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FACTOR ADJUSTMENTS AND THE ECONOMIC
GROWTH OF THE ATLANTIC REGION

by

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A thesis submitted to the Faculty of
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of the requirements for the degree of
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ABSTRACT

One of the crucial elements determining the economic progress of a region is its ability to adjust its factors of production to changing circumstances. Part I gives the contention that two meaningful mechanisms of adjustment can be identified. It has been possible (in Parts II and III) to find evidence that both mechanisms have been in operation in the Atlantic economy.

For technological and demand reasons, the forces which allocate inputs have been weaker than they should be, and the two adjustments have been incomplete (Part IV). With factor proportions not fully corrected, the general direction of change has been toward an 'uneconomic' use of inputs (specifically labour, Part V).

The policies used for the regional problem are briefly reviewed in Part VI, and most, but not all, seem to concur with those required for factor adjustment.

PREFACE

A preface seems pretentious but it is inserted here to acknowledge, with gratitude, assistance which I have been given.

I offer especial thanks to my thesis advisor, Dr. T.N. Brewis who has been ever a positive influence, and who has gone beyond the call of duty to make his time available. To Mr. G. Paquet I am twice indebted, first for suggesting the topic, and second for a thorough review of an earlier version. My programmer, Mrs. D. Laycock, has vastly increased the extent of operations that could be performed with basic data.

My sincere thanks to these and to others who have helped. In the light of such assistance, those shortcomings which remain must be scored to intransigence.

R.K.

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I

THE THEORY OF FACTOR ADJUSTMENTS

"Since 'tis Nature's law to change
Constancy alone is strange."

J. Wilmot 1647-1680

1. The Two Adjustments

Factor proportions can be adjusted in two ways: by an alteration in the relative amounts of inputs used by one industry, and by a redistribution of the factors between industries.

The first type of adjustment requires that inputs should have some degree of substitutability between them.¹ In the finest tradition of Marshall, the adjustment takes place along smooth isoquants convex to the origin, and in response to changes in the price of factors.

The second adjustment embodies the other polar case. Instead of perfect substitutability between inputs, it employs Walras' assumption of fixed coefficients of production. A strong Walrasian case would permit any industry only one method of production. In such a circumstance, adjustments to changes in input prices would take place by inter-industry factor movements.

1. A. Marshall, Principles of Economics, 9th edition (Macmillan, 1961), p. 157.

CHART I.1

The classical adjustment uses smooth isoquants Q_1 and Q_2 . A decrease in the price of input W relative to X can be shown by a change in the exchange rate from OG (for OF) to OH and a movement from the old equilibrium at A to a new one at B . If the firm had continued to make the same total outlay and did not change factor proportions, then it would move to R after the price change.

The output attainable at R is less than at B so new factor proportions are implemented to reach B (under perfect competition).¹ Every response to a price change will be met by some substitution of the relatively cheaper factor of production for the relatively more expensive one.

The fixed coefficients case assumes two processes, I_1 and I_2 , which use inputs W and X in different quantities. Suppose that A and B are points which represent equal total amounts of output.

1. Assuming that the "best practice" technique will be implemented, where "best" depends upon technical and economic feasibility. See W.E.G. Salter, Productivity and Technological Change, Cambridge University Press (1960); especially Chapter II.

At the price ratio FG, process B is used because at that price the cost of B is cheaper, and likewise for price HJ and process A.

Now it does not matter if I_1 and I_2 are different industries. It is still true that at price FG, where W is relatively cheap, industry B, which needs relatively more of W, will be favoured relative to the other industry. In a dynamic context, the 'favoured' industry may grow more rapidly than the other.¹

Both mechanisms operate according to the same fundamental precept - relative scarcity, and it would properly be expected that both forces exert pressure in the same direction. In the reconciliation of factor proportions and factor prices, the forces assist one another.

For this reason it is difficult to make a clear separation between the two types of adjustment - if indeed such separation is

1. So far as I know, the work by J.H. Dales is the pioneer effort on the adjustments which I employ. See his "Fuel Power and Industrial Development in Central Canada" in the American Economic Review, Papers and Proceedings (May 1953), p. 187, where he says that:

industrial adjustment to energy patterns consisting of different proportions of fuel and water power, will take place according to the Walrasian mechanism whereby particular industries will appear in different proportions as between one region and another, and not according to the Marshallian mechanism whereby the technical coefficients used in each industry will vary between regions but the industrial pattern of one region will be roughly similar to that of another.

desirable.¹ This work follows the classification of J.H. Dales, a change in an industry is considered a Marshallian shift, while a change in the way factors are distributed among industries is a Walrasian shift.²

2. The Regional Context

The assumption of perfect substitution between inputs and the assumption of zero substitution are polar cases, but empirical findings have validated each as being applicable to specific industries. It seems likely that the economy of a region has some industries of each type, and that both forces would be in operation.³

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1. Marshall himself would seem to feel that separation was not desirable:

"... great mischief seems to have been done by yielding to this temptation and drawing broad artificial lines of division where Nature has made none. The more simple and absolute an economic doctrine is, the greater will be the confusion which it brings into attempts to apply economic doctrines to practice, if the dividing lines to which it refers cannot be found in real life.

Principles, preface to the first edition, IX.

2. These 'shifts' are analogous to the categories formulated by P.N. Mathur in "An Efficient Path for the Technological Transformation of an Economy" in Structural Interdependence and Economic Development, Ed. Tibor Barna (New York: Macmillan, 1963. He uses "structural changes" to cover the changing factor proportions among industries and "technological change" for a within industry change in input output relations. The emphasis in our classification is not on input and output changes but in alterations between inputs.
3. R.S. Eckaus has envisaged an economy which has two sectors, one operating with rigid input requirements, the other with substitution; "The Factor Proportions Problem in Underdeveloped Areas", American Economic Review, September, 1955, see also E. Despres and C.P. Kindleberger, "The Mechanism of Adjustment in International Payments, The Lessons of Postwar Experience", A.E.R., May, 1952.

An attempt will be made to show that both adjustment mechanisms have been at work in the Atlantic Region. We have adhered throughout, to the convention of defining the four Atlantic provinces as the "Atlantic Region" and the three provinces without Newfoundland as the "Maritime Region".

The investigation involves: first, an attempt to identify two adjustment mechanisms, and second, an attempt to give some indication of their strength and to relate the adjustments to the problem of slow growth in the Atlantic Region.

The aspects of the regional problem which are relevant here, are those which are concerned with the factor market. Not all the sources of the problem originate with the inputs, but most aspects have an influence on it and require adjustment there.

It may be worthwhile to mention alternative classificatory devices which I do not intend to use. Kindleberger separates structural disequilibrium at the goods level from disequilibrium at the factor level according to the source of the disequilibrating forces.¹ The problem at the goods level arises from a change in demand² and at the factor level from factor prices which differ from factor endowments.

1. International Economics (Homewood, Ill.: Irwin, 1963), pp. 578-586.

2. The history of the Atlantic Region offers many examples: the West Indies fish trade, the timber preference, the mast trade, wooden ships, and coal substitutes are only a few of the more important cases.

In addition, a "technological" level could be specified.¹

Each of the three disequilibrating forces require factor adjustment and it is on these adjustments that attention is focused here.²

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1. Agriculture (mining) for example and labour saving techniques of production.
 2. An informative treatment which covers both adjustments in this context is given in R.C. Estall and R.O. Buchanan, Industrial Activity and Economic Geography (London: Hutchinson and Co., 1961, especially pp. 80-101.

II

EVIDENCE OF INTER- AND INTRA-INDUSTRY ADJUSTMENT

(THE STRUCTURE OF THE MANUFACTURING SECTOR)

II. Evidence of Inter- and Intra-Industry Adjustments

This chapter gives an analysis of the manufacturing sector in an attempt to throw light on the operation of the two adjustment mechanisms. The central purpose of the search is to show as well as possible the existence of both mechanisms. If we are able to distinguish the operation of both mechanisms in the economy of the Atlantic Region, we will be able to investigate (in later chapters) how well they are performing their allocation function, and then to show any implications which this has for the problem of regional growth.

This part of the investigation is arranged in three stages: the first establishes regional accounts for the capital and labour inputs, the second looks for factor substitution within an industry, and the third seeks to establish the existence of our Walrasian adjustment.

1. The Capital and Labour Input

The two-factor production function employs labour and "all other inputs" which are referred to here as capital. Payments made to labour includes wages and salaries reported in the General

Review of the Manufacturing Industries in Canada.¹ The capital employed in production is the sum of all other inputs which contribute to total value added, and capital has been obtained by subtracting payments to labour from value added.² The statistical problems involved are discussed in a note at the start of Appendix 2.

A summary of 'capital' and labour inputs for all manufacturing industries by province and region is given as Table 2.2 in the appendix. The labour used in annual production grew more rapidly in Newfoundland, and slowest in New Brunswick during the 1949-1959 period. The capital used annually increased at about the same rate in every province.

The capital labour : ratio for manufacturing in the Region was .95 - almost exactly the same in 1959 as it had been in 1949. (These ratios for all manufacturing industries in the region are given in the appendix as Table 2.1.)

The capital : labour ratio for Ontario was 1.08, also the same in both terminal years.³ One important difference was that in the Atlantic region the growth rate of the two inputs was .8 times that of Ontario, a facet of the Regional problem.

1. Dominion Bureau of Statistics, Ottawa (annual).

2. The shortcomings of this concept of capital are at once obvious. In the first place other inputs (rent, profits, interest) are included, so we are calling the whole of non-labour input by the name of its most prominent part. Secondly, the complex question of embodied technology has been skipped over (although in the short run we hope this will not be too important). The crude measures used here are sufficient to give a rough indication of the quantity of each factor used for annual production.

3. Ibid.

A second important difference is the difference in the labour intensity of production in the Atlantic Region - an indication that the adjustment mechanisms may have been at work. We will direct our attention to this indication almost at once, but first a look at the components of the industry's capital : labour ratio to see if the aggregate hides more than it reveals.

The ratios for individual industries have been shifting in such a way as to offset each other in the manufacturing total. Most made some shift and the chart indicates this:

CHART II.1

Capital : Labour Ratios in the Atlantic Region Selected Manufacturing Industries

	<u>Average</u> <u>1949-1954</u>	<u>Average</u> <u>1955-1959</u>
Foods and Beverages	1.29	1.20
Leather Products	.84	.56
Textiles	.69	.96
Knitting Mills	.54	.73
Clothing	.51	.41
Wood Products	.82	.78
Paper Products	1.60	1.27
Printing, Publishing and Allied Industries	.80	.78
Iron and Steel Products	.38	.48
Transportation Equipment	.36	.33
Non Metallic Minerals	1.15	1.31
Chemicals and Allied Products	2.00	1.98
All Manufacturing	.99	.99

Source: Table 2.2.

The chart (II.1) compares ratios during the 1949-54 period with those of 1955-59. The normal suspicion would be that capital : labour ratios would be higher in the second period when some labour was not hired but the capital could not be adjusted so easily. This was not strictly so.

There is an ever present problem in comparisons of this sort that the components of any 'industry' may differ from region to region, and if the components have very different capital : output ratios, comparison may be meaningless. This difference in composition is a Walrasian effect which occurs within an industry, an adjustment which is not captured in the analysis.

The change in the Leather industry is complicated by reporting problems but the figures given probably come very close to an accurate presentation of the shift toward more labour and less capital. During the period, Newfoundland started reporting and Nova Scotia stopped. In New Brunswick, where 70% of the region's production originates, the average ratio was .92 for the first period and .76 for the second.¹

The textile industry used decidedly more capital in the second period. The regional figures are affected by some adjustments which were not marginal in nature (New Brunswick reduced its employees from 773 to 372 from 1956 to 1957) but even so, Nova Scotia, which accounts for one half of all production, experienced a rise in its

1. General Review, op. cit. (and working papers).

capital : labour ratio from 1.00 to 1.40 between periods.¹

The Paper Products industry is interesting for another reason. It illustrates that production can be performed with different factor proportions within the same region. The average capital : labour ratios for the 1949-1954 period for Newfoundland, Nova Scotia, and New Brunswick were 1.35, 1.71 and 1.81 and for 1955-1959 they were .96, 1.51 and 1.46. In both cases Newfoundland uses factors in different proportions than the other two. Since labour is not cheaper in Newfoundland the question can only be answered by means of our mechanisms, if capital is more expensive there.² There are likely many other factors at work.

Two industries have capital : labour ratios which are nearly constant over the whole period. These are Wood Products, and Printing and Publishing and the possibility exists that these industries operate with fixed techniques.

If the industries are in fact operating under conditions of fixed coefficients of production, then there would be cost forces (among other things) compelling them to move to a region where their relatively important factor of production is cheaper.³ The size of

1. General Review, op. cit. (and working papers).

2. By the size of the coefficient we can see that capital is of more importance for this industry than for others.

3. J.H. Dales, op. cit.

the capital : labour ratios indicate that labour is the more important input, and the labour-capital price ratio is lower in the Atlantic provinces.¹ We expect, therefore, a greater than "normal"² proportion of Wood and Printing industries in the Region under the Walrasian mechanism.

2. Within-Industry Factor Adjustment

In order to predict the Marshallian adjustment we must know the prices of the factors of production. R.E. George has studied this in his paper entitled Costs of Manufacturing in Alternative Locations: Nova Scotia Compared with Ontario and Quebec³ and has found that the cost of an effective unit of labour⁴ in Nova Scotia is significantly less than in Ontario but the cost of all other inputs is very nearly the same in the two regions.

This circumstance is suited exactly to Marshall's analysis. Instead of allowing the price to change from one point in time to the next, consider two Regions at one point in time. OG represents the price of labour in Ontario (for one unit of capital OC), and OH, its price in the Atlantic Region.

-
1. See R. George, The Cost of Manufacturing in Alternative Locations. Nova Scotia Compared with Ontario and Quebec. *see § 2.3*
 2. For example, more of the Region's total value added may originate in this industry than is the case in other regions.
 3. Read at the Canadian Political Science Association Meeting, Kingston, 1964. His information was obtained from responses to a questionnaire.
 4. Allowing for differences in productivity.

Given a difference in the price of labour as persistent as it has been between regions, we can expect that each industry will have had a chance to make the adjustment and will therefore operate at E_2 in the Atlantic Region and E_1 in Ontario.

At E_2 , as opposed to E_1 , different quantities of both labour and capital are employed; but since labour is the only input whose price has changed between regions, and the industry must use relatively more of the input which becomes cheaper when it operates in the Atlantic Region. How much more, is dependent upon the extent of the price difference, the possibility of substitution, etc.

In the diagram the capital : labour ratio for the Atlantic provinces is $\frac{OB}{OF}$ and it must be less than $\frac{OA}{OD}$, the ratio for Ontario because the former ratio includes relatively more of the cheaper input (labour), and labour enters in the denominator. If R.E. George is correct, and labour is cheaper in the Atlantic Region than in Ontario, then according to the Marshallian adjustment, we would expect each industry to have a lower capital : labour ratio in

the Atlantic provinces than the same industry has in Ontario. Chart II.3 gives such a comparison for the industries which operate in both regions.¹ The year 1955 has been chosen in an attempt to make the comparison for a "normal" year,² Comparisons between other years show much the same picture so it appears that the chart represents the situation fairly.

CHART II.3
Capital : Labour Ratios
Atlantic Region and Ontario
1955

	<u>Atlantic Region</u>	<u>Ontario</u>
Foods and Beverages	1.29	1.64
Leather Products	.53	.57
Textiles	.70	.86
Knitting Mills	.53	.59
Clothing	.46	.55
Chemicals and Allied Products	1.86	2.21
Iron and Steel Products	.44	.81
Transportation Equipment	.25	.81
Non Metallic Minerals	1.36	1.27
Wood Products	.80	.65
Paper Products	1.44	1.36
Printing Publishing and Allied Industries	.81	.76
All Manufacturing	.99	1.12

Source: A General Review of the Manufacturing Industries of Canada 1955. Dominion Bureau of Statistics.

