most regulations (Alternatives 1 and 2), two schemes have the most effect in increasing aggregate incomes. Redefining domestic requirements in terms of nonfat solids, Alternative 3, results in an \$80 million increase in national income, but removing price supports in favour of the direct subsidy (Alternative 5) generates \$104 million extra income per year. Unfortunately, the latter scheme costs taxpayers an additional \$130-230 million. As a result of recent budget constraints, federal policy has been moving in the opposite

TABLE 11
SUMMARY OF EFFECTS OF SIX ALTERNATIVE POLICIES COMPARED TO
PRESENT SYSTEM OF REGULATION
(in millions of 1980 dollars)

Policy Alternative	Increase (+) or Decrease (-) in:			
	Welfare Costs	Producer Transfer	Consumer Transfer	Taxpayer Transfer
1. Unregulated market, both fluid and industrial milk	-208	-671	+686	+380
2. Retain foreign trade controls; remove domestic controls	-143	-560	+391	+380
2A. Remove only indus- trial milk domestic controls	-112	-310	+111	+369
3. Domestic Requirements defined in terms of Non- fat Solids, not Butterfat	- 80	+ 64	0	+174
4. Remove Direct Subsidy; Raise price supports to compensate	+ 45	+ 20	- 68	+ 280
5. Remove Price Supports; Raise direct subsidy to compensate	-104	+100	+183	-231
5A. Only raise subsidy to generate present <u>net</u> milk price	-104	0	+183	-131
6. Abandon pricing formula; Price milk so MSQ value = 0 by means of:				
A. Lowering direct subsidy	0	-256	0	+256
B. Reducing skim milk powder price	-104	-256	+180	+100

Source: Chapters IV, V and Appendix.

direction, increasingly towards Alternative 4 with less reliance on the direct subsidy. Table 11 shows this to be the least desirable alternative from the aggregate or national point of view, actually contributing more waste and less national income than the present costly package of regulations.

Useful as this table is, it only outlines a specific set of different directions and hardly exhausts the variety of possible policy choices. Many policies exist which are intermediate positions, part way between present regulation and the listed alternatives, or combinations of two or more of those listed. For example, one might consider a policy of some reduction in the support price for skim milk powder. This policy would be a partial implementation of Alternative 5, and its effects will be some fraction of those listed in Table 11 depending on the size of the change in the skim milk powder price. Another option might be to limit subsidy payments per farm to some maximum level, keeping constant the size of the total subsidy payment, support prices and the MSQ level. This alternative would be attractive only if income redistribution among producers was desired, to give smaller producers relatively more benefits than they presently receive. This is, however, the only major effect of the proposal. Aside from lowering quota values and redistributing the otherwise unchanged package of producer benefits, all other magnitudes of Table 11 remain unaffected. Finally, one could consider removing some of the barriers to interprovincial movement of production. In the case of industrial milk, this would involve relaxing the present restrictions on movement of quota (MSQ) across provinces, and for fluid milk, this would involve permitting provincial fluid quota to be held outside the province or permitting fluid milk from other provinces to compete against the local product. Both these steps would encourage a rationalization of regional production patterns and would permit some gains from provincial comparative advantage to be realized. As a consequence, a reduction in present welfare costs could be enjoyed.

Finally, from this examination of alternatives we can associate the major policy instruments of present regulation with welfare costs and certain transfers. An increase in the target milk price, however financed, will increase the transfer to producers. When financed by an increase in the direct subsidy, taxpayers will be harmed, but when support prices are raised consumers suffer losses and additional welfare costs are generated. An increase in the volume of domestic production, say by expanding quotas, will benefit producers, harm taxpayers and, under present circumstances, add more welfare costs. In addition, quotas have a profound effect among producers by transferring income away from entering and expanding producers towards those contracting in size or leaving the industry.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Viewed through the eyes of the Dairy Farmers of Canada and other supporters of present dairy policy, the industry is strong and the policy is successful. The industry is seen as being more stable than previously, milk prices continue to rise and offset increasing costs, prices are high enough to yield fair returns to farm resources yet, given recent inflation and the growth in personal incomes, be still reasonable to consumers, and the industry in Canada is among the most productive in the world.

The conclusions of this study, addressing interests much broader than those of producers, are certainly different. Although this complex program is successful in benefitting producers handsomely, there are more people involved in the industry than producers. Milk product consumers and taxpayers are also involved and they are seriously harmed by the program. Above all, the present regulations are apparently set with neglect for national productivity effects, the outcome of which is a major waste of the nation's resources.

Providing more detail, we find that the average physical productivity of Canadian dairy farmers lags behind that of numerous other western countries. In terms of both average yield per cow and average production per man, Canada lags substantially behind the United States. One reflection of this low labour productivity is that average incomes of dairy farmers appear to be low relative to those of other Canadian farmers. The result is the ever-steady exit of dairy producers from the industry.

In part to reduce these economic pressures on individual producers to improve productivity or leave the industry, a complex and pervasive set of regulations has been devised to govern the production and marketing of milk products in this country. Producers have been heavily relied upon to aid in both the determination and operation of this regulation, to the exclusion of substantial input from other interested parties, often even the federal department of agriculture.

There is not even a pretense of involving consumers in this process, and the influence of Agriculture Canada, as distinct from the federal regulatory agency, the Canadian Dairy Commission, is usually small.

