STAFF STUDY No. 8

Export Projections to 1970

by J. R. Downs

prepared for the
Economic Council of Canada

EXPORT PROJECTIONS TO 1970

by

J. R. Downs

Staff Study No. 8

Economic Council of Canada

December 1964

This is one of a series of technical studies which have been prepared as background papers for the First Annual Review of the Economic Council of Canada. Although these studies are published under the auspices of the Economic Council, the views expressed in each case are those of the authors themselves. At the end of this Study is a list of additional studies which are being published separately and are available from the Queen's Printer, Ottawa.

Available by mail from the Queen's Printer, Ottawa,
and at the following Canadian Government bookshops:

OTTAWA
Daly Building, Corner Mackenzie and Rideau

TORONTO
Mackenzie Building, 36 Adelaide St. East

MONTREAL
Æterna-Vie Building, 1182 St. Catherine St. West

or through your bookseller

A deposit copy of this publication is also available
for reference in public libraries across Canada

Price 75 cents Catalogue No. EC22-1/8

Price subject to change without notice

ROGER DUHAMEL, F.R.S.C.
Queen's Printer and Controller of Stationery
Ottawa, Canada
1965

TABLE OF CONTENTS

Tables

Charts

EXPORT PROJECTIONS TO 1970

The main purpose of this paper is to assess the potential level of Canadian exports in 1970, in a world in which foreign industrial production is growing at a moderately high rate and the Canadian economy is operating at a high level of output and a low level of unemployment. A further purpose is to make broad assessments of the direction and composition of the over-all projection of exports in 1970. In order to place both the logic of the projection techniques and results in perspective, a brief review of Canadian export trends since 1900 is incorporated in the paper. Because the growth of Canadian exports since the mid-1920's has been closely related to requirements of the main industrial countries for material supplies, a comparison is also made of the rates of growth since 1900 of industrial production, particularly in the United States, and of consumption of raw materials.

The techniques of projection are described generally in the following paragraphs. Exports were divided into agricultural and nonagricultural groups.[1/] The volume of nonagricultural exports was calculated as an index, using value, price and volume data already available in publications of the Dominion Bureau of Statistics.[2/] Indexes were prepared for the volume of nonagricultural exports to all countries, and to the United States separately, for the period 1926 to 1963. These indexes were then fitted by least square regressions to indexes of industrial production in other countries on the same bases. The volume index for exports to all countries was fitted in this way to the combined index of industrial production of industrial countries of the Organization for Economic Co-operation and Development (OECD), which in this study is called world industrial production.[3/] The index of export volume to the United States was fitted to the index of United States industrial production.

The computed elasticity of export volume in relation to world industrial production, together with a projection of world industrial production 1963-70, provided the basis for projecting the level of export volume to all countries in 1970. The elasticity of export volume to the United States in relation to United States industrial production, adjusted for an evident time shift in the post-war period, provided the basis

---

1/ The agricultural group has been defined according to the Dominion Bureau of Statistics export classification in effect before 1961; that is, agricultural and vegetable products, plus animals and animal products, including items such as whisky and fish.

2/ Particularly Trade of Canada, Volume I, and Review of Foreign Trade, first half of 1954. Export volume indexes were constructed from 1948 constant dollar data.

3/ The countries in question are the United States, West European industrial countries, and Japan. See Table A-2 in the Statistical Appendix.

for judging the direction of the projected volume of nonagricultural exports in 1970, as between the United States and overseas countries.

World industrial production was projected at a growth rate slightly over 5.5 per cent per annum, and United States industrial production at 5.0 per cent per annum between 1963 and 1970. These projections were prepared by other members of the staff of the Economic Council of Canada, on the basis of growth rates projected to 1970 for real Gross National Product by the OECD and EEC for West European countries, by the Economic Planning Agency of Japan, and on assumptions for the United States of moderately high levels of output and employment in 1970.

A broad assessment of the composition of nonagricultural export volume in 1970 was compiled on the basis of commodity analyses of export prospects at the projected rate of growth of foreign industrial production. In making these assessments, considerable reliance was placed on consultations with specialists in private industry and public service. It was not practicable to analyze each commodity or export subgroup in this way.[1/] In particular, exports of a range of miscellaneous materials, and of highly manufactured products, were placed within the projected total volume of nonagricultural exports in 1970, by means of conservative assumptions about their future rates of growth. These assumptions were based on historically stable relationships between "miscellaneous" product groupings within a larger grouping,[2/] actual experience of growth in the post-war years for the products concerned, and regression analysis of the volume of exports of materials as a group (excluding highly manufactured products) in the post-war years which allowed the calculation as a residual of a "bench-mark" figure for materials not covered by the explicit commodity analyses. For highly manufactured exports, particular account was taken of the effects of the exchange rate fixed for the Canadian dollar in 1962, relatively stable internal Canadian prices, and recent public measures ranging from long-term financing to defence production sharing and trade promotion. The composition of export volume compiled on the foregoing bases constitutes an approximate distribution consistent with the total volume projected by other means. The aggregated projections for major groups of products (within the over-all projection) are considered to be better than the separate commodity assessments.

1/ Specific analyses covered some 75 per cent of "materials", that is, of nonagricultural products excluding highly manufactured products.

2/ For example, the relationship of "other forest products" within the group that also includes newsprint, pulp and lumber.

As regards Canadian agricultural exports, volume projections were made entirely on the basis of commodity analyses. In the case of wheat, data on orders and intentions to order by Communist countries as far ahead as 1967-68 were useful in complementing assessments of Canada's possible export performance in more traditional markets for wheat and grain to 1970. This procedure runs the risk of being misunderstood as a forecast of actual sales, rather than as a projection of the average magnitude of export volume around 1970. It is, of course, the latter. In respect of agricultural products other than grain, projections here also owe much to consultations with experts, as well as commodity projections already prepared by specialists.

I - CANADIAN EXPORT TRENDS SINCE 1900

Production of goods for sale to customers in other countries has long been a large and integral part of Canadian economic activity. Between 1900 and 1963, the value of Canadian exports multiplied about 35 times, and volume increased about 11 times.[1/]

In 1900, Canadian merchandise exports other than gold amounted to about 20 per cent of the value of the Gross National Product, and in 1963 to about 16 per cent. In the 1920's, exports were the equivalent of more than one fifth of GNP, and in the 1950's the equivalent of about one sixth. As a proportion of the GDP of the goods-producing industries in Canada, exports have been even more significant, as is shown in the accompanying table. In the 1960's, for example, exports have accounted for nearly half of the output of the goods-producing industries in Canada.

Table 1

Merchandise Exports as a Percentage of the Gross National Product and of the Gross Domestic Product of Goods-Producing Industries in Canada, Selected Years, 1900-63

Per Cent of:	1900	1926	1935	1945	1955	1963
GNP	20	24	17	27	16	16
GDP of goods-producing industries	n.a.	57	54	68	42	48

Source: Statistical Appendix Table A-1. The goods-producing industries are defined as agriculture, forestry, fishing and trapping, mining and manufacturing.

1/ See Statistical Appendix Table A-1.

In terms of value, agricultural exports grew about as rapidly as nonagricultural exports from 1900 to the late 1920's. As late as 1928, agricultural products accounted for some 59 per cent of Canadian merchandise exports, roughly similar to the proportion in 1900 which was 56 per cent. Since 1928, however, there has been a steady rise in the proportion of nonagricultural products which in 1963 accounted for over three quarters of exports.

In terms of volume, agricultural exports in 1963 were nearly 60 per cent above their 1926 level, while nonagricultural exports were about 340 per cent above their 1926 level. Table 2 summarizes the composition and volume of exports for selected years since 1926.

Table 2

Composition and Volume of Exports, Selected Years, 1926-63

Composition of Exports	1926	1936	1950	1963
(Per cent of current values)				
Wheat and grain	38	27	15	13
Other agricultural	20	21	17	11
Total agricultural exports	58	48	32	24
Forest products	23	21	35	27
Minerals	9	22	20	32
Chemicals	1	2	3	4
Highly manufactured products	8	6	9	12
Other (residual)	1	1	1	1
Total nonagricultural exports	42	52	68	76
Total exports	100	100	100	100
Volume of Exports (1953 = 100)				
Agricultural	74	71	72	117
Nonagricultural	38	51	88	166
Total exports	52	59	83	153

Source: Based on data from the Dominion Bureau of Statistics

The direction of Canadian exports has also undergone substantial changes since 1900. The main change has been a relative shift away from the United Kingdom market, towards the United States and third country markets. There was, in fact, no marked statistical trend between 1900 and 1926 in the relative importance of the United States market, and the more noteworthy feature in that period was the rise in the relative importance of third country markets, particularly between 1918 and 1928. Since the late 1920's, there has been no marked trend in the relative importance of third country markets as a group. During the 1930's, the decline in the relative importance of the British market was temporarily reversed. In 1948, there occurred an apparently

sudden upward movement in the relative importance of the United States market, which may perhaps be characterized as the emergence of a trend which had been obscured in the statistics by the impact of commercial policies during the great depression, by public controls on exports during the war years, as well as by heavy exports to overseas countries in the immediate post-war years, partly financed by Canadian loans to Britain and other countries.[1/] Table 3, which follows, provides figures on the direction of exports for selected years since 1900.

