

NOTES AND BOOK REVIEWS

REGIONAL WELFARE AND MEASURED INCOME DIFFERENTIALS IN CANADA

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I. INTRODUCTION

Regional economic policy is usually discussed in terms of provincial differences in measured per capita income as calculated by standard macroeconomic techniques. In Canada, these differences are large, with the lowest provincial income reaching only 55 percent of the highest in 1966. Differences of this magnitude have persisted since the earliest years for which provincial incomes may be estimated—a period of about 60 years. The Maritime region per capita participation income has ranged between 64 and 72 percent of the national average since 1910; Quebec, between 77 and 94 percent; and Ontario between 105 and 123 percent. The Prairies have fluctuated somewhat more widely (98–127 percent) and British Columbia declined sharply between 1910 and 1920 (about $\frac{1}{3}$), but has been fairly stable ever since, at a level of 14–37 percent higher than the national average (McInnis, p. 447).

Straightforward considerations suggest that such differentials should close over time through capital and/or labour movements. That capital has not moved into the Atlantic Region to reduce the income gap could possibly be explained by the limited size of the potential local market. On the other hand, migration has not closed the gap either, although 60 years would be long enough for it to have done so. Moreover, out-migration from the Atlantic region relative to the birth rate has actually slowed down—from seven-eighths of the crude rate in the 1920's to one-quarter in the 1950's (Anderson, p. 22).

That the income gap has not narrowed through migration to the higher income regions could conceivably be explained by high relocation costs. It could also be explained by failure of the measured income series to reflect welfare levels adequately. Since national accounts are intended primarily to reflect short term changes in business activity and not to measure welfare, welfare levels could depart substantially from measured per capita income. Many writers have mentioned this possibility. In a recent study we have investigated the adequacy of the national accounts for this purpose and found most of the potential flaws in accounts methodology to be not terribly serious. The most important reason for the failure of the per capita income gap to close may then be that it is the per-household rather than the per-capita measure which more accurately reflects welfare levels and to which people respond. And average household differences are much less substantial than the per capita differences, with the highest provincial income per household exceeding the lowest by only 28 percent as compared with a 70-percent spread between the highest and lowest regions on a per capita basis.

Two things argue for the use of the household rather than the individual for welfare comparisons. First, there are scale economies in consumption that permit larger households to enjoy a higher utility than smaller households (including single persons).

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Also, the number of wage earners per household member falls with increased household size (e.g. a five person household may have, on average, two wage earners, or 0.4 per household member, while a one-person household might have, on average, 0.9 wage earners per household member). Since some part of the income flow accruing to any wage earner is related to the earning of a livelihood (clothing, lunches, personal care, etc.) and, therefore, does not contribute to the final utility of the household, it should not be commensurated with that part of income which does go for final consumption. One way to allow for this is to relate income to the household rather than to the individual.

II. PROBLEMS IN WELFARE INTERPRETATIONS OF THE NATIONAL ACCOUNTS

The potential sources of discrepancy between measured macroeconomic aggregates and welfare most relevant to regional analysis are: (1) the shape of the regional income distribution; (2) differences in regional price levels; (3) regional consumer debt patterns; (4) and (5) differences in intermediate goods, like automobiles and urban services; (6) housing imputation procedures; and (7) imputation of income in kind other than housing. We will consider them in turn.

II.1 *The Shape of the Income Distribution*

Two regions alike in all respects, including average per capita income, will have different welfare levels if their income distributions differ, the region having the narrower income distribution being the better off because of diminishing marginal utility of income. The obvious correction will be to omit the highest income earners from comparisons. There is no clear scientific method for determining what percentage should be neglected, or whether inclusion should be based simply on some maximum income level. Chernick's analysis of the subject, which is probably the most complete, gives inconsistent or tentative conclusions, which the author himself recognizes (pp. 75-77). We can do no more here than stress the need to consider the problem when making any specific comparison.

II.2 *Differences in Regional Price Levels*

Although regional welfare is clearly conditioned by price levels and expenditure patterns as well as by income levels, no official attempt has been made in the past to deflate regional income for these factors (Chernick did make an attempt in his study). Nor, until 1968, was any attempt made to compile an interregional price index. In that year the Dominion Bureau of Statistics began publishing a series of this kind—an inter-city Consumer Price Index—for items comprising about three-quarters of the consumer's market basket (DBS, 1968). However, it is not really adequate for regional income deflation.