One would expect this arrangement to lead to policy very biased in favour of producers, particularly those producers well represented in the Dairy Farmers of Canada, and this turns out to be true in the extreme (see Table 10). From a list of stated program goals we find that those achieved mostly serve producer interests. Their incomes are temporarily increased, followed by capital gains on land and quota holdings, milk production levels are preserved at a higher level compared to free trade or an unregulated domestic market, price and production patterns are more predictable, and there is an aura of equity across producers. The only consumer benefits from this regulatory package are the "Made in Canada" feature of most dairy products sold in the country and the continuation of stability in milk product prices and supplies. Even the degree to which this stability is caused by current regulations is unclear. However, the costs to consumers are clear: prices of manufactured milk products in Canada are roughly double the available world market prices and fluid milk prices exceed the real (non-quota) costs of fluid production.

These apparent producer advantages and consumer costs have been quantified as the income transfers to or from the different groups. Although their direction is readily predicted, the magnitude of these transfers is startling. In addition to the benefits of a larger volume of business enjoyed by dairy product processors, milk producers as a group enjoy a transfer gain of \$671 million per year (including both the fluid and industrial milk components of current dairy policy). The loss sustained by consumers is an equally staggering sum, an annual transfer away from consumers of \$686 million. Even the taxpayer loss is formidable, \$303 million per year.

Reviewing both the process of policy formation and the numerical estimates of the income transfers causes one to note the large degree of influence held by those regulated in determining their own regulatory

rules and, subsequently, their income levels and capital gains. The absence of checks and balances to convey, if not protect, the interests of other parties involved reveals dairy policy to be incredibly one-sided, particularly at the industrial milk level. Although it is important for policy makers to know their size, little can be said about whether particular transfers are deserved. Just as some have argued that consumers and taxpayers can "afford" their current transfer losses, by the same token one can argue that producers could afford to lose their present privileged status in a move to less regulation of the industry.

What is more serious and generally damaging is the waste caused by present policy. This dairy program generates a productivity loss of at least \$208 million per year. This is a loss in national income, meaning slower economic growth and smaller slices of the economic pie for everyone in the future. At the farm level of the industry this measure is incomplete, and a host of additional productivity losses are caused by current regulations in the processing, distribution and retailing sector.

Because this waste of lost productivity represents income that only could have been earned, it appears to have been systematically ignored in the formulation of the present dairy program. Yet through these losses the program "appropriates" in excess of \$200 million of the nation's resources each year to no one's benefit, and does so without formal (or, apparently, informal) review. This lack of attention in dairy policy to productivity effects is hardly unique in Canada, but is clearly supported by Table 11. Of all the policy variations considered, only one incurs greater productivity losses than the current regime, and that is precisely the direction in which the program has been moving since the mid-1970's.

To redress this neglect of national income losses we have applied our model of the dairy industry to several alternative policy options, analyzed in detail in the previous chapter. Using that information and the policy evaluation also undertaken in that chapter, we have arrived at five general recommendations. The first three of

these suggest means of reducing the large productivity loss of present policy.

1. There are simply too many resources currently allocated to industrial milk production. Any reduction in this volume of production will lessen the waste of agricultural resources, reduce skim milk powder exports presently sold at a substantial loss, and permit savings from buying inexpensive imported butter. Although such a proposal will lead to large productivity gains and possibly consumer benefits, it clearly involves losses to the total dairy farm sector and would be strongly opposed by the Dairy Farmers of Canada. Consequently, this topic, the degree of self-sufficiency in dairy products, is a highly charged political issue.

Without question, any sizeable reduction in industrial milk production will impose short term adjustment costs on some producers who would reduce production and leave the industry. This suggests that such a policy be introduced in a manner which keeps those adjustment costs low. For example, if it were introduced gradually and with forewarning, producers would have time to adjust production and channel more of their working time to other types of agriculture or off-farm jobs. There is already clear evidence that dairy farmers do possess substantial employment mobility, even in regions of high unemployment like rural Quebec. Adjustment costs could also be kept low to departing producers by offering them acceptable compensation, such as a high price for their quota holdings. These various forms of compensation could reasonably be financed from some of the aggregate productivity gains this policy proposal would create. However, as large as these potential benefits are from reducing domestic production, considerable productivity gains can still be made by altering present regulations without changing the volume of industrial milk produced or increasing imports.

2. The present mechanism for pricing industrial milk should be changed. The arbitrary and artificial formula now used to price milk (Dairy Returns Adjustment Formula) ought to be abandoned and replaced with a pricing regime which more accurately reflects the real (non-quota)

cost of producing milk. With quota values substantially above zero it is clear that the present formula yields a price which individual farmers believe exceeds that real cost. An improved and more accurate pricing regime would operate with price being set at the level which results in a zero or other acceptably low value of quota. The new milk price would cover real costs, it would rise and fall with those costs to preserve stable net returns to producers, and for today's conditions it would result in a fall in the price of milk by some \$5.80 per hectolitre.

Those most seriously harmed by this proposal are the producers who have recently bought industrial milk quota, notably new entrants to the business. As discussed in the previous recommendation, it may be desirable to keep these losses low by introducing the scheme with forewarning and by offering some compensation to those new entrants.

Despite the transfer loss to existing producers imposed by this proposal, it does reduce the financial barrier to new producers and aids expanding producers by lowering the costs of quota. As well, such a price is defensible because of its close relation with real farm costs and its valuable stabilizing effect on net revenues. A major advantage is that it allows a reduction in support prices or the direct subsidy. By using this opportunity to lower skim milk powder prices, substantial productivity gains would be realized, in addition to increased transfers to consumers. Alternatively, to the extent the direct subsidy is reduced, taxpayer savings can be enjoyed. The advantage of following this recommendation rather than the first one is that it can generate substantial productivity benefits without the temporary dislocation that may arise from a significant reduction in milk production. Finally, this suggestion of a flexible pricing arrangement is particularly valuable for its automatic means of dealing with improvements in milk production technology. Because the present pricing formula appears incapable of dealing with improvements in technology, over time those improvements which are adopted will benefit neither producer nor consumer and will simply increase the price of quota.