Table 3

Direction of Canadian Merchandise Exports

(Per cent of current values)

To:	1900(1)	1910(1)	1928	1938	1947	1948	1958	1963
United States	34	37	36	32	37	49	59	55
Britain	57	50	33	41	27	22	16	15
Other	9	13	31	27	36	29	25	30

(1) Fiscal years.

Source: Based on data from the Dominion Bureau of Statistics.

The foregoing broad trends in the size, composition, and direction of Canadian exports reflect responses of exporters to the growth of external demands and a long-term rise of Canadian participation in international trade. In terms of volume, Canadian exports multiplied about 11 times between 1900 and 1963, while exports of all countries multiplied about 6 times. In terms of value (f.o.b. in United States dollars), Canadian exports accounted for about 1.9 per cent of the exports of all countries in the period 1900-13; for about 3.7 per cent in 1924-38; and for an estimated 4.6 per cent in 1950-63.[2/]

Since the mid-1920's, Canadian export growth trends reflect, especially, requirements for raw and processed materials generated by the growth of industrial production in the United States and other advanced countries.

1/ For an earlier discussion see David W. Slater, "Changes in the Structure of Canada's International Trade", C.J.E.P.S., February 1955. See also R. Warren James, Wartime Economic Co-operation, C.I.I.A., Ryerson, 1949, Chapters VI and VII. The data in the table before 1947 generally overstate the importance of the U.K. market, and understate the "other" group. See R.V. Anderson, The Future of Canada's Export Trade, a study for the Royal Commission on Canada's Economic Prospects, Ottawa, 1957, pp. 18-19.

2/ Sources of data on which these volume and value figures are based are Dominion Bureau of Statistics; Angus Maddison, "Growth and Fluctuation in the World Economy, 1870-1960," in Banca Nazionale del Lavoro Quarterly Review, June 1962; OECD, General Statistics. See Table A-5 in the Statistical Appendix.

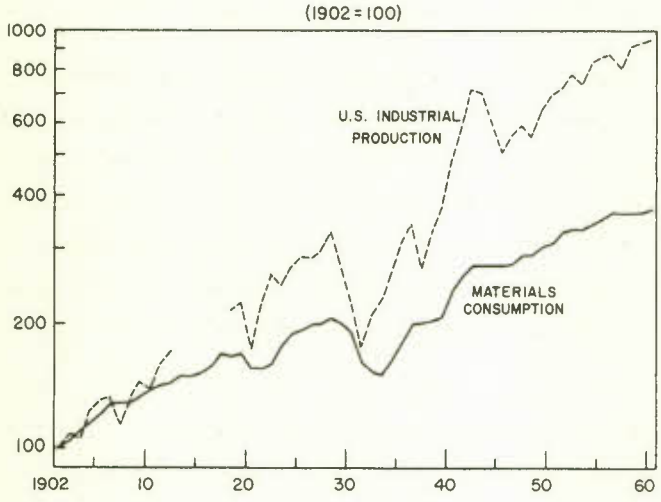
II - RAW MATERIAL REQUIREMENTS OF INDUSTRIAL COUNTRIES

The purpose of this part of the paper is to explore broad relationships between the growth of industrial production particularly in the United States, and the apparent consumption of raw materials. Chart 1 depicts the growth of United States industrial production and apparent consumption of raw materials other than food and gold during the period between 1902 and 1961. It is quite clear from the Chart that United States industrial production has grown much more rapidly than consumption of raw materials used by industry. Although the more rapid growth of production is evident even in the early part of the period, it is clearly more pronounced in the years since 1920. Table 4 sets out some comparative data.

CHART I

INDUSTRIAL PRODUCTION AND CONSUMPTION OF RAW MATERIALS IN THE UNITED STATES

(1902 = 100)



Source: See notes to Table A-3.

Table 4

Growth of Industrial Production and Volume of

Consumption of Raw Materials in the United States

(Average annual percentage change)

	1902-30	1930-61	1902-61
U.S. industrial production	3.7	4.1	3.9
Consumption of raw materials (except food and gold)	2.5	2.0	2.2
		1920-40	1920-61
U.S. industrial production		2.6	3.6
(U.S. manufacturing production)		(2.7)	(3.5)
Consumption of raw materials (except food and gold)		1.4	1.8
Selected Groups and Subgroups:			
Forest materials		-0.3	0.2
Pulpwood		4.0	4.0
Metals, except gold		1.9	1.4
Mineral fuels		1.8	2.6
Construction minerals		2.6	3.9
Other minerals		2.5	3.8

Source: See Table A-3.

The declining use of newly produced materials per unit of industrial output is evidently a reflection of many factors.[1/] Among the more obvious of these are (a) the use of salvaged or scrap material, particularly metal scrap, but also material such as waste paper, and (b) more economic use of materials actually employed in a variety of ways, such as use of hitherto "waste" by-products, the development of light and strong metal alloys, and so forth. It seems clear that the development of new products, of ways to make traditional products more durable in use and re-use, and the increasing sophistication of many kinds of consumer, investment, and defence goods are an integral part of this process.

The phenomenon of "materials saving" has also been recognized in industrial countries other than the United States. Indeed, in the United Kingdom and Continental Europe during the war, substantial resources were devoted to the discovery of techniques to achieve this very purpose. War-time experience reinforced a long historical trend

1/ It is industrial requirements for newly produced raw materials, or for their synthetic substitutes, which are relevant to the consideration of the scope of Canadian export opportunities. There is, for example, little growth for Canada as an exporter of scrap metal, or waste paper.

already in evidence. Although the consumption of raw materials per unit of output has apparently not been falling as rapidly in other industrial countries, the long-term trend of consumption in this sense is clearly downward.[1/]

It is apparent that the processes of production beyond the primary stage, even after allowance for salvage, have been contributing a rising proportion of the volume of industrial output in advanced countries.

III - PROJECTIONS OF CANADIAN EXPORT VOLUME TO 1970

Nonagricultural Exports

As noted earlier, two regressions were computed to provide a basis for projecting the volume of nonagricultural exports to 1970. That is, the volume index for nonagricultural exports to all countries was fitted to the combined index of industrial production of the OECD industrial countries for the period 1926 to 1963. The volume index for these exports to the United States was fitted to the index of United States industrial production for the same period.[2/] In each case, several years were omitted from the series because of lack of data, or distortions associated with the war of 1939-45, when rationing and direction of exports were in effect.

The first regression indicates that over the period 1926-63 the volume of nonagricultural exports to all countries grew at an average annual rate some 1.13 times the rate of growth of world industrial production. The coefficient of determination was computed at 0.982, and the ratio of the regression coefficient to its standard error at about 37. The computed volume figures of nonagricultural exports are quite close to the observed figures for the years 1926 to 1929, and for the years 1950 to 1963, inclusive.[3/] Since 1953, the computed volume figures have been within a range of 5 per cent of the observed figures, with an average variation under 2.5 per cent. There is no significant difference in the last ten years between the trend of the computed and observed figures on volume. Although the computed figures in the last decade are all slightly above the observed figures, it is the similarity of trends which is important.

1/ See M.FG. Scott, A Study of United Kingdom Imports, Cambridge, 1963, pp. 26-30. See also J. Hurstfield, The Control of Raw Materials, H.M.S.O. and Longmans Green, London 1953, Chapter XXII.

2/ The volume and production indexes were entered as logarithmic numbers. An ordinal-numbered time variable was introduced in each case, 1963 being number 38 in the series 1926 to 1963. In each case, this time variable proved to be of little significance.

3/ See Table A-4.

The period 1926 to 1963 was, of course, one in which there were fundamental changes in the world trading environment. In the 1930's these included large-scale increases in United States tariffs, the trend towards autarchy and bilateralism in Europe, and the broadening and deepening of the Commonwealth system of preferential tariffs. Towards the end of the 1930's, the United States, the United Kingdom, and Canada, had already withdrawn part way from the protectionist and preferential policies of the early part of the depression. Apart from this, world demand for goods in the late 1930's was influenced by spending on armaments. War-time regulation of production and trade, postponement of civilian demands, destruction and deterioration of productive capacity in Europe, left a post-war regime of discriminatory exchange and trade controls. Since then, capacity has grown rapidly; discrimination and import control have been largely dismantled; and the process of reciprocal tariff reductions has continued.[1/] Nonagricultural trade, on the whole, is freer than at any time since 1929, and clearly will become freer still in the years that lie ahead to 1970. The later 1960's, therefore, will be a period when the growth of production abroad will constitute a stronger and more direct potential demand for Canadian nonagricultural exports than in the 1926-63 period. No attempt has been made in this study to adjust the elasticity of export volume in relation to world industrial production to take account of this consideration.

