

WHAT DO WE ALREADY KNOW ABOUT THE APPROPRIATE DESIGN FOR A FISCAL EQUALIZATION PROGRAM IN CANADA AND HOW WELL ARE WE DOING?

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In the Canadian federal system, equalizing transfers have been an important component of intergovernmental fiscal relations during the post-War period. Much is now known about the efficiency-promoting role of equalization in a federal system of government, largely as a result of developments in the area of local public finance during the past decade. There, the emphasis has been on promoting the efficient allocation of mobile factors of production within the federation.

There is also a strong case to be made for equalizing transfers in a federal system of government on grounds of horizontal equity, and this argument has figured significantly in the discussion of equalization in Canada. Horizontal equity dictates that the public sector, both federal and provincial, should not discriminate on the basis of the province of residence in its impact on individuals' well-being. Indeed, the traditional justification for fiscal equalization rests on equity principles.¹

In recent years, both the Equalization program itself and the notion of equalization outside of Equalization have been challenged. The purpose of this paper is to assess these challenges in the context of both the theory and

¹ The theoretical case on grounds of equity and efficiency for equalization payments is well described in the Economic Council of Canada's remarkably comprehensive and thorough study, *Financing Confederation: Today and Tomorrow* (Ottawa: Ministry of Supply and Services, 1982).

practice of equalization as applied to the Canadian federation.

In the next section, the theoretical case for making Equalization payments to the provinces is reviewed. The analysis also suggests the form such payments ought to take. This is followed by a review of the current Equalization program in Canada. With this as background, a short section then assesses proposals for changing the Equalization formula from one based on a representative tax system (RTS) to one based on a "macro" indicator of provincial fiscal capacities. This is followed by an assessment of equalization outcomes in the Canadian federal system. The paper concludes on a note in favour of preserving the RTS as the cornerstone of equalization in Canada.²

THE THEORETICAL CASE FOR EQUALIZATION PAYMENTS

The case for fully equalizing provincial revenues to a national average standard has been made by a variety of authors and on both equity and efficiency grounds. For Canada, the equity case has been made by Graham (1964), while the efficiency case has been made by Boadway and Flatters (1982). Both perspectives are outlined in The Economic Council of Canada (1982) and, more recently, Boadway and Hobson (1993).

It is instructive to develop a simple analytical model that makes the case for equalization payments in a federation such as Canada. Consider a federation that consists of a number of provinces, each with its own government. Provincial governments provide public goods and services to residents, financed through taxes on residents or through resource rents. There are no spillover benefits across provinces. There is also a federal government that provides public

² Many of the arguments made in this paper are complementary to those made in a recent unpublished paper by Robin Boadway, "Revisiting Equalization Again: RTS vs. Macro Approaches."

goods and services at a national level, financed through taxes on the national population. Provinces are assumed to possess fixed endowments of natural resources. These natural resources are owned by the government of the province in which they are situated and associated rents may be used either to finance the delivery of publicly provided goods to residents of the province or to make equal per capita transfers to residents of the province.

Labour and natural resources, the sole factors of production, are combined to produce aggregate output in each province, which is delivered through either the private sector or the public sector. Labour exhibits diminishing marginal productivity in the presence of a fixed quantity of natural resources in each province.

Initially, assume that all individuals are identical other than in province of residence. Individuals are each endowed with one unit of labour and are assumed to be perfectly mobile across provinces. In equilibrium, individuals will be as well off in one province as in the other. That is, if individuals can improve their well-being through migration, they will indeed migrate. One measure of an individual's well-being is comprehensive income (I), since it reflects the individual's command over goods and services. Comprehensive income comprises income from labour (w) net of personal taxes (T) as well as any transfers from government and implicit income associated with the provision of goods and services by government. A so-called "migration equilibrium" can then be expressed in terms of equality of comprehensive incomes (measuring the marginal benefits to the individual associated with migration) across provinces

Let G/N^α denote the individual benefits that arise from public expenditures. This formulation admits two extreme cases of public expenditures. Where $\alpha = 0$, we have the case of pure public goods—that is, publicly provided goods that are non-rival in consumption. In this case, migration into province i will not alter the benefits received

by existing residents associated with a given level of public expenditure. Where $\alpha = 1$, we have the case of publicly provided private goods—that is, goods that are fully rival in consumption. In that case, migration into province i will reduce the benefits received by existing residents associated with a given level of public expenditure.