-
1. Assuming that the industries are of comparable composition.
 2. Chosen with reference to the business cycle. We know that the "trough" year may be associated with excess capital and suspect that the peak may involve the opposite problem. 1955 is in between.

For "All Manufacturing" it appears that the Marshallian type of factor substitution may have occurred in the past. The same is true for the first eight industries in the table. However, for Non Metallic Minerals, and for the Three Forest Products industries, it appears that the Atlantic provinces employ more capital intensive technology than does Ontario.

A simple test can be made by studying value added per man, since the man working with a great deal of capital should be more productive than the man with less assistance. The figures confirm the capital intensity of the Paper Products industry in the Atlantic Region (see Appendix, Table 2.3). For all other industries average product per man is higher in Ontario.

The contribution of capital intensity differences has been contended. A.L. Levine ". . . would conclude that the case for the influence of New Brunswick-Canadian capital intensity differentials upon the observed labour productivity differences has yet to be established".¹ He has a 'stock' concept of capital as opposed to our 'annual input' notion. His study uses the proportion of staff on salary as a proxy for the stock of capital and he concludes that plant size and entrepreneurial vigour are likely to be more important than capital intensity differences.

1. Toward an Analysis of the Effectiveness of a Group of New Brunswick Manufacturing Industries, delivered to the C.P.S.A. meeting, June 1964, Charlottetown, P.E.I., p. 30.

The factor adjustment approach throws the problem into clear relief. There is not a one way relationship where capital intensity influences labour productivity. Rather, labour productivity and the technical rate of substitution between labour and capital affect the capital intensity via the Marshallian adjustment.

To return, though, to the application to the Region, we have four perverse industries which have never read the Principles. The root of this perversity is not the choice of an atypical year.¹ The next question may be directed at the assumption that capital costs the same amount in each region.² Since the evidence (cited above) indicates that it does cost the same, the only explanation seems to be a dissimilar composition of the industry in each region; but until that is shown, the best course is to admit that the cases are perverse.

In summary then, eight of the twelve industries behaved as predicted, and the capital : output ratio for manufacturing as a whole has made the proper movement to indicate intra-industry factor adjustment.

1. By examination of the ratios for other years.

2. If the government assistance programmes (whereby capital financing is made easier for firms in depressed regions) have had an effect, then production in the Atlantic area may be more capital intensive than it would be without aid. A wiser policy would be to have the government pay part of wages and thereby make the cost of labour relatively less than the cost of capital.

The results are not conclusive enough to prove fully the existence of a Marshallian adjustment mechanism at work in the Atlantic economy, but they do give fairly firm support to such a contention.

A second manifestation of factor price adjustment can take place through the size of the firm. R. Komiya and T. Uchida in The Labour Coefficient and Size of Establishment conclude that the labour-using coefficient for smaller establishments is significantly higher than for larger establishments.¹

This might lead to the " S_1 hypothesis" that small firms have an advantage in the Atlantic Region where labour is cheap. For this reason we would expect value added per firm to be smaller in the Region than in Ontario. (The problem is that this influence cannot be separated from the tendency which results in more capital intensive firms in Ontario - where capital intensity may also explain size.)

In any case we can see whether or not the data are consistent with the S_1 hypothesis. For ten of the twelve industries examined, value added per firm is higher in Ontario than in the Atlantic region (see Appendix, Table 5.4). The two exceptions which had a larger firm size in the Atlantic region were Paper Products

1. Structural Independence and Economic Development, edited by Tibor Barna (New York: Macmillan, 1963).

(again)¹ and Knitting Mills.

We can conclude then, that if small firms are indeed better suited to take advantage of the lower price of labour in the Atlantic Region, then the evidence is consistent with the contention that this form of adjustment has occurred.

This in turn might lead to hypothesis S_2 , that the increase in value added in the Atlantic Region is due to an increase in the number of, rather than the size of, firms. This can be investigated by examining the average growth in the total number of firms, and comparing it with the average growth in total value added.

For a dynamic investigation, and one which gives compound rates, the procedure involves six steps:

- (a) sum the provincial figures by industry for establishments - (E);
- (b) find the actual rates of change from the formula
$$\frac{E_{t+1} - E_t}{E_t};$$
- (c) average the rates of change by industry;
- (d) add 1.000;
- (e) repeat the steps for value added; and
- (f) find the ratio of the change in value added per firm.

1. The Paper Products industry in the Atlantic Region has an average firm size about triple that of Ontario, sufficient to indicate that the two industries are not strictly comparable; and to thereby account for the higher capital intensity of the industry in the Atlantic Region.

If this small firm hypothesis is correct, the increase in value added will be associated with an increase in the total number of firms. This is not the case. For all manufacturing, the average annual change in value added was from 1.00 to 1.05, while the average number of firms decreased from 1.00 to .99 (Appendix, Table 5.5). Value added per firm increased to 1.06. It appears, therefore, that the growth in value added is due (primarily) to increases from existing firms rather than from new small firms and small firm hypothesis S_2 must be discredited.

3. Inter-Industry Factor Adjustment

If fixed techniques is an important consideration in economic theory, we should be able to find evidence that in the structure of the Atlantic economy, the labour-using industries are more important than they are in regions where labour has a higher price.

The first requirement is an objective definition of a labour-using industry. If an industry pays more than half of its factor rewards to labour it will be called "relatively labour intensive". Since the price of labour in either region is a determinant of the wage bill, it would be improper to use regional figures to derive such a labour intensity test.

Total Canada figures have been used for this purpose (Appendix, Table 2.6). Two years have been tried, one a full employment year (1955) and the other a slack year, 1958. The cut-off

point of .500 leaves the same two groups in each case. More important, the cut-off occurs in the largest gap in the data.

Industries judged to be relatively labour intensive make from 64% to 56% of their factor payments to labour, and are (in descending order): Leather, Knitting Mills, Clothing, Transportation Equipment, Textiles, Printing and Publishing, Electrical Apparatus and Supplies, Wood Products, and Iron and Steel Products. Those to which the labour bill is less important are: Non Metallic Minerals (43%), Paper Products, Foods and Beverages, Rubber Products, Chemicals and Allied Products, Non Ferrous Metal Products, Tobacco and Tobacco Products, and Products of Petroleum and Coal (17%).

The next step is to decide whether one region has more of any industry than the other. Dependency ratios purport to show how important any industry is in one region. These are obtained by calculating the per cent of total value added (or employment) which originates in an industry so that a comparison can be made between the two regions.

The problem with such a comparison is that one region may be highly dependent on one or two industries while the other is not. In the Atlantic Region over 50% of all value added in manufacturing originates in the Paper Products and Foods and Beverages industry. When the remaining .5 of dependency is shared by the other fifteen industries then it will appear that Ontario, where many industries share the full 1.00 of the dependency coefficient, is more dependent in fourteen of the seventeen manufacturing industries.

This is a correct picture, but not the one that should be tested for the Walrasian adjustment. We want to know whether or not factor prices have had an influence on the relative dependency of the economy on industries of different (fixed) factor proportions. This has been done in Tables 2.6 and 2.7 (Appendix) by the ranking of dependency ratios.¹

The theory behind this ranking goes something like this: Suppose we have seventeen industries using different amounts of capital and labour and two regions, A and O, where the price of labour is cheaper in A. If we ranked the seventeen industries in order of decreasing importance for region A (where "importance" is determined by the dependency ratio for value added), we would expect the most labour intensive to appear near the top of the list. When the industries are ranked for O where labour is more expensive, the capital intensive industries should be closer to rank one than they were in A.

The measurement is complex but the issue is fairly simple. First we define which industries are labour - and which capital intensive, then region A should be more dependent on labour intensive industries than O is, and vice versa. The Walrasian adjustment predicts:

1. See Table 2.7, note, for treatment of the five industries not previously recognized.

CHART II.4

<u>Region with a Relatively Greater Dependence</u>	<u>Labour Intensive Industries</u>	<u>Capital Intensive Industries</u>
A	all labour intensive industries	
O		all capital intensive industries

In the Appendix, Table 2.7, industries are ranked according to their labour intensity as decided above and in Table 2.6. The industries in the Atlantic Region and in Ontario are assigned a second rank, based on the size of their dependency ratio. (If the 11th and 12th items are of equal size, they were both given a rank of 11.5.)

By comparing the priority of any industry in the industrial structure of the Atlantic region with the priority of that industry in Ontario it is possible to decide which region has a relatively greater dependence on that industry. We expect, again, the Atlantic Region to have a higher dependency rank than Ontario does, for labour intensive industries. Similarly we expect Ontario to have a higher rank dependency for activities which have been defined as capital intensive. (The greatest dependency is given the first rank or the lowest number.)

The results of the test are summarized here:

CHART II.5

Relative Dependence of the Atlantic Region and of Ontario
on Labour Intensive and Capital Intensive Industries

<u>Region with a Relatively Greater Dependence</u>	<u>Labour Intensive Industries</u>	<u>Capital Intensive Industries</u>
Atlantic	6	3
Ontario	3	5

Source: Table 2.7

There is perceptible but not conclusive support for believing that a Walrasian mechanism has been at work.¹ Out of seventeen industries, eleven behave as predicted. Six of the relatively labour intensive industries are relatively more important in the Atlantic Region and Ontario is more dependent upon five of the eight capital intensive industries.

Given the fact that factor prices are not the only determinant of industrial location but just one of the more important determinants, the test shows fairly well the existence of some effect of labour intensity on the industrial structure of a region.

Suppose we allow that nearness to markets, external economies and other influences can offset factor price differences for those industries which use capital and labour in about the same

1. Under a chi square test this is significant only at a P of .25.

proportion (i.e., where wages make up about 50% of the total factor bill).

Another way to get to the same point is to allow that industries which are not excessively capital-using or labour using do not need to pay so much attention to regional differences in factor prices.

We can run the test again, but for only those industries which pay less than 40%, or more than 60% of their total factor rewards to labour (i.e., those which are definitely labour-intensive or capital intensive).

This gives five labour intensive and five capital intensive industries:

CHART II.6

Relative Dependence of the Atlantic Region and of Ontario on Ten Industries which are Distinctly Labour - or capital-Intensive

<u>Region with a Relatively Greater Dependence</u>	<u>Labour Intensive Industries</u>	<u>Capital Intensive Industries</u>
Atlantic	4	0
Ontario	1	5

Source: Table 2.7.

This time the results are more convincing, as nine of the ten industries obey the Walrasian mechanism.¹ Under the "exact

1. The lone exception is Transportation Equipment, a capital intensive industry supported in the Atlantic Region by Federal policy.

procedure" the results are significant of the 97% level.¹ The results give sufficient evidence to enable the conclusion that, for the ten manufacturing industries of unusual capital or labour intensity, differences in factor prices between regions have had an effect on the industrial structure.

1. An application of the chi square test. For derivation see F.E. Croxton and D.J. Cowden, Applied General Statistics, 2nd edition, Prentice-Hall, pp. 686-687.

III

THE PATH TO ADJUSTMENT

(THE AGRICULTURAL SECTOR)

Introduction

The production function in the agricultural sector should include at least three factors: capital and labour, as before, and land, which is important in this production process. In this part the "stock" concept of capital is used. The analysis has been performed in the framework of a production function of the form:

$$A = f(K, L, N, S)$$

where output A is a function of capital (K) in the form of machinery and equipment, labour (L), "natural resources" (N) in the form of land and buildings, and livestock (S).

The generally accepted view of this industry is that output is being produced with less and less labour, more capital and slightly less land. If this is so, then agriculture should afford a sharp view of the adjustment which affects the proportionality of factors of production within an industry. In addition, a study of the forces acting on the labour input should uncover some evidence on the effectiveness of the Walrasian adjustment between industries.

But the examination of the agricultural industry using the framework of our two adjustment mechanisms is at first perplexing. This is because intra-industry adjustments are supposed to be made on a smoothly diminishing classical production function, and a long run look at the industry indicates that the technique being employed now

is different from the earlier method of production - in other words, a Walrasian adjustment has occurred within the industry.

The assumption that each industry does not change its whole production technique is extreme and obviously not tenable in the long run. A second technique uses combinations of inputs in a manner which was not possible prior to the mechanization of farm processes, and one which produces the same output at a lower cost in terms of inputs.

1. The Components of Agricultural Capital

(a) Machinery and Equipment

There are two beliefs with respect to the nature of the change that occurred. The first is theoretical, and it suggests that a major innovation such as motor driven machinery should be followed by a 'hump' of investment and a 'tail' of late investors.¹ The second is the suggestion that mechanization continued at a rapid rate in the more recent years.²

Neither appears to be wholly correct. Taking the second suggestion first, even after adjusting the value of machinery and

1. See J.R. Hicks, A Contribution to the Theory of the Trade Cycle (Oxford: The Clarendon Press, 1950).

2. F. Doucet, The Changing Economic Structure of the Atlantic Region. In this paper, delivered to a C.P.S.A. meeting in Charlottetown, June 1964, and in reference to the 1951-1961 period, the author states that "There was also a considerable increase in the value of machinery and equipment on the farm", p. 10.

equipment for a census change (Table 3.2) the deflation of decennial growth rates by the price of agricultural machinery (Tables 3.3 and 3.4) gives a value of agricultural machinery and equipment for the Maritime Region which is almost the same in 1961 as it was in 1951. The undeflated figures show an increase from \$68 million to \$89 million for the Region.¹ To the extent that prices reflect embodied technological change not accounted for in the construction of the price index, the deflation is improper. It is not possible to tell how much improvement was made in this decade, but it remains that much of the increase in the reported figures is illusory.

Substantiation for the "hump of investment tailing off" theory cannot be found in the data for the Atlantic Region - not unless we admit the possibility of Bactrian (two humped) as well as dromedary investment processes. The decennial growth rates for the stock of agricultural machinery and equipment are given in the chart:

CHART III.1

Growth in the Real Value of All Agricultural Machinery - Maritimes

<u>Period</u>	<u>Growth Rate</u>
1911-1921	.98
1921-1931	1.23
1931-1941	.74
1941-1951	1.47
1951-1961	.97

Source: Appendix, Tables 3.2, 3.3 and 3.4.

1. Census of Canada, Vol. V, Table 3.4 in the Appendix, shows that in Prince Edward Island such capitalization did occur - perhaps because the new technology was more appropriate there.

From 1911 to 1921 investment was sufficient only to keep the stock of machinery and equipment at the same level. The first hump occurred in the 1920's during which time the stock of machinery and equipment increased by 23%. The gain was removed during the 1930's. The second hump occurred between 1941-1951 and resulted in a gain of almost half the 1941 amount, and the stock was maintained at that level in the decade to 1961.¹

The number of tractors in the Region affords a crude check on these capital estimates. This measure of mechanization is roughly in line, as a fourfold increase occurred between 1941 and 1951 and the smallest increase from 1951-1961 (Table 3.4b). Under both measures Prince Edward Island shows noticeably longer and stronger growth.

The result of this change in technology was that in the half century this element (K) increased enormously in its importance for the production process. In 1901 machinery and equipment made up 6% of the total capital value of farms in the Maritime Region. In 1961 the figure was 24%.²

(b) Livestock and Poultry

It is possible that the introduction of new machinery and equipment would favour either land crops on the one hand or

1. See Appendix, Table 3.2 for adjustment procedure.

2. Table 3.2 and 1961 Census, Vol. V.

livestock on the other, by increasing the productivity of either input.

