INTERPROVINCIAL VARIATION IN ECONOMIC GROWTH IN CANADA

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ABSTRACT

In the present paper, the dynamic aspects of regional variations in the economic growth are examined. Over the three decades of the fifties, sixties and seventies, the growth pattern in different provinces of canada has undergone significant changes. These changes are more or less in the same direction as one would expect in a capitalist economy (see, Dholakia, 1985). The contribution of worker rate in explaining the growth differentials considerably declined over time. Changes in the industrial structure and variations therein play a significant role on margin. However, unlike the case of the analysis of the regional differences in the levels of economic development where capital intensity (factor proportions) played the major role, in the case of the regional differentials in the rates of economic growth, capital productivity (technology) played a significant role. Thus, at a later stage in the national economic development, regional variations (disparities) are governed more by the pure technological factors than by the structure or the attitude of the people to work or the capital investments per se. The case of India examined with all limitations on the data availability (see, Dholakia, 1985) corroborate these findings. This presents good potential for learning from Canadian experience for formulating regional policies in countries like India.

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I. Introduction

In a recent paper, it has been shown that, although the regional problem in Canada is almost non-existent as compared to the one in India, its trends over the past 30 year period (1951-81) are interesting (see, Dholakia, 1989). It has also been argued there that the emphasis of the regional problem in Canada has shifted totally from Ontario v/s. Quebec to Alberta v/s. the Atlantic provinces in recent years. This calls forth a closer examination of the growth experience of different Canadian provinces over the period, 1951-81. In the next section, we examine the extent of growth variation among the Canadian provinces with emphasis on the relationship between migration and wage rates. In the third section, we present the basic framework to study the regional variations in growth patterns over the three decades. The fourth section, then, presents the results of our empirical exercise. In the fifth and the final section, concluding observations on the exercise are made. Methodology and sources of data to generate comparable estimates of output, capital stock and employment for Canadian provinces are presented in the Appendix.

II. Migration and Wages

Several microlevel studies go into the question of wage rates inducing population transfers in and out of a given regional unit. At macrolevel, non-availability of the required type of data usually becomes a constraint in carrying out such tests. However, if we take most acceptable proxies for the purpose, we can get some broad idea about the wage-differential hypothesis of migration in Canadian environment.

If we hypothesise that natural growth of population in different provinces remains the same during a given decade, we can use the observed population growth differential during the decade to indicate the direction as well as the magnitude of the migration during the decade. As far as the wage rate is concerned, we can assume that real wage rate has one-to-one correspondence with the average real labour productivity. This assumption is less stringent than the one of proportionality which implies constancy of labour shares across regions. Under our assumption, labour share may vary across regions but not substantially.

Table 1 presents population and labour productivity in Canadian provinces in the bench-mark years during 1951-81. Table 2 presents the growth rates in population, per capita real income and labour productivity over the three decades.

TABLE 1

Population and Productivity Per Worker in Canadian Provinces, 1951-81

(In %)

Provinces	1951		1961		1971		1981	
	Population	Y/W	Population	Y/W	Population	Y/W	Population	Y/W
1	2	3	4	5	6	7	8	9
1. NFL	3614	2951	4579	6273	5221	8644	5677	8521
2. PEI	984	2783	1046	4258	1116	5914	1225	6984
3. NS	6426	4080	7370	5381	7890	7536	8475	8425
4. NB	5157	4132	5979	5505	6346	7817	6964	9082
5. Qub.	40560	5257	52590	7292	60280	9115	64380	10369
6. Ont.	45976	6628	62361	8337	77031	10957	86247	10900
7. Man.	7765	5600	9217	6721	9882	9154	10262	9686
8. Skt.	8317	5696	9252	5736	9262	9299	9683	11188
9. Alb.	9395	7068	13320	7785	16279	11142	21923	13349
10. B.C.	11652	7377	16291	8943	21846	10773	27440	11602
Total	139840	5942	182000	7600	215150	10060	242730	10897

Note : Population is in hundreds and productivity per worker (Y/W) is in Can. $ at 1971 prices.

Source : Statistics Canada, and Appendix Tables 1 to 4 in Chapter 1 above.