The net fiscal benefit (NFB) to a resident of a province is defined as the difference between the benefits that accrue to the individual from provincial government expenditures and provincial taxes incurred by the individual. Thus, $NFB^i = G^i/(N^i)^\alpha - T^i$ denotes NFBs accruing to residents of province i . We will proceed by identifying various sources of NFBs, the incentives that they provide for migration between provinces, and the implications for the efficient allocation of labour across provinces. Where the migration equilibrium turns out to involve an inefficient allocation of labour, we identify appropriate policy responses.

For simplicity, we will not explicitly model income transfers from government to individuals. Analytically, these turn out to be equivalent to publicly provided private goods financed through resource rents, a case which is considered below. Comprehensive income in province i is given by the expression

$$I^i = w^i + [(G^i / (N^i)^\alpha) - T^i] = w^i + NFB^i$$

Budget balance requires that

$$G^i = N^i T^i + R^i$$

Substituting for G^i in the expression for comprehensive income and doing some simple algebra, yields the following expression where $\alpha = 0$ (the pure public goods case):

$$I^i = w^i + (N^i - 1)T^i + R^i$$

The sources of NFB differentials across provinces in this case are population and individual tax levels and access to resource

royalties. The fiscal externality associated with migration is the reduction in existing residents' taxes when the migrant assumes his/her share of the tax burden, T^i . Thus, the amount T^i represents the amount by which existing residents benefit from the migration decision of the marginal resident.

For the case where $\alpha = 1$ (the publicly provided private goods case), a similar process yields the following expression:

$$I^i = w^i + R^i / N^i$$

The source of NFB differentials across provinces is access to resource royalties. The fiscal externality associated with migration in this case is the reduction in consumption of publicly provided private goods financed from resource royalties incurred by existing residents. This amounts to the migrant's claim on resource rents, R^i/N^i .

There is however an additional source of NFB differentials across provinces. If provinces differ in average incomes (that is, assume non-identical individuals in terms of labour endowments and different distributions of types across provinces) and levy proportional income taxes at a uniform rate, then per capita personal tax revenues will be lower in those provinces with lower average income and higher in those provinces with higher average income. Other things being equal, this will result in lower NFBs for like individuals living in below average income provinces than for those living in above average income provinces.

FISCAL EFFICIENCY

Fiscal efficiency requires that the social benefits from migration be equalized across provinces. Social benefits include not just benefits to the individual (comprehensive income in different provinces) but also any associated fiscal externalities.

For the case where $\alpha = 0$, this requires that $(I^i + T^i)$ be equal across provinces. Individuals' migration decisions will therefore be consistent with fiscal efficiency only where T^i is equalized across provinces.

For the case where $\alpha = 1$, fiscal efficiency requires that $(I^i - R^i/N^i)$ be equal across provinces. Individuals' migration decisions will therefore be consistent with fiscal efficiency only where R^i/N^i is equalized across provinces.

Fiscal Equity

The principle of horizontal equity requires that equals should be treated equally. The fiscal system is horizontally equitable if it treats individuals in similar economic circumstances in like manner. In a decentralized federal system of government, fiscal inequity is said to exist where, due to differences in fiscal capacities across provinces, identical persons are treated differently. In the presence of differences in fiscal capacities, provinces have different abilities to provide public services for their residents at given tax rates, giving rise to differences in NFBs across provinces.

For the pure public goods case, we have already argued that on the grounds of fiscal efficiency, T^i should be equalized across provinces in view of the fiscal externality associated with migration. However, to the extent that provincial populations differ, this will not imply the equalization of individuals' NFBs that arise from the economies of scale associated with the consumption of pure public goods (the second term on the right in the above expression). NFBs that arise from using resource revenues to finance the provision of pure public goods (the third term on the right in the above expression) should not be equalized on efficiency grounds, however, since there is no fiscal externality associated with migration. On grounds of fiscal equity, however, these differences in NFBs should be fully equalized.

The extent of equalization called for on the grounds of both fiscal efficiency and fiscal equity is identical in the case of publicly provided private goods ($\alpha = 1$). As we have already seen, on the grounds of fiscal efficiency, per capita resource revenues should be fully equalized in this case. Since it is differences in per capita source-based revenues that give rise to differences in NFBs across provinces, the same policy prescription is dictated on the grounds of fiscal equity.

The upshot of this discussion is that, in the presence of differing fiscal capacities, a system of equalization payments will be indicated on efficiency and equity grounds. Moreover, the associated equalization formula will be tied to provincial revenue generating capacity as reflected in the revenue sources available to provinces.