Another way to look at this would be to hypothesize that the tractor (introduced about 1920, according to the last section) is a complementary factor of production with land but not with livestock. This would mean a decline in the value of livestock relative to land.

This livestock-land hypothesis is examined in the next section. The statistical problems which inhibit comparability should be mentioned though. Two measures to handle the inflation in prices are given in the Appendix as Table 3.5. To allow for the change in the definition of a farm, each animal not reported in 1961 was assigned a value equal to the average value of that type of beast on the included farms. The result would produce a slight overestimation of 1961, since animals on the low production farm which is excluded would presumably be of less value. Results are given as Table 3.6 in the Appendix.

The general picture of the stock of capital in livestock and poultry is one of decline, led in the 1921 to 1951 period by New Brunswick and Nova Scotia (Appendix, Table 3.6).

(c) Land and Buildings

This section attempts to look at, in turn, three developments which resulted from the change in technology: (i) the redefinition of a "marginal farmer"; (ii) the change in farm organization, and (iii) the change in the relative importance of land and livestock.

(1) Mechanization made a large increase in the productivity of some land but it operated to the disadvantage of those types of land which were too rugged to make use of the new technology. To some extent this explains why the Maritime farmer made rather slower gains in productivity compared with agriculture as a whole.¹

Compare two farmers in 1921, both on the last unit of land that can be usefully employed, one on relatively flat land (elsewhere in Canada), and the other in the Appalachians. Introduce the tractor technology and the man on flat ground is intra-marginal because the tractor greatly improves his productivity, while the other farmer (and some of his fellows) is extra marginal. This is especially so if the elasticity of demand for output is so low that all of the increased production granted by the new technology is not required for consumption.

The total acreage cultivated dropped by about 1% per year from 1931 to 1952² for the Region as a whole and it was the two provinces in the Appalachians that led the decline. The termination of extra-marginal farms was one of two factors working to reduce the total number of farms.

1. See, for example, W.M. Drummond and W. Mackenzie, Progress and Prospects of Canadian Agriculture, Royal Commission on Canada's Economic Prospects (Ottawa: Queen's Printer, 1957), p. 90.

2. 1961 Census, 5.1-2 to 5.1-4.

(ii) The other was the organizational change which resulted from the fact that the new production process enabled one unit of labour to look after more land. In each province, total number of farms decreased by more than 5% in every decade since 1921.

Nova Scotia had an average decennial decrease of 21% over the 1921-1961 period. The reductions were heavily concentrated in farms of smaller size; in fact, there is a rather precise relationship between size in acres, and the 1921-1961 change in number of farms (Appendix, Table 3.8). In 1921, 17% of all farms in Nova Scotia were 10 acres or smaller in size, while in 1951 only 7% were this small (Table 3.9).

The pervasiveness of this tendency indicates that the new technique involved organization on a different scale.

(iii) Earlier it was mentioned that tractors and land are complementary so that the first phase of mechanization might result in an adjustment away from livestock and toward the use of land.

This was in fact what happened although not in such a simple way. The new technique at first decreased the value of land in the region because the necessary produce could be attained with less of the factor land. After the initial adjustment, the total values of Maritime land and machine capital moved in unison. The 'Land and Buildings' values found in Chart III.3 are consistent with special survey results which have been made available by the Dominion

Bureau of Statistics (see Appendix, Table 3.10).

The value of the stock of capital in livestock and poultry underwent a much more severe reduction in the decade of the 1920's when the burst of investment in machinery occurred. The numbers in the following chart give the value in decade $t+1$ divided by the value in decade t .

CHART III.2

Decennial Movements in the Value of the Stock of
Farm Capital by Component
Maritimes 1921-1961

	<u>Machinery and Equipment</u>	<u>Land and Buildings</u>	<u>Livestock and Poultry</u>
1921-1931	1.23	.82	.64
1931-1941	.74	.78	.88
1941-1951	1.47	1.52	1.09
1951-1961	.97	1.00	.91

Source: Chart III.1 and Appendix Tables 3.6 and 3.10.

The same result can be seen during the second hump of investment in machinery and equipment. By that time certain equipment which was complementary to livestock could be affecting the result and altering our expectations (but is not evident in the chart). From 1941 to 1951 the stock of machinery and equipment increased

by one half, land and buildings again followed suit, and livestock and poultry in contrast, made only a slight increase.

It also appears that the period when land was being withdrawn from cultivation was not a period of declining total land value. This is consistent with the hypothesis that the marginal farm was being redefined in terms of "flatness" to be consistent with the new technology.

2. Labour and Its Adjustment

(a) Effect of the Change in Technology

The mechanization of agriculture also affected the ratio of land: labour required in the production process, and the exodus from agriculture attests to this. The usual analyses make use of figures published for the "agricultural labour force", and thus have the weakness of not fully capturing the problem of underemployment.

Define the "maximum available labour force" as the total farm population. Dividing this by the area in all farms gives an outside boundary for the land: labour ratio. In the last four decades this has fallen from 43 persons per thousand acres to 41, 40 and 35 persons in 1961.¹

To some extent the excess population on the land is the result of government policy. Efforts have long been made to recruit

1. Appendix, Table 3.11. The case is stronger than pictured by this ratio because there has been an increase in the number of farm residents employed off the farm - Trends in the Agricultural Labour Force in Canada, Department of Labour 1960, p. 46.

abroad and this is likely to have interfered with the natural demand-supply relationship in the industry. In addition, the 1930's saw an attempt to have urban families on relief move to farms and a \$600 incentive was offered for this purpose.¹ After the war, when natural forces indicated that persons would leave agriculture, recruiting farmers from abroad was again a policy. In his thorough study of the problem, Dr. Haythorne observes that "only in the last two decades have the market forces exercised their proper pull out of agriculture".²

According to the tools of the present thesis, a new technique was introduced in the agricultural sector which meant that some of the labour located there was no longer needed. In theory one member of the farm family could be declared 'redundant' and asked to leave. Alternatively he could stay, and slow down the improvement in productivity.

The mobility of labour out of agriculture is an adjustment of the Walrasian type and will depend on the attracting industry as well as the expelling one. For that reason a statement such as "In depressed areas the mobility of labour may have been too low to enable a better allocation to take place"³ seems to dispose of the

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1. Labour in Canadian Agriculture (Harvard University Press, 1960), p. 65.
 2. Ibid., p. 67.
 3. Vocational Training Needs in Canadian Agriculture, Bulletin No. 5 of the Research Program on the Training of Skilled Manpower, p. 10.

problem too quickly. The following is an attempt to get behind this immobility in order to examine the strength of the forces which would produce such an adjustment.

(b) The Strength of Adjustment Forces

Whether or not a unit of labour leaves the agricultural industry depends on, among other things, the wage in his present and prospective occupation. The problem with some comparisons of this nature is that they give the difference between the wage which a worker receives on the farm and a wage in an occupation which a farm labourer can never hope to work because of skill differentials.

The following chart attempts to compare the strength of economic forces operating on male farmers and farm workers in the Atlantic Provinces with the forces in operation in Ontario. The "Farmer and Farm Worker" evaluates a hypothetical move to a job as an "Industrial Labourer", a category which excludes resource workers.

CHART III.3

Farm Employment and Industrial Alternatives in
the Atlantic Region and in Ontario, 1951

	<u>Atlantic Region</u>		<u>Ontario</u>	
	<u>Farm</u>	<u>Industry</u>	<u>Farm</u>	<u>Industry</u>
Yearly Earnings \$	1191	1634	1513	2355
Per cent of all wage earners earning less than \$2000 per year	78	63	65	39
% of all males who work 42-50 weeks per year	43	39	53	58

Source: Appendix, Table 3.12.

A farm worker can become a labourer in the Atlantic Region and raise his income from \$1191 to \$1634 while his counterpart in Ontario makes an improvement from \$1513 to \$2355, almost twice as great in terms of dollar differentials. The absolute size of the difference may be a very important factor if the increase has to cover a moving cost. In such a case, the wage differential may have to be of some critical minimum size.

Another way to look at the situation is to compare the returns to inter-industry mobility in each region. In the Atlantic Provinces this return is 37% while in Ontario it is 56%. If we use these two numbers as a crude measure of Walrasian strength, then from their quotient we can say that the inter-industry attraction force acting on agriculture is .66 as strong in the Atlantic Region as it is in Ontario.

The other figures in the chart substantiate this difference in attracting power. After a change in occupation the worker in the Atlantic Region has a large chance of earning less than \$2000 per year, while in Ontario 61% of all industrial labourers earn more than that. The bottom row shows that the hypothetical alternative opportunity will increase the labourer's chance of securing employment for more than 42 weeks per year in Ontario but this is not true of the Atlantic Region.

'Between region' mobility is discussed in the section on occupations, but perhaps it should be mentioned here. Nothing in the model prevents a movement from agriculture in the Atlantic

Region to industry in Ontario, and indeed the attracting force for this form of the Walrasian adjustment is particularly strong (our worker doubles his earnings by this means). The situation is analogous to the problem of whether an electric current will cross a gap - it depends not only on the magnitude of the charge but also on the size of the gap, and in our case the geographic distance is very great, and the social distance is alleged to be great as well.

The Walrasian adjustment depends not only on wages but on the number of employment opportunities. Between 1946 and 1958 the agricultural labour force in the Region shrunk by an average of 4.0% per year while in Ontario the average decrease was 4.7%, a more effective inter-industry correction. The bulk of the reason was the ability of other industries to expand and absorb labour. During the same period the non-agricultural labour force in Ontario increased by 50% while in the Atlantic Region it grew by only 18%.¹

Another form which this lower attraction takes, is in the number of choices open to a labourer. Table 3.13 compares wages of male farm help with some particular unskilled occupations. In the Atlantic Region the choice of "meat packer" is not open to the unskilled. The table also shows the "bunching" of wage rates that occurs in a slack labour market. When inter-industry differentials are greater then the Walrasian adjustment is more likely to take place.

1. Calculated from Trends in the Agricultural Labour Force in Canada from 1921 to 1959, Department of Labour (Ottawa, 1960), pp. 10 and 63.

It appears from the foregoing figures, therefore, that the forces calling for adjustments in the factor market have been acting with some strength and for considerable time. It still remains that the forces acting on agricultural inputs have been less compelling in the Maritime Region than they have been in Ontario.

An investigation of why this is so is the task of Chapter IV; but first a brief presentation of the effects that factor adjustment has had on the agricultural industry in the light of the regional problem.

3. Results of Factor Adjustment

The study has indicated that the period from 1941 to 1951 was one of heavy capitalization and that the increase in the stock of machines ^{was} held during the next decade. At the same time, the amount of land used for production decreased more rapidly after 1951 and holdings were consolidated into fewer farm units.¹ The capital value of livestock increased slightly from 1941-1951, reversing a long term decline, and the labour component in our production function decreased sharply as workers moved to other industries.²

Given the fact that on balance, total value of the stock of inputs were reduced, what happened to total output? The following table gives a quantitative measure.

1. See Table 3.8.

2. See Part V on labour or Table 5.2.

CHART III.4

	Quantity Index of Agricultural Output at Factor Cost - Canada Average
1935 - 1939	100.4
1940 - 1944	102.7
1945 - 1949	102.6
1950 - 1955	123.3
1956 - 1962	126.5

Source: Index of Real Domestic Product by Industry of Origin
1935-1961, D.B.S., p. 67, Table 1.

On a per unit of input basis the increase in agricultural productivity was greater than the increase for the industrial sector.¹ For Canada as a whole, agriculture advanced an index from 101 in 1948 to 175 in 1958 while non agricultural productivity advanced only from 99 to 125.²

In constant 1935-39 dollars the increase in average output per man-hour in agriculture between the two periods 1926-30 and 1951-55 is estimated at 90%.³ Almost all of this increase was achieved in the post 1940 period, when capital in machinery and equipment increased by almost one half (Chart III.1) and the agricultural labour force was reduced by an average of 4% per year.⁴

1. G.V. Haythorne, op. cit., p. 3.

2. Ibid., p. 121.

3. W.M. Drummond and W. Mackenzie, op. cit., p. 63.

4. Trends in the Agricultural Labour Force, p. 63.

These factor adjustments went a long way toward alleviating the problem of regional stagnation. Even so, farm incomes lagged considerably in the Maritime Provinces. The figures in the chart have been adjusted (by the Department of Labour) for the cost of hired labour, the food component in kind, other income in kind, and farm family living costs:

CHART III.5

Average Net Farm Real Income per Person
in 1935-39 dollars

	<u>Maritime Region</u>	<u>Ontario</u>
1946 - 1951	483	816
1952 - 1957	579	882
Improvement	20%	8%

Source: Trends in the Agricultural Labour Force in Canada,
Appendix B, Table G II.

The relative improvement is encouraging but, if the forces acting on the inputs in the Atlantic Region are relatively weaker (as indicated in the section on "The Strength of Adjustment Forces") then further improvement may be more difficult to achieve than in the past, partly because of the relatively weaker forces and partly because those people most likely to make adjustments (e.g. by moving) do so first.

Over the period studied, the change in technology resulted in two periods of heavy capitalization (or one period, interrupted by

the depression). The new technique favoured the output of field crops as compared with meat, and consequently increased the importance of the factor land relative to the factor livestock.

At the same time as adjustments were being made, changes in the scale and organization of production helped to increase productivity and real incomes. Nevertheless it appears that the forces acting in the region have not been strong enough to push our two adjustments to completion. It is to this that we must now turn our attention.

IV

THE ROLE OF FACTOR ADJUSTMENT

IN REGIONAL GROWTH

(THE RESOURCE INDUSTRIES)

1. Introduction

The model set forth in this chapter attempts to measure the actual performance of industries important to the Atlantic region against a hypothetical norm. The norm represents expected performance and the comparison is based on four criteria which have been set up in an attempt to capture the developmental impact of each industry on the region. From this analysis it should be possible to consider the implications which the existing industrial structure carries for inter and intra-industry adjustments in the factor market.

Under conditions of expanding demand, competition for factors of production drives input prices to a full employment solution. The result is the complete Marshallian adjustment which has been here discussed. The "completeness" of the classical adjustment is further ensured by the Walrasian mechanism whereby inputs are attracted to the industry which is growing more rapidly. Both tendencies generate competition for inputs and the two together reinforce the likelihood of a full employment solution.

The problem then is to explain why this in fact has not been the solution in the Atlantic Region. The discussion in this section makes use of the answer provided by Keynes and has the following outline:

1. Canadian industries have grown at widely differing rates and the ones which are the slowest growers are those which are important in the economy of the Atlantic Region.

2. Industries which are important in the industrial structure of the Region are not only slow growers but have relatively low inter-industry linkages, poor labour-income multipliers, and small labour-employment capacities.¹

3. Without a compelling intra-regional growth pole to attract inputs via the Walrasian (inter-industry) adjustment mechanism, and with labour fairly immobile, a less than full employment solution is in effect. Without the Walrasian reinforcement, the Marshallian adjustment is incomplete.

The first point may require clarification. It is part of this investigation to discover whether the Atlantic Region has a mix of industries which are slow growers. The likely case is that, for historical, resource, and market reasons, the structure of the Atlantic economy (in say 1946) depended less on industries facing the most rapid expansion in demand. The analysis of input usage has been performed using national figures rather than regional ones. Otherwise it might not be the mix of industries which impeded progress,

1. A more difficult point can be made to further support this absence of any growth producing effect. In Chapter II we saw that two important industries (Wood, Printing et al) behaved as though they had fixed production coefficients. R. Bharadwaj in "On Factor Substitution and Full Employment" (Indian Economic Journal, October 1963) has shown that under limited substitution full employment will result only at a particular level and mix of demand.

but rather a reflection that the part of each industry which is located within the region has expanded more slowly than the part located elsewhere in Canada, a plausible but separate hypothesis.