TABLE 2

Growth Rates of Population, Per Capita Income and Productivity Per Worker in Canadian Provinces, 1951-81

(In %)

Provinces	Growth During 1951-61			Growth During 1961-71			Growth During 1971-81		
	Popula-tion	PCI	Y/W	Popula-tion	PCI	Y/W	Popula-tion	PCI	Y/W
1	2	3	4	5	6	7	8	9	10
1. NFL	26.7	44.7	112.6	14.0	65.5	37.8	8.7	18.5	-1.4
2. PEI	6.3	28.0	53.0	6.7	50.5	38.9	9.8	36.6	18.1
3. NS	14.7	26.1	31.9	7.1	48.7	40.0	7.4	29.9	11.8
4. NB	15.9	18.4	33.2	6.1	54.2	42.0	9.7	36.7	16.2
5. Queb.	29.7	25.4	38.7	14.6	43.9	25.0	6.8	33.6	13.8
6. Ont.	35.6	14.8	25.8	23.5	43.3	31.4	12.0	18.8	-0.5
7. Man.	18.7	13.5	20.0	7.2	45.4	36.2	3.8	23.9	5.8
8. Skt.	11.2	-9.4	0.7	0.1	68.3	62.1	4.5	43.5	20.3
9. Alb.	41.8	5.3	10.1	22.2	54.2	43.1	34.7	57.0	19.8
10.B.C.	39.8	11.1	21.2	34.1	40.7	20.5	25.6	31.2	7.7
Total	30.1	16.6	27.9	18.2	47.3	32.4	12.8	30.1	8.3

Source : Same as Table 1 above.

From the tables, it becomes clear that population growth in Canada is declining from a high level during the fifties to the sixties and from the sixties to the seventies, The same declining trend is seen in the cases of Newfoundland, Quebec, Ontario, Manitoba and British Columbia. In four provinces, viz., Nova Scotia, New Brunswick, Saskatchewan and Alberta, the population growth rate declined from the fifties to the sixties but again increased from the sixties to the seventies. In Prince Edward Island, the population growth has been rising from a very low level in the fifties to the sixties and the seventies. These trends, however, only reflect, if at all, the rate of acceleration or deceleration in the basic phenomenon of population transfer among regions of a country.

Migration is basically reflected by the differential growth of population as compared to the national average. It becomes immediately clear from Table 2 that only three provinces, viz., Ontario, Alberta and British Columbia had higher population growth rates during the fifties and the sixties and only Alberta and British Columbia had higher than the national average growth of population during the seventies. The rest of the regions were the net losing regions. According to the wage differential hypothesis, therefore, we should expect that wages would be low in the losing regions and high in the gaining regions. A closer look at Table 1 confirms this expectation with the only exception of Ontario during the seventies. However, it can be observed from the Tables 1 & 2 that labour productivity in Ontario

actually declined rather than increasing during the period 1971-81. This could have resulted not only in halting the flow but even reversing it during 1981. It is, thus, evident that the Canadian provincial data tend to support the wage-differential hypothesis of population transfer.

In the case of India, however, such a relationship between population growth and labour productivity is not borne out so neatly. This by itself may not be considered as an evidence against the wage differential hypothesis of migration. It is possible and also quite plausible that the assumptions of uniform natural growth of population across regions and of one-to-one correspondence between labour productivity and wage rate may not hold true in the case of Indian states. These assumptions going wrong by itself does not invalidate the wage differential theory of migration for its application for policy purposes in India.

III. The Framework

It can be seen from Table 2 that although the growth in labour productivity has a high degree of association with the growth rate of per capita real income, the association is far from perfect. Moreover, the divergencies between the two variables are increasing during the sixties and the seventies. In view of the importance of the provincial income disparities in Canada, it is necessary to examine the role of different factors in the growth of per capita incomes of different provinces over the three decades, 1951-61, 1961-71 and 1971-81.

We identify the following four factors : the worker rate (W/P), the capital productivity (Y/K), the capital intensity (K/W) and industrial structure (Wi/W), as the component factors of the per capita income (y). If we place suffix o and 1 to each of these to indicate the initial period and terminal period respectively, we may write the identities as follows:

$$y_o = \left(\frac{W}{P}\right)_o \sum \left(\frac{Y_i}{K_i}\right)_o \left(\frac{K_i}{W_i}\right)_o \left(\frac{W_i}{W}\right)_o \qquad \ldots\ldots\ldots (1)$$

$$y_1 = \left(\frac{W}{P}\right)_1 \sum \left(\frac{Y_i}{K_i}\right)_1 \left(\frac{K_i}{W_i}\right)_1 \left(\frac{W_i}{W}\right)_1 \qquad \ldots\ldots\ldots (2)$$

In order to examine growth patterns, we should express the difference (y1 -yo) in terms of the changes in the four abovementioned factors. It is possible to decompose this change (y1-yo) into the four component factors with residual appropriately distributed among them. (See, Dholakia, 1985 and 1986). Following the same method of standardization procedure (Dholakia, 1985), we have generated the partial and total contributions of each factor with the attached resitual for all the 10 provinces in each of the 3 decades under consideration. Applying the method suggested in Dholakia (1986), we have then derived the average contributions of each factor in the observed growth of per capita income during each of the 3 decades in each of the 10 Canadian provinces and for the total of these 10 provinces taken together.