EQUALIZATION IN PRACTICE

Actual equalization flows are determined by formula, based on the Representative Tax System. The current formula, in effect since 1982-83, is constructed to equalize revenues to a five province standard, comprised of Quebec, Ontario, Manitoba, Saskatchewan and British Columbia. Of particular note, for purposes of this paper, 100 per cent of oil and gas royalties are included in the RTS. Also, a growth ceiling on entitlements has been in place since 1982-83, constraining growth in total entitlements to not exceed growth in GDP. This ceiling became effective in 1989 through 1992. In order to satisfy this constraint, entitlements are reduced on an equal per capita basis.

For any province, overall entitlements are calculated according to the following formula:

$$E_i = \sum_j E_{ij} = \sum_j t_j \left[\frac{B_{Rj}}{P_R} - \frac{B_{ij}}{P_i} \right] P_i$$

where

$$t_j = \frac{\sum_i TR_{ij}}{\sum_i B_{ij}}$$

denotes the national average tax rate, TR_{ij} denotes total revenues from source j in province i , B_{Rj} denotes the aggregate base for revenue source j in the five representative provinces, P_R denotes the population of the five representative provinces, B_{ij} denotes the base for revenue source j in province i , and P_i denotes the population of province i . Note that t_j , the national average tax rate, is simply the tax rate applied to a particular (standardized) base that will yield actual provincial revenues from that base (using actual rates and the actual base).

In principle, then, the formula equalizes per capita revenues to a notional standard based on the application of the national average tax rate to the per capita base in the five representative provinces summed across all revenue sources. A province's overall per capita entitlement is the difference between this notional standard and aggregate notional per capita revenues at national average tax rates. Total entitlements are simply per capita entitlements multiplied by provincial population.

Equalization operates as a "gross" scheme—that is, positive total entitlements are paid to so-designated "have-not" provinces—hereinafter referred to as recipient provinces—out of consolidated federal revenues, negative total entitlements involve no direct revenue transfer from so-designated "have" provinces—hereinafter referred to as non-recipient provinces. A "net" scheme, on the other hand, would involve direct transfers from "have" provinces to "have-not" provinces.

Prior to 1982, the equalization standard was a national average standard. Oil and gas revenues were, however, only partially equalized. In addition, property taxes for municipal services were not included in the RTS. Only in 1973-74

were property taxes for education purposes included in the RTS.

THE "IDEAL" FORMULA

Based on the theoretical analysis of the type outlined above, the "ideal" formula would be based on a national average standard and would operate as a net program, transferring revenues from those provinces with negative overall entitlement (the "have" provinces) to those with positive overall entitlement (the "have-not" provinces). The term "ideal" is used here to define a benchmark case against which the adequacy of existing equalization flows may be assessed. Specifically, the formula would be of the form:

$$E_i = \sum_j E_{ij} = \sum_j t_j \left[\frac{B_{Cj}}{P_C} - \frac{B_{ij}}{P_i} \right] P_i$$

where all variable are as defined previously, other than B_{Cj} which denotes the national base for revenue source j ($B_{Cj} = \sum_i B_{ij}$) and P_C denotes national population.

Recall that, for any base, the national average tax rate, t_j , is calculated as national revenues divided by the national base. Thus, the above equation may be rewritten as:

$$E_i = \sum_j E_{ij} = \sum_j \frac{\sum_i TR_{ij}}{\sum_i B_{ij}} \left[\frac{B_{Cj}}{P_C} - \frac{B_{ij}}{P_i} \right] P_i$$

or

$$E_i = \sum_j E_{ij} = \sum_j TR_j \left[\frac{P_i}{P_C} - \frac{B_{ij}}{B_{Cj}} \right]$$

In this "shares" version of the formula, a province is defined as being a have-not province under any revenue source if its share of national

population is less than its share of the national base for that revenue source.

Summed over all revenue sources, each province's aggregate equalization entitlement is given by:

$$E_i = \left(\frac{P_i}{P_C} \right) \sum_j TR_j - \sum_j t_j B_{ij}$$

In other words, province i 's equalization entitlement under a national average standard may be calculated as the difference between the population share-weighted entitlement to national revenues and its potential total revenue yield assessed using national average tax rates.

PROPOSALS FOR A "MACRO" FORMULA

There are, in fact, two sorts of "macro" formulas that can be identified among Canadian proposals. Courchene (1984) outlines a proposal that would use a "macro" indicator to allocate a pool of revenues to be equalized. Actual provincial revenues, however, determine the magnitude of the pool. This is very different from the sort of "macro" formula proposed by Usher (1996) and by Boothe (1999) and Boothe and Hermanutz (1999). For these authors it is deviations in "macro" indicators which ultimately determine the magnitude of the equalization pool.