Industries Important to the Region

The issue here is to discover which industries are more important in the Atlantic economy relative to their importance in the economic order of other regions. The dependency ratio is a measure which purports to show the extent to which a region depends on any industry for employment or for production. These ratios have been calculated for seven industries, and for five regions of Canada, and they appear as Table 4.1 in the Appendix.

According to that analysis, the Atlantic Region is more dependent than any other region is, on the Mining and Mineral Processing industry. The Atlantic area has a greater proportion of total value added, and of employment, in the Mining industry than has any other region. In the Forestry and Fishing industry the employment dependency ratio is higher than in any other region, and the net value dependency is second only to British Columbia.

In the less important Electric Power industry the Atlantic Region ranks second by both dependency criteria. In agriculture the Region ranked third and fourth but was almost identical in both respects with Quebec and Ontario so that the three cover ranks two, three and four.

The results are conclusive for the two industries mentioned first. The Forestry and Fishing, and Mining industries assume an unusual importance in the Atlantic Region.

3. Rates of Growth in the "Over Represented" Industries

The first and most commonly used indicator of growth is the annual increase in the value of output of each industry. If the industries which are abnormally important in the Atlantic Region are slow growers, then Forestry and Fishing, and Mining should be pulling down the average rate of increase in Gross Domestic Product (G.D.P.). On a least squares of logarithms basis, the average annual growth rate of the Forestry industry in Canada between 1946 and 1961 was 1.4 per cent while G.D.P. grew by 4.2 per cent per year.¹ The increase for the Fishing and Trapping industry was 1.6 per cent, again significantly below the rate for G.D.P.

On the other hand, Mining grew at 9.5% per annum, more than double our 'average' rate. But before calling this industry a "growth pole",² two cautions are in order. First, the dependency ratios indicate that Forestry and Fishing is 2.5 times as important

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1. See Appendix, Table 4.2, where the average annual growth rates over this period and over the longer period, 1935-1961, are given for thirteen industries.
 2. This captures the idea, presented earlier, whereby a rapidly growing industry acts as a transmitting centre sending impulses to the rest of the economy. Some of the impulses act by attracting inputs from declining industries - the Walrasian adjustment. On growth poles, see F. Perroux, "Les Macrodécisions", Economie Appliquée 1949, No. 2, p. 321.

as the Mining industry on a value added basis. Secondly, the word growth has been employed here to mean economic development. In this context the Mining Industry must be subjected to further tests to see if it has the input-demanding, income-creating, and employment-generating effects¹ that would qualify the industry as a growth pole.

Two other industries should be mentioned. The Region was second in its rank-dependency upon the Electric Power industry which had an annual post war growth rate of 9.8%. This phenomenal average increase must be deflated by the importance of the industry (dependency of .014 to .039) before its implications for economic development can be understood. Furthermore, the smallest and largest dependency ratios anywhere were .01 and .04 so the Atlantic Region was barely different from any other region in its dependency upon Electric Power.

The Agriculture industry was important to the Region and had the slowest growth rate of any industry (1.8% for the 1946-61 period).

The "abnormally important" industries will now be tested for their growth-generating capacity.

4. The Strength of the Input Demanding Effect

It is a central feature of input linkages that one dollar of final output in one industry has a greater influence upon

1. M.H. Watkins, "A Staple Theory of Economic Growth", C.J.E.P.S., Vol. 29, No. 2, May 1963, p. 145.

the economy than one dollar of output in another industry. This analysis attempts to compare backward linkages that those industries important in the Atlantic Region have on other industries, with a "normal" demand for inputs.

The first problem is the need for a standard against which one can measure the amount of pull of any industry. The 1949 Canadian Input-Output Table¹ gives intermediate inputs and G.D.P. as follows:

Rows 1-20 in Column 18	=	\$15,872	(a)
Rows 22-25 in Column 26	=	14,885	(b)
		<hr/>	
Total Input		\$30,757	(c)

(a) is the total direct input linkage backward through the economy
 (b) is the total value added in the economy, and the ratio $\frac{(a)}{(c)}$
 gives the proportion of total input which penetrates backwards in the form of inter-industry demands.

The average direct link backwards per dollar of sales for the Canadian economy is .516. There are two indicators which suggest that this "average coefficient of pull" may not be too erroneous. The first is the plausibility of items within the range. The lowest input demand on other industries occurs in the Coal industry² where the coefficient is .19, the highest is .78 in the

1. Officially called The Inter-Industry Flow of Goods and Services, Sixteen Industry Aggregation, D.B.S. 1949.

2. Of obvious but dire importance to the Atlantic Region.

Foods, Beverages and Tobacco industry. The second source of support is that the median coefficient is .495.

The coefficients of inter-industry pull for five industries can be found as Table 4.3 in the Appendix.

Suppose we let the "average" Canadian industry at .52 have an input-demanding power of 1.00. Then the Wood and Paper Products industry¹ has a comparative pull of $\frac{-58}{-52} = 1.12$ and the following chart can be produced:

CHART IV.1

<u>Industry</u>	<u>Coefficient of Comparative Input Pull</u>
Transportation Storage and Trade	.50
Forestry and Fishing	.54
Mining, Smelting and Refining	.56
Agriculture	.60
Wood and Paper Products ¹	1.12
Average Canadian Industry	1.00

Source: Appendix, Table 4.3

With one exception, all coefficients for industries important to the Atlantic Region are below the coefficient for the

1. Shown separately because aggregation with Forestry hides vast differences here.

"Average Canadian Industry". This is not much of a surprise since primary resources are relatively more important in the Region and these industries are supposed to have weaker backward linkages.¹ Nonetheless, it should be safe to conclude that there is relatively less interaction from inter-industry demand in the Atlantic Region than there is in other Canadian Regions.

5. Income-Generating Capacities

The second step in the investigation is to look at the labour income capacities of the same industries. This can be done by a static analysis to discover the absolute size of the capacity and by a second probe to find the trend of earnings in these firms.

The first step is straightforward but not very conclusive. Table 4.4 in the Appendix gives the payment to labour per dollar of output. The industries which are important in the Atlantic Region are scattered throughout the range and are not perceptibly different from the others.

In the dynamic context we must enquire whether the rate of growth of labour income in the selected industry is greater than the rate of growth of labour income as a whole,² or whether it is slowing down this rate of progress.

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1. A.O. Hirschman, The Strategy of Economic Development (New Haven: Yale University Press, 1958), p. 109. The variable used here is a proxy for the more elaborate type of Hirschman link.
 2. This idea that a growth industry pulls the average upwards is given full discussion by F. Perroux in "Les industries motrices et la croissance d'une économie nationale", Problèmes de Planification (Montréal: Les Presses H.E.C., 1964).

Table 4.5 in the Appendix indicates that the Mining industry has kept pace with the increase in total labour income but that Agriculture, and Forestry and Fishing have fallen well behind.

6. Employment-Creating Ability

A similar analysis of the number of men employed in these industries should show how this measure of progress has been affected. To give this analysis, the rate of growth in number employed in the specified industry is compared with the rate of growth in industry as a whole (i.e. in the industrial composite). Later, the extent of the gap between the coefficient for a particular industry and the "average" will be used as a measure for comparison.

CHART IV.2

<u>Industry</u>	<u>Annual Labour - Employment Multiplier</u>	<u>Annual Change %</u>
Agriculture	.9640	- 3.6
Forestry et al	.9440	- 5.6
Mining	1.0087	.9
Industrial Composite	1.0094	.9

Source: Appendix, Table 4.6.

Agriculture and Forestry show an absolute decline while mining lagged slightly behind the Industrial Composite in its ability to employ labour.

We would like to know if this is so in the longer period, but there is no input-output table prior to 1949 so there is no sure way to tell how input requirements are changing. As Table 4.7 indicates, the income and employment trends in the 1921-1951 period adhere pretty closely to the picture which emerges from the postwar analysis presented here.

7. Economic Performance

The four indicators can be brought together to find how each industry scores as an engine of growth. Each negative number in the following chart represents a lag behind the average for the economy as a whole. In order for an industry to be growth-generating, a significant positive number must occur.

There is only one indication in the twelve results of the following table which can be interpreted as signifying a centre of growth.¹ The absence of a growth pole is important first of all for its own production, and secondly, because inputs are not attracted from less productive employments.²

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1. Even this must be downgraded since the mining industry in the Atlantic region is composed of more Coal firms than elsewhere in Canada and the output of coal has been declining.
 2. A specific case was suggested in the section on agriculture - an agrarian could become an industrial worker in the Region and improve his wage from \$1191 to \$1634, while in Ontario he would move from 1513 to \$2355.

CHART IV.3

Performance of Selected Industries Under Four Growth Criteria

	Employment Effect	Labour-Income Effect	Intermediate Input-Effect	Gross Output
	Annual change in employment in specified industry less annual change in industrial composite	Annual change in labour income in specified industry less annual change in all labour income	Input demands of specified industry less input demands of "average" industry per dollar of output	Annual change in specified industry less annual change in G.D.P.
	%	%	\$	%
Agriculture	- 4.5	- 5.1	- .21	- 3.0
Forestry, fishing, Wood, paper products	- 6.5	- 3.7	- .01	- 2.8
Mining	- .1	- .1	- .23	5.3

8. The Role of Aggregate Demand

Now that the weakness of forces operating along Walrasian lines has been indicated, it may be prudent to discuss an alternative "solution". Before 1936 one might have felt, as did Pigou, that:

With perfectly free competition there will always be at work a strong tendency for wage rates to be so related to demand that everybody is employed . . . such unemployment as exists at any time is due wholly to the fact that changes in demand conditions are continually taking place, and that frictional resistances prevent the appropriate wage adjustments from being made instantaneously. ¹

In the course of Marshall's adjustment a reduction in the wage level would make the use of labour more attractive and remove the disguised and visible unemployment (aided by migration from the region because of the wage differential). It is now a commonplace that the prospective classical adjustment is fundamentally wrong. Keynes has shown that the manipulation of wages is not an effective way to increase employment. ²

Thus writers in the classical tradition, overlooking the special assumption underlying their theory [i.e. the assumption that the wage bargain determines the general level of real wages] have been driven inevitably to the conclusion, perfectly logical on their assumption, that apparent unemployment . . . must be due at bottom to a refusal by the unemployed factors to accept a reward which corresponds to their marginal ~~product~~ productivity. ³

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1. Theory of Unemployment (London: Macmillan and Co., 1933), p. 252.
 2. He also recognized the unwillingness of employed workers to accept a wage cut.
 3. The General Theory of Employment, Interest and Money (London: Macmillan, 1936), p. 16.

He argued, furthermore, that the classics ignored the important connection between wage payments and the total demand for consumer's goods. The latter is the rationale for sizeable government transfers to the region.¹

It seems possible that growth in other regions of Canada would favourably influence demand for the products of the Atlantic region (a) by raising incomes (elsewhere) and (b) by shifting comparative advantage by changing factor proportions through capital accumulation.² However, the inter-regional trade multiplier has a small effect in the overall demand picture.

It has been shown earlier that the industries with preponderant importance in this region have demands for intermediate goods and services which are unusually small. On top of this, the region's demand for final output is determined by an average income which is 35% below the Canadian average³ so it is not difficult to see that aggregate demand is exceptionally low. In such a case the ploy of wage reduction, which is supposed to push the Marshall-Walras adjustments to completion, is not at all a solution.

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1. Over \$175 million per year between 1951 and 1955 and much increased since that time (Howland, op. cit., p. 70). In 1963 the Atlantic Development Board was given a fund of one hundred million dollars to operate on the investment component.
 2. H.G. Johnson, "Equilibrium Growth in an International Economy", Canadian Journal of Economics and Political Science 19 (1953), pp. 478-500. The above is an application of international trade theory to regions of one country.
 3. The Gordon Commission, for example, found that per capita income in the Region was 64.9% of the figure for Canada in the early 1950's (Howland, op. cit., p. 49). The same is true for the 1960's (see the Annual Report of the Atlantic Development Board, p. 9).

There are other reasons for believing that the Regional problem is one of insufficient aggregate demand.¹ Unemployment in the Region is closely related to unemployment in Canada as a whole. Furthermore, an increase in unemployment in Ontario by 2% is likely to be accompanied by an increase in Atlantic Unemployment of twice that amount.²

These relationships, the production relationship (whereby intermediate input demand is low), and the small size of incomes which can bid for final goods all point to a deficiency in aggregate demand as the culprit. Does this mean that Keynesian tools could rejuvenate the Atlantic economy? There are sound reasons for giving these tools priority, and much can be said for more imaginative Keynesian measures, but there are two reasons why such policies will fall short of their goal.

First and most important, much of the demand has typically come from foreign sources and is therefore almost beyond the reach of the Canadian policymaker. Furthermore, this demand may be shrinking for real and artificial reasons. Nurkse has suggested the following:³

(a) output as a whole may have been shifting away from industries with large raw material inputs per unit of output, (b) synthetic materials may be affecting raw material demands, (c) there is a low income

1. As argued by Dr. T.N. Brewis in "The Problem of Regional Disparities", Growth and The Canadian Economy, Carleton University, pp. 3-7.

2. Ibid., p. 5.

3. Equilibrium and Growth in the World Economy, edited by G. Haberler (Harvard), 1961.

elasticity of demand for food (including fish), and (d) protectionism may have been more severe in the last half century.

Secondly, even if, in 1965, former markets could be restored to full strength, there is no guarantee that industries of the forest, sea, and mine, could absorb the accumulated unemployment because they have such weak income-generating and employment-creating effects. In other words, technology is now capable of increasing output without greatly affecting the demand for inputs, a situation which is accentuated by disguised unemployment and excess capacity. (For example, we have seen that output in the agricultural sector was expanded using less land, less labour, and very little additional capital.)

Reviving the old industries emphasizes the intra-industry adjustment and plays down factor adjustments between industries. In short, the approach is backward looking. Re-establishment of former markets is just one phase of a more comprehensive policy of encouraging overall (local plus foreign) aggregate demand, a policy which would be forward looking, backward looking or, in fact, looking everywhere.¹

The wisdom of doing everything possible by means of aggregate demand has not been challenged here. However, since technology requires only small amounts of intermediate inputs and of

1. It is still unlikely that such demand policies would be "neutral" though, because if A is taxed and a transfer payment is made to B, then there is a structural distortion which results whenever B purchases the products of a different industry than A would have chosen.

labour (in the industries of the region) and since much of the demand is outside Canada, we do not expect that aggregate demand alone will be sufficient to fully employ the inputs of the Region.

The vehicle ~~for operation~~ for operating on both the factor proportions of the region and on foreign markets should be commercial policy. This seems wryly appropriate since the tariff has been partly responsible for the regional problem by discriminating in favour of manufacturing industries and therefore against resource intensive regions.¹ The tariff may have cost the "average" Canadian 6% of his standard of living.² The main brunt of this cost has been paid by any region with an industrial structure which is resource-dependent.

Conclusion

The industrial structure of the Atlantic economy leaves the Region highly dependent on industries which exert developmental pulls that are sub-normal as judged by the model. Final demand is also weak, and emigration from the region is at a rate too low to

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1. ". . . the development of industry in Canada has been a response to the growth of wealth based on exports of resource products; and the effect of the tariff has been simply to make the Canadian industrial sector somewhat larger than it would otherwise have been." H.G. Johnson, The Canadian Quandary (Toronto: McGraw-Hill, 1963), p. 108.
 2. J.H. Dales, The Canadian American Income Differential and the Canadian Tariff (mimeo. no date).

restore resource proportionality.¹

Together these factors produce an underemployment situation where demands in the factor market are weaker than they ordinarily would be. With no sufficient centre of growth in the region, inter-industry factor movements are far below a desirable level. A Marshallian adjustment with excess labour implies a reduction in the price of labour and a decrease in aggregate demand. Without assistance from the Walrasian siphon, the Marshallian adjustment is incomplete.