The second regression indicates that over the period 1926-63 the volume of nonagricultural exports to the United States grew at an average annual rate some 1.14 times the rate of growth of United States industrial production. The coefficient of determination was computed at 0.994, and the ratio of the regression coefficient to its standard error at about 70. The computed figures on volume are close to the observed figures throughout most of the period. Of the figures since 1953, five of the computations are within 1 per cent of observed figures, and the remainder within 5 per cent or less. In the last decade, there appears to have been a rising trend of the observed figures in relation to the computed figures on export volume to the United States. Table 5 provides some descriptive statistics which illustrate this point. In view of the long-term trend towards materials saving, the elasticities shown clearly indicate that Canada either has been increasing its share of the market for raw materials, or has been exporting a greater proportion of processed and manufactured products or both.

1/ For analysis and exposition of these fundamental points, see Angus Maddison, Economic Growth in the West, The Twentieth Century Fund, New York, 1964, pp. 165-69. Eric Wyndham White, International Trade: Challenge and Response, speech released by GATT Secretariat, Geneva, 1959. Douglas R. Annett, British Preference in Canadian Commercial Policy, Ryerson, Toronto, 1948, pp. 81-91.

Table 5

Average Annual Rates of Growth of Volume of Canadian Nonagricultural Exports, of Foreign Industrial Production, and Elasticities of Export Volume

	1926-63	1953-63
Exports to all countries	4.12%	5.23%
World industrial production (1)	3.69%	4.61%
Apparent elasticity	1.12	1.13
Regression elasticity	1.13	
Exports to the United States	4.12%	4.28%
U.S. industrial production	3.62%	3.13%
Apparent elasticity	1.14	1.37 (2)
Regression elasticity	1.14	

(1) Combined industrial production of the OECD industrial countries.
(2) From 1949 to 1963, the apparent elasticity is 1.18.

Source: Based on data in the Statistical Appendix, Tables A-2 and A-4 and regression worksheets.

The time shift noted in the previous paragraph in respect of the growth of exports to the United States shows up clearly in the apparent elasticity of 1.37 for these exports in relation to United States industrial production from 1953 to 1963. Within the over-all projection of these exports to all countries in 1970, a higher elasticity for exports to the United States and a lower elasticity (than 1.13) for overseas countries clearly seems appropriate. The figure 1.37 for the United States would imply a Canadian export performance in overseas markets which is quite implausible in the circumstances of the 1960's. On the other hand, the apparent elasticity of exports to the United States in relation to United States industrial production between 1949 and 1963 (rounded to 1.20) yields plausible results for export performance in 1970 both in the United States market, and implicitly in overseas markets. It also dovetails plausibly with the commodity analysis.

Thus, for the purpose of judging the direction of projected export volume, an elasticity of 1.20 for Canadian exports to the United States in relation to the growth of United States industrial production seems appropriate. This adjustment of the computed elasticity[1/] in respect of the United States, of course, entails an

1/ One of the checks applied to the regression analyses involved use of work done by United States scholars relating to the volume of imports from Canada. See Richard Reimer, "The United States Demand for Imports, 1923-60", The Review of Economics and Statistics, February 1964. Reimer's group of materials imported from Canada in 1960 amounted to some 85 per cent of the combined value of the two DBS export sections, crude and fabricated materials. Another main difference between his group of materials, and Canadian nonagricultural exports, is that the latter is open-ended and includes highly manufactured products.

offsetting adjustment of the implicit elasticity in respect of overseas exports in relation to the combined industrial production of West European countries and Japan, from 1.13 to 1.00.

On the basis of projected growth of 5.5 per cent per annum of industrial production in OECD industrial countries between 1963 and 1970, and the assumed elasticity of 1.13, nonagricultural exports to all countries have been projected at an average annual rate of increase of 6.2 per cent in this period. Within this over-all projection, nonagricultural exports to the United States have been projected at an average annual rate of increase of 6.0 per cent, the product of projected growth of United States industrial production at 5.0 per cent per annum and the assumed elasticity of 1.20. Chart 2, which is presented on page 22, shows the actual pattern of export volume to all countries and to the United States separately, in relation to the respective industrial production indexes, and the projections to 1970.

Some further perspective may be thrown on the use of an elasticity of 1.13 to project Canadian nonagricultural exports in relation to growth of world industrial production, by means of a comparison between Canada's export performance over time and that of a country such as Sweden, which exports similar materials as well as manufactured products.

The volume of world exports in the period 1953 to 1963 grew at an average rate of 6.2 per cent per annum. Total Canadian export volume grew an average 4.3 per cent per annum; and nonagricultural exports grew at an average 5.2 per cent per annum. Swedish export volume in this period rose an average 8.2 per cent per annum, exceeding the rates of growth of world export volume and of the combined industrial production of the OECD industrial countries (which was some 4.6 per cent) by a coefficient of about 1.75. Nor were Swedish exports by any means the most rapidly growing among trading countries.

In this perspective, the future growth of volume of Canadian nonagricultural exports at a rate 1.13 times the rate of growth of world industrial production is not an unreasonable projection. It does, however, imply a competitive level of Canadian costs and prices, in relation to prices in important countries abroad. It also implies that Canada will continue to increase its share of the external market for raw materials, or export a higher proportion of processed and manufactured products or both.

Agricultural Exports

Although grains have declined relatively, wheat, flour, oats, barley and

rye continue to account for a substantial proportion of exports, about 13 per cent in 1963. Although substantial sales of flour were made in the 1963-64 crop year,[1] wheat in the form of grain has constituted the mainstay of this trade. Coarse grain exports averaged $191 million in value in 1951 to 1953 inclusive, and $53 million in 1961 to 1963, inclusive. Flour exports averaged $111 million in the earlier period, and $60 million in the later.

Canada has not been a particularly competitive supplier of feed grains in international markets in the post-war period, though doubtless this posture might be improved. Export markets for flour have been restricted partly by subsidized competition and partly by the construction of flour mills by less developed importing countries as a matter of policy.

In the case of wheat, research, production and marketing efforts have developed and maintained the Canadian product as the standard of excellence in terms of price, quality, and service.[2] Exports of wheat have encountered two major market problems in the post-war period, the existence of subsidized competition, and of protection on the part of importing countries which provide a high degree of shelter for domestic producers from international price competition. The conditions for trade in large groups of agricultural products in the post-war period have developed quite differently than for trade in most nonagricultural products, a result of deeply engrained historical processes which change slowly. The efforts of the major trading countries have long been directed towards achieving a continuing accommodation which would avoid extremes and reduce the costs of protectionism for agricultural importing and exporting countries.[3] These objectives have been sought particularly within the various international wheat agreements in the post-war period.[4]

1/ Unless otherwise specified, references to years in the text are to calendar years.

2/ See Marketing Western Canada's Grain, The Winnipeg Grain Exchange, 1964, pp. 55-63.

3/ See Trends in International Trade, Report by a Panel of Experts, the Contracting Parties to GATT, Geneva, 1958, pp. 80-102. Also Eric Wyndham White, Looking Outwards, speech released by the GATT Secretariat, Geneva 1960, pp. 8-11.

4/ See Marketing Western Canada's Grain, op. cit., pp. 34-38. I am indebted to officials in the Departments of Trade and Agriculture, and the Wheat Board staff, for helpful information and technical advice.

In that period, the quantity of Canadian wheat exports to the "historical" market has been fairly consistent, taking one year with another, as Table 6 illustrates:

Table 6

Average Annual Exports of Wheat

and Flour (Wheat Equivalent) by Country Groups

(Millions of bushels; crop years)

	1945-46 to 1952-53	1953-54 to 1962-63	Range of Shipments to Historical Market, 1953-62
Historical market	260.1	260.6	239 to 294 million bushels, a variation of from 92% to 123% of the average.
Communist countries	6.3	33.6	
Other	39.6	3.6	
Total	306.0	297.8	

Note: The historical market is defined as those non-Communist countries which, in the ten years ending in 1962-63, purchased wheat from Canada in more than five years. Within the total of this market, of course, there have been offsetting rises in the quantity of exports to some countries, and a decline in exports to others.

Source: Canadian Wheat Board.

Since about 1960, there has developed a significantly larger market for Canadian wheat in Communist countries, particularly China, Eastern Europe, and, of course, the U.S.S.R. in 1963. It is the rise in sales to these countries, as distinct from net export performance in the historical market, which has led to much higher levels of the volume of wheat exports in recent years.

The Wheat Board's export arrangements with the U.S.S.R. for the 1963-64 crop year entailed delivery of about 240 million bushels (including wheat equivalent of flour).[1/] Soviet officials have indicated publicly that the U.S.S.R. would be in the market as a buyer in the future, though naturally not on the scale of the crop year 1963-64. It appears entirely probable that China and the East European countries will be more or less steady customers for Canadian wheat for the remainder of the decade. The former country has indicated intentions to buy for the crop year 1965-66, and some of the East European countries have indicated intentions for the crop years ahead to 1967-68.