The "macro" formula discussed by Courchene (1984) is of the following form:

$$E_i = \sum_j TR_j \left(\frac{P_i}{P_C} - \frac{MB_i}{MB_C} \right)$$

where MB_i/MB_C denotes province i 's share in the macro base (MB). Other than that the last term on the right-hand-side is collapsed into a single "aggregate" or "macro" [measure] of the tax base, this is very close to the shares version of the Equalization formula discussed above. Since each province's share of the macro tax base, like its population share, is a constant, the

formula is extremely simple to implement, given agreement on an appropriate measure for a macro tax base.

Courchene considers two potential macro bases. The first is adjusted personal income. Personal income excludes business income and royalties, which would clearly reduce the perceived degree of fiscal disparity across provinces. Personal income is adjusted to exclude (i) value changes in farm inventory, (ii) provincial-local transfers to persons (if included, provinces could alter its share of the base by modifying transfers to persons), and (iii) federal income tax on persons as well as employment taxes (CPP, EI) since these are not available for provinces to tax.

The second macro base considered is provincial gross domestic product (PGDP) at factor cost. PGDP at factor cost is PGDP at market value less indirect taxes and subsidies. Since PGDP at factor cost includes business income and royalties, this base will yield greater fiscal disparity across provinces than adjusted personal income. It is recognized that other macro bases could be employed.

Courchene then proceeds by redefining total revenues to be equalized. He adjusts total revenues to be equalized by adding on the 50 per cent of resource royalties excluded from the base under the formula in place prior to 1982. The term ΣTR_j above, however, refers to actual provincial revenues collected from all bases included in the RTS, so this adjustment would appear to double-count the excluded portion of royalties.

Referring to Table 7.1 in Courchene (1984), we restrict the commentary to the distribution of unadjusted total revenues to be equalized under each of the proposed macro bases. The results are straightforward. Equalization flows using adjusted personal income as the macro base are substantially less than under the RTS (\$2,249M as compared with \$4,160M). Moreover, the formula produces perverse impacts on the distribution of entitlements across provinces.

Quebec's entitlement, for example, is halved while Manitoba's is cut by a factor of five. Saskatchewan, by way of further example, goes from non-recipient status to that of a recipient.

Equalization flows using PGDP are closer to actual levels (\$3,560M as compared with \$4,160M). For the Atlantic provinces as a whole, equalization flows are higher than under the RTS (for all other than PEI). Quebec and Manitoba, however, suffer substantial reductions.

In any event, the "macro" formula under consideration has its roots in the formal equalization literature. To repeat, the "shares" version of the RNAS formula may be viewed simply as a disaggregation of Courchene's "macro" formula. To put it another way, the RTS is one way of measuring provincial fiscal capacities, albeit an imperfect measure. A "macro" indicator such as PGDP provides a proxy measure for overall provincial fiscal capacities, but neither is this a perfect measure.

What is crucial is the understanding that Courchene's "macro" indicator is used to distribute entitlements relative to the amount "total revenues to be equalized"—an amount based on actual provincial collections. That is, the role of the macro tax base is in allocation, it is not the basis for Equalization, *per se*.

Nonetheless, it must be emphasized that the formula, by construction, equalizes for disparities in GDP relative to population, not for disparities in bases relative to population. Equalization is about disparities in revenue generating capacities—the difference between any province's population share of total revenues to be equalized and its capacity to generate revenues. The macro formula looks at the difference between any province's population share of total revenues to be equalized and its "notional" capacity to generate revenues—computed as a "macro" version of a national average tax rate multiplied by "macro" measure of the tax base. Thus if a province's share in the base (GDP) is equal to its population share its entitlement is zero; yet a province's capacity to

generate revenue from GDP can be very different, depending on the composition of GDP. And it is this latter point that is fundamental to the design of an appropriate Equalization formula.

Boothe (1999) and Boothe and Hermanutz (1999) examine three alternative macro bases—provincial gross domestic product, personal income by province, and adjusted personal income by province. They propose a net scheme in which a province with a macro base above the national average will contribute a fixed percentage of each dollar by which it exceeds the national average. A recipient province (one that has a macro base below the national average) will receive a fixed percentage (same rate as above) of each dollar for which it is below the national average.