3. Federal industrial milk policy should be moved away from the use of price supports and more toward the use of the direct subsidy. In other words, the current trend in federal dairy policy, to finance producer milk prices by always reducing the real value of the direct subsidy and increasing the support prices for milk products, should be stopped and reversed. Again, this proposal is attractive because of the large productivity gains which it contributes to the economy. Unlike earlier recommendations, this proposal involves no financial losses to producers, either individually or in the aggregate. Although they may prefer less direct means of support than the subsidy, producers can actually benefit from such a policy shift, due to the fact that total production is unchanged and net producer prices could rise. Consumers will definitely benefit from this proposal but taxpayers are the ones who must finance it and who must, of course, suffer the loss. Unfortunately, it is the tax cost of this scheme which militates against its acceptance and encourages adoption of policies which instead involve tinkering with market prices.

Present policy arrangements generally involve many price distortions and indicate no appreciation for the crucial role which price signals and incentives play in affecting individual decisions and national productivity. Given our present surplus of skim milk powder, this problem of price distortions affecting the consumption of dairy products is made clear. But the problem is also evident at both farm and processing levels. Despite this surplus, domestic prices neither discourage skim milk supplies nor encourage alternate uses of them. In fact, these prices promote a bias in favour of marketing the lowly-valued skim milk along with the cream and against processing milk products like cheese which utilize both skim milk and butterfat (unlike butter). This bias is wastefully maintained in the present dairy program by universal application of the within-quota levy, the butter storage and transportation subsidy and the manufacturing plant supply allocation system. As a result, an array of incentives encourages producers to supply incorrect amounts of butterfat and nonfat solids to the market and processors to manufacture the wrong

mix of final products. It is then not surprising to find that productivity losses are presently so large.

4. In the interest of achieving a reasonable degree of fairness in dairy policy, the benefits of the current program should be redistributed among producers. At present, net farm incomes are only temporarily raised, and they soon become capitalized into quota and land prices. This leaves the lion's share of the program benefits as capital gains in the hands of the small group of producers who have the largest holdings of these two assets. The many small producers (see Table 9) enjoy very small gains. In addition, post-1975 entrants to the industrial milk market who had to purchase their land and quota have benefitted little from the present milk price levels and regulation. Those who were already producing industrial milk in the early 1970's have enjoyed capital gains on both land and quota assets. If they remain in the industry, they are still enjoying their accrued gains, but if they have left the industry since 1975, they were able to take with them all the future years' benefits of the higher milk price by selling their land and quota.

Admittedly, income redistribution towards the poorer dairy farmers is not the objective of present dairy policy, but surely neither is the intent to concentrate the program benefits so heavily in favour of the most viable and asset-rich producers or away from young and entering dairy farmers. One method of removing this large intergenerational transfer is to eliminate the main policy instrument responsible, the quota. When done simply by relaxing restrictions with no other program changes, costly and wasteful surpluses are likely to occur. A more workable and efficient means is to lower milk prices, as suggested earlier, until the quota has no market value. It is no solution to ban the trade in quota; the program benefits would then be capitalized into another asset, usually land, to preserve the problem as before. Alternatively, the producer subsidy can be paid with a limit on the size of payment per farm.

Although this small sample of options offers no easy solution, the alternative of maintaining the status quo is unattractive. Because

the young and entering producers are presently left with little share in the regulatory benefits, they are likely to place demands on the regulators for higher milk prices to offer them the opportunity for their own capital gains. This not only suggests that strong pressure will be mounted to maintain the present regulatory framework, but that milk prices are likely to grow and increase the national productivity losses and costs to consumers and taxpayers.

In addition, the present inequities will predictably lead to demands for further regulations. Even now, there are demands for new programs and rules to help finance the entry of younger farmers who face such high milk quota and land costs. Rather than attack the real causes of the problems, governments are pressed to multiply regulations, like applying band-aids on top of band-aids, with little regard for the ensuing costs to consumers, taxpayers, producers and national productivity.

5. Finally, if nothing else is to be done, at least the process by which dairy policy is formed should be changed. Specifically, the process should be made less closed and producer-dominated by opening it up to include more of the parties affected by dairy policy.

Because present policy is largely determined by the Canadian Dairy Commission in close collaboration with the Dairy Farmers of Canada, the process can be opened up by removing their monopoly. Three of many options to accomplish this democratization are suggested here. Whether dairy policy decisions continue to be made by the C.D.C. or are formed elsewhere, they could be subjected to review and acceptance by a non-dairy industry body, such as the National Farm Products Marketing Agency. Alternatively, the C.D.C. could concentrate on operating the pricing system and export program, and a new body composed of consumer and government as well as producer representatives could make the policy decisions. It would even be a major improvement to policy-making if the federal department of agriculture, Agriculture Canada, was to have an influential and decisive role in determining dairy policy, in contrast to its present nominal role.