The underlying demand for wheat in the historical market is shaped primarily by the fact that the large importers, apart perhaps from Japan, have reached income levels at which the per capita consumption of wheat tends to decline, and little if any

---

1/ See "Canada - U.S.S.R. Trade Agreement", a release by the Minister of Trade and Commerce, September, 1963. It should be noted that Canada began to sell wheat to the U.S.S.R. under long-term arrangements in 1955.

growth in consumption in the form of food can be expected.[1/] In these circumstances, particular importance attaches to the efforts of our trade negotiators and to a climate favouring the moderation of protectionism in international trade, as well as to the maintenance of the highest standards of production and marketing, if wheat exports to the historical market are to grow even modestly beyond the post-war average.

There is potentially a third major market for Canadian food grains in the less developed countries.[2/] Since a number of these countries are already regular customers, this outlet may also be thought of as an extension of the historical market. The potential increase in sales to less developed countries is difficult to quantify, even in terms of estimation. These markets, however, ought not to be ignored on that account, since the potential is clearly large in terms of Canadian export magnitudes. When and to what extent potential demand may become more effective are questions which range beyond the scope of this paper. The relevant point is that food is in inadequate supply in the world as a whole, and this fact has already been reflected in the growth of grain exports to Far Eastern and other countries. Without labouring the point, it may be highlighted by pointing out that wheat is much cheaper as a food, in relation to rice, than it was before the war.[3/]

It appears reasonable to project the 1970 export volume for wheat to non-Communist countries at more than the 1953-63 average of 264 million bushels per annum, allowing particularly for some further extension of sales to less developed countries. A figure of 285 million bushels is suggested as one which might be regarded as an appropriate projection for an average year around the turn of the decade.

The volume of wheat exports to Communist countries may be appraised by considering particularly the scope of their intentions to purchase in the crop years 1964-65, and 1965-66. Intentions indicated more than one year in advance are usually for minimum quantities. The following table sets out theoretical levels for wheat exports on these bases for the next two crop years.

1/ Some observers consider that the quality of Canadian wheat may well result in securing a larger share of the EEC market, for example. See Sol Sinclair, The Common Agricultural Policy of the EEC and its Implications for Canadian Exports, The Private Planning Association of Canada, 1964, pp. 90-91.

2/ See Walton J. Anderson, Canadian Wheat in Relation to the World's Food Production and Distribution; a study for the Alberta Wheat Pool, the Saskatchewan Wheat Pool, and Manitoba Pool Elevators, Saskatoon, 1964.

3/ The average monthly price of rice in Thailand in 1937 was $1.47 (U.S.) per one hundred pounds, and in 1963 about $5.28 (U.S.) per one hundred pounds, or an increase of roughly 260 per cent. By way of comparison Canadian wheat increased by about 37 per cent in price between 1937 and 1963, from $1.34 (U.S.) to $1.83 (U.S.) per bushel. See International Financial Statistics, International Monetary Fund, various issues.

Table 7

Actual and Theoretical Wheat Exports

(Millions of bushels, including wheat equivalent of flour)

(Crop Years)	Actual 1963-64	Theoretical[1] 1964-65	1965-66	Calendar Year 1970 Projected
Historical market and other	270			285
Communist countries	324	115 plus X	95 plus Y	115
Total	594			400

(1) Figures for Communist countries are estimated from data on orders and intentions to buy, released from time to time by the Department of Trade and Commerce, and the Wheat Board. X and Y represent further quantities which may well be ordered. The figure 285 million bushels for non-Communist countries represents the projected potential around 1970. As previously emphasized, the total represents the projection of an average year, and is not a forecast.

Source: Department of Trade and Commerce, and estimates by Economic Council of Canada.

Table 7 indicates a projection of some 400 million bushels of wheat exports (representing an average year) in the calendar year 1970. This is somewhat lower than shipments of wheat actually made in 1963.[1/] For other grains, barley, oats and rye, the year 1963 was one in which export volume was at a historically low level, and some recovery from this point may be anticipated. For wheat and the other grains together, the volume of exports in an average year at the turn of the decade may be projected at a level which might approximate that of 1963, some $900 million in 1963 prices, or a little less. This projection is reasonable, though moderately optimistic. It assumes a conjuncture of a not unfavourable climate for trade in grains, and some net growth of effective demand from non-Communist countries.

Agricultural exports other than grain consist of a wide variety of products, some of which clearly have growth potential, and some of which clearly have little. This subgroup grew in volume between 1956 and 1963 at about 3 per cent per annum. In respect of fishery products (which are included in this subgroup), a 1963-70 projection suggests a slightly higher rate of growth of export volume than in the post-war period,

---

1/ Grain exports in 1964 exceeded the 1963 level, partly because the bulk of the large sale to the U.S.S.R. was delivered in 1964, and partly because of a recovery in the level of coarse grain exports. Consideration was given at the Federal-Provincial Agricultural Outlook Conference in Ottawa, November 1964, to a shift of acreage from wheat to coarse grains to maintain adequate reserves of feed grains.

due largely to greater efforts within the trade to improve productivity and marketing.[1/]

Taking account of greater trade promotional efforts for many nongrain products, and of anticipated higher levels of income abroad, it appears reasonable to project the volume of these exports between 1963 and 1970 at an average 3.5 per cent per annum. This is admittedly a primitive calculation which, however, is also consistent with the view that external barriers to expansion of at least some of these exports are likely to be lower in future.

As a result of these calculations, the whole group of agricultural exports has been projected in 1970 at an average annual rate of growth of 1.5 per cent from 1963, the weighted average of the projections for the grain and nongrain subgroups.

IV - COMPOSITION OF EXPORT VOLUME IN 1970

The commodity analyses in this part of the paper refer to nonagricultural exports, which are divided into three groups: two groups of materials; namely, forest products, and all other materials (metals, minerals, fuels, and miscellaneous); and a group of highly manufactured products defined as those classified in the Dominion Bureau of Statistics export section, "end products inedible".

The main purpose of the appraisal of export composition in this part of the paper is to assess the rates of growth of the two materials groups combined, and of the group of highly manufactured products, within the projected growth rate of 6.2 per cent per annum of all nonagricultural products between 1963 and 1970. A further aim is to set out an approximation of the rates of growth of each of the materials groups, on the basis of aggregating individual commodity projections.

To facilitate achievement of the main purpose, a regression was computed of the volume of materials exports in relation to world industrial production, for the period 1949 to 1963.[2/] The regression coefficient was 1.03, the coefficient of

---

1/ The technical work for this projection was done by D.J. Packman of the Department of Trade and Commerce, in consultation with specialists in the Department of Fisheries and other agencies.

2/ The export volume series for materials was calculated simply by subtracting the constant dollar total for highly manufactured exports from the total for nonagricultural exports. An alternative method would be to aggregate the constant dollar totals for two DBS export classifications, crude and fabricated materials. Because of a shift of some products out of the "agricultural" grouping in the export classification adopted by DBS in 1961, the two methods result in indexes with somewhat different levels. The pattern of year-to-year change in the two indexes derived in this way is similar, and the 1949-63 growth rates are close, an average 5.6 per cent per annum in each.

determination 0.9922, and the ratio of the regression coefficient to its standard error about 40.

The observed and computed series of export volume of materials in this regression are quite close together between 1949 and 1963, within 3 per cent, with the exception of one year. Thus, despite the shortness of the observation period, the indicated elasticity of just over 1.0 for exports of industrial materials in relation to world industrial production constitutes a useful guide.

The implications of using an elasticity of 1.0 for materials, in the context of the projected growth rate of 5.5 per cent for world industrial production, are: (a) a projected rate of growth of 5.5 per cent per annum for materials between 1963 and 1970; and (b) an implied rate of growth of about 10.0 per cent per annum for the remainder of nonagricultural exports, the highly manufactured group of products.

In the perspective of trade developments since 1949, and particularly after 1959, it is entirely reasonable to impute a much higher rate of future growth to highly manufactured exports than to other nonagricultural exports. Table 8 provides some statistical perspective on this point.

Table 8

Average Annual Rates of Growth of Volume

of Exports of Highly Manufactured Products

1949-56	1956-63	1960-63
-5.0%	10.3%	21.0%

Source: Based on data from the Dominion Bureau of Statistics.

Reasons for the decline in the volume of highly manufactured exports in the 1950's include the exchange premium on the Canadian dollar, relative cost and price increases for Canadian manufactured products, and the recovery of European exporters of manufactured products to world markets. The rapid rate of growth of export volume, which has been sustained since 1960, occurred in the fundamentally more favourable competitive climate established by devaluation of the Canadian dollar, coupled with relative stability of prices for manufactured exports, and with the availability in Canada of manufacturing capacity in many lines over and above the requirements of the domestic market.