Based on simple regression analysis, Boothe and Hermanutz choose adjusted personal income as the macro base which best “explains” current net transfers to provinces. That is, an equation based on deviations from average adjusted personal income explains most (96 per cent) of the variation in net transfers among provinces. Based on their regression analysis, recipient provinces would receive \$0.32 for each dollar by which their adjusted personal income deviates from the national average. By the same token, donor provinces would pay \$0.32 on each dollar into the equalization pool. This results in significant reductions in entitlements for Nova Scotia, New Brunswick and Manitoba. Saskatchewan would show a significant increase in entitlements.

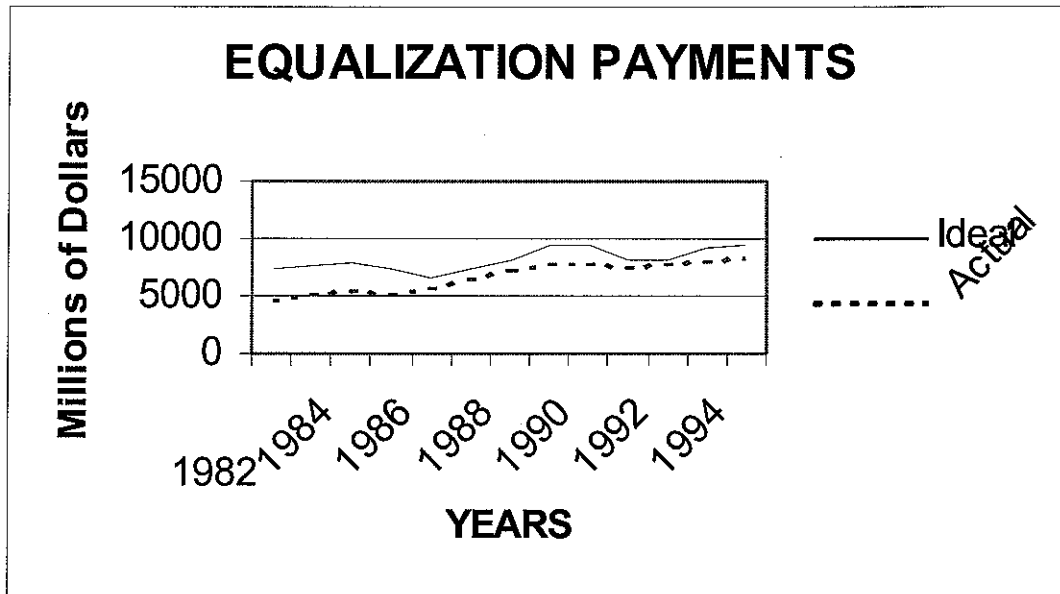
It is important to note that this formula equalizes provinces to a fixed percentage of the difference between the national average for the macro indicator and the macro indicator for each province. For Boothe and Hermanutz (1999), the macro indicator is adjusted personal income. For Usher (1995), a similar proposal is made: Provinces should be equalized to 70 per cent of the difference from national average GDP. Thus it is the absolute value of the deviations between the national average for the relevant macro

indicator and each province’s level that determines total revenues to be equalized. This, in general, will bear no relation to provincial revenue generating capacities as reflected in the RTS. In both cases, the macro base determines total revenues to be equalized, whereas in Courchene (1984), to repeat, the role of the macro base is simply in allocating a given pot. The point is that these are very different views of a macro formula for equalization.

HOW ARE WE DOING?

Chart 1, extracted from Hobson (1997), compares aggregate actual equalization payments and those that would exist under an ideal scheme. It is evident from Chart 1 that, historically, aggregate actual entitlements have been below those that would have existed under an ideal scheme. Several factors account for this discrepancy: The standard for equalization; the treatment of resource revenues; the growth ceiling on entitlements. It is of particular significance that, under an ideal scheme, Ontario would have been a recipient province throughout the decade from 1975-76 to 1984-85. Since 1982, the change in the Equalization standard would largely explain the discrepancy between actual and ideal entitlements. Floor provisions appear to have stabilized actual Equalization flows during the 1990 recession. Aggregate actual entitlements have ranged from 51% of ideal levels in 1980-81 to 95% in 1992-93.