1. . . . even though movements have been large and increasing each decade; see L. Laberge, "Le Quebec et les migrations interregionales au Canada", Culture, Vol. XVIII, No. 2, Juin 1957, p. 166.

V

FACTOR ADJUSTMENTS AND THE
LABOUR INPUT

1. Introduction

Adjustments of the labour market are of a special importance because of the human element in this factor of production. In the last chapter it was shown that the lack of expansion in industries of the Region has impeded the operation of the inter-industry adjustment mechanism. The decrease in requirements for the labour input (Chapters II, III, and IV) also help to account for the fact that, by 1958, total labour income in the Region increased to only five times its 1926 level while Ontario was at seven times its 1926 level.¹

In addition, the structure of the economy about the time of the First World War meant that the adjustments required were of greater size than in the more favoured regions. In 1911, agriculture accounted for 40% of all occupations and labourers were next in importance at 12% (Appendix, Table 5.1). In 1961 the three largest occupations did not include either of these, but were manufacturing, service, and transportation which together accounted for 38% of all occupations. This reversal warrants some investigation.

The discussion of the Walrasian adjustment in the labour market attempts to answer three questions:

1. Labour Income 1926-1958, D.B.S., March 1960.

1. What are the general directions that the required adjustment could take, and what direction has been taken?
2. What amount of help can be expected from moving labour out of the region?
3. How have labour requirements grown relative to expectations?

2. General Direction of the Adjustment

The response in the labour market to a changing industrial structure could take place in one or more of four ways:

- a) a smooth switch of employees to new jobs in expanding industries;
- b) an emigration from the region;
- c) unemployment;
- d) non participation.

As indicated in the last chapter, there have been relatively few new jobs in expanding industries so the adjustment has had to take less acceptable forms. A job in another region necessitates the sale of a home plus the personal cost of the uprooting and a financial moving cost. Unemployment involves an obvious human cost and economic wastage.¹ Retirement at a substandard income is another

1. Dr. T.N. Brewis in Growth and the Canadian Economy, p. VI-7, indicates that unemployment in the past seven or eight years has cost the Region about a billion dollars in G.N.P. foregone.

unfeasible solution. Other involuntary departures from the labour force are equally undesirable.

The analysis has been framed in terms of a "Statement of Sources and Uses of Labour" which depends on the basic labour-accounting equations reviewed here below.

Let P be the population over 14 years of age,

F -- labour force participants,

N -- non-participants,¹

E -- the employed,

U -- the unemployed,¹

A -- the employees in the agricultural sector, and

I -- employees in the industrial sector (all non-agricultural).

$$\text{Then } P = F + N \quad (1)$$

the population over 14 is the sum of those in the labour force and those not in.

$$F = E + U \quad (2)$$

the labour force is the sum of the employed and the unemployed.

$$E = A + I \quad (3)$$

the total employed is the sum of those employed in the agricultural and industrial sectors.

1. The reader should bear in mind that these two variables include agricultural and industrial persons.

Substituting from (2) and (3) into (1) gives the population - labour equation

$$P = A + I + U + N \quad (4)$$

We are concerned with the dynamic problem of rates of change over time. Equation (4) is true at a point t in time and at $t+1$. Successive differences between periods give an annual snapshot of the behaviour of all components.

Define those components which, on balance, contribute labour to be "sources", and those which absorb labour to be "uses" and the identity becomes:

$$P - A = I + U + N$$

with the sources on the left hand side and the uses on the right.¹

Complete results by year are given in the Appendix as Table 5.2, here we will deal with the total of annual changes from 1946 to 1964.

During this period, the increase in population provided 218 thousand labour units in the Region, and agriculture provided 55 thousand more. The sources therefore accounted for 273 thousand persons and of these, only 109 thousands were used productively (that is I above, the number absorbed by industry), Unemployment increased over the period by 16 thousand, those not participating by 148 thousand.

1. The change in the total number of people in agriculture has been negative and therefore $-A$ will be positive on this side of the equation.

It is true that while participation rates in Canada have risen, they have fallen in the Atlantic Region from 51.2 in 1946 to 47.0 in 1964¹ but it is alarming to see more persons leaving the labour force than "used" for productive purposes. It would be useful to know what these non-participants do.

Some light can be shed on the matter by using Census data. In 1951 part of the "over fourteen" population not in the labour force were keeping house or retired and part were in school. By projecting this structure to the 1961 population size it is possible to compare the results with the actual 1961 configuration and to examine differences.

The data show an 11 thousand increase in persons at school and a seven thousand decrease in others not in the labour force.

CHART V.1

Non-Participants

Activity of Additional Persons Not in the

Labour Force in 1961

Atlantic Region

	<u>Male</u>	<u>Female</u>	<u>Total</u>
Keeping house, retired, other	37,466	- 44,495	- 7,029
At school	8,482	2,389	10,871
Total Additional Non- participants	45,948	- 42,106	3,842

Source: Appendix, Table 5.3.

1. The Labour Force, Supplement March 1965, p. 20.

In projecting the 1951 population to 1961 size, 72 thousand non-participants were created (Appendix, Table 5.3) and only 3,842 more were "unexpected". But there was a huge increase in the number of additional non-participating men and almost as large a decrease in the number of women who were projected to be out of the labour force but decided to enter.¹ This too is a facet of the change in the occupational structure. Male occupations were mostly in the resource sector and female jobs are mostly in the service sector (which has traditionally been a low wage sector).²

Other differences have been noticed. F. Doucet has pointed out that the expanding industries require more education, are usually in urban centres, offer non-union employment, and are often of the white collar type as opposed to the physical nature of contracting industries.³

The increase in the number of males in school and their exit from the labour force bear witness to the difficulty of finding employment. Net migration has been out of the Maritimes at least since 1926 and in the 1946-1950 period was over 5% of the 1946 population;⁴ another witness to the difficulty.

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1. I do not enter the controversy over participation, but one recent discussion is by Dernburg and Strang, "Cyclical Variation in Civilian Labor Force Participation", Review of Economics and Statistics, November 1964.
 2. F. Doucet, op. cit.
 3. The Changing Economic Structure of the Atlantic Region, op. cit., pp. 14-15.
 4. Howland, op. cit., p. 195.

The absence of sufficiently expanding industries has led to the less enjoyable forms of adjustment, emigration, unemployment and non-participation. On economic grounds, emigration is the only one of these that can be called a solution.

3. The Mobility of Labour¹

There can be little doubt that the immobility of labour is one reason for depressed incomes in the region. The slowness of this adjustment has been attributed to various financial and psychic costs which impede mobility.²

Certainly the cost of moving a large family several hundred miles is a factor to be reckoned with. Also the loss from the "sale" of an extra-marginal farm must be considered.³ It has also been argued that ". . . the Atlantic Region is more mature and the traditions of living go deep. These should not be underestimated."⁴

The desirability of encouraging mobility seems to depend on whether the argument originates on political or on economic grounds. The Special Committee of the Senate on Manpower and Employment in their discussion of the Atlantic employment problem was able to conclude that:

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1. The chief concern in this section is emigration from the region as opposed to other forms of mobility.
 2. For a general discussion see L.A. Sjaastad, "The Costs and Returns of Human Migration", J.P.E. 70, October 1962, Part 2, pp. 80-93.
 3. And is being considered under the Agricultural Rehabilitation and Development Administration which has been easing adjustment by purchasing marginal lands for conservation, drainage and other uses.
 4. Howland, op. cit., p. 200.

Over the long run there are only two solutions: either the people move out to better opportunities elsewhere, or better opportunities are made available to them where they are. The massive migration of the population is neither socially nor economically desirable and we reject this possibility. 1

The opposite conclusion is reached in a closely argued economic tract by Professor A. Scott.² He holds that as different staples become important and decline, so prospers a region, according to presence or absence of immobile factors of production. Land and natural resources are logically immobile but capital and labour are free to respond to regional differences in factor returns. He is opposed to the reactionary efforts of local governments which try to retain population.

Surely the Senate would agree that it is the welfare of persons which we seek to maximize, not the population of regions. Scott argues:

that factor mobility is a fact of economic life in Canada. The aim of policy should be to assist this mobility, thus raising the incomes of all factor owners. 3

It is not difficult to indicate that movement of labour takes place for economic reasons. The correlation between (a) the ratio of those attracted to a province to the total population of a province in 1961 and (b) a five year average of personal income per

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1. Report of the Special Committee on Manpower and Employment, Debates of the Senate, 4th Session, 24th Parliament, Vol. 109, No. 68, 1961, p. 876.
 2. Policy for Declining Regions, a paper read to the C.P.S.A. meeting, Kingston, October 1964.
 3. Ibid., p. 34. He also suggests that regions should search for another staple.

capita is .87.¹ Although we know that those who move do so for economic reasons, it is less clear why others do not respond to income and opportunity differentials. If the more "footloose" units adjust first, then further adjustment occurs under conditions of decreasing elasticity with respect to income.

It may also be that those who remain are somewhat older and do not move because investment in themselves would have a short payout period. The evidence indicates that mobility is higher for younger workers.² In theory, this change in age composition should speed up natural depletion and aid the attainment of factor proportionality.

Labour is not homogeneous so it is necessary to state factor proportions in terms of some more disaggregated classification. There is increasing evidence that the "labour surplus" exists only for the unskilled.³ Adjustment should be facilitated by retraining programmes but it is hard to estimate how extensive this influence is.

A Swedish study has confirmed that adjustment can be facilitated by a general educational programme by showing that

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1. Population figures are from the 1961 Census of Canada, D.B.S., and the average total income for 1951-1955 in constant 1955 dollars is from Howland, op. cit., p. 45.
 2. Manpower and Employment Trends, Policies, Programs, a report prepared for O.E.C.D., Department of Labour, Ottawa 1965, p. 54.
 3. For example, R. George, op. cit., p. 11, found that the Nova Scotia-Ontario wage differential was much smaller for skilled workers than for unskilled. This implies that a Marshallian adjustment should occur whereby industries in the region would use more labour of the second grade than they would without the differential.

geographic mobility is highly correlated with education.¹ Some comfort may be derived from the increase in the number staying in school. The growth in the Region's population over fourteen years of age indicated that eleven thousand more people over fourteen would remain in school in 1961 than in 1951 (Appendix, Table 5.3). In fact the increase proved to be almost twenty two thousand, fourteen thousand of them males.²

Emigration from the region has been both large and persistent, but has not been large enough to remove inter-regional wage differentials. Howland calculates that net migration was more than -3.4% in every decade between 1926 and 1955.³ Despite such a large adjustment, unemployment remains at twice the national average.⁴

It is also possible to notice that net migration was a far more effective adjustment during prosperous periods, a result consistent with the discussion in Part IV. In the 1926-1930 period, net migration was -3.4% of the 1926 population and from 1946-1950 it was 5.2%.⁵ Other studies support this assertion and find a

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1. E. Neymark, Migration Differentials in Education, Intelligence, and Social Background: Analysis of a Cohort of Swedish Males. Arbetsmarknadsstryrelsen Stockholm, 1964.
 2. At the same time the Atlantic provinces might pay more than their share of the cost if they educate labour for another region.
 3. Howland, op. cit., p. 195.
 4. Manpower and Employment, op. cit., p. 26.
 5. Ibid.

negative correlation between mobility and unemployment.¹

Emigration from the region has been a useful form of Walrasian adjustment but not of sufficient size to result in a correction that can be judged as adequate either on grounds of efficiency or of welfare. It is clear that a high level of demand in Canada as a whole would encourage the mobility of this factor. It is to be hoped that the programs encouraging mobility will have a cumulative effect which is large enough to overcome the greater 'unwillingness' of those who remain, if that should be necessary.

4. Labour Requirements

This section intends to examine (a) the way that the occupational structure has changed (since 1901) relative to the structure of occupations in an expanding region, and (b) which occupations have or have not provided a 'reasonable' number of new jobs.

(a) As the resource industries decrease in importance and manufacturing industries expand, but less rapidly than in Ontario, it seems likely that the occupational structures of the two regions would become more similar.

The 1961 Census gives fifteen occupations classified by 1951 definitions for census years to 1921 (shown for the Atlantic

1. H.T. Greenway and G.W. Wheatley, "Regional Aspects of Labour Mobility in Canada 1956-1959", C.P.S.A. Conference on Statistics, 1961.

Region and Ontario in the Appendix, Table 5.4). If occupations in the two regions are ranked according to importance, then the Spearman rank correlation coefficient gives an idea of how similar the two structures are.

For 1921 the coefficient is .80, signifying a certain amount of similarity; for 1941 it is .85, and for 1961, .91 (Appendix, Table 5.5).

The coefficients, therefore, suggest that the occupational structures are becoming more alike. The 1941 Census gives a consistent, nine occupation table back to 1901. By repeating the operation for 1921, and including 1901, it should be possible to overlap the two series. The Spearman rank correlation coefficients for 1901 and 1921 under this nine industry classification are .85 and .90 respectively.

According to this weak test, it appears that the occupational structures of Ontario and the Atlantic Region have persistently become more similar ever since 1901.

(b) This section hopes to say which occupations have been particularly biased against labour, and which have been biased toward it. This is done on an assumption, heroic in size, that each occupation should expand in such a way as to absorb its proportionate share of the increasing labour force. This enables an estimation of which occupations underperform and which overperform according to this criterion.

Following is the formula for the procedure:

$$\frac{L_{is}(t+10) - \dot{G}_{st} L_{is}(t)}{L_{is}(t)}$$

where $L_{is}(t)$ is the number in occupation i , of sex S at time t , where $t+10$ is the next Census year and where $\dot{G}$ is the growth in over fourteen population from t to the next census year for sex s . The rates of growth of population by sex, $\dot{G}_s(t)$, are given in the Appendix as Table 5.6.

If an occupation absorbed its proportionate share on this criterion, then the value of its employment performance coefficient would be zero. The values by occupation for the decades from 1911 to 1961 are given in the Appendix Table 5.7, "Employment Performance Coefficients".

This is a stringent requirement and no occupation exceeds population in growth rate in every decade. Total female employment does though, while total male employment is slightly less than this norm would have us expect, a result which has important consequences for economic growth. In the 1951-61 decade, agriculture, logging, and mining (male) lagged population by almost half of the hypothesized jobs. In the same decade, no female occupation was lagging by an important amount.

The six male occupations which underperformed between 1951 and 1961 were more important, and underperformed more severely than the four which overperformed. Four were near the norm. In the

In the previous decade this was not at all the case. Only mining and agriculture lagged, and some strong performances were recorded.

From the evidence in the Table it appears that inter-industry adjustments (for males) were not likely to occur in the period from 1911 to 1930 because employment expanded too slowly. In the thirties such an adjustment would be difficult indeed, but the decade from 1941 to 1951 offered the expansion in employment which is necessary for mobility. The 1951-1961 period again offered little opportunity for this type of adjustment.

Even during more prosperous times labour has not been freely mobile between industries, perhaps because a different skill may be required on the new job. W.A. Miernik has studied mobility between industries, specifically from declining industries to other sectors, and found that workers were reluctant to change their line of work; in fact, 35% found another job in the same industry.¹

In Part IV and again here, we have found that the lack of a sufficient expansion has impeded factor adjustment. The escape valve of emigration has been of some moment but still not large enough to reduce unemployment to a tolerable level. Net migration from 1931-1955 was -13.4% of the 1931 population. Natural growth

1. "Labour Mobility and Regional Growth", Economic Geography, October 1955. The study also indicated an unwillingness to change place of residence.

in population over the same period was 33.7%.¹

Evidence in Part II indicated that industries in the region had made Walrasian and Marshallian adjustments toward the use of the cheaper input, labour. It now appears (Parts IV, V) that the motivating force behind both adjustments was the "push" of an increased labour supply acting on old industries, rather than any "pull" which would attract labour to new uses.²

1. Howland, op. cit., p. 77.

2. While the population increased by 33.7% from 1931 to 1955, the labour force increased by only 18.8%. Howland, op. cit., p. 77. See also our Appendix, Table 5.7 which shows among other things that the "pull" which encourages adjustment was weaker for males than for females.