The relatively favourable price posture since 1960 has doubtless been an indispensable element in the rates of growth of export volume actually achieved. In

terms of United States dollars (taking account of changes in the exchange rate) the export price index for Canadian highly manufactured products declined by about 4 per cent between 1960 and 1963. In the same period, the manufactured export price indexes of the main European exporters rose by 5-10 per cent in terms of United States dollars, and the United States export price index for finished products rose by about 2 per cent.

A number of particular factors clearly contributed to the rapid rise in exports of highly manufactured products since 1960. These include the defence production sharing arrangements with the United States, the provision of public funds for long-term financing of exports of capital equipment, and more intensive market development efforts by government and industry. These remain important sustaining influences on the level of highly manufactured exports and, with the possible exception of the first, they also constitute steady expansive stimuli beyond 1963, given the maintenance of the necessary underlying price competitiveness. It is difficult to disentangle the effects of these particular influences from the pervasive effects of the exchange rate adjustment which could be more persistent.

The high rate of growth of manufactured exports since 1960, higher than 20 per cent per annum, would doubtless be difficult to sustain for the rest of the decade. But a growth of 10 per cent per annum on the average between 1963 and 1970 would not appear to be an unreasonable estimate in the circumstances envisaged to 1970. A shift towards a higher proportion of highly manufactured products in Canadian exports is clearly necessary, in the light of the long-term trend in advanced countries towards materials saving, if export volume is to grow at a sustained high rate.

Table 9 below draws together illustrative data relating to the composition of exports in 1963, with growth rates to 1970, together with some comparative data on post-war experience between 1949 and 1963.

Table 9

Canadian Merchandise Exports, 1949 to 1970

	Exports in 1963	Projected 1970	Rate of Increase of Volume in 7-Year Periods		
			1949-56	1956-63	1963-70
	(Billions of 1963 dollars)		(Average annual percentage change)		
Agric. products	1.5	1.6	2.9	2.3	1.5
Nonagric. products, (Of which):	5.3	8.2	5.1	5.1	6.2
Materials	(4.5)	(6.6)	6.6	4.5	5.5
Highly mfgd. products	(0.8)	(1.5)	-5.0	10.3	10.0
Total	6.8	9.8	4.5	4.4	5.3

Source: Based on data from the Dominion Bureau of Statistics and estimates by Economic Council of Canada.

Within the industrial materials group, it is possible to indicate approximate rates of growth of export volume of forest products, and of other industrial materials (mainly of mineral derivation), by aggregating individual projections of the outlook for major commodities which account for a high proportion of each group.

The bases for such appraisals consist of assessment of market growth at the projected rate of growth of foreign economic activity, the growth in Canada and other countries of capacity to supply the market, and the share of the market anticipated for Canadian suppliers in the light of their competitive position.

In the case of forest product exports, a growth rate between 1963 and 1970 of roughly 5.2 per cent per annum was calculated on these bases.[1/] The commodities examined in detail were newsprint, pulp, and lumber, which since 1950 have accounted for between 86 per cent and 89 per cent of the value of all forest product exports. In general, emerging shortages of softwood in the advanced countries of Western Europe,[2/] the United States and Japan will establish an increasingly favourable climate for growth of the exports of competitive suppliers.

In the case of metals, minerals, and fuels, an aggregation of the results of market analyses for a varied range of exports (about $2.0 billion in 1963) has suggested an average growth rate of about 6.0 per cent per annum in volume between 1963 and 1970.[3/] For exports of the rest of the minerals and miscellaneous materials (about $700 million in 1963), a growth rate of 5.2 per cent per annum would be necessary if all industrial materials were to grow in volume at 5.5 per cent per annum between 1963 and 1970. This rate of growth of 5.2 per cent to 1970 for the residual group of materials appears to be a conservative estimate in the light of past experience (for example, chemical products which are included grew in volume at about 5.9 per cent between 1956 and 1963), and in

---

1/ Regarding this projection, I am indebted particularly to F. Leslie C. Reed, of the staff of the Council of the Forest Industries of British Columbia, J.M. Savage of the Newsprint Association of Canada, and Ian B. Chenoweth of the Canadian Pulp and Paper Association, and to officials of the Departments of Trade and Commerce, and Forestry, as well as of the Bank of Canada, for helpful information and technical advice.

2/ There are several reference studies, including Pulp and Paper Prospects in Western Europe, an FAO study directed by Arne Sundelin, Munich, 1963; the U.S. Tariff Commission, Report on Softwood Lumber, Washington, 1963, and papers submitted to the Commission; Supply and Demand for Lumber in Japan, a projection to 1970 by the Japan Lumber Importers' Association.

3/ The products for which individual analyses were considered in this study include ores and concentrates, and primary metals, of lead, zinc, copper, nickel and iron; aluminum primary and semi-fabricated; asbestos; potash; sulphur; uranium; crude petroleum; natural gas; electricity. I am particularly indebted to R.B. Toombs of the Department of Mines and Technical Surveys for his market analyses of the nonfuel minerals. Officials of the National Energy Board, and of the Department of Trade and Commerce also provided helpful information and technical advice.

the light of expected high levels of demand in external markets. The weighted average of the two estimated rates of growth for materials other than forest products (that is, 6.0 per cent per annum for the larger grouping, and 5.2 per cent for the smaller) is about 5.8 per cent per annum between 1963 and 1970. This appears to be a reasonable estimate for the purpose of judging the composition of the over-all projection of non-agricultural products.

The analysis of market prospects for the nonfuel minerals has been based on work done in the Department of Mines and Technical Surveys. The implicit export components of an earlier forecast of mineral output in 1970 were reviewed so as to take account of an external environment in which world industrial production is taken to be growing at 5.5 per cent per annum, and United States industrial production at 5.0 per cent per annum from 1963 to 1970.[1/]

The appraisal of the growth rates between 1963 and 1970 of components of the industrial materials group in the foregoing manner represents an approximate rather than a precise distribution, particularly since prospects for about 25 per cent of the group have not been analyzed in detail. It is clear from the commodity analyses, however, that the supply of materials required to fulfil the over-all projection for nonagricultural exports can be foreseen as emerging on a competitive basis, without the need to postulate the discovery and exploitation of hitherto unknown resources or exceptionally rapid development of known but undeveloped resources. The search for undiscovered resources in Canada, of course, continues on a large scale.

Charts 3, 4, and 5, which are presented on pages 24, 25, and 26, show graphically the estimated rates of growth of exports of the two groups of materials, and of highly manufactured products, within the overall-projection to 1970.

V - CONCLUSIONS

The conclusions are intended to draw together the results of the preceding analysis. In the context of the external environment projected to 1970, the main conclusion is that the projected growth of Canadian merchandise exports from $6.8 billion to $9.8 billion in 1963 prices, between 1963 and 1970, is a reasonable appraisal. This represents an average annual growth of exports of 5.3 per cent, as compared with 4.4 per cent in the preceding seven-year period.

1/ The original study is "Canadian Minerals in National and International Perspective", Mineral Information Bulletin MR75, Department of Mines and Technical Surveys, 1964.

A further conclusion is that nonagricultural exports will tend to rise further as a proportion of total exports. The projected growth of agricultural exports is from $1.5 billion to $1.6 billion in 1963 prices between 1963 and 1970.[1/] Nonagricultural exports are projected to rise from $5.3 billion to $8.2 billion in 1963 prices between 1963 and 1970.

Another conclusion relates to the direction of the projected volume of all Canadian exports in 1970. The proportion destined for the United States within the total projection for 1970 is not greatly different than the proportion actually shipped to the United States in 1963, about 55 per cent. Since agricultural export volume is projected at a low growth rate, the proportion destined for the United States in 1970 (in 1963 prices) would not likely be much different than in 1963. Nonagricultural exports to all countries are projected as growing at 6.2 per cent per annum, somewhat more rapidly than the projected growth of 6.0 per cent to the United States (with an implicit growth of some 6.5 per cent to overseas countries). Because nearly two thirds of nonagricultural exports are currently shipped to the United States, however, these different rates of growth would not greatly affect the relative percentages by 1970.

A further important conclusion relates to the composition of nonagricultural exports to 1970. There is clear evidence that the demand for raw materials in industrially advanced countries grows significantly less rapidly than the growth of industrial output. For a country such as Canada to achieve a rate of growth of nonagricultural exports higher than the growth of world industrial production, it is obviously necessary either to increase Canada's share of the market for raw or lightly processed materials, or to export a greater proportion of heavily processed or fully manufactured products. All the available data indicate that some combination of a larger share in supplying raw material requirements, and of a shift towards greater processing of exports, has operated in the period 1926 to 1963, since the volume of Canadian nonagricultural exports grew more rapidly than world industrial production in that period.[2/] In recent years, it has been the growth of highly manufactured exports which has paced the rise in nonagricultural export volume, as indicated in Table 10.