IV. The Results

The results of the abovestated empirical exercise are reported in Tables 3, 4 and 5 respectively for the decades 1951-61, 1961-71 and 1971-81. Tables 6, 7 and 8 represent the average contributions of the four factors as annual average compound growth rates of provincial incomes in Canada during the decades viz. 1951-61, 1961-71 and 1971-81 respectively.

From Table 3, it becomes obvious that the growth pattern during 1951-61 in different provinces was broadly uniform. The contributions of worker rate and capital productivity were negative and those of capital intensity and employment structure were positive in all provinces. In Saskatchewan, the increase due to capital intensity was more than offset by the decrease due to capital productivity. In the rest of the provinces, income grew largely because of substantial increases due to capital intensity. Favourable changes in the employment structure played important role in Nova Scotia where the contribution of this factor was second highest. During the fifties, thus, the Canadian provinces gew through a substantial investment efforts resulting in drastic changes in capital per worker. The technology became more capital intensive in all provinces. There was also a shift in employment pattern away from low productivity primary sector to high productivity sectors.

During the sixties and the seventies, however, the growth pattern changed substantially as can be seen from Tables 4 and 5. Changes in worker rate turned favourable in all provinces during

TABLE 3

Absolute Average Contribution of Factors in Provincial Income Growth in Canada, 1951-61

(In Canadian $)

Provinces	Average Contribution of				$y_j(1961) - y_j(1951)$
	W/P	Y/K	K/W	$W_{i/W}$	
1	2	3	4	5	6
1. NFL	-485	-210	902	216	423
2. PEI	-213	-91	443	145	284
3. N.S.	-67	-26	349	87	343
4. NB	-175	-64	387	95	243
5. Queb	-214	-119	720	74	461
6. Ont.	-266	-227	824	69	400
7. Man.	-130	-394	722	88	286
8. Skt.	-228	-985	834	167	-212
9. Alb.	-128	-579	638	214	145
10. B.C.	-245	-392	909	17	229
Total	-224	-262	757	98	369

Note : Figures are at 1971 constant prices.

Source : The same as Table 1 above.

TABLE 4

Absolute Average Contribution of Factors in Provincial Income Growth in Canada, 1961-71

(In Canadian $)

Provinces	Average Contribution of				$y_j(1971) - y_j(1961)$
	W/P	Y/K	K/W	$W_{i/W}$	
1	2	3	4	5	6
1. NFL	332	-614	1231	-51	898
2. PEI	130	259	147	122	658
3. NS	122	-78	686	77	807
4. NB	165	163	423	98	849
5. Queb.	378	133	424	69	1004
6. Ont.	323	362	633	22	1340
7. Man.	873	549	798	-1123	1097
8. Skt.	109	469	715	97	1390
9. Alb.	604	1039	514	-587	1570
10. B.C.	542	330	332	-20	1184
Total	340	263	574	42	1219

Note : Figures are at 1971 constant prices.

Source : The same as Table 1 above.

TABLE 5

Absolute Average Contribution of Factors in Provincial Income Growth in Canada, 1971-81

(In Canadian $)

Provinces	Average Contribution of				$y_j(1981) - y_j(1971)$
	W/P	Y/K	K/W	$W_{i/W}$	
1	2	3	4	5	6
1. NFL	455	-648	593	19	419
2. PEI	333	131	33	222	719
3. NS	426	-231	514	28	737
4. NB	459	-223	637	12	885
5. Queb.	604	-359	868	-10	1103
6. Ont.	860	-734	708	1	835
7. Man.	617	-384	597	10	840
8. Skt.	741	196	434	116	1487
9. Alb.	1405	262	857	21	2545
10. B.C.	933	89	272	-18	1276
Total	794	-360	710	-2	1142

Note : Figures are at 1971 constant prices.

Source : The same as Table 1 above.

