

Canadian Equalization Grants in Theory and Practice

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Introduction

Grants or subsidies from the federal government to the provinces have been an important part of the Canadian fiscal system since 1967. The initial statutory subsidies at Confederation designed to balance per capita provincial budgets, were altered and added to on an ad hoc basis until the 1940's when the Rowell-Sirois Commission recommended the substitution of unconditional grants. These proposed fiscal need transfers were not implemented but the Commission's determination to lessen differences in revenue-raising capacities and expenditure responsibilities among provinces did influence subsequent Canadian federal-provincial fiscal agreements. From 1947 until 1967, the agreements contained an element of implicit equalization but in 1957, equalization payments were made explicit: grants were to bring the per capita yield from the three standard income taxes in each province up to the yield of the two richest provinces. This "income approach" to equalization was later replaced by a "tax indicator" or "representative tax" approach in 1967 when all major revenue sources were used to assess provincial tax capacities. With several modifications (most noteworthy being those to accommodate energy price increases), this is the equalization grant system in Canada today.

The economic philosophy underpinning the Canadian grant system is at best unclear. Some authors claim that although the formula ignores provincial differences in expenditure needs it can be construed as a fiscal need system if one assumes that per capita needs are implicitly the same in all provinces. Other authors claim that the philosophy underlying the Canadian grant system is derived from Buchanan's principle of fiscal equity, that similarly situated citizens should receive equal fiscal treatment regardless of where they live. The well-quoted statement by Finance Minister Mitchell Sharp before the Tax Structure Committee in 1966 that: "there should be a redistribution of that wealth so that all provinces are able to provide to their citizens a reasonably comparable level of basic services, without resorting to unduly burdensome levels of taxation", has been interpreted as supporting either the philosophy of fiscal need or of fiscal equity, depending upon the author.

The aim of this paper is to review two philosophies of fiscal federalism, that of fiscal equity and of fiscal need; and to determine which (if either) offers a rational and useful basis on which to build a system of equalization grants in Canada. Sections II and III review the economic literature; section IV builds two theoretical models of optimal equalization grants; section V contains some statistics measuring the importance of grants in Canada; and section VI attempts to reconcile the philosophies behind equalization grants with the current programme.

II. A Philosophy of Fiscal Federalism: Fiscal Equity

The theory of public goods traditionally studies two problems: how much of the public good to efficiently supply; and how to equitably distribute the cost among citizens. Efficient supply can be achieved when $\Sigma MRS = MRT$ while the allocating of costs depends upon whether the benefit, or ability to pay approach is taken. The benefit approach has the advantage than when each individual pays a tax price equal to his/her marginal benefit from the public good, the efficiency criterion is also satisfied since $\Sigma MB = \text{tax prices} = MC$ so $\Sigma MRS = MRT$.

Once the output of public goods and the distribution of costs have been decided, an individual faces the same level of services and taxes regardless of where he/she lives in a unitary state (assuming all public goods are pure). The fiscal system is neutral geographically for each citizen. As a result, population migration within a country is affected in theory only by private sector decisions, not by the public sector.(1) However, government provision of public goods is not (except by chance) geographically neutral in a federal system. Some provinces with larger tax bases will be able to provide better levels of services and/or lower levels of taxation than their poorer neighbours. As a result, incentives to migrate from the low public goods/high tax provinces to the high public goods/low tax provinces do exist. Individuals are not treated neutrally by the fiscal system in a federal country.

This unequal treatment of equals prompted J.M. Buchanan to propose that the federal government should ensure that equals are treated equally either through provincially differentiated federal tax rates or unconditional equalization grants to the provinces. He proposed fiscal equity as the criterion: that the individual should receive the same fiscal pressure or residuum (defined as total benefits minus total taxes) regardless of residence.

Later R.A. Musgrave pointed out that the fiscal equity criterion is automatically satisfied by benefit taxation. Buchanan replied that although benefit taxation ensures $MB = \text{tax price}$, the individual taxpayer's surplus (total benefits minus total taxes) varies between provinces as long as service levels vary. Buchanan concluded that $MB = \text{tax price}$ is a necessary but not sufficient condition for fiscal equity. For true neutrality the individual must be able to purchase the same quantity of the public good for the same tax price (implying a constant

taxpayer's surplus) regardless of residence. Musgrave disagreed, arguing that differences in taxpayer's surplus under benefit taxation are a given datum for location and do not distort regional allocation of resources. He also argued that Buchanan's theory was too simple since it ignored real world problems such as tax shifting, business taxation and differences in cost functions for public services. Such fiscal inequities should therefore be treated as the price of federalism and ignored according to Musgrave. J.F. Graham supported Buchanan's view that being able to receive the same level of services and tax burden regardless of residence is as important as simply equalizing fiscal residua. Since Graham did not see benefit taxation as necessary for the achievement of fiscal equity, his definition is somewhat less restrictive than Buchanan's in terms of the distribution of taxes.