1/ For ease of future reference, the projections from 1963 have been made on the base of agricultural products included in the new Dominion Bureau of Statistics export sections -- live animals, food, feed, beverages and tobacco. Using the definition of agricultural products in line with the Dominion Bureau of Statistics export classification in effect before 1961, agricultural and animal products, the agricultural projection would be from $1.6 to $1.8 billion, and the nonagricultural projection would be from $5.2 billion to $8.0 billion in 1963 prices, between 1963 and 1970.

2/ Cf. R.V. Anderson, op. cit., pp. 14-15.

Table 10

Average Annual Rates of Growth of Volume of Nonagricultural Exports, By Degree of Processing

(Average annual percentage change)

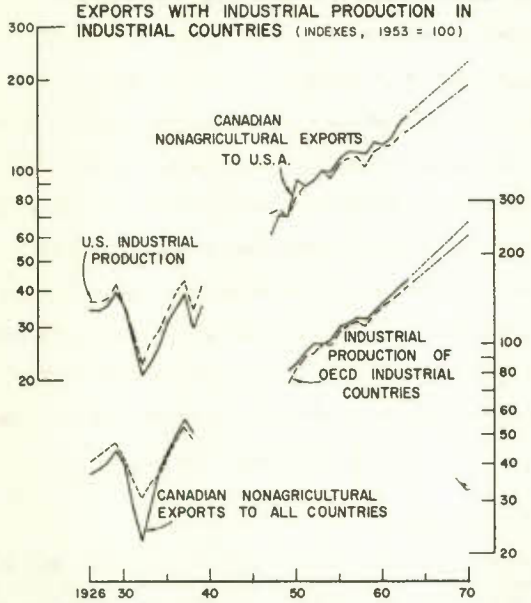
	1949-56	1956-63	1960-63
Crude materials	11.5	6.3	6.0
Processed materials	5.4	3.9	4.0
Highly manufactured products	-5.0	10.3	21.0
All nonagricultural exports	5.1	5.1	6.1

Source: Based on data from the Dominion Bureau of Statistics.

The projection of nonagricultural exports to all countries in 1970 is depicted in Chart 2, in relation to the projection of world industrial production, together with the actual course of exports and industrial production between 1926 and 1963. Chart 2 also depicts the course of indexes of United States industrial production, and the volume of Canadian nonagricultural exports to the United States, from 1926 to 1963, with projections to 1970.

CHART 2

COMPARISON OF CANADIAN NONAGRICULTURAL EXPORTS WITH INDUSTRIAL PRODUCTION IN INDUSTRIAL COUNTRIES (INDEXES, 1953 = 100)



Source: See notes to Table A-2. Projections are from estimates of the Economic Council of Canada.

In 1964, moreover, export data for the first ten months indicate a rise in volume of highly manufactured exports of nearly 40 per cent above the 1963 level. Although some of this rise is attributable to fairly volatile influences such as sales of military aircraft, and world industrial production rose rapidly in 1964, it is also clear that the underlying growth rate for these exports in 1964 has not been lower than the 1960-63 average. Given a favourable milieu in terms of competitiveness, and of improved access to foreign markets, Canadians may well be able to achieve a higher average rate of growth than the 10 per cent projected in the preceding analysis for these exports in the years from 1963 to 1970. Conversely, a decline in the competitiveness of Canadian industry could lead to a lower rate of growth or even a decline in export volume of these products, as the experience of the first half of the 1950's clearly demonstrates.

Given the weight of exports as a proportion of the output of the goods-producing industries in Canada, around 50 per cent over a long period of time, it is important to recognize that crude and processed materials will continue to constitute a high proportion of Canadian exports in the years ahead to 1970. Emphasis on the need and the opportunity to expand sales abroad of highly manufactured products is clearly essential, but not sufficient of itself. Opportunities for expanding the volume of agricultural exports should not be overlooked. Although difficult to quantify, such opportunities clearly exist.

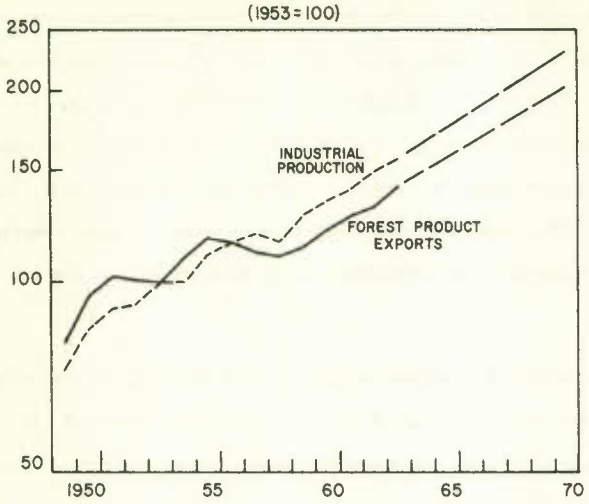
It is useful at this point to present in the form of charts a disaggregation of the index of export volume to all countries shown in Chart 2, for the period 1949 to 1970, along the lines suggested by the commodity analysis. This disaggregation appears in Charts 3, 4, and 5. These estimates are subject to the qualifications previously noted in this paper, and particularly that the projections of volume at this level of disaggregation are considered to be rough approximations.

Each of the charts includes, as a reference line, the index of industrial production of the OECD industrial countries from 1949 to 1963, and the projection to 1970 at a growth rate of 5.5 per cent per annum.

Chart 3 shows the pattern of export volume of forest products, and of world industrial production, between 1949 and 1963, with each index projected to 1970. Export volume of these products grew relatively rapidly between 1949 and 1955, but subsequently declined between 1955 and 1958. Thereafter, it rose roughly in line with the production index. The 1963-70 projection shows the volume of these exports rising more rapidly than in the 1949-63 period.

CHART 3

WORLD INDUSTRIAL PRODUCTION AND VOLUME OF CANADIAN EXPORTS OF FOREST PRODUCTS



Source: Based on data from the Dominion Bureau of Statistics, and estimates from staff worksheets for the period 1963-70.

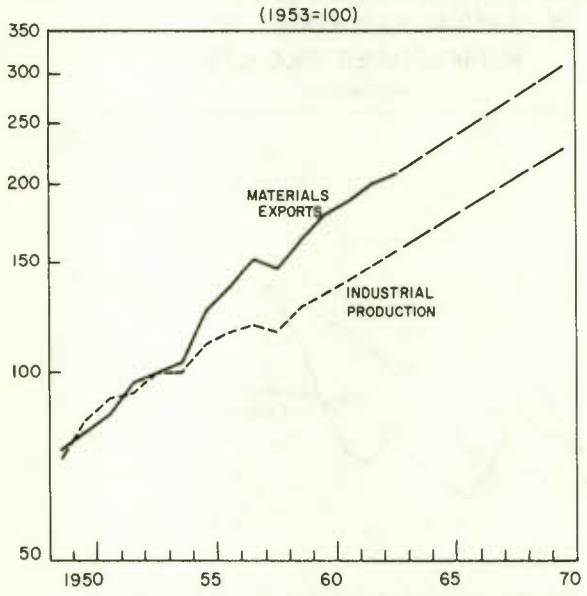
Chart 4 shows the pattern of growth of export volume of all other industrial materials from 1949 to 1963, and the projection of this index to 1970. The notable feature here is the "step-up" of the export volume to a new level between 1954 and 1957, which was clearly related to a surge in the rate of natural resource development in the mid-1950's. From 1949 to 1954, and from 1957 to 1963, there was a rough parallelism in the export and production indexes which continues in the projection to 1970, with the export volume index rising somewhat more rapidly than the production index.

The question arises as to whether a step-up similar to that of 1954-57 of the export volume level is likely to occur in the 1963-70 period. This possibility is already partly discounted in the projection which incorporates expectations concerning development before 1970 of known but hitherto unexploited resources. A number of known ore bodies have not, however, been taken into account in the commodity appraisal of future export volume, since their development before 1970 is highly uncertain. No quantitative assessment of the effects of possible further resource discoveries before

1970 can reasonably be made, though clearly any such effects are likely to be positive. It would, however, require very large absolute increases in exports to achieve a repetition of the 1954-57 surge, when volume increased by nearly 50 per cent in three years.

CHART 4

WORLD INDUSTRIAL PRODUCTION
AND VOLUME OF CANADIAN EXPORTS
OF MINERAL AND MISCELLANEOUS MATERIALS



Source: Based on data from the Dominion Bureau of Statistics, and estimates from staff worksheets for the period 1963-70.