Of the selection of recommendations and policy alternatives presented here and in Table 11, none were suggested expressly to reduce producer advantages (rents), yet virtually all do so in some form or another. This situation arises not by chance but because the present system is designed so much in the producer's favour. It is indicative of the skill of the Dairy Farmers of Canada that virtually none of the alternatives examined here can improve the collective well-being of Canadian dairy farmers. However, it also suggests that if the policy-making process is left unchanged, nothing will occur to reduce the existing transfers or, more importantly, the enormous waste and productivity losses. In fact, over time they are likely to grow.

APPENDIX

THE ESTIMATION OF WELFARE COSTS AND TRANSFERS

The resource allocation costs and transfers presented in Chapter IV are estimated with the use of a static supply-demand framework, described in some detail in this Appendix. Because all regulations at the processing, distribution and retailing levels are presently ignored, this analysis is focussed on farm level aggregate markets for industrial and fluid milk. Consequently, the costs and transfers measured apply to only the farm production sector of the dairy industry.

Industrial Milk Market Analysis

Analysis of the industrial milk market is hampered by a lack of precise information regarding the positions (levels) and slopes of the various supply and demand curves. Market quantity data from the 1979 calendar year was combined with price data for the second quarter of 1980 (April-June) to position the curves. To arrive at the unobserved aggregate demand curve of all industrial milk we used the fact that industrial milk is composed of the joint products of butterfat and nonfat milk solids (skim milk). Because these two joint products are supplied in approximately fixed proportions, the aggregate demand curve is the vertical sum of the demand curves for butterfat and solids-not-fat. We could assume that the mix of these two components supplied to the market was independent of price because the federal price support policy and multiple uses for butterfat and nonfat solids preserved the relative independence of their demand curves.

For each of them we know one point, the domestic disappearance of butterfat at the support price for butter, and the domestic disappearance of nonfat solids at the skim milk powder support price. In the case of butterfat, we know that 44 million hectolitres (hl.) in milk equivalents were produced, but that net butter and evaporated milk exports must be subtracted and net cheese imports added to arrive at domestic demand for butterfat. These manufactured dairy products were transferred into milk equivalents by assuming that one hectolitre

of milk would yield 4.32 kilograms (kg.) of butter and 8.23 kg. of skim milk powder (produced jointly), 2.27 cases (42 l.) of evaporated milk, or 5 kg. of cheese. From data for calendar 1979, this shows domestic demand for butterfat to be 43.8 million hectolitres, assumed to be stable for 1980 at the April 1/80 net farm price of \$13.31 per hl. of milk equivalent. This butter price was arrived at from the support price of \$3.43 per kg. (\$14.40 per hl. milk), less the assumed (30%) proportion of the \$3.64/hl. processor margin applicable from April 1, 1980.

The demand for nonfat solids was determined similarly, but subtracting from domestic production (44 M hl.) the milk equivalent of evaporated milk and skim milk powder exports, to arrive at domestic demand for nonfat solids. This was calculated to be 31 M hl. in milk equivalents for 1979. Assuming a stable demand for 1980, we can associate this quantity with the net farm skim milk price of \$14.00 per hl. in milk equivalents, arrived at from a skim milk powder support price of \$2.00 per kg. (\$16.54 per hl. milk) less an assumed 70 percent of the processor margin of \$3.64.

Elasticities for these two curves were not directly available. Consequently, they were drawn from previous estimates of demand elasticities for specific manufactured milk products combined with knowledge of the proportions of butterfat and nonfat solids used in the production of these various products.

Drawing on recent unpublished Agriculture Canada estimates and those reported in Stonehouse, Harrington and Sahi¹ we note butter demand elasticities typically exceed (minus) one, cheese elasticities are in the range of -0.6 to -0.9, while skim milk powder elasticities are usually between -0.1 and -0.3. The influence of butter on the demand for butterfat and of skim milk powder on the demand for nonfat solids leads one to expect a more elastic demand for butterfat than for nonfat solids. Bearing in mind the elasticity levels noted and the fact that the demands for butterfat and nonfat solids are derived

¹ D.P. Stonehouse, D.H. Harrington and R.K. Sahi, "An Econometric Forecasting and Policy Analysis Model of the Canadian Dairy Industry", in Commodity Forecasting Models for Canadian Agriculture, vol. 1, coord. Z.A. Hassan and H.B. Huff (Ottawa: Agriculture Canada, 1978), p.77.

demands, we considered a range of elasticities from -1.0 to -1.5 for butterfat and a range from -0.75 to -1.25 for nonfat solids. For the standard reporting of results the values of -1.0 for nonfat solids (η_{ns}) and -1.25 for butterfat (η_{bf}) were used. These demand curves were assumed to be linear.

In choosing the absolute size of these elasticities, an important consideration was the elasticity of the resulting (industrial) demand for whole milk. For butterfat and nonfat solids demand elasticities of -1.25 and -1.0, respectively, the implied elasticity of demand for whole milk is -0.7.

Another means of investigating the demand elasticity for industrial milk is to consider the weighted average of the elasticities of demand for the component products. Using domestic disappearance data for 1979 as weights and mean elasticity estimates from the sources noted above (butter, -1.0; cheese, -0.7; evaporated milk, -1.3; skim milk powder, -0.3), the weighted average elasticity of industrial demand for raw milk was -0.84. Recent U.S. studies of a similar nature¹ have used more elastic estimates, typically larger (in absolute value) than -1. As a means of testing the importance of these elasticity assumptions, sensitivity tests were conducted for industrial milk demand elasticities between -0.5 and -0.9. Although our estimated welfare costs and transfers were quite robust with respect to different demand elasticities, our choice of a slightly smaller demand elasticity (-0.7) will have the general effect of reducing estimated welfare costs and increasing estimated transfers.