TABLE 6

Average Contributions of Factors Expressed As Annual Compound Growth Rates of Provincial Incomes in Canada, 1951-61

(In %)

Provinces	Annual Growth Rate Due To				Growth Rate in y_j
	W/P	Y/K	K/W	$W_{i/W}$	
1	2	3	4	5	6
1. NFL	-6.92	-2.48	6.92	2.07	3.76
2. PEI	-2.32	-0.93	3.68	1.34	2.49
3. NS	-0.52	-0.20	2.38	0.64	2.35
4. NB	-1.41	-0.49	2.60	0.70	1.70
5. Queb.	-1.24	-0.67	3.39	0.40	2.81
6. Ont.	-1.03	-0.88	2.70	0.25	1.39
7. Man.	-0.63	-2.03	2.97	0.40	1.27
8. Skt.	-1.06	-5.61	3.21	0.72	-0.99
9. Alb.	-0.47	-2.33	2.10	0.75	0.52
10. B.C.	-0.98	-1.61	3.02	0.06	1.05
Total	-1.06	-1.26	2.99	0.43	1.55

Source : The same as Table 1 above.

TABLE 7

Average Contributions of Factors Expressed As Annual Compound Growth Rates of Provincial Incomes in Canada, 1961-71

(In %)

Provinces	Annual Growth Rate Due To				Growth Rate in y_j
	W/P	Y/K	K/W	$W_{i/W}$	
1	2	3	4	5	6
1. NFL	2.20	-5.77	6.62	-0.38	5.17
2. PEI	0.95	1.83	1.07	0.90	4.17
3. NS	0.71	-0.49	3.52	0.46	4.05
4. NB	1.01	1.00	2.42	0.61	4.43
5. Queb.	1.54	0.57	1.72	0.30	3.71
6. Ont.	1.00	1.11	1.88	0.07	3.66
7. Man.	3.14	2.07	2.89	-6.06	3.82
8. Skt.	0.52	2.09	3.06	0.47	5.34
9. Alb.	1.91	3.11	1.65	-2.24	4.42
10. B.C.	1.72	1.08	1.10	-0.07	3.47
Total	1.24	0.98	2.03	0.16	3.95

Source : The same as Table 1 above.

TABLE 8

Average Contributions of Factors Expressed As Annual Compound Growth Rates of Provincial Incomes in Canada, 1971-81

(In %)

Provinces	Annual Growth Rate Due To				Growth Rate in y_j
	W/P	Y/K	K/W	$W_{i/W}$	
1	2	3	4	5	6
1. NFL	1.84	-3.31	2.35	0.09	1.71
2. PEI	1.58	0.65	0.17	1.08	3.17
3. NS	1.61	-0.98	1.91	0.12	2.65
4. NB	1.76	-0.97	2.37	0.05	3.17
5. Queb.	1.70	-1.15	2.37	-0.03	2.94
6. Ont.	1.79	-1.79	1.49	---	1.74
7. Man.	1.63	-1.15	1.58	0.03	2.17
8. Skt.	1.98	0.56	1.20	0.34	3.67
9. Alb.	2.77	0.57	1.77	0.05	4.61
10. B.C.	2.07	0.21	0.65	-0.04	2.75
Total	1.92	-0.99	1.73	---	2.66

Note : --- is negligible

Source : The same as Table 1 above.

this period. Changes in capital productivity also turned favourable in all provinces except Newfoundland, Manitoba, Alberta and British Columbia. Capital intensity continued to be the most important cause for the growth in all provinces except Prince Edward Island, Manitoba, Alberta and British Columbia. As can be seen from the Table 2, the growth rate of per capita income was substantially higher during the sixties as compared to the seventies.

Four distinct growth patterns emerged during the sixties among the Canadian provinces. Since changes in worker rate and capital intensity were favourable in all the provinces without exception during the sixties, the four different growth patterns can be represented in terms of favourable and unfavourable changes in capital productivity and employment pattern as under:

		Favourable Y/K	Unfavourable Y/K
Favourable	Wi / W	PEI, NB, Queb., Ont., Skt.	NS
Unfavourable	Wi / W	Man., Alb., B.C.	NFL

Since out of the ten provinces, five including the two largest provinces in Canada had the most favourable type of growth pattern during the sixties, the nation's growth pattern was also the same. This accounted for the rapid growth in per capita income observed during the sixties.

On the other hand, during the seventies, changes in capital productivity turned unfavourable in several provinces including Quebec and Ontario. The nation's growth pattern, therefore, also showed unfavourable changes in capital productivity. Table 5 clearly reveals again four different growth patterns during the seventies since changes in worker rate and capital intensity were favourable in all provinces :

		Favourable Y/K	Unfavourable Y/K
Favourable	Wi/W	PEI, Skt. Alb.	NFL, NS, NB, Ont., Man.
Unfavourable	Wi/W	B.C.	