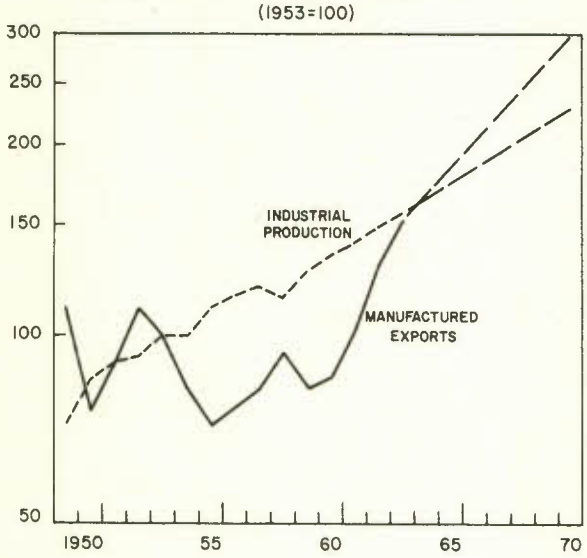
Chart 5 shows the pattern of growth of export volume of highly manufactured products from 1949 to 1963, and the projection to 1970. The projection to 1970 represents a slowing down of the rate of growth which occurred from the relatively low level in 1959, to 1963. The probable export volume in 1964 (for which data are available for the first ten months at the time of writing) will likely place this index above the 200 level on the chart. For the reasons referred to earlier in the Conclusions, it may well be possible for Canadians to achieve a higher average rate of growth than 10 per cent for these exports between 1963 and 1970.

One final word ought to be said about the implications of the technique employed in this paper to calculate projections of the volume of nonagricultural exports. The elasticities employed for this purpose are "total", in the sense that they reflect

the combined effects of rising demands for goods and the relative prices of suppliers competing to supply those demands. The use of these elasticities implies a broad assumption of little further shift of price competitiveness on the part of Canadian exporters.

CHART 5

WORLD INDUSTRIAL PRODUCTION AND VOLUME OF CANADIAN EXPORTS OF HIGHLY MANUFACTURED PRODUCTS



Source: Based on data from the Dominion Bureau of Statistics, and estimates from staff worksheets for the period 1963-70.

VI - STATISTICAL APPENDIX

Table A-1

Canadian Merchandise Exports, 1900-63[1]

Year[2]	Indexes of All Exports (1953=100)			Volume of Agric. and Nonagric. Exports[3] (1953=100)		Composition of Exports (Per Cent of Value)		Direction of Exports (Per Cent of Value)			Exports as a Percentage of GNP; and of GDP of Canadian Goods-Producing Industries[4]	
	Value	Price	Volume[5]	Agric.	Nonagric.	Agric.	Nonagric.	To U.S.	To U.K.	Other	GNP	GDP (Goods)
1900	5	34	14			56	44	34	57	9	20	
1901	5	35	14			53	47	38	52	10	20	
1902	5	36	15			58	42	34	56	10	20	
1903	5	36	14			61	39	32	58	10	18	
1904	5	35	14			58	42	34	56	11	15	
1905	6	38	16			56	44	37	51	12	17	
1906	6	40	15			60	40	36	54	10	15	
1907	6	42	15			58	42	34	55	11	17	
1908	6	41	15			56	44	37	51	12	16	
1909	7	42	17			58	42	35	52	13	16	
1910	7	41	17			58	42	37	50	13	15	
1911	7	41	18			57	43	38	48	14	14	
1912	9	41	22			61	39	35	51	14	16	
1913	11	39	28			60	40	39	48	13	18	
1914	11	41	27			64	36	38	50	12	19	
1915	19	47	40			59	41	42	46	12	30	
1916	28	54	53			53	47	27	61	12	39	
1917	38	80	48			47	53	24	65	11	44	
1918	31	80	38			52	48	27	55	18	31	
1919	31	86	36			43	57	37	45	18	27	
1920	31	99	32			58	42	37	40	23	24	
1921	20	63	31			56	44	46	26	28	20	
1922	21	56	38			52	48	40	40	20	21	
1923	24	53	46			54	46	41	41	19	22	
1924	25	58	44			55	45	41	34	25	24	
1925	30	61	50			49	51	39	37	24	25	

(continued)

Table A-1 (continued)

Canadian Merchandise Exports, 1900-63[1]

Year[2]	Indexes of All Exports (1953=100)			Volume of Agric. and Nonagric. Exports[3] (1953=100)		Composition of Exports (Per Cent of Value)		Direction of Exports (Per Cent of Value)			Exports as a Percentage of GNP; and of GDP of Canadian Goods-Producing Industries[4]	
	Value	Price	Volume[5]	Agric.	Nonagric.	Agric.	Nonagric.	To U.S.	To U.K.	Other	GNP	GDP (Goods)
1926	31	59	52	74	38	58	42	36	37	27	25	57
1927	29	57	51	71	39	56	44	39	34	28	22	53
1928	32	55	59	86	42	59	42	36	33	31	22	54
1929	28	54	51	61	45	47	53	43	25	32	19	49
1930	21	46	46	54	41	44	56	43	27	30	15	40
1931	14	38	38	52	29	45	55	41	29	30	13	39
1932	12	34	35	55	22	52	48	33	36	31	13	41
1933	13	34	38	53	29	49	51	32	40	28	15	48
1934	16	36	44	51	39	46	54	34	42	25	16	46
1935	18	37	48	53	44	43	57	36	42	22	17	46
1936	23	39	59	71	51	49	51	36	42	22	20	54
1937	24	45	54	47	56	37	63	36	40	24	19	48
1938	20	40	51	50	51	35	65	32	41	27	16	40
1939	22	38	59	62	56	36	64	41	36	24	16	41
1940	29	42	68	60	71	31	69	38	43	19	18	42
1941	39					29	71	37	41	22	20	47
1942	57					21	79	38	31	31	23	51
1943	72					26	74	39	35	27	27	63
1944	83					32	68	38	36	26	29	68
1945	78					37	63	37	30	33	27	68
1946	56	68	82	83	81	40	60	38	26	36	20	48
1947	67	77	87	80	89	35	65	37	27	36	21	50
1948	75	85	88	81	91	34	66	49	22	29	20	47
1949	73	87	83	81	83	36	64	50	24	26	18	44
1950	76	92	83	72	88	32	68	65	15	20	17	41

(continued)

1951	95	104	91	82	96	32	68	59	16	25	19	43
1952	105	103	101	101	101	33	67	54	17	29	18	49
1953	100	100	100	100	100	33	67	59	16	25	17	42
1954	94	98	97	85	103	28	72	60	17	24	16	42
1955	104	100	104	81	115	24	76	60	18	22	16	42
1956	116	103	113	99	118	26	74	59	17	24	15	42
1957	117	102	114	91	122	28	76	59	15	26	15	43
1958	117	102	115	102	121	26	74	59	16	25	15	44
1959	123	104	118	94	129	24	76	61	16	23	14	43
1960	128	104	124	89	138	22	78	56	17	27	15	43
1961	141	105	134	109	147	25	75	54	16	30	15	48
1962	151	108	139	100	158	23	77	58	15	27	15	46
1963	166	109	153	117	166	24	76	55	15	30	16	48

(1) Exclusive of gold.

(2) Composition and direction of exports are calculated for fiscal years from 1900 to 1918, and for calendar years thereafter.

(3) Based on Dominion Bureau of Statistics export classification prior to 1961.

(4) GNP data 1900 to 1925 from which the export percentage is derived are for calendar years, from an unpublished study by Kenneth Buckley. The goods-producing industries are agriculture, forestry, fishing and trapping, mining, and manufacturing.

(5) Value, price and volume indexes for the years 1900 to 1925 are on a calendar-year basis, from worksheets of the staff of the Economic Council of Canada. The indexes from 1926 are based on data from the Dominion Bureau of Statistics.

Source: Dominion Bureau of Statistics, Trade of Canada, Review of Foreign Trade, National Accounts, various issues, and sources shown here.

Table A-2

Selected Indexes of World Trade and Industrial Production, 1926-63

(1953=100)

	Export Volume (All Goods, f.o.b.)						Export Volume - Selected Categories				Industrial Production				
Year	All Countries	Canada	United States	United Kingdom	West Germany	Sweden	Canada, End Products Inedible	U.S., Finished Manufactures	U.K., Manufactured Products	Germany (FGR), Finished Products	U.S.	U.K.	EEC	OECD Industrial Countries (1)	
1926	64	52	45	72		49					37	38	55	41	
1927	69	51	48	82		61					37	48	60	43	
1928	72	59	49	85		60					38	47	65	45	
1929	75	51	52	87		70					42	51	66	48	
1930	70	46	43	72		65					35	47	62	42	
1931	65	38	35	55		52					29	44	54	36	
1932	55	35	27	55		47					23	45	46	31	
1933	57	38	27	55		57					26	48	52	35	
1934	59	44	29	59		67					29	53	55	38	
1935	62	48	31	63		68					34	58	59	43	
1936	65	59	32	63		77					40	63	65	49	
1937	73	54	41	69		90					44	69	71	54	
1938	68	51	41	61		75					34	64	72	48	
1939		59	43								42				
1940		68	50								48				
1946		87	79				137	60			65				
1947		88	98				138	87			72				
1948		83	81				137	68			75				
1949		83	84				110	66			71	88	73	73	
1950	85	83	73	106	58	99	76	59	110	42	82	94	80	84	

(continued)

1951	94	92	93	104	81	103	91	78	109	72	89	98	92	91
1952	95	101	96	98	88	92	111	86	100	89	92	95	95	93
1953	100	100	100	100	100	100	100	100	100	100	100	100	100	100
1954	106	97	97	104	122	110	84	90	104	124	94	108	110	100
1955	116	104	98	112	142	116	72	85	112	149	106	114	122	111
1956	126	113	117	118	165	128	77	97	119	174	109	114	132	116
1957	134	114	123	120	188	140	83	97	122	202	110	116	140	119
1958	134	115	107	115	194	139	95	89	117	212	103	114	144	116
1959	146	118	104	119	217	150	83	84	121	229	116	120	153	127
1960	159	124	120	125	249	171	87	90	128	260	119	129	171	135
1961	(165)	134	120	128	264	183	103	89	131	277	120	130	182	140
1962	(174)	139	124	131	273	200	130	96	132	284	130	131	193	149
1963	(189)	153	133	138	303	219	153	101	139	316	136	136	203	157

(1) Includes the U.S., West European countries, and Japan. Weights in the combined index are based on those used by the National Institute of Economic and Social Research (United Kingdom) and are as follows: U.S., 62.4; Western European countries, 35.1; Japan, 2.5.