VI

SOME IMPLICATIONS FOR POLICY

1. Marshallian and Walrasian Adjustments in the Atlantic Economy

Changes in markets and in technology required adjustments to the Atlantic economy that were more severe and of greater duration than elsewhere in Canada. The absence of a sufficient expanding centre of growth made alterations all the more excruciating.

But adjustments did occur. Some very competent observers have not given proper credit to the positive corrections which have been made. Dr. Haythorne is a case in point. Thus he states:

Frequently, in fact, the obstacles have been so great that badly needed shifts have not occurred at all, with the result that the over-all allocation of resources, judged by economic standards, leaves much to be desired.¹

Agriculture experienced a period of heavy capitalization, land reduction, reorganization and a labour outflow of considerable moment.² The industrial sector too has made huge alterations, and the occupational structure has been turned almost inside out.³

It is true that the present allocation leaves much to be desired. Nevertheless, the forces at work in the future may not

1. Op. cit., p. 109 (in reference to the agricultural sector) underscoring mine.

2. See Appendix, Tables 3.4, 3.6 to 3.11, and 5.2.

3. Appendix, Tables 5.1 and 5.4.

be as strong as in the past,¹ especially since factor differentials have not been widened by sufficiently expanding growth centres. A noticeable shift has already occurred within industries, toward the substitution of labour for capital; and the industrial structure has adopted a greater than normal proportion of labour-intensive industries.²

What then can be done to facilitate the two adjustments in the future? The attempt to increase the capital : labour ratio falls logically into three categories:

1. Policies which concentrate on the denominator on the grounds that labour should be more responsive to the adjustment mechanisms.
2. Policies which attempt to increase the stock of capital on the grounds that the supply of labour is not a policy variable (see pp. 71-2 above).
3. Policies which operate on both capital and labour.

2. Policies to Reduce the Amount of Labour

The beauty of emigration from the Region as a correction to factor proportions lies in the fact that it should make possible a fairly complete adjustment in the short or medium run.

1. In Part V we found that labour adjustment was more difficult in the decade 1951 to 1961 than during the previous decade (or see Appendix, Table 5.7). Agriculture made greater changes in its input proportions during the 'forties than in the 'fifties as well (see Chart III.2).

2. Charts II.3 and II.5.

In the past, extra regional mobility has been a useful but not overly powerful form of assistance in factor allocation.¹ Education, full employment, better labour market information and financial assistance can hopefully be expected to increase mobility. Each improvement in mobility represents an increase in the efficiency of the Walrasian adjustment mechanism.

If distant jobs are (a) too uncertain or (b) too costly, then the force which results in migration may diminish in strength as the number of those most willing to move is reduced. The "Job Mobility Programme"² is a well advised (and inexpensive) policy for handling the cost of moving, but its success will depend largely on the ability of the reorganized National Employment Service to reduce uncertainty.

Even a substantial wage decrease may not be a strong motivating force because the labourer has adjusted his consumption habits to his recent lower income, contrary to the Duesenberry effect.³ Further, there is some indication that within the region the strength of the Walrasian attracting force is smaller than in

1. See Part V, section 3 "The Mobility Correction".

2. The programme offers loans and grants without a means test, in order to help workers find full time employment. Speech by A.J. MacEachen to Ontario Mayors and Reeves, Windsor, May 19, 1965.

3. And his income may therefore not seem substandard to him. James Duesenberry, Income, Saving and the Theory of Consumer Behaviour (Harvard University Press, 1949).

other regions.¹

The disadvantages of mobility are related to those who are left behind. They must carry the burden of social overhead expenditures as well as bearing the "consumption effect",² since the person who has emigrated no longer buys goods in the Region (no matter how few goods he used to purchase with his substandard income).

If too much prominence were given to these disadvantages, then factor adjustment would not be encouraged and the lagging economic growth might become a perpetual problem.

The "Job Mobility Programme" of 1965 offers far more promise for a Walrasian adjustment than did the Senate Report of 1961.³

3. Policies Which Increase the Stock of Capital

There can be little disagreement that welfare and maximum total product require the fullest possible use of capital and labour resources which already exist. The best policy as far as the present stock of inputs is concerned must be one of full utilization wherever possible.

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1. 66% as strong in the instance given in Chapter II. See Tables 3.12, 3.13 and 5.2.
 2. See Unemployment and Structural Change, International Labour Office (Geneva, 1962), p. 45.
 3. See Part V, section 3.

A second tack is to alter the stock of capital by affecting new capital formation. This is a marginal adjustment and it will therefore take several years before the capital labour ratio is altered significantly. The theory behind capital assistance programs depends on a basic complementarity of capital and labour (the theory in fact denies a polar Marshallian adjustment and perfect substitution between inputs).

It is necessary to admit that there is some degree of complementarity. The "Assistance" theory is sound enough, but the way it is put into practice ignores both types of factor adjustment.

It should be possible to use labour productively by acquiring the complementary capital with which labour can work. Such an argument is behind the government's capital assistance programmes to the coal mining industry, to fisheries, and to the manufacturing and agriculture industries,¹ (although the cost and productivity of capital is relevant too).

The Special Capital Cost Allowances Program (1960) allowed firms in problem areas to claim double their normal depreciation during the first year of operation.² Only 30 projects were realized by 1963 when the Area Development Agency was created. A.D.A. can grant a three year tax holiday, and accelerated depreciation

1. All of these are early programmes, see Howland, op. cit., p. 191.

2. Manpower and Employment, Trends, Policies, Programs, Department of Labour (for O.E.C.D.) Ottawa, March 1965, pp. 29-31.

on buildings, machinery and equipment.

The effect of all these programs is to lower the price of capital below what it otherwise would be. This produces (a) a Marshallian adjustment whereby each industry qualifying for the plan uses more capital than they otherwise would, and (b) a Walrasian adjustment whereby capital intensive industries locate in the region.

On a priori grounds the proper policy for a region with redundant labour would be one which encouraged labour intensive rather than capital intensive production.

A second, and very helpful form of government aid is the policy of improvements to the infrastructure by means of special grants, through the Municipal Loan Fund, and the Atlantic Development Board. These aids are nearly neutral with respect to factors of production.

The programmes have had some effect on the rate of capital formation in the years since Howland found that "the matter of increasing capital investment in the area" was one of the "basic problems" of the Region.¹

CHART VI.1

Total Investment
(millions of current dollars)

	<u>1949</u>	<u>1956</u>	<u>1963</u>
Atlantic Region	260	486	710
Ontario	1300	2871	3205

Source: Public and Private Investment in Canada, Department of Trade and Commerce.

1. Howland, op. cit., p. 92.

He indicated that capital formation in the Atlantic Region was inadequate when compared to Ontario. Since 1956, total capital levelled off in Ontario but continued its sharp increase in the Atlantic Region.¹ Despite such improvements, the growth problem is not nearly solved.

4. Policies Which Act on Both Capital and Labour

The examination of intermediate and final demand in Part IV in conjunction with the inability of migration to fully adjust factor proportions² led to the conclusion that some form of industrial assistance was desirable, at least in the short run.

Assistance to industry which emphasizes capital formation ignores Marshallian and Walrasian adjustments because it tends to make capital cheaper relative to labour. On the grounds of factor proportions it is desirable to give assistance to industry and sufficient assistance to attract firms to the Region, but in such a way that factor adjustments are aided instead of thwarted. The obvious correction would be to subsidize labour instead of capital.

A wage subsidy may sound all the more attractive because it should have external returns *via* aggregate demand.³ On the other

1. See also D.A. White, Business Investment to 1970, Staff Study No. 5 for the Economic Council of Canada 1964, p. 14.

2. See Part V, section 3.

3. As far as smaller firms are concerned, a wage subsidy will likely be more attractive than the present capital subsidy for two reasons. First it is more easily calculated than accelerated depreciation and second, a tax holiday is not very useful during years of small or zero profits.

hand, the preponderant conclusion from economic discussions on the topic leans to the view that the subsidy would become perpetual.¹ Capital assistance at least has the advantage of being a once and for all measure.

The "incremental" scheme has been proposed to meet this objection.² Firms receive a (five year) subsidy for additional workers which they employ. This appears to be the least expensive, and least risky way to deflect the intensity of production in the proper direction for factor equilibrium. The question now begged, is "How large a subsidy would be necessary for a return to full employment?"

In the light of the weakness of the Walrasian mechanism (see Part III, Section 2(b) and Part IV, section 6) it may be a large cost. Nevertheless, the institution of such a program would have a desirable influence on the strength of that mechanism.

5. Factor Adjustment and Regional Growth

The broader problem of regional growth is complex, and therefore requires a mix of instruments to enable an attack on a broad front, as opposed to a continuous application of ad hoc palliatives.

A matter that can only be mentioned here, is the use of upcoming negotiations in commercial policy to assist resource

1. Report of the Joint Working Party on the Economy of Northern Ireland (London: H.M.S.O., 1962), pp. 31-34.

2. Ibid., pp. 34-36.

based regions. Complete access to foreign markets is impossible in present circumstances¹ but the tool should not be neglected. The devaluation of 1962 was one influence which improved the competitive position of regions selling in foreign markets.

A second and powerful policy that cannot be neglected is one of full aggregate demand. This has an encouraging effect on business in general and helps to create the pressures in the factor market which lead to the full and efficient use of all resources.

Factor adjustment is an integral part of the general problem of inadequate regional growth. Factor market corrections have been occurring for a long time, but it is clear that any policy which encourages factor mobility, either within or without the region, will result in a movement toward equilibrium.

In view of the size of the adjustment still to be made, the weakness of forces working for correction, and the preference which labour has revealed to stay put, it does seem prudent to take direct action to bring jobs to workers. Since the factor proportions problem is central to the overall problem of economic growth in the region, the type of industry attracted should be one which alleviates both disequilibrium, that is, one which has relatively labour

1. Canada's "commercial policy, and the industry structure for which it is in part responsible, require a larger degree of adaptation than that required of other countries. Yet the limits imposed on the negotiations preclude the free access to larger markets for Canadian exports, which would make domestic adjustment in Canada most worthwhile". H.E. English, Industrial Structure in Canada's International Competitive Position, Private Planning Association of Canada, 1964, pp. 47-48.

intensive production and sufficient growth potential.

This growth potential must include the developmental impulses which are important to the creation of a viable economic structure. There is no indication that the formation of such centres of growth will be easy, but it is only through such a policy that the forces producing factor adjustment can be increased. If that could be even partly achieved, the urgency of both problems will be much diminished.

APPENDICES

APPENDIX 1

Supplementary information not contained in the appendix can be found in the working papers. A set of these papers is available in the library of the Economics Department at Carleton University.

In most cases the information in the working papers is available by province, while the thesis (and the appendix) usually concern figures which have been aggregated to the regional level.

APPENDIX 2

Note: The following are statistical problems associated with the use of A General Review of the Manufacturing Industries of Canada¹ as a source of data. In interpreting those of the following tables which originate in the General Review, the following points must be kept in mind.

Classification Changes

The period chosen for analysis depended, to a large degree, on the possibility of getting a series of consistent data. The most important adjustment made to the data used was the separation of "Knitting Mills" from the "Clothing" industry in the years prior to 1953 so that the two can be shown as separate industries for the whole of the 1949-1959 period.

In 1960, a more devastating reclassification took place - one which does not permit the corrections needed for the extension of a consistent series.

Unreported Firms

When only one or two firms make up an industry in any province, then the figures are not usually reported separately but are consolidated in "Miscellaneous Industries" or "All Other Groups".

1. Dominion Bureau of Statistics, Ottawa (annual).

A problem arises whenever an industry drops from three firms (reported as three) to two firms (reported as zero) and year to year comparison in such a province would not be meaningful. For this reason the "Products of Petroleum and Coal" industry has been excluded. The problem remains for less important industries.

Most of the analysis performed in this chapter has been done at the Regional level where such distortions are less significant.

Absent Industries

Some of the industries which are important to other regions do not appear at all in these reports on the Atlantic area.

These are: Tobacco Products Industries
 Rubber Industries
 Non Ferrous Metal Products
 Electrical Apparatus and Supplies
 Products of Petroleum and Coal

The first two industries are of minor importance to the Region.

The next two are one or two firm industries, excluded as explained in the note above.

Excluded industries have been transferred to "Miscellaneous Industries" so that the totals properly represent activity by province and region. In tables where Miscellaneous Industries are not specifically mentioned (because, for example, it would offer a meaningless catch-all coefficient), the total includes all manufacturing activity.

TABLE 2.1

Capital - Labour Ratios by Manufacturing IndustryAtlantic Region 1949-1959

	Food and Beverages	Leather Products	Textiles	Knitting Mills	Clothing	Wood Products	Paper Products
1949	1.41	.86	.63	.94	.44	.73	1.49
1950	1.31	.92	.90	.78	.35	.83	1.80
1951	1.24	.82	.83	.03	.57	.82	1.97
1952	1.20	.88	.64	.52	.89	.83	1.62
1953	1.27	.84	.50	.28	.41	.80	1.40
1954	1.30	.70	.72	.67	.38	.87	1.30
1955	1.29	.53	.70	.53	.46	.80	1.44
1956	1.10	.54	.77	.74	.39	.75	1.34
1957	1.16	.39	1.11	.67	.35	.75	1.05
1958	1.26	.79	1.07	.88	.33	.86	1.30
1959	1.20	.57	1.14	.84	.51	.76	1.20

Source: A General Review of the Manufacturing Industries of Canada (annual).

Printing Publishing et al	Iron and Steel	Transpor- tation Equipment	Non-Metallic Mineral Products	Chemicals & Allied Products	Miscel- laneous Industries	All Other Groups	Total Manufac- turing
.85	.43	.37	1.20	1.99	2.86	1.62	.96
.79	.49	.09	1.40	1.76	.76	1.71	1.02
.73	.50	.42	1.31	1.95	.84	1.47	1.09
.77	.28	.46	.97	2.14	.85	1.54	.94
.82	.23	.42	.89	2.45	.84	1.08	.88
.82	.32	.40	1.15	1.71	1.56	2.19	.96
.81	.44	.25	1.36	1.86	1.60	2.08	.99
.81	.59	.44	1.28	1.88	2.14	1.14	.98
.75	.36	.34	1.25	1.94	3.51	2.10	.94
.79	.53	.32	1.45	1.77	3.59	2.42	1.08
.76	.49	.28	1.21	2.45	1.57	1.87	.94

TABLE 2.2

Capital and Labour Inputs, Atlantic Provinces and Region 1949-1959

All Manufacturing Industries

	CAPITAL (thousands of dollars)					LABOUR (thousands of dollars)				
	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Total	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Total
1949	17433	2204	42692	46967	109296	15486	2134	51652	44220	113492
1950	20466	1942	37362	59818	119588	16246	2432	52019	46386	116993
1951	31009	2587	50976	67048	151620	22681	2460	60805	53547	139493
1952	30875	3151	50128	61859	146013	25234	2806	71639	55978	155657
1953	31180	2783	51526	60864	146353	26605	3096	76391	59753	165845
1954	29383	3045	58040	62907	153375	30101	2999	71739	55108	159947
1955	31984	3357	63090	64123	162554	28605	3074	76555	56684	164918
1956	32144	2930	75872	64252	175198	30464	3232	83948	61064	178708
1957	23762	3300	85049	63063	175174	32783	3279	90634	60485	187181
1958	28813	3876	90993	69590	193272	29232	3390	86004	61078	179704
1959	27274	3536	73759	70063	174632	30481	3856	87694	63872	185903

Source: A General Review of the Manufacturing Industries in Canada, Vols. for 1949, 50-59.