Changes in employment pattern during the seventies did not play a substandard role in any of the provinces except in Prince Edward Island. The changes in worker rate, however, played a major role in almost all provincial economies. The national aggregate actually shows that changes in worker rate was the most important cause for the increase in per capita real income during the seventies. The same holds for PEI, Ontario, Manitoba, Saskatchewan, Alberta and British Columbia. The negative contribution of capital productivity was higher than the positive contribution of capital per worker in NFL and Ontario during the seventies. In these two states, the growth rate of per capita income dropped sharply during the seventies as compared to the

sixties. In all other provinces except Alberta, the growth in per capita income declined considerably during the seventies from the high level reached during the sixties.

The lesson from this exercise is clear. In the economic growth process, worker rate and capital productivity are very crucial variables which cannot be ignored. When both are unfavourable, the economy tends to grow very slowly. When both are favourable, the economy tends to grow very rapidly. When one is unfavourable, and the other is favourable, the growth rate is average. In Canada, during the fifties, the provinces were very comparable to the Indian states in the sixties in terms of the growth experience. Even during the seventies, only in a few states in India, the contribution of worker rate in the growth has become favourable (Dholakia, 1985). In Canada, on the other hand, during the sixties and then during the seventies, the worker rate has turned favourable in all the provinces. Even then, during the seventies, almost all Canadian provinces experienced declining growth rate. This is largely on account of unfavourable capital productivity changes during the seventies. Thus, on margin, capital productivity becomes an extremely important determinant of growth rates in the provincial economies. This also comes out clearly from the analysis of the Indian experience (Dholakia, 1985). It is thus, the technological factors which play important role in the determination of economic growth. In the initial stages when the economy is not settled and stabilized, structural changes

reflected by shifts in employment pattern play a crucial role in stepping up the growth rate. Once the economy reaches stability in terms of the employment pattern, it is the overall worker participation rate that contributes significantly to the growth in the economy. Indian economy has barely crossed the take off in the eighties. As a result, we can expect both the structural factors and the worker rates to play very important role in the growth process in future. If, at such times, therefore, capital productivity is not monitored seriously by appropriate choice of technology, the economy would miss an invaluable growth opportunity.

Turning our attention to the regional disparities, we should examine the factors responsible for variations in economic growth among the Canadian provinces. Tables 6, 7 and 8 present the contributions by the four identified factors as annual average compound rates of growth in the per capita incomes during the fifties, sixties and seventies in Canadian provinces. The purpose of such presentation is to eliminate the size of the economy in assessing the importance of a factor. Thus, all figures in these tables may be compared to the respective national average.

The following tabular presentation of coefficient of variation of the annual compound growth rate series with respect to the respective national average summarizes the findings :

Coefficients of Variation With Respect to National Average (in %)

	Category	1951-61	1961-71	1971-81
a)	Annual Growth Rate in Per Capita Income (Yj)	85.71	17.54	34.13
b)	Annual Growth Rate Due to :			
	i) W/P (Worker Rate)	191.016	67.44	18.55
	ii) Y/K (Capital Productivity)	131.18	253.62	130.58
	iii) K/W (Capital Intensity)	46.68	85.78	43.93
	iv) Wi/W (Industrial Structure)	154.89	1345.22	95.48

As it can be seen from this table, the regional variations in growth rate of per capita income were of substantially high order in the fifties. They declined significantly during the sixties but rose again during the seventies. What is most interesting to observe is that the key factor causing high variations in the annual growth rates does not remain the same from decade to decade. The Canadian experience shows that growth due to worker rate showed maximum inter province variation during the fifties. Its variations declined considerably during the sixties and seventies. Thus, the factor which accounted for a large variation in the beginning has turned out to be of little importance in the regional variations in growth over time.

Growth due to industrial structure again ranks very high in the interprovince variations during the fifties and the sixties. During the seventies, however, the magnitude of the variations in

the growth due to industrial structures has declined considerably. Growth due to capital intensity showed minimum regional variations increased considerably during the sixties but again fell during the seventies. Considering the fact that the overall per capita income growth showed much less variations during the sixties as compared to the seventies, the higher magnitude of variations in the growth due to capital intensity is basically countering the influence of increased variations in other factors. Variations in the growth due to capital productivity were high during the fifties and became higher during the sixties. During the seventies, however, the variations in the growth due to capital productivity again fell to their level of the fifties. But during the seventies, growth due to capital productivity shows maximum variations as compared to the other factors. Thus, during fifties, worker rate and industrial structure played most important role in the regional variations in economic growth in Canada. During the sixties, industrial structure and capital productivity played major role, while during the seventies, the capital productivity and industrial structure were the major contributory factors in the inter-provincial variations in economic growth in Canada.