Given the existence of industrial milk quotas to restrict production, the supply curve inclusive of costs of holding the quota will equal the aggregate quantity of quota at the net farm gate milk price. The aggregate quantity of industrial milk quota (MSQ) is 44 M.h.l. and the net farm gate price for industrial milk is the target price less the in-quota levy, or \$31.08/hl. during the second quarter of 1980.

¹See, for example, Paul W. MacAvoy, Ed., Federal Milk Marketing Orders and Price Supports, Ford Administration Papers on Regulatory Reform, Washington, D.C.: American Enterprise Institute for Public Policy Research, 1977.

The supply curve reflecting true resource costs (net of the costs of holding the quota) will be beneath that described above by the flow cost per unit of milk of holding the quota. Using prices of industrial milk quota (MSQ) traded in Ontario and Quebec during March and April, 1980 (between \$23 and \$29 per annual hectolitre of milk) and an interest rate of 12 percent (1978 average interest rate for all agricultural credit in Canada), two bounds on the annual cost per hectolitre of milk of holding the quota were calculated.

The minimum cost would be only an interest cost on the investment, with no risk premium, depreciation or appreciation anticipated. This is equivalent to treating the quota as an infinitely-lived asset, its returns discounted at the rate of interest. The annual cost is then calculated to be \$3.10 per hectolitre. Alternatively, the quota can be treated as a risky asset, in some jeopardy of continuing to convey its present benefits. There is no direct evidence of an upper bound on this risk, but we judge it to be equivalent to expecting only four years of benefits from the quota¹. The resulting annual cost is \$8.50/hl. These two values serve as the basis for upper and lower bound estimates, respectively, of the supply price (P_s) of industrial milk production for the sensitivity tests reported in Chapter IV. For the base case analysis, the annual cost of holding the quota is assumed to be the mean of these two values, \$5.80/hl. This implies that the quota asset is expected to yield its benefits for 6.7 years.

The resulting supply price of milk at the aggregate margin of production (MSQ level) is \$25.26/hl. (\$11.12/cwt.). The supply elasticity was assumed to be +1.0, but sensitivity tests of alternate values (+0.5; +1.5) were undertaken.

The resulting supply and demand curves are illustrated in Figure 5. The demand for butterfat is labelled D_{bf} , with an elasticity of -1.25 through the point, (43.8 M. hl., \$13.31/hl.). The demand for nonfat solids is labelled D_{ns} with an elasticity of -1.0 through the point (30.9, \$14.00). The vertical sum of these two curves gives us

¹ Aside from casual evidence of four and five year time horizons, a similar figure is assumed in Peter L. Arcus, "The Values of Milk Quotas in British Columbia", Canadian Journal of Agricultural Economics 26 (July 1978):62-71, and calculated in Richard R. Barichello, "Milk Quotas and Cost of Production in the B.C. Milk Industry", unpublished, 1977.