Source: OEEC Industrial Statistics, and OECD General Statistics. Dominion Bureau of Statistics, Trade of Canada. Board of Governors of the Federal Reserve System, Industrial Production 1957-59 Base, Washington 1962, and Federal Reserve Bulletin, various issues. Economic Planning Agency of Japan, Japanese Economic Statistics. Pre-war export volumes for the United Kingdom, and Sweden, are derived from Angus Maddison, "Growth and Fluctuation in the World Economy, 1870-1960", in Banca Nazionale del Lavoro Quarterly Review, June 1962. Maddison's data are also used here to derive an export volume series for all countries between 1926 and 1960; the figures shown for 1961-63 are estimates, based on data from OECD General Statistics.

Table A-3

United States Industrial Production, and
Volume of Apparent Consumption of Raw Materials Other Than Food and Gold, 1902-61
(1902=100)

Year	Industrial Production(1)	Apparent Consumption of Raw Materials(2)	Year	Industrial Production(1)	Apparent Consumption of Raw Materials(2)
			1931	228	191
1902	100	100	1932	179	164
1903	108	105	1933	210	154
1904	105	110	1934	229	152
1905	124	116	1935	265	165
1906	132	123	1936	313	182
1907	135	129	1937	343	201
1908	114	130	1938	271	203
1909	135	131	1939	330	204
1910	146	134	1940	379	209
1911	141	140	1941	487	239
1912	162	143	1942	598	261
1913	173	146	1943	715	274
1914	N/A	150	1944	705	275
1915		150	1945	608	274
1916		153	1946	513	274
1917		159	1947	567	278
1918	N/A	169	1948	590	291
1919	215	168	1949	558	293
1920	226	170	1950	646	305
1921	173	157	1951	701	313
1922	221	157	1952	727	331
1923	263	162	1953	787	338
1924	247	178	1954	740	336
1925	272	190	1955	833	345
1926	288	193	1956	861	354
1927	287	199	1957	869	367
1928	298	202	1958	808	365
1929	332	207	1959	911	364
1930	276	202	1960	937	366
			1961	947	374

Average Annual Rates of Change for Selected Periods

	1902-30	1930-61	1902-61
Industrial Production	3.7%	4.1%	3.9%
Apparent Consumption of Raw Materials	2.5%	2.0%	2.2%

(1) Based on data from OEEC, Industrial Statistics. Board of Governors of the Federal Reserve System, Industrial Production 1957-59 Base, Washington, 1962, and Federal Reserve Bulletin, various issues.

(2) Original data are in 1954 constant dollars, from United States Bureau of the Census, Raw Materials in the United States Economy, 1900-1961, Washington, 1963. The annual figures were smoothed by means of a three-year moving average on the end year, and expressed as an index.

Table A-4

Observed and Computed Indexes of the Volume of Canadian Nonagricultural Exports

Year	Nonagricultural Exports to all Countries (1953=100)		Nonagricultural Exports to U.S. (1957-59=100)		Exports of Industrial Materials to all Countries (1953=100)	
	Observed	Computed[1]	Observed	Computed[2]	Observed	Computed[3]
1926	37.5	38.1	28.9	28.4		
1927	38.9	40.2	28.8	28.3		
1928	41.6	42.3	30.3	29.6		
1929	45.0	45.5	33.7	33.3		
1930	40.5	39.2	30.3	27.1		
1931	28.7	33.0	23.0	21.9		
1932	22.4	27.9	17.6	16.6		
1933	28.7	32.0	19.5	20.0		
1934	38.6	33.0	22.0	22.0		
1935	44.3	40.2	26.3	25.9		
1936	50.7	46.5	29.5	31.2		
1937	56.3	51.8	33.4	34.5		
1938	50.7	45.5	24.5	26.5		
1939			30.3	33.2		
1940			35.7	38.7		
1948			61.0	63.7		
1949	82.8	72.6	59.9	59.8	78.4	76.9
1950	87.4	84.9	78.5	70.6	89.3	88.9

1951	95.4	92.8	75.2	77.4	96.1	96.6
1952	101.1	95.1	77.6	80.6	99.6	98.7
1953	100.0	103.1	84.4	88.2	100.0	106.5
1954	102.8	103.1	83.6	82.2	105.8	106.5
1955	114.5	115.8	93.1	93.9	121.2	118.7
1956	117.5	121.7	97.9	97.6	123.8	124.2
1957	122.0	125.2	97.7	98.4	128.1	127.6
1958	121.2	121.7	95.8	90.8	125.3	124.3
1959	128.6	134.6	106.5	103.9	135.7	136.5
1960	138.4	144.1	102.6	107.0	146.5	145.4
1961	146.6	150.0	108.0	108.5	153.5	151.0
1962	158.1	160.8	123.2	118.0	162.6	161.1
1963	166.4	170.5	128.3	124.8	168.6	171.2

(1) By regression of the observed export volume on world industrial production, defined as the combined industrial production of the United States, West European countries, and Japan.

(2) By regression of the observed export volume on United States industrial production.

(3) By regression of the observed export volume on world industrial production.

Table A-5

Canadian Exports

In Relation to the Current Value of Exports of all Countries,

Valued f.o.b. in United States Dollars

5-Year Period	Annual Average	Range	Range as a Percentage of the Annual Average
Canadian Exports as a Percentage of Exports of all Countries			
1880-84	1.26	1.19 to 1.38	15
1885-89	1.22	1.12 to 1.28	13
1890-94	1.37	1.15 to 1.50	26
1895-99	1.62	1.49 to 1.72	14
1900-04	1.93	1.78 to 2.08	16
1905-09	1.85	1.78 to 1.94	9
1909-13	1.95	1.80 to 2.29	25
1925-29	3.94	3.48 to 4.25	20
1930-34	3.31	3.04 to 3.52	15
1934-38	3.88	3.52 to 4.54	26
1950-54	4.89	4.51 to 5.49	20
1955-59	4.61	4.33 to 4.72	4
Canadian Exports as a Percentage of Exports of all Countries, other than Communist Countries			
1950-54	5.46	4.97 to 6.10	21
1955-59	5.33	5.17 to 5.37	4
1960-64(est.)	4.89	4.75 to 5.00	5

Source: Based on data from Maddison, op. cit., also OECD, General Statistics.

TECHNICAL STUDIES

The following is a list of technical studies which have been prepared as background papers for the First Annual Review of the Economic Council of Canada. They are being published separately and are available from the Queen's Printer, Ottawa. Although they are being published under the auspices of the Economic Council, the views expressed in them are those of the authors themselves.

Staff Studies

1. Population and Labour Force Projections to 1970, by Frank T. Denton, Yoshiko Kasahara and Sylvia Ostry.
2. Potential Output, 1946 to 1970, by B. J. Drabble.
3. An Analysis of Post-War Unemployment, by Frank T. Denton and Sylvia Ostry.
4. Housing Demand to 1970, by Wolfgang M. Illing.
5. Business Investment to 1970, by Derek A. White.
6. Special Survey of Longer Range Investment Outlook and Planning in Business, by B. A. Keys.
7. Canada and World Trade, by M. G. Clark.
8. Export Projections to 1970, by J. R. Downs.
9. Federal Tax Revenues at Potential Output, 1960 and 1970, by D. J. Daly.
10. National Saving at Potential Output to 1970, by Frank Wildgen.
11. Changes in Agriculture to 1970, by John Dawson.

Special Studies

1. Immigration and Emigration of Professional and Skilled Manpower During the Post-War Period, by Louis Parai.
2. A Survey of Labour Market Conditions, Windsor, Ontario, 1964: A Case Study, by G. R. Horne, W. J. Gillen and R. A. Helling.

Export Projections to 1970, *by* J. R. Downs

Economic Council of Canada

1964