There are two problems in using the inter-city CPI: commodity definitions and weighting patterns (the problem of commodity definitions may be considered a special case of the latter). Prices are compared for identical goods—to the extent of trying to assure brand identity—even though the goods may be irrelevant locally. For example, if the CPI is pricing a national brand of applesauce from a Niagara cannery, the price will almost certainly be higher in Halifax by roughly the transport cost difference. Say this leads to a brand price 20 percent higher in Halifax. But suppose there is a local brand accounting for 95 percent of the applesauce business in Halifax and priced 15 percent lower. It is not meaningful to use the price of the national brand in constructing a CPI. Indeed, it may be that over the years, because of cost differentials, Haligonians have become sliced-apple eaters, or that an entirely different fruit preparation serves them in exactly the same way as applesauce serves the Toronto market. Similarly with beef and fish. Or bread and potatoes. It is, then, the price of the relevant "applesauce equivalent" which should be compared.

Obviously, it would be very difficult to determine what the equivalents are for all consumption items—many conceptual difficulties need resolution and classificatory

decisions would have to be made which, since many people would believe them arbitrary, would have to be made with extreme caution. Indeed, some would argue that the whole attempt to relate "equivalents" would be arbitrary and should be eschewed. To this one can only reply that such decisions have to be made many times every day in any central statistical organization. Quite properly, for example, the monthly national CPI has variable weighting patterns—fresh peaches have a significant weight in August and September and a negligible weight in January.

Although it is not usually recognized as such, the question of commodity definition is a special case of the general problem of which weights to assign to an income comparison when we try to determine which of the two situations is better.¹ The result of this exercise might be inconsistent in the sense that the Haligonian would appear better off than the Torontonion when Toronto prices are applied to the Haligonian's consumption mix, while the Torontonion might appear better off when the Halifax prices are applied to his consumption mix. We experimented with various regional commodity group weighting schemes as given by the DBS publication on inter-city price indexes and concluded that we would not get this kind of perverse behaviour in practice—whichever region's quantity weights were used the order of measured income was the same.

Finally, we should note that the DBS inter-city price index does not adjust for provincial sales taxes which vary from zero to 8 percent on the commodities on which they are levied, with the tax being set at five percent for four of the seven provinces for whose major cities the index is kept in 1968 (the variation was greater at the time of the 1965 index). Part of the sales tax is related to the provision of certain municipal and provincial services which are "intermediate" in nature. In this case they should be subtracted out of income. Part relates to the provision of some final good, such as education, in which case the consumer gets something for his money besides the nominal purchase. For final services, therefore, we must adjust the price index. Our analysis suggests that about 60 percent of the municipal and provincial expenditures are on final services. Therefore, we will adjust for 60 percent of the sales tax only. Quebec (Montreal), whose index falls by two percent, and Saskatchewan (Regina) and Alberta (Edmonton), where it rises by three percent, are the only city indexes affected.

II.3 *Interregional Differences in Consumer Debt Patterns*

A major problem in different consumption patterns arises in the use of consumer debt. Suppose, for example, that one man with an after-tax income of \$5,000 has an average annual debt of \$1,000 while another with \$4,000 buys always for cash, and that all income is consumed. Assuming an average interest charge of 17.5 percent on consumer debt means that \$175 a year of the income of the former is spoken for before the salary earner gets home, reducing his effective income to only \$4,825, i.e., from a differential of 25 percent greater to one of 20.6 percent.

Instead of adjusting income directly, an adjustment could be made in the deflator, but this is never done—price indexes concentrate wholly on the ticket price.

Several studies of consumer debt have been conducted. One, at least, is based upon data which could permit a reasonable estimate. This study by DBS in 1963, (*Incomes, Assets, and Indebtedness of Non-Farm Families in Canada*, 1963) is the most complete yet undertaken in Canada. It covers 8,400 non-farm households. Its major shortcoming is its coverage of urban families only. In addition, disclosure problems prevent a cross-classification to permit the kind of estimates we would like to make. Ideally, we would estimate regional debt by applying to each region's income distribution (given in Table 3 of the study) its own indebtedness distribution. Lacking the latter

¹To see that they are essentially the same problem, consider two "applesauce" equivalents each of which is consumed exclusively in one of the regions. We could then think of the consumption in each region as being a different quantity of a single commodity called "applesauce equivalent". Or else we could imagine two commodities ("applesauce equivalent"₁, "applesauce equivalent"₂) each regional vector of consumption quantities for which would have one zero and one positive number.

for each region, we applied to each income distribution the national indebtedness pattern (Table 41 of the study). We thereby estimate the following annual interest cost: Atlantic provinces—\$74.7; Quebec—\$93.6; Ontario—\$103.1; Prairies—\$84.6; and British Columbia—\$92.9.