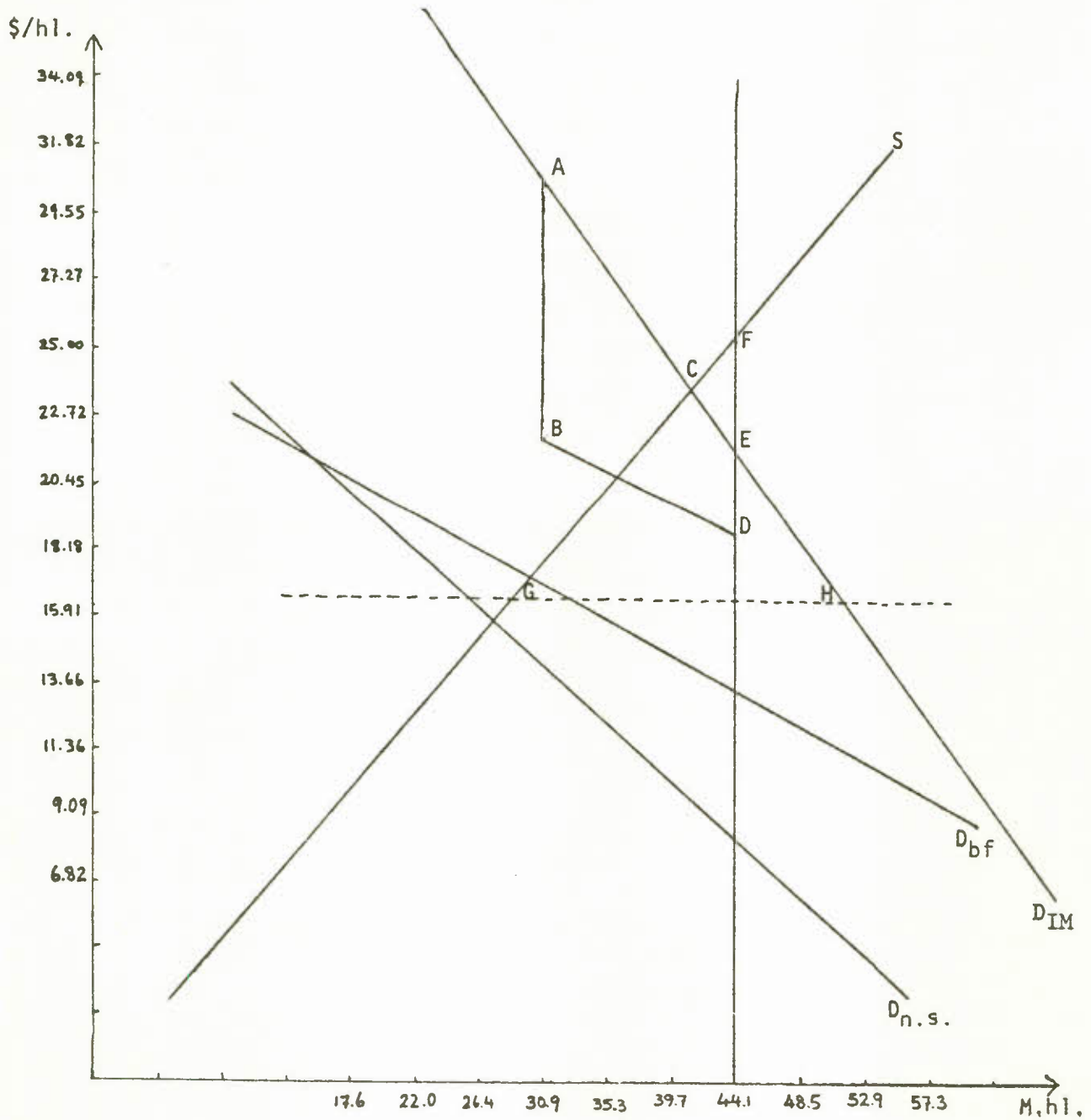


Fig. 5. - Canadian Industrial Milk Market

the demand for industrial milk, D_{IM} , with an elasticity of -0.7 at the point, (44 M. hl., \$21.40). The supply curve is labelled, S, cutting the point (44 M. hl., \$25.26) with unit elasticity.

A final variable of considerable interest to this analysis of dairy policy is the world price of industrial milk. It is important in order to properly value present production and to consider the alternative of exploiting opportunities of international trade. Two particular problems arise in considering the world price. First, because the world market of industrial milk products is a residual (and fairly thin) market, subject to large exogenous shocks in supply and demand from various domestic policy changes, there is considerable price variability.¹ Secondly, if Canada moved unilaterally to free trade, the volume of Canadian industrial milk imports would be likely to affect the world price, a factor that ought to be incorporated in any calculation of the effective import price facing Canada.

Rather than use only the current import price of manufactured milk products, with all the uncertainty for future prices which that would entail, we have chosen to use the mean value of the three most recent years, 1978, 1979 and 1980 (2nd quarter), translated into 1980 dollars, to represent the expected "world price". Because New Zealand and Australia are considered to be the marginal sources of supply, the New Zealand export price (f.o.b. New Zealand²) was translated into Canadian dollars, estimated freight and insurance charges were added and resulting prices were inflated to 1980:II dollars. The mean values of these three years are \$960 per tonne for skim milk powder and \$1700 per tonne for butter. Translating to equivalents of milk these prices became \$7.91/hl. and \$7.36/hl. respectively, and after subtracting the 1980 processor margin, the net farm gate prices, again in milk equivalents, became \$5.37 and \$6.28. The average (1978-1980) import value of one hectolitre of milk at the farm gate was then \$11.65, but over the period this value would range from a low of \$5.91 (1978) to a high of \$16.22 (1980:II). Sensitivity tests were later carried out

¹ In only the last three years, the price of skim milk powder, c.i.f. Montreal, has varied from \$460 to \$1395 per tonne.

² New Zealand export prices and estimated freight and insurance charges were obtained from Agriculture Canada, Ottawa.

with world price levels 40 percent above and below this mean level (\$11.65) to show the large effect that this range of values had on estimated welfare costs and transfers.

Our second concern is to estimate the effect which Canada would have on these world prices if a unilateral move by this country to free trade was adopted. Increased Canadian demand for industrial milk products would call forth additional supplies from those countries which represent marginal sources of supply at current world prices. Despite the large contribution of the European Economic Community to world trade in dairy products, this trade volume is exogenously determined as a result of domestic policy decisions. Given E.E.C. support prices, the supply price of milk from within the community is between \$32 and \$34 per hectolitre, and at world prices which are less than twenty dollars per hl., exports from the E.E.C. would not be responsive to price. This situation prevails in North America as well as in Europe, and the marginal source of supply of world dairy product imports is considered to include only New Zealand and Australia. In that case we are interested in the excess supply elasticity from those countries to allow prediction of the price effects of Canada's increased imports due to a Canadian shift to free trade.

Our strategy in this question is to estimate the largest reasonable world price response. This will place a lower bound on the associated welfare costs and transfers, a strategy pursued throughout this analysis. In estimating the excess supply elasticity, a lower bound estimate was obtained by using New Zealand data alone, and choosing rather small supply and demand elasticities. Specifically, New Zealand exports about eighty percent of its total production and domestic supply and demand elasticities were assumed to be +0.5 and -0.5, respectively. The resulting excess supply elasticity is +0.75, and adding Australian data, where almost 40% of total production is exported, would only increase the size of this elasticity.

The volume of industrial milk products presently exported by these countries was calculated to be equivalent to 67 million hectolitres,

including cheese, butter and skim milk powder only. To account for omitted products, this figure was rounded to 70 M hl. The rest of the world was assumed to have a zero excess demand elasticity, with only Canada varying its imports in response to changing world prices. Collectively, these assumptions all overstate the increase in world prices which can be expected. Consistent with our earlier model (Figure 5), Canada was assumed to have a unit elastic supply of industrial milk and a demand elasticity of -0.7.