Chart 1: Actual versus Ideal Equalization Flows



In practice, equalization occurs not just through the Equalization program. Cash transfers under the Canada Health and Social Transfer (CHST) are computed as a residual by subtracting the (Equalized) value of the old EPF tax points from provincial per capita total entitlements. Since Ontario's own-source fiscal capacity exceeds the fiscal capacities of all other provinces (inclusive of Equalization in the case of the recipient provinces), this means that Ontario receives the smallest cash transfer on a per capita basis. It is useful to think of the portion of other provinces' cash transfers which raises them to the "Ontario standard" as a sort of super-equalization. This process is illustrated in Chart 2. Note that super-equalization is paid to both Alberta and British Columbia, not just to provinces that are recipients under Equalization. Cash transfers to provinces under the CHST, inclusive of super-equalization, clearly impact on provincial fiscal capacities.

For the Atlantic provinces, Table 1 illustrates both the effect of Equalization on relative provincial fiscal capacities and the effect of Equalization plus CHST cash transfers. The table shows that in the absence of Equalization there is wide disparity in relative provincial fiscal capacities, ranging from 66 per cent of the national average in Newfoundland to 110 per cent of the national average among the non-recipient provinces. Alternatively, relative to an Ontario standard, Newfoundland's fiscal capacity is .64. Equalization raises the Atlantic provinces to 94 percent of the national average fiscal capacity, and 96 per cent of the Ontario level. Including CHST cash in the calculations, raises the Atlantic provinces to 96 per cent of the national average, 98 per cent of the Ontario standard. Clearly, CHST cash contributes to the attainment of the goal of fully equalized fiscal capacities across provinces.

Table 1: Indices of Fiscal Capacity, 1996-97

	Own Source Revenues (Standardized)		Own Source Revenues plus Equalization		Own Source Revenues plus Equalization and CHST	
	(\$ per capita)	(% of national average)	(\$ per capita)	(% of national average)	(\$ per capita)	(% of National Average)
Newfoundland	3 480	66	5 278	94	5,895	97
Prince Edward Island	3 751	71	5 258	94	5,785	96
Nova Scotia	3 942	75	5 199	94	5,748	95
New Brunswick	3 956	75	5 269	94	5,804	96
Atlantic Average	3 827	73	5 243	94	5,802	96
Recipient Average	4 461	85	5 206	94	5,796	96
Non-recipient Average	5 781	110	5 781	104	6,222	103
RFPS	5 148	98	5 370	97	5,875	97
National Average	5 254	100	5 551	100	6,052	100
Low/Ontario		0.64		0.96		0.98

CONCLUSION

The economic theory of equalization payments in a federal system of government prescribes not just that equalization payments can potentially enhance the attainment of both fiscal efficiency and fiscal equity goals in a federation, but also the form that such payments should take. In particular, the theory indicates an equalization formula that is similar in many respects to that of the RTS employed in Canada. In contrast to the actual formula for Equalization currently in use, economic theory would indicate a national average standard and full equalization of all bases. As well, such modifiers as the growth ceiling on entitlements would be eliminated.

There is no case on theoretical grounds for moving to a "macro" formula. Nor is there a case on grounds of simplicity. Indeed, the sort of macro formula advocated by Boothe (1999) and Usher (1995) would seem to miss the point of Equalization. Equalization payments are

designed to ensure that all provincial governments have the capacity to provide reasonably comparable public services at reasonably comparable levels of taxation. Neither personal income nor provincial gross domestic product provide good proxies for measuring a province's revenue generating capacity. And certainly, the objective of Equalization is *not* the equalization of personal incomes or PGDP, so centering the program around these measures misses the point.

Thus, what makes the calculation of equalization "complicated" is the measurement of 'base' by revenue source. While this has indeed been difficult and contentious, it is surely no more difficult than generating an aggregate measure such as personal income (adjusted in whatever way) or gross provincial product (measured in whatever way).

Hence, the issue must be more than this. Does potential revenue generating capacity represent the "right" aggregate measure? Is this superior to provincial personal income or provincial gross domestic product? Probably not on grounds of simplicity of measurement. Rather, it is an issue of content. Changes in bases such as resource revenues can create major changes in entitlements due to significant disparities in resource endowments. Using GDP as the macro tax base applies the same measure of revenue generating capacity to all revenue sources contained in revenues to be equalized, whether sales or income tax revenues, lottery revenues, or resource revenues. Hence, inclusion of resource revenues no longer creates the problems for Equalization associated with the RNAS.

The case for equalization only through Equalization (and hence, for example, equal per capita distribution of CHST cash across provinces) hinges on getting the Equalization formula "right." The present system of allocating CHST cash, which includes an element of super-equalization, enhances the ability of the transfer system to attain the goals of equity and efficiency upon which the theory of equalization is based.

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