Notes: a) The 'Capital' in this table can be more properly identified as "non-labour input" since it has been derived by subtracting the labour input from total value added.

b) Further detail can be obtained from the working papers where calculations by province and by industry have been made.

TABLE 2.3

Value Added Per Employee Atlantic Provinces and Ontario1955

Industry	Value Added per Employee	
	Atlantic Region	Ontario
Foods and Beverages	4.37	7.70
Leather Products	2.96	3.96
Textiles	3.71	5.23
Knitting Mills	2.86	3.63
Clothing	2.09	3.77
Wood Products	2.87	4.43
Paper Products	9.82	9.13
Printing, Publishing and Allied Industries	4.76	6.25
Iron and Steel Products	4.70	6.89
Transportation Equipment	3.73	7.08
Non Metallic Minerals	6.70	7.95
Chemicals and Allied Products	8.55	11.59
All Manufacturing	5.05	7.21

Source: A General Review of the Manufacturing Industries of Canada 1955.

TABLE 2.4

Value Added Per Firm for Manufacturing Industries
in the Atlantic Region and Ontario 1955

Industry	Value Added Per Firm 1955	
	Atlantic Region	Ontario
Foods and Beverages	95	190
Leather Products	101	215
Textiles	144	360
Knitting Mills	430	286
Clothing	82	120
Wood Products	15	63
Paper Products	3639	1143
Printing, Publishing and Allied Industries	53	120
Iron and Steel	374	539
Transportation Equipment	367	2354
Non Metallic Mineral Products	142	303
Chemicals and Allied Products	151	527
All Manufacturing Industries	92	333

Source: A General Review of the Manufacturing Industries of Canada, 1955.

Note: Data for firms in industries not mentioned above are included in the total.

TABLE 2.5

1 + Average Annual Rates of Change in Number of
Establishments and in Value Added for Manufacturing
Industries in the Atlantic Region 1949-1959

	<u>1 + Average Annual Rate of Change</u>		
	<u>Establishments</u>	<u>Value Added</u>	<u>Value Added per Establishment</u>
Foods and Beverages	.991	1.063	1.07
Leather Products	.959	1.026	1.07
Textiles	1.000	.979	.98
Knitting Mills	1.058	1.098	1.04
Clothing	.937	.952	1.02
Wood Products	.984	1.017	1.03
Paper Products	1.028	1.050	1.02
Printing, Publishing and Allied Industries	1.012	1.064	1.05
Iron and Steel Products	1.016	1.049	1.03
Transportation Equipment	.988	1.073	1.09
Non Metallic Minerals	1.032	1.093	1.06
Chemicals and Allied Products	.997	1.060	1.06
All Manufacturing	.990	1.051	1.06

Source: A General Review of the Manufacturing Industries of Canada 1949-1959 (and working papers).

Note: These rates have changed by the ratio of each year to the preceding year and averaged.

TABLE 2.6
Proportion of Value Added from Labour
Canada, 1955 and 1958

	Wages: Value Added 1955	Rank 1955 1958		Wages: Value Added 1958
Leather	.643	1	1	.637
Knitting Mills	.609	2	5	.575
Clothing	.607	3	2	.620
Transportation Equipment	.606	4	4	.584
Textiles	.597	5	7	.558
Printing, Publishing and Allied Industries	.564	6	8	.558
Electrical Apparatus and Supplies	.562	7	6	.560
Wood Products	.561	8	3	.602
Iron and Steel Products	.557	9	9	.549
Non Metallic Minerals	.434	10	11	.440
Paper Products	.403	11	12	.439
Foods and Beverages	.397	12	13	.411
Rubber Products	.394	13	10	.462
Chemicals and Allied Products	.350	14	15	.347
Non Ferrous Metal Products	.340	15	14	.394
Tobacco and Tobacco Products	.332	16	16	.341
Products of Petroleum and Coal	.174	17	17	.337
All Manufacturing Industries	.473			.491

Source: A General Review of the Manufacturing Industries of
Canada 1955, 1958.

TABLE 2.7

Labour IntensityRelative Dependence of the Atlantic Region and Ontario
on Manufacturing Industries 1955

	Dependancy Ratio		Rank		Relatively More Dependent Region
	Atlantic Region	Ontario Region	Labour Intensity	Dependancy Atlantic Region	
<u>Labour Intensive Industries</u>					
Leather	.005	.011	1	11.5	16
Knitted Goods	.007	.008	2	10	17
Clothing	.005	.021	3	11.5	15
Transportation	.082	.128	4	5	2
Textiles	.015	.031	5	8	12.5
Printing, Publishing	.041	.049	6	6	8
Electrical Apparatus (a)	.000	.075	7	14	4
Wood Products	.093	.036	8	4	9.5
Iron and Steel	.110	.180	9	3	1
<u>Capital Intensive Industries</u>					
Non Metallic Minerals	.030	.036	10	7	9.5
Paper Products	.279	.070	11	1	6
Foods and Beverages	.266	.125	12	2	3
Rubber Products	.000	.034	13	16.5	11
Chemical Products (a)	.013	.066	14	9	7
Non Ferrous Metal Products	.000	.072	15	14	5
Tobacco and Products (a)	.000	.003	16	16.5	14
Products of Petroleum & Coal	.000	.031	17	14	12.5

Source: Calculated from A General Review of the Manufacturing Industries of Canada, 1955.

(a) Industries which did have production in the Atlantic Region but were "non-reporting firms" (see note at beginning of Appendix 2). The three industries are ranked as equals here and ahead of the two which did not exist in the Region.

APPENDIX 3.1

Note to Appendix 3

The reader should be wary of two difficulties.

First, capital in the last section was an annual input, here it is viewed as a stock concept. Second, various assumptions have been made to adjust Census data for 1961 for a change in the definition of a 'farm'. In most cases the assumptions made here (and stated as footnotes where applicable) adjust published data upwards by about 5%. Other assumptions of course give different values but would not change the conclusiveness based upon this data.

TABLE 3.2

Capital Value of Machinery and EquipmentAdjustment for Census Change in Definition of a Farm1951-1961

	Units	Prince Edward Island	Nova Scotia	New Brunswick	Total
Reported Value 1961 ^(b)	\$'000	26856	30252	31682	
Reported Farms	units	7335	12518	11786	
Average Value of machinery	\$ per farm	3661	2417	2688	
Unreported Farms	units	690	5746	6545	
Capital on unreported Farms	\$'000	505	2778	3519	
Total	\$'000	27361	33030	35201	95592

Notes: (a) This assumes that those farms excluded by the census change had one-fifth the capital of the reported farms. The reason for setting it this high is that vehicles constitute part of the value of machinery.

(b) 1961 Census of Canada 5.1 - 5, p. vii.

TABLE 3.3
Decennial Inflation in the Price of Agricultural
Machinery - Eastern Canada 1911-1961

Year	Farm Machinery Index 1935-39 = 100
1911	51.1
1921	111.4
1931	94.5
1941	109.7
1951	185.2
1961	265.5

Notes: (a) Source of Figures for 1921 to 1951 - Prices and Price Indexes 1949-52, Dominion Bureau of Statistics, Table 13, p. 97.

(b) Ibid., 1961, February 1963, Table 14, p. 42.

(c) 1911 by extrapolation.

(d) Farm machinery includes motor trucks as of 1931.

TABLE 3.4

Maritime ProvincesGrowth in Value of Machinery and Equipment 1911-1961Adjusted for Price Changes

	Price Deflator	Decennial Growth Rates			
		Prince Edward Island	Nova Scotia	New Brunswick	Maritimes
1911-1921	.4587	.880	1.016	1.017	.983
1921-1931	1.1788	1.392	1.226	1.153	1.231
1931-1941	.8614	.615	.894	.703	.744
1941-1951	.5923	1.660	1.363	1.475	1.469
1951-1961 ¹	.6976	1.174	.913	.910	.974

Notes:

- (a) Adjusted for a change in the definition of a farm.
- (b) These growth rates are not in percentage terms. The figure given in the first row is the 1921 value divided by the 1911 value and so on.

TABLE 3.4b

MechanizationNumber of Tractors 1921-1961

Year	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Total (Without Nefoundland)
1921		49	164	104	317
1931		176	424	289	889
1941		577	1386	1140	3103
1951	126	2776	4307	5221	12304
1961	307	4472	4496	5224	14192

Source: Censuses of Canada: 1931, Vol. VIII, p. lxix,
 1941, Vol. VIII, Table 48,
 1951, Vol. VI, Table 24,
 1961, Vol. VI, Part I, Table 6.

TABLE 3.5
Deflator for Agricultural Capital -
Livestock and Poultry 1931-1961

	Index of Canadian Farm Products: Animal ¹	Average	Deflator I	Deflator II ² Maritime Region
1930	133.3	113.0		
1931	92.7			
1940	106.7	115.5	.9783	.8636
1941	124.4			
1950	281.4	309.1	.3736	.3198
1951	336.9			
1960	264.1	267.0	1.1577	1.1091
1961	270.0			

1. Prices and Price Indexes, Vols. 23 and 41, Dominion Bureau of Statistics, Table 3.

2. Unpublished material, courtesy of Agricultural Division, D.B.S.

Note: Deflator II includes livestock specifically in the Maritime Region and is therefore more appropriate. However, the 1931-41 figure has been obtained by extrapolation - a dangerous procedure given the large fluctuation involved. To acquire a longer series, Deflator I has been used for agricultural capital. This will result in growth rates which are slightly higher than they would be under II. It is reassuring to see that the two deflators are fairly similar.

TABLE 3.6
Growth Rates of Real Value of Livestock and Poultry
Maritime Provinces and Region
1921-1961

	Deflator ^(a)	Prince Edward Island	Nova Scotia	New Brunswick	Maritime Region
1921-1931	.9204 ^(c)	.73	.59	.64	.64
1931-1941	.9783	.87	.89	.89	.88
1941-1951	.3736	1.32	1.05	1.00	1.09
1951-1961	1.1577	.86	.97	.90	.91

Sources: (a) Table 3.5 in Appendix.

(b) Working papers - Agriculture (from Censuses).

(c) Obtained by extrapolation.

Note: These growth rates are not in percentage terms. A figure in the first row is the 1931 real value divided by the 1921 real value.

TABLE 3.7
Decennial Growth Rates - Total Number of Farms
Three Maritime Provinces
1921 to 1961

	Prince Edward Island	Nova Scotia	New Brunswick
1921-1931	.94	.83	.93
1931-1941	.95	.84	.94
1941-1951	.83	.71	.83
1951-1961	.80	.78	.69

Sources: Calculated from 1961 Census of Canada Bulletins 5.1-2, 5.1-4, 5.1-5.

Note: The figure given is not in percentage terms but is the ratio of the terminal year of the decade to the initial year.

TABLE 3.8
Change in the Number of Farms by Size
Three Maritime Provinces
1921 to 1961

Size of farm in acres	<u>Change from 1921 to 1961 as a % of 1921</u>		
	Prince Edward Island	Nova Scotia	New Brunswick
1 - 4	- .77	- .90	- .85
5 - 10	- .78	- .90	- .88
11 - 50	- .76	- .86	- .86
51 - 100	- .57	- .78	- .77
101 - 200	- .15	- .63	- .56
201 - 299	.71	- .30	- .17
300 - 479	1.51	- .28	- .19
480 - 639	2.45	- .03	- .03
640 and over	4.33	.24	.23
Total	- .46	- .74	- .68

Source: See Table 3.7.

NOTES: (a) Complete decennial growth rates from 1921 to 1961 by province and size of farm are available in the working papers.

(b) It is not possible to correct for the impact of the change in the definition of a farm. New Brunswick had a large number of the small units which were excluded, and P.E.I. very few.

TABLE 3.9
Per Cent of All Farms in Each Size Class
Maritime Provinces
1921-1961

Province	Year	Size of farm in acres				
		0 - 10	11 - 50	51 - 100	101-200	201 & over
Prince Edward Island	1921	5.3	25.7	40.6	24.3	4.1
	1931	3.4	23.7	39.4	26.6	4.9
	1941	4.5	23.5	38.4	27.9	5.7
	1951	2.3	18.5	37.6	34.0	7.6
	1961	2.3	11.6	32.9	38.7	14.5
Nova Scotia	1921	16.6	25.4	26.4	22.3	9.3
	1931	14.1	24.4	26.2	24.1	11.2
	1941	10.5	24.0	27.1	25.3	13.1
	1951	6.7	20.5	27.0	29.3	16.5
	1961	6.1	13.6	22.2	31.0	27.1
New Brunswick	1921	7.4	21.9	35.5	24.3	10.9
	1931	6.7	21.5	35.6	23.8	12.4
	1941	5.2	20.8	35.5	25.5	13.0
	1951	4.9	19.9	33.9	26.6	14.7
	1961	3.0	9.3	25.7	33.1	28.9

Source: Calculated from Census of Canada 1961, Table 3 in Bulletins 5.1-2 to 5.1-5.

Figures for 1961 involve a change in definition.

TABLE 3.10

Total Value of Land and Buildings and DecennialGrowth Rates - Maritime Region 1901-1961

	Value ^(a) \$'000	% Change in Decade	Estimate From Sales of Farms \$'000,000
1901	120580		n.a.
1911	190958	58	267.2
1921	244685	28	426.2
1931	202476	- 17	297.0
1941	158143	- 22	251.1
1951	241047	52	424.0
1961 ^(b)	239759	0	449.0

Sources: Figures for column 1 are calculated from the 1961 Census of Canada.

Column 3 originates with figures supplied by the Agricultural Division, D.B.S., for the average selling value of farms in each province on a per acre basis. These figures have been applied to the number of acres in the province and summed.

Notes: (a) Columns 1 and 2 by province can be found in the working papers.

(b) Adjusted: farms excluded in the 1961 definition have been valued at one fifth of the per acre value of included farms.

TABLE 3.11
Available Labour Force per Thousand
Acres of Farmland

	Prince Edward Island	Nova Scotia	New Brunswick	Maritime Region
1931	46.6	41.3	43.4	42.9
1941	43.7	37.7	44.3	41.3
1951	42.8	36.4	43.2	40.3
1961	34.5	32.9	36.1	34.5

Source: 1961 Census of Canada, 5.1-2 to 5.1-5 and 1951 Census, Vol. VI, Table 16.

Note: The ratio for 1961 should be a slight overestimate as the acres affected by a definition change have been adjusted by their actual quantity whereas the number of farms requiring adjustment has been multiplied by 5.132, the average number of persons per farm in 1951, to make the population adjustment.

TABLE 3.12

Comparison of Farm Employment with Industrial AlternativesAtlantic Provinces and Region and Ontario1951

	Newfoundland	Prince Edward Island	Nova Scotia	New Brunswick	Atlantic Region	Ontario
Farmers and Farm Workers						
Average Male Earnings	1543	961	1209	1197	1191	1513
Total Wage Earners	650	1400	3692	3676	9418	40319
Males Earning Less than \$2000. per year	423	1141	2887	2841	7292	26073
Total Males who Work 40-52 weeks per year	311	538	1865	1315	4029	21537
No. of Females	16	141	86	139	382	5781
Industrial Labourers (a)						
Average Male Earnings	1630	1207	1668	1648	1634	2355
Total Male Wage Earners	7496	1288	12833	10848	32465	103019
Males Earning Less than \$2000. per year	4866	1043	7778	6618	20305	39674
Total Males who work 42-50 weeks per year	2384	419	5449	4326	12578	59181
Number of Women	91	84	424	469	977	9163

Source: 1951 Census of Canada, Vol. V, Table 21.