II.4 Differences in Intermediate Goods: Automobile Consumption

Macroeconomic aggregates attempt to exclude all intermediate goods and measure only final activity. The one major acknowledged exception is the inclusion of investment in the global totals, but since a deduction for depreciation is made annually in deriving Net National Income and Net National Product, this is not serious. However, many other goods which really serve an intermediate function are included. When we neglect them we overstate the welfare levels of measured income. The most important of these are probably intermediate automobile² consumption and urban services.

Short of a specially designed survey, there is probably no way to determine satisfactorily an intermediate transportation correction. Our attempt here is proposed only as a rough approximation. We start with information from the 1969/70 edition of *Area Sales Guide* compiled by the Canadian Automotive Trade, on vehicle registrations by census tracts and by provinces. We must determine the amount of automobile consumption which is work activity. On the basis of various conservative assumptions we calculate the following annual intermediate automobile consumption costs: Atlantic provinces—\$273; Quebec—\$249; Ontario—\$329; Prairies—\$391; and British Columbia—\$360. It is probable that the high vehicle incidence on the Prairies includes a large farm vehicle component, which, however, would also be work-related and would represent a greater intermediate input adjustment than the commutation vehicle.

II.5 Differences in Intermediate Goods: Urban Services

The demand for municipal services may be viewed as a function of price and city size. For any given size the demand would slope downward, although it would be rather inelastic. People will demand more garbage collection, for example, with falling price to avoid processing their garbage so intensively, reduce odours, etc. Demand will also change when we shift from a small to a large city. Thus, for a city of size $N_1 = 2N_0$ the demand curve, DD , would not be a simple doubling of the individual demand curves, DD_0 , but, rather, would shift further to the right (to DD_1) than the horizontally added curves of two cities of size N_0 each, which we will call DD_0' .

Consider garbage collection again. For the larger city two rather than one garbage collections a week might be required for health reasons. Thus to measure the increase in welfare accompanying the larger city which attaches directly to the increased level of service we must think in terms of DD_0 and DD_0' , and relate a consumer's surplus to these curves. The further price reduction resulting from the higher level of demand necessitated by the larger city does not represent any net benefit to the consumer.

In estimating the intermediate public expenditure data, we analyzed provincial expenditure data by function. Our tentative estimate, which is based on assumptions of varying frailty concerning revenue incidence and the purposes served under broad function headings, is that the Atlantic region average household income is overstated in comparison with Ontario by \$106.

II.6 Imputation Procedures: Housing

Housing is treated in the accounts as an investment good and it is the annual flow of services which it provides that is counted as current consumption, with a net rental value imputed by the DBS for owner-occupied dwellings.

²Ideally, we should adjust for any work-related intermediate input, including, e.g., household appliances which lighten the household chores and permit the wife to work, as well as for consumer expenditures such as day care centres which also free the housewife's time for alternative income producing uses. Consumer expenditure studies undertaken in the past do not attempt to specify these items. Our preference for household rather than per capita income measures does make up—perhaps it overcompensates—for this, however.

The difficulty here is the possibility that demand pressures may differ seriously between two regions and cause the rent imputation in one to include a higher economic rent component which does not reflect any increase in the welfare of the occupant.

Montreal and Toronto provide an excellent illustration of this phenomenon. Both are large, cosmopolitan, proud cities. Owing to reduced demand pressures real estate prices in Montreal for equal housing are reputed to be 40–50 percent lower than those in Toronto. But this does not mean that Torontonians are twice as well off. Thus, the comparisons will tend to be biased against the lagging regions and the apparent income differences will be larger than the welfare differentials. Since housing accounts for such a large portion of the consumer's budget—about 25–30 percent in the \$4–8,000 income groups according to many budget studies—this could have a serious effect in distorting welfare comparisons.

The wide variation in housing values which seems to depend on demand pressures shows up very clearly in a recent survey by Jane Abramson. For example, of the respondents sampled in five Atlantic areas, the percentage of homeowners owning property which they themselves valued at less than \$11,000 varied from 100% to 5%. Only in Bathurst—a small city—did a large number (43%) value their homes higher. At the same time, the author estimated that “at price levels prevailing in most urban areas the dwellings owned by the same families would cost at least \$1,200–\$2,000 per year” (p. 66), implying a property value of about \$16,000–\$18,000 a year, i.e. over twice as much as the average owner-estimated valuation. The implication of these figures is that throughout much of the lagging areas the local home owner would receive a DBS imputed owner occupied net rental of 30–50% less than in the nation as a whole. This difference might amount to \$300 or more per owner which works out to a household difference of around \$120 between the Atlantic region and Ontario.

II.7 *Imputation Procedures: Income in Kind other than Housing*

Since in some sectors, especially agriculture, the result of economic activity can take the form of commodities as well as cash, most central statistical organizations attempt to impute a value for consumption in kind. This is a well-known and long-accepted procedure although details vary among nations.