V. Conclusion

Population movements in Canadian provinces are largely governed by the economic impetus in the form of higher and rising wages. The non-economic barriers to population movements which

usually exist in many of the large sized countries like India seem to be quite weak in Canada. The labour market is, therefore, more competitive and integrated. The differences in the rates of economic growth among provinces in Canada, therefore, become more economic phenomenon than the result of non-economic forces in operation. Over the three decades of the fifties, sixties and seventies, the growth pattern in different provinces of Canada has undergone significant changes. These changes are more or less in the same direction as one would expect in a capitalist economy. (See Dholakia, 1985). The contribution of worker rate in explaining the growth differentials considerably declined over time. Changes in the industrial structure and variations therein play a significant role on margin. However, unlike the case of the analysis of the regional differences in the levels of economic development where capital intensity (factor proportions) played the major role (see, Dholakia, 1989), in the case of the regional differentials in the rates of economic growth, capital productivity (technology) played a significant role. Thus, at a later stage in the national economic develop-ment, regional variations (disparities) are governed more by the pure technological factors than by the structure or the attitude of the people to work or the capital investments per se. The case of India examined with all limitations on the data availability (see Dholakia, 1985) corroborate these findings. This presents good potential for learning from Canadian expe-rience for formulating regional policies in countries like India.

APPENDIX

Estimates of Output, Capital Stock and Employment for Canadian Provinces

1. Output

The provincial income or output is estimated as Gross Domestic Product originating in the respective provinces excluding military wages and salaries. It may be mentioned here that unlike the case of Indian states, the GDP for different provinces in Canada is not estimated strictly on the income originating basis. However, to a large extent, it corresponds to the originating income concept. In Canada, experimental data on provincial economic accounts are available in Statistics Canada Cat. # 13-213 for the period 1961-81. Moreover, Statistics Canada Cat. # 61-213 and 61-202 also provide useful data pertaining to the provincial and national GDP. We have generated regional shares from Cat. # 13-213 and applied them to Cat. # 61-213 Canada totals to get comparable estimates of regional GDP at current prices to Cat. # 61-202. We then obtained the industrial breakdown of GDP at current prices by provinces for the period 1971-81 and again applied this back to Cat. # 13-213. For 1971 constant price estimates, we used the national implicit deflators for the primary, secondary and tertiary sectors obtained from Cat. # 61-213. For generating the estimates for 1961 to 1971, we used the ceusus value added by selected sectors from Cat. # 61-202 (1979) to generate regional shares which were

then applied to the national current price estimates of the primary and secondary sectors comparable and consistent with Cat. # 61-213. Regional total GDP shares are applied also to the comparable current price estimates to obtain tertiary sector's current price figures. There is a break in the two series of regional GDP at current prices, viz., 1961-71 and 1971-81 at the point 1971. The ratios are obtained and the 1961-71 figures are adjusted to the 1971-81 set. The break, it may be noted, occurs only in the primary and secondary sectors, the estimates of the total being the same. This will generate current price composition because the totals would be available by regional share method and national total from Cat. # 61-516 which would be at constant prices but convertible into current prices by applying the price index calculated from the Historical Statistics of Canada 2nd edition Cat. # 11-516E. To convert everything at constant 1971 prices, the uniform national implicit price deflators by the three broad sectors have to be used.

For the period prior to 1961, the census value added concept and data from Cat. # 61-202 (1979) are used along with Canada GDP at factor cost from CAt. # 13-531 or Cat. # 11-516E with the consumption that provincial share of personal income is equivalent to the provincial share in GDP. The constant price estimates are obtained by deflating everything by the industry specific price deflators calculated from Cat. 11-516E.

2. Capital Stock

Gross stock of fixed capital at 1971 constant prices is used as a concept of capital stock in the present study. The estimates of gross fixed capital stock for each of the 10 provinces in Canada are readily available on request from Statistics Canada for the years 1955 onwards upto 1983-84. In some provinces, the sectoral break-up of the data are not available at the desired level of disaggregation but such details are available for the nation from Cat. # 13-568 and the major regions like Ontario, Quebec and British Columbia. By taking appropriate ratios and applying to the provincial combined figures we can obtain the necessary break-ups.