Notes: (a) Figures for Industrial Labourers originate in census data as "Labourers not elsewhere specified". Excluded are resource labourers: agricultural, fishing, mining and logging.

(b) Women have been excluded because they make up only 4% of the farm labour force in the Atlantic Region, and 3% of the "Industrial Labourers" group.

TABLE 3.13

Wages of Male Farm Help Compared with Unskilled LabourSelected Occupations and Provinces

1958

(dollars per hour)

	Farm Help ^(a)	Dairy Prod.	Sawmills	Construction	Meat Packing
Prince Edward Island	.73			.85	
Nova Scotia	.73	.99	.78	1.37	
New Brunswick	.73	.77	.87	1.05	
Ontario	1.03	1.51	1.14	1.30	1.65

Source: Trends in the Agricultural Labour Force in Canada, Dept.
of Labour, 1960, Table 14.

(a) without board

TABLE 4.1
Dependency Ratios for Production and Employment
Industry as a Percentage of Regional Total 1953

	Atlantic Region		Quebec		Ontario		Prairie Region		British Columbia	
	Net Value	Empl.	Net Value	Empl.	Net Value	Empl.	Net Value	Empl.	Net Value	Empl.
Forestry and Fishing	31.1	39.0	13.1	10.3	6.1	5.1	2.7	3.9	39.1	36.3
Mining and Mineral Processing	12.4	8.6	7.8	3.8	6.5	4.0	12.1	2.6	8.4	6.8
Agricultural Products	10.3	22.1	9.7	25.9	11.1	23.2	42.8	63.9	6.1	13.0
Secondary Manufacturing	19.5	11.8	48.7	42.5	58.0	49.3	16.4	10.8	16.9	16.6
Electric Power	3.9	1.4	4.0	1.2	2.8	2.3	2.6	1.0	3.5	1.4
Construction	22.5	17.0	15.6	15.7	14.5	15.5	23.4	17.8	24.0	25.2
Residual (Primary)	0.3	0.1	1.1	0.6	1.0	0.6	-	-	2.0	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: R.D. Howland, Some Regional Aspects of Canada's Economic Development, Royal Commission on Canada's Economic Prospects (Ottawa), 1957, Table 8, p. 43.

TABLE 4.2
Average Growth Rates in Selected Industries

Canada

	1935-1961	1946-1961
Gross Domestic Product	4.5	4.2
Goods Producing Industries	4.4	4.2
Agriculture	.9	1.2
Forestry	3.2	1.4
Fishing and Trapping	1.9	1.6
Mining	7.3	9.5
Manufacturing	5.1	3.9
Construction	6.9	6.2
Electrical Power, Gas Utilities	8.3	9.8
Other n.c.c.	3.8	3.2
Service Producing Industries	4.5	4.3
Transportation, Storage, Communication	5.1	4.4
Trade	5.3	4.1
Finance, Insurance, Real Estate	4.9	5.2
Public Administration, Defence	3.5	4.7
Community, Personal, Recreational and Business Services	4.0	3.5

Source: Index of Real Domestic Product by Industry of Origin
 1935-1961, D.B.S., p. 21.

TABLE 4.3

Coefficients of Inter-Industry Pull

Input demanded from other industries
per dollar of output of indicated
industry, Canada 1949

Transportation Storage and Trade	.26	
Forestry and Fishing	.28	) .51
Wood and Paper Products	.58	
Mining, Smelting and Refining	.29	
Agriculture	.31	
Overall Canadian "Average"	.52	

Source: Inter-Industry Flow of Goods and Services Sixteen
Industry Aggregation, D.B.S., 1949.

TABLE 4.4
Payments to Labour per Dollar of Final Output
Canada 1949

Agriculture	.06
Foods and Beverages, Tobacco	.13
Chemicals et al	.16
Electric Power, Gas and Water Utilities	.22
Paper Products	.22
Construction	.27
Transportation Equipment, Electrical	.29
Wood Products	.30
Mining, Smelting, Refining	.33
Other Manufacturing	.34
Iron and Steel, Non Ferrous Metal Products	.35
Leather, Textile, Clothing	.36
Other Service Industries	.38
Forestry and Fishing	.39
Transportation, Storage, Trade	.43
Coal Mining, Crude Petroleum and Natural Gas	.49

Source: Inter-Industry Flow of Goods and Services Sixteen
Industry Aggregation, D.B.S., 1949.

TABLE 4.5
Labour Income 1947-58 Selected Industries
 (millions of dollars)

	Agriculture	Forestry and Fishing	Mining	Total Labour Income
1949	134	216	279	8,000
1950	144	290	303	8,629
1951	158	416	364	10,014
1952	172	346	418	11,218
1953	171	331	417	12,125
1954	159	343	425	12,452
1955	161	362	457	13,223
1956	172	411	528	14,890
1957	173	376	528	15,996
1958	176	317	562	16,434
(1958) ^{1/9} (1949)	1.031	1.045 ^(b)	1.081	1.082

Source: Labour Income 1926-58, D.B.S., 1960, p. 31. Annual Income by Industry.

Notes: (a) Forestry and Fishing have been consolidated.

(b) Forestry and Fishing contains such large fluctuations that its ratio was taken from 1956-7-8 divided by 1947-8-9.

TABLE 4.6

Annual Average Index Numbers of Employmentby Industrial Group 1951-1960^(a)

Year	Forestry	Mining	Industrial Composite	Agriculture ^(b) (persons)
1951	140.3	111.0	109.1	939,000
1952	119.5	116.9	111.9	
1953	98.3	110.8	113.1	
1954	96.3	110.4	109.9	
1955	102.9	113.7	112.9	
1956	113.2	122.7	120.7	
1957	99.3	127.2	122.6	
1958	75.9	123.5	117.9	
1959	78.9	123.4	119.7	
1960	84.0	120.1	118.7	675,000
$\frac{(1960)}{(1951)}^{1/9}$	.9440	1.0087	1.0094	.9640

(a) Canada Year Book, 1961, p. 735.
Base 1949 = 100.

(b) The Labour Force, D.B.S., February 1964.

TABLE 4.7
Increase in Wages, Employment
1921-1951

	Increase in Average Wages	Increase in Employment
Forestry, Logging	2.32	2.70
Coal Mining	1.70)	1.98
Metal Mining	2.31)	
Industrial Composite	2.53	2.32

Sources: Calculated from Wage Rates, Salaries, and Hours of Labour 1963, Table B, pp. 30-31, and Employment, Payrolls and Weekly Earnings, January 1949 - June 1953, Table 6.

TABLE 5.1
Dependency Ratios
Maritime Region 1911 and 1961
Males by Occupation

Occupation	Dependency 1911	Dependency 1961
Manufacturing	.089	.137
Service	.019	.130
Transportation	.063	.108
Agriculture	.398	.097
Labourers	.118	.084
Proprietary, Managerial	.038	.084
Construction	.043	.076
Professional	.019	.054
Clerical	.020	.052
Commercial	.029	.049
Fishing, Hunting, Trapping	.067	.040
Logging	.027	.037
Mining, Quarrying	.063	.025
Financial	.002	.006
Not Stated	.000	.021
All Occupations	1.000	1.000

Source: 1961 Census, Vol. 3.1-1, Table 3.

TABLE 5.2

Statement of Sources and Uses of Labour

Atlantic Region 1947-1964

(in thousands)

Year	SOURCES			USES			
	Increase in Population over 14 years of age ²	Decrease in Agricultural Labour ¹	Total	Industry	Unemployed	Not Participating	Total
	ΔP	$-\Delta A$		ΔI	ΔU	ΔN	
1947	19	7	26	22	-3	6	25
1948	3	4	7	4	-1	4	7
1949	2	1	3	-1	1	3	3
1950 ³	4	3	7	-15	14	9	8
1951	-7	16	9	24	-19	4	9
1952	11	4	15	-9	1	22	14
1953	12	2	14	2	5	8	15
1954	12	6	18	-5	5	17	17
1955	12	1	13	12	0	1	13
1956	13	0	13	11	-2	5	14
1957	10	-4	6	-1	14	-7	6
1958	13	-2	11	-25	22	14	11
1959	14	-1	13	12	-8	9	13
1960	16	1	17	11	0	6	17
1961	18	0	18	15	5	-3	17
1962	24	11	35	20	-2	18	36
1963	24	10	34	16	-7	24	33
1964	18	-4	14	16	-9	8	15
TOTAL	218	55	273	109	16	148	273

Source: Calculated from The Labour Force, Supplement to the March 1965 Report, Dominion Bureau of Statistics.

Notes: 1. Agricultural and Non Agricultural Employed include paid workers, self-employed, and unpaid family workers.

2. Excludes inmates of institutions, members of the armed services and Indians living on reserves.

3. Newfoundland included from 1950; 1950 adjusted by 1951 Census data to produce sources and uses.

TABLE 5.3

Activity of Persons not in the Labour ForceAtlantic Region1951 and 1961

		Over 14 Population	Total not in Labour Force	Keeping House Retired, Other	At School
1951	Male	545116	110901	70952	39949
	Female	533791	431896	391182	40714
	Total	1078907	542797	462134	80663
1961	Male	622389	172570	118476	54094
	Female	603648	446312	397881	48431
	Total	1226037	618882	516357	102525
1951 Projected to 1961 Population Size	Male	622389	126662	81010	45612
	Female	603648	488418	442376	46042
	Total	1226037	615040	523386	91654
Non-Participants Accounted for by Increase in Population	Male	77273	15721	10058	5663
	Female	69857	56522	51194	5328
	Total	147130	72243	61252	10991
Additional Non- Participants	Male		45948	37466	8482
	Female		- 42106	- 44495	2389
	Total		3842	- 7029	10871

Source: 1951 Census of Canada, Vol. V, Table 2; 1951 Census, Vol. IV, Table 2; 1961 Census, Vol. III, Table 3.1 and Vol. I, Part 2, Table 3.

- Notes: a) Figures have been adjusted to allow for the change in the age required for inclusion in the Census labour force. The 1951 Census covered persons over 14 while 1961 included only those over 15.
- b) In 1951, 65% of those not participating were keeping house, 15% were at school, 10% were retired or voluntarily idle and 10% had other reasons.

TABLE 5.4

Occupational Distribution of the Labour Force

Maritime Provinces and Ontario

1901 to 1961

	1901		1921		1921		1941		1961	
	Maritimes	Ontario	Maritimes	Ontario	Maritimes	Ontario	Maritimes	Ontario	Maritimes	Ontario
Proprietary and Managerial					22097	86423	17234	84577	32618	192898
Professional					15497	59444	20804	99554	40236	239915
Clerical	6865	27293	16308	94801	16247	94414	18012	140510	43641	352225
Agricultural	124827	306451	114742	295071	113364	291948	95362	268796	34348	172171
Fishing, Hunting, Trapping	18096	2046	16516	2391	16317	2379	16601	6321	13417	3317
Logging	3396	6201	6632	7935	6363	7540	17271	14228	12611	11888
Mining and Quarrying	8192	3903	15316	8679	15007	8146	15718	23684	8324	25862
Manufacturing and Mechanical					27254	169859	34845	305128	53221	441440
Construction	50234	179012	48313	254497	15660	57505	18177	69612	25491	119501
Transportation					18639	67574	28485	93249	39366	164529
Commercial	27833	83055	47978	190494	13752	63335	16861	86864	29601	172635
Financial					978	7397	1105	9880	2186	23000
Service	39839	94990	43884	145476	26171	76773	40791	149320	74560	296613
Labourers	21597	50947	38487	117015	38100	116479	25907	96874	29416	121689

Source: Columns 1 to 4 are constructed from the 1941 Census of Canada, Vol. VI, Table 2 and employ the 1931 classification of occupations to the degree of detail possible for 1901.

Columns 5 to 10 are constructed from the 1961 Census, Vol. 3.1-1, Table 3 and use the 1951 occupational classification.

TABLE 5.5

Occupations Ranked by Number Employed
Maritime Provinces and Ontario
1901 to 1961

	1901		1921		1921		1941		1961	
	Maritimes Ontario	Maritimes Ontario	Maritimes Ontario	Maritimes Ontario	Maritimes Ontario	Maritimes Ontario	Maritimes Ontario	Maritimes Ontario	Maritimes Ontario	Maritimes Ontario
Proprietary and Managerial					5	5	10	9	7	5
Professional					10	9	6	5	4	4
Clerical	8	6	7	6	8	4	8	4	3	2
Agricultural	1	1	1	1	1	1	1	2	6	7
Fishing, Hunting, Trapping	6	9	6	9	7	14	12	14	11	14
Logging	9	7	9	8	13	12	9	12	12	13
Mining, Quarrying	7	8	8	7	11	11	13	11	13	11
Manufacturing	2	2	2	2	3	2	3	1	2	1
Construction					9	10	7	10	10	10
Transportation					6	7	4	7	5	8
Commercial	4	4	3	3	12	8	11	8	8	6
Financial					14	13	14	13	14	12
Service	3	3	4	4	4	6	2	3	1	3
Labourers	5	5	5	5	2	3	5	6	9	9
r (rank)	.8500	.9000	.7978	.8462	.9077					

128.

Source:

TABLE 5.6
Population 15 Years of Age and Over
1911-1961
Maritime Region

	MALE		FEMALE	
	Population over 15	Decennial Increase	Population over 15	Decennial Increase
1911	314682		301941	
1921	333132	1.0586	321131	1.0636
1931	344880	1.0353	324391	1.0102
1941	405579	1.1760	381527	1.1761
1951	417237	1.0287	413207	1.0830
1961	463627	1.1101	454729	1.1005

Source: 1961 Census of Canada, 3.1-1, Table.1.

TABLE 5.7

Employment Performance CoefficientsAtlantic Provinces 1911-1961

	MALE					FEMALE				
	1911-21	1921-31	1931-41	1941-51	1951-61	1911-21	1921-31	1931-41	1941-51	1951-61
All Occupations	.00	-.03	-.17	.11	-.12	.18	.03	.11	.11	.26
Proprietary, Managerial	.91	-.27	-.20	.57	.03	.74	-.14	.26	.87	.18
Professional	.11	.15	-.02	.38	.38	.45	.07	-.04	.17	.37
Clerical	.22	-.17	-.05	.66	.07	1.83	-.04	.15	.84	.32
Agricultural	-.06	-.09	-.28	-.37	-.58	-.03	-.04	-.61	-.36	.38
Fishing, Hunting, Trapping	-.18	.02	-.21	-.03	-.30					
Logging	-.20	-.25	2.30	.12	-.47					
Mining, Quarrying	-.21	.01	-.18	-.21	-.46					
Manufacturing, Mechanical	-.18	-.02	.21	.33	.01	-.39	-.30	-.07	.41	-.04
Construction	.24	-.12	.09	.26	-.02					
Transportation	-.07	.17	.12	.33	-.13	1.69	-.01	-.21	.80	.18
Commercial	.06	.00	-.13	.24	.21	.72	-.04	.35	.36	.19
Financial	.95	.33	-.36	.18	.47					
Service	.28	.25	-.12	1.69	.58	.02	.13	.26	-.32	.18
Labourers	.10	.18	-.63	.21	-.20					

Source: Census of Canada 1961, 3.1-1.

Note: A positive coefficient signifies that the occupation provided abnormal employment during that decade, a negative one, that the occupation expanded more slowly than the population aged 14 and over as in Table 5.6.

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