The decision on what to count as leisure and what as productive activity is arbitrary. We usually concern ourselves most with the income in kind of the agricultural sector because this is where it seems to be most important and it is easiest to measure.

Probably more important than the question of what to include in income imputation is the question of what value should be placed upon it. In practice DBS values the farm output at “its estimated alternative market price, i.e. the price the farmer would have received had it been sold rather than consumed” (DBS, 1967, p. 18). But is this really the relevant price? Consider a pure subsistence case. The farmer consumes milk, cheese, poultry and vegetables valued at \$2,000 at wholesale. These same goods after trade markups might be worth, perhaps \$3,000. This is the amount, let us say, that a labourer in the city would have to pay for this amount of physical output. Therefore, the welfare value of these goods is more than \$2,000. On the other hand, if he actually had to pay the city retail prices for these goods, the farmer might not wish to spend \$3,000 on these items, preferring instead to substitute additional nonfood for food consumption. This is the usual problem of true index numbers. But this is not all. The farmer has leisure time in which his family can put up part of the output—make cheese, can vegetables, and cure meat. The farmer in effect chooses to farm and process his own goods rather than go through the market. The value to him is really the value of the final processed goods and we suggest that this would be a much more relevant price for that part of it which is processed. It is therefore the processed food price which is relevant to the quantity which he actually would consume to remain on the same welfare level (same indifference curve) if he were faced with urban relative prices. Thus, ideally we look for the true index number of urban/rural consumption with the retail prices of goods in their state at time of consumption (raw, preserved used in some other product, etc.).

Our procedure is essentially the same as the principle of imputing gross rent, and hence net rent, for owner-occupied dwellings on the basis of comparable rents of renter-occupied sites. The observed market price of the product is considered; DBS does not impute the value to a homeowner who has fixed up his own home with his own labour on the basis of the potential earnings of the owner from an alternative use of that same labour time, but, rather, on the basis of the rent which would accrue to a similar property. Thus, if it is arbitrary to value consumption of own agricultural production at market price for processed goods, we would also have to object to home valuation on the basis of comparables (in either case, of course, there would have to be inter-regional price adjustments).

Valuation of raw output and at wholesale rather than at retail and according to degree of processing can not even be argued to be free from unarbitrary valuations. To use the market price in effect would assume that the farmer's entire output could be sold at the observed wholesale price, and in regions where home consumption comprises a large share of total, this is most unrealistic. For Canada as a whole in 1965, for example, home consumption of fruits and vegetables accounted for 13 percent of total output (sales plus home consumption) and 5-6 percent of dairy products, eggs, and poultry (DBS, 1967, pp. 67, 74). In some provinces, the shares were greater: the home consumption share in dairy products was over 10 percent of the total in four provinces (reaching 20 percent in Saskatchewan) while home consumption of fruits and vegetables accounted for over ten percent in five provinces, exceeding one-third in Alberta and reaching nearly 90 percent in Saskatchewan. It would not be reasonable to expect the observed market price to remain stable if such large quantities were added to the marketed output.

The net result of our calculations is to raise the Atlantic region average household income differential by amounts varying from \$26 (in British Columbia) to \$202 (in Saskatchewan). The average differential between the four Atlantic provinces and Ontario is \$20, i.e. the income of the former is understated by \$20 relatively to Ontario.

III. CONCLUSION: TOTAL EFFECT OF ADJUSTMENTS ON MEASURED INCOME

Although our estimates are imprecise, they do suggest the direction that a truer welfare comparison would take as compared with comparisons of unadjusted measured macroeconomic categories. Our major proposition, which is as yet supported only by logical reflection rather than careful consumer budget analysis, is that the household rather than the individual is the correct basis for welfare-oriented income comparisons. The greatest inter-regional household difference is only 28 percent while per capita differences reach 70 percent. Officially measured income per household in 1966 was \$7945 in Ontario and \$6,100 in the Atlantic region. The national accounts methodology itself does tend to bias comparisons against the Atlantic region, but not by a startling amount. The net dollar adjustments that should be made to the Atlantic average household income for a comparison with Ontario are as follows:

Type of Adjustment	Amount to be Added to Atlantic Regional Average Household Income
Shelter Rental	\$45
Imputed Net Rental of Owner Occupied Dwellings	120
Consumer Credit Interest	30
Intermediate Auto Consumption	56
Intermediate Public Sector Services	-106
Agricultural Income in Kind	20
Total	\$160

The total adjustment of \$160 amounts to 9 percent of the 1966 measured household differential of \$1,745.

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