For the period prior to 1955, the estimates are obtained using the data on capital expenditures by sectors and provinces available on request from Statistics Canada. These expenditures were converted into constant 1971 prices by applying implicit national deflators from Cat. # 13-568. For obtaining the estimates for the years 1951-54, we used the following method:

$$K_{oj} = K_{ij} - A_j \quad \text{and} \quad A_j = \left(\frac{GFCF - D}{GFCF} \right) \times GFCF_j$$

where K is real Gross Fixed Capital Stock; GFCF is real Gross Fixed Capital Formation; D is depreciation at constant 1971 prices. Subscript j indicates j^{th} province. Subscript o and i represent initial and subsequent year. Depreciation at 1971

prices was estimated by estimating the average life of assets on the basis of 1955 set of estimates for each of the broad sectors for each province.

3. Employment

The data on employment refers to the labour force concept applied by the Statistics Canada in their monthly labour force surveys. There are sharp breaks in the series from 1966 and 1975. However, two sets of estimates are available for the linking years which can be used for generating comparable series. For the period 1951 to 1960, the comparable estimates were generated by applying adjustment factors by age and sex available from a Statistics Canada Study by Denton and Ostry (1967) for Canada to each province by sectoral age-sex break-down from 1951 census. Thus, 1951 sectoral composition comparable to the labour force concept was obtained for each province. The so obtained proportions were then applied to the total working force estimates available on request from the LF division of Statistics Canada for each province. Then, the overall adjustment proportions were applied as before to these figures by sectors to get a comparable and consistent series of employment in provinces by broad sectors.

All these estimates for the bench-mark years 1951, 1961, 1971 and 1981 are presented below in Appendix Tables 1 to 4 respectively.

Appendix Table 1 : Estimates of the Component Factors in Canadian Provinces, 1951

Provinces	W/P	Yp/Kp	Kp/Wp	Wp/W	Ys/Ks	Ks/Ws	Ws/W	Yt/Kt	Kt/Wt	Wt/W
1	2	3	4	5	6	7	8	9	10	11
1. NFL	0.3210	0.4206	2461	0.4828	1.4891	3206	0.1379	0.2253	20976	0.3793
2. PEI	0.3659	0.1774	6012	0.4722	0.6661	3540	0.1389	0.1772	28321	0.3889
3. NS	0.3221	0.2383	7282	0.2464	0.4190	8248	0.2319	0.2376	22995	0.5217
4. NB	0.3199	0.3425	5622	0.2727	0.3993	9934	0.2485	0.1630	33596	0.4788
5. Queb.	0.3467	0.3209	8063	0.1650	0.5959	8945	0.3734	0.2701	22777	0.4616
6. Ont.	0.4067	0.2413	14562	0.1315	0-5249	12111	0.3882	0.3251	23689	0.4802
7. Man.	0.3799	0.2824	15596	0.2441	0.5429	6629	0.2441	0.2687	26511	0.5119
8. Skt.	0.3944	0.3090	12396	0.5610	0.4076	10715	0.0823	0.2479	36044	0.3567
9. Alb.	0.3896	0.1565	20941	0.4126	0.3552	15874	0.1557	0.3324	33718	0.4317
10. B.C.	0.3553	0.2938	18366	0.1353	0.4317	16702	0.3019	0.2712	29288	0.5628
All Provinces	0.3721	0.2541	12533	0.2133	0.5204	11035	0.3156	0.2854	25656	0.4711

Basic Source : Statistics Canada.

Note : Symbols are as per equation (2) in the text. Subscripts p, s and t represent primary, secondary and tertiary sectors. Cols. (4), (7) & (10) are in $.

Appendix Table 2 : Estimates of the Component Factors in Canadian Provinces, 1961