The price effect can be determined by assuming some volume of imports demanded by Canada (consistent with some price, P_0) and, given both the proportionate increase in imports and the excess supply elasticity, calculating the percentage price change. This new price, p' , is an equilibrium price when it is equal to the initial price, P_0 , a solution which can be found in several iterations. Beginning with the mean world price, \$11.65/hl., and the data outlined above, a unilateral movement by Canada to free trade in industrial milk would generate a 38% increase in the world price to a level of \$16.13/hl.¹ This value generates the segment GH in Figure 5, an important element of the welfare cost and transfer estimates to be presented next.

The calculation of welfare costs and transfers proceeded from Figure 5. The resource allocation or welfare costs were generated from four sources. First, because an unregulated domestic industry equilibrium would occur at the intersection of the supply and demand curves, at an output of 41 million hl. and a farm gate price of \$23.50 per hl., present policies generate excess milk production in Canada. This loss is measured by the triangle CEF, a loss of \$5.95 M.

Second, because present support prices for skim milk powder and butter cause domestic surpluses of skim milk powder which is exported at world prices, the actual value of Canadian milk production falls short of the value placed on it by domestic consumers. This loss

¹ Similarly a high (+40%) world price of \$16.30/hl. would be increased 19% to \$19.45/hl., and a low (-40%) world price of \$7.00/hl. would be increased to \$11.65/hl by a Canadian shift to free trade.

arises from reduced consumption of skim milk powder plus losses incurred on skim milk powder exports, and is measured in Figure 5 by the area, ABDE. The segment BD measures the actual value of Canadian milk production, beginning at the margin of domestic nonfat solids consumption (31 M hl.), after which milk is valued at the demand for butterfat (consumed domestically) plus the value of exported skim milk powder (priced at the net farm gate price of exported skim milk powder in milk equivalents, second quarter 1980 prices, \$5.37/hl. cwt.). This loss from allocating skim milk to lower-valued consumption uses than domestic consumers would be willing to pay, amounts to \$74.40 M.

The third sources of loss is caused by our import barriers which restrict domestic consumption and increase domestic production compared to the alternative of importing industrial milk products from New Zealand and Australia. This loss is illustrated by triangle GCH which measures \$65.72 M. It should be noted in passing that this loss from restricting imports is extremely sensitive to assumptions about world prices. For example, at high world prices, this component of welfare costs falls to \$20.20 M., and at the low world prices, increases to \$184.29 M.

Finally, there is a component of resource cost to Canada which is not displayed in Figure 5 and that is the cost of activities of the Canadian Dairy Commission. These costs are taken from the most recent data, 1977-78, and include costs of administration, marketing, research, advertising and other marketing expenses. They do not include losses on export operations, because it is assumed that these losses are included in the area, ABDE, already measured. The total cost of these C.D.C. activities, inflated to 1980 dollars, is \$31.70 M.

In sum, the resource allocation or welfare costs of the present industrial milk program to the farm gate are conservatively measured at \$178 million.

The transfers generated by present policies can also be calculated from Figure 5. Producers would receive a price of \$16.13 per cwt. if present regulations and import barriers were removed, and would

consequently produce only some 28 M hl. Because they presently receive a net price of \$31.08, they enjoy a transfer gain of $(31.08-16.13)$ 28.1 M or \$420 million. Consumers suffer a transfer loss of \$406 million when considering both butterfat and nonfat solids. Their present butterfat consumption of 43.8 M hl. would be available in an unregulated market at an effective price of \$8.70 per hl. instead of the present \$13.31, generating a loss due to the present regulation of \$203 M. For nonfat solids, the present consumption of 30.9 M hl. presently costs \$14.00 per hl. instead of an unregulated \$7.43, a loss of \$203 million. The present policy costs taxpayers \$292 M in 1977-78 dollars. The subsidy component has stayed constant, but the remaining C.D.C. costs have been inflated to 1980 dollars, giving a total tax cost of \$303 million. Within the dairy farm community the policy generates a transfer in the long run from buyers of industrial milk quota to MSQ sellers, in an amount equal to \$256 M., the product of an annual quota cost of \$5.81/hl. and the outstanding quota stock of 44 million hectolitres. The last element of transfer is a gain to overseas importers of Canadian skim milk product exports, who are buying a product at low world prices which costs Canada the high domestic cost of production, measured as a residual to be \$318 million. Finally, it should be noted that all these costs and transfers are expressed on an annual flow basis, in 1980 dollars, and they will continue as long as present circumstances prevail.

Fluid Milk Market

The analysis of the fluid milk market is more straightforward, because the product is more homogeneous and data are more readily available. Although regulations differ by province, the analysis was simplified by considering only two provinces, Ontario and British Columbia. The results from Ontario were extrapolated to the rest of Canada excluding B.C. and the results from B.C. were subsequently added.

The demand curve for fluid milk was assumed to have an elasticity of -0.35 at the point of present consumption. For Ontario, that point was the 1978-79 level of Class I consumption (9.93 M. hl.) at the Class I