Provinces		W/P	Yp/Kp	Kp/Wp	Wp/W	Ys/Ks	Ks/Ws	Ws/W	Yt/Kt	Kt/Wt	Wt/W
1		2	3	4	5	6	7	8	9	10	11
1.	NFL	0.2184	0.3347	10030	0.2700	0.7711	10578	0.1800	0.2380	29782	0.5500
2.	PEI	0.3059	0.1281	11842	0.3750	0.7899	6925	0.1250	0.1649	36450	0.5000
3.	NS	0.3080	0.2190	12012	0.1806	0.4290	11948	0.2115	0.2330	26988	0.6079
4.	NB	0.2843	0.1981	11250	0.2000	0.3425	17278	0.2176	0.1759	36822	0.5824
5.	Queb.	0.3132	0.2140	19768	0.1056	0.5289	12640	0.3758	0.2774	30119	0.5185
6.	Ont.	0.3714	0.2238	29212	0.0851	0.4598	17434	0.3618	0.3111	28361	0.5531
7.	Man.	0.3591	0.1333	28563	0.1782	0.4953	10977	0.2447	0.2513	32511	0.5771
8.	Skt.	0.3545	0.1346	23181	0.4665	0.4614	19383	0.0914	0.1776	44099	0.4421
9.	Alb.	0.3724	0.1295	38003	0.3125	0.4214	21693	0.1693	0.2465	36794	0.5181
10.	B.C.	0.3253	0.2810	34696	0.0849	0.3578	24792	0.2811	0.2374	37345	0.5339
All Provinces		0.3394	0.1822	25826	0.1452	0.4631	16170	0.3089	0.2677	31510	0.5460

Basic Source : Statistics Canada.

Note : The same as in Appendix Table 1

Appendix Table 3 : Estimates of the Component Factors in Canadian Provinces, 1971

Provinces	W/P	Yp/Kp	Kp/Wp	Wp/W	Ys/Ks	Ks/Ws	Ws/W	Yt/Kt	Kt/Wt	Wt/W
1	2	3	4	5	6	7	8	9	10	11
1. NFL	0.2624	0.1902	62300	0.1168	0.6394	21804	0.1825	0.1777	37880	0.7007
2. PEI	0.3315	0.1440	14309	0.2973	1.0597	7600	0.1351	0.1890	39267	0.5676
3. NS	0.3270	0.2055	26872	0.0969	0.3062	24091	0.2209	0.2469	31889	0.6822
4. NB	0.3089	0.1839	32859	0.0867	0.3101	24590	0.2500	0.2072	39201	0.6633
5. Queb.	0.3607	0.1802	39052	0.0566	0.5498	17716	0.3082	0.2991	30074	0.6352
6. Ont.	0.4049	0.1924	40780	0.0587	0.5241	22941	0.3273	0.3435	31107	0.6140
7. Man.	0.3835	0.1712	50167	0.1187	0.4959	17561	0.2032	0.2581	36375	0.6781
8. Skt.	0.3682	0.1960	43475	0.3548	0.4258	25600	0.0938	0.1997	47689	0.5513
9. Alb.	0.4011	0.1477	75178	0.2128	0.5267	25082	0.1531	0.2817	37826	0.6340
10. B.C.	0.3799	0.2029	63853	0.0687	0.3803	30445	0.2458	0.2808	36558	0.6855
All Provinces	0.3776	0.1779	49197	0.0907	0.5003	22029	0.2757	0.2957	33232	0.6336

Basic Source : Statistics Canada.

Note : The same as in Appendix Table 1.

Table Appendix/4 : Estimates of the Component Factors in Canadian Provinces, 1981

Provinces	W/P	Yp/Kp	Kp/Wp	Wp/W	Ys/Ks	Ks/Ws	Ws/W	Yt/Kt	Kt/Wt	Wt/W
1	2	3	4	5	6	7	8	9	10	11
1. NFL	0.3153	0.0910	77195	0.1173	0.3328	25828	0.2011	0.1758	49803	0.6816
2. PEI	0.3837	0.1288	25000	0.1702	0.7464	10167	0.1277	0.2232	34812	0.7021
3. NS	0.3799	0.0811	59441	0.0683	0.2885	33195	0.2019	0.2425	34815	0.7298
4. NB	0.3633	0.1029	50279	0.0751	0.2618	37402	0.2055	0.2052	45254	0.7194
5. Queb.	0.4234	0.0854	57524	0.4878	0.5039	23601	0.2634	0.2795	36394	0.6878
6. Ont.	0.4836	0.1127	53027	0.0491	0.4284	27995	0.3002	0.3101	34721	0.6507
7. Man.	0.4492	0.0917	67694	0.1085	0.5534	19310	0.1887	0.2356	4224	0.7028
8. Skt.	0.4389	0.1143	78990	0.2329	0.5459	21983	0.1223	0.2551	46312	0.6447
9. Alb.	0.5255	0.1224	140509	0.1406	0.6152	23459	0.1979	0.3109	39258	0.6615
10. B.C.	0.4628	0.1025	80732	0.0693	0.4235	30733	0.2181	0.2966	38739	0.7126
All Provinces	0.4534	0.1096	78911	0.0733	0.4539	26604	0.2519	0.2864	37364	0.6747

Basic Source : Statistics Canada

Note : The same as in Appendix Table 1.

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