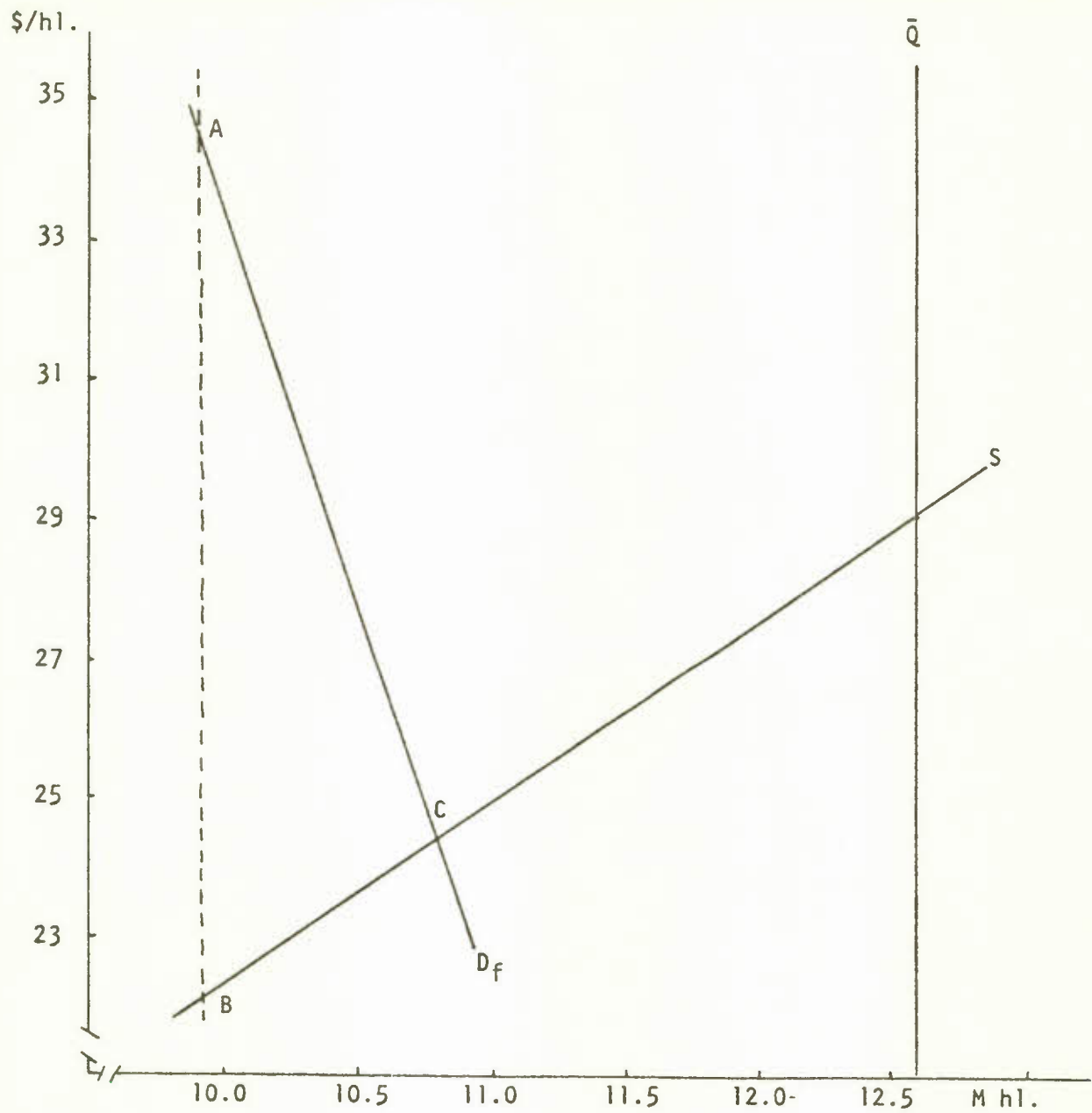


Fig. 6. - Ontario Fluid Milk Market

price of \$34.39/hl. The supply curve, inclusive of quota costs, cuts the level of fluid quota production (1978-79), 12.61 M hl., at the group 1 (blend) price of \$32.22/hl. Given fluid quota prices of \$67 per litre of daily delivery and an interest rate of 12 percent, the annual cost of holding the quota was calculated as for the industrial milk market discussed above, resulting in a cost estimate of \$4.12/hl. The supply curve, net of quota costs, therefore, cuts the level of fluid quota production at \$28.10/hl., and its elasticity at that point is assumed to be +1.0, comparable to the assumption for the industrial milk market.

These facts and assumptions indicate an unregulated equilibrium price of \$24.40/hl. at an output of 10.94 M hl. This is illustrated in Figure 6 by point C, the intersection of the demand curve, D_f , and the real resource cost supply curve, S. The welfare cost is measured by the triangle, ABC, the net value of consumption foregone due to the higher than equilibrium Class 1 price of \$6.19 M. In addition, the administrative costs of the Ontario Milk Marketing Board, \$4.53 M, represent the remaining resource cost of present Ontario fluid milk market regulation. When extrapolated to the rest of Canada, excluding B.C., the total welfare cost is \$24.04 M, and when similar calculations for British Columbia are added, the resource cost of fluid milk regulation in Canada is estimated at \$30.47.

Transfers implicit in fluid milk regulation can also be calculated from Figure 6. At present consumption levels (9.93 M hl.), consumers pay \$34.39/hl. instead of an unregulated \$24.40, to generate a transfer loss of \$99 M to Ontario fluid milk consumers. Producers would receive \$24.40/hl. on 10.94 M hl. of production in an unregulated market, but under present regulations receive \$32.22/hl., a transfer gain of \$86 M. But more significantly, those who sell fluid milk quotas receive a transfer gain over the long run of \$52 M, at the

expense of those who purchase the quota asset. This annual transfer is calculated as the product of the annual interest cost of holding the quota (\$4.12/hl.) and the outstanding stock of fluid quota.

These transfers were extrapolated to the rest of Canada and the B.C. estimates added as described for fluid milk welfare costs. This showed producers to benefit by a transfer gain of \$250 M, consumers to lose from present fluid regulation by \$280 M, and fluid quota sellers to gain at the expense of quota purchasers by \$176 M.

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