Most of the work on equalization grants since the mid-1960's has focused not on fiscal equity but on fiscal need or horizontal fiscal imbalance (HFI). The difficulty of applying the fiscal equity concept in practice coupled with the distortionary effects on migration and resource allocation assumed to accompany fiscal equity transfers have resulted in a de-emphasis on fiscal equity as a justification for grants. As R. W. Boadway recently concluded: "the notion of fiscal equity as a rationale for unconditional grants has fallen out of favour in the economics literature."

III. A Philosophy of Fiscal Federalism: Fiscal Need

Unlike the fiscal equity criterion which relates the federal government to individuals within the provinces, the fiscal need criterion relates the federal government to the provincial governments. Equalization grants here are necessary to correct horizontal fiscal imbalance: the imbalance between expenditure needs and revenue means among provincial governments. Due to differences in costs of providing public services, in tax capacities and in exceptional needs, expenditure requirements and potential revenues will vary from province to province. The Australian Grants Commission and later the Rowell-Sirois Commission in Canada proposed that equalization grants be based on fiscal need to enable each province to provide adequate (nationally acceptable) levels of services without resorting to unduly high (higher than average) taxation rates.

The principle of fiscal need has been criticized by J. F. Graham (1964) as being a vague concept that does not provide a clear rationale for fiscal adjustments and implies an organic theory of the state. Certainly much of the literature on fiscal need does not make any clear theoretical justification for fiscal need. Most of the justifications are normative, either political or ethical, such as the following:

1. Provincial governments should be able to provide at least minimum uniform standards of public services across the country (reasons: spillovers, option values, inequity to individual).

2. Strong regional governments are necessary to preserve the federal character of the country: if grants are withheld differences in service levels can become intolerable and the federation dissolve.
3. Some national policies benefit certain regions and not others and the latter should not be penalized.
4. The region where income is received is not necessarily the region where the income was earned so grants are necessary to redistribute tax revenues.
5. Disparities in service levels are inconsistent with the concept of nationhood - all Canadians regardless of where they live should be able to enjoy the same level of public services simply because they are Canadians.
6. If grants are withheld the relative position of the poor provinces will deteriorate even further as labour and capital move out.
7. The exercise of self-government by the regions is valuable and justifies giving these governments sufficient resources to perform their functions.

Two authors, Bargava (1963) and Hunter (1977), have developed a positive theory of horizontal fiscal imbalance that justifies the use of equalization grants. Bargava (1963) treats the federal system as an association of provinces cooperating like a family to maximize national welfare. He notes that each province on its own efficiently allocates resources where MSB equals MSC of the last unit of public expenditure. In the rich regions MSB of the last unit (and the associated MSC) will be smaller than in the poorer region. The federal government should therefore provide federal grants in aid to the poorer ones so that province i 's $MSB = \text{province } i\text{'s } MSC = \text{federal } MSB = \text{federal } MSC$ for all provinces $i = 1, 2, \dots, n$. A.D. Scott (1964) strongly criticized Bargava's paper on the grounds that if tastes differed between regions the federal government would have to develop a social welfare function to weigh the net fiscal advantages from public goods in each region. Provincial autonomy would be lost with the federal government emerging as the paternalistic and superior political entity.

Hunter later refined Bargava's analysis; pointing out the crucial assumptions of diminishing marginal utility, tax costs treated as real costs, and the static nature of the analysis. In Hunter's model, national welfare is maximized where $MSB_i = MSC_i = MSB_j = MSC_j$ for provinces i and j . The federal government intervenes to redistribute tax revenues among provinces via grants so this can be achieved. Scott's criticisms of Bargava can, however, still be levelled at the Hunter analysis since it also requires interprovincial comparisons of MSB and MSC . If we ignore this criticism then Bargava-Hunter do provide us with a definition of horizontal fiscal balance; HFB is achieved when $MSB_i = MSC_i = MSB_j = MSC_j$ for all provinces i and j . Equalization

grants can be justified on this basis whenever fiscal need or HFB exists such that $MSR_i \neq MSR_j$ or $MC_i \neq MC_j$.

IV. Models of Optimal Equalization Grants

Two basic theoretical justifications are made for equalization grants. The fiscal equity approach says that grants are necessary to preserve horizontal equity under a federal fiscal structure so that equal individuals are treated equally. How fiscal equity is to be achieved in theory is unclear. It could require some combination of the following elements: (a) equalized fiscal residua or taxpayer's surplus (b) benefit taxation; and (c) similar levels of government services and tax burdens. Buchanan's initial definition of fiscal equity was simply (a) - total benefits minus total taxes should be the same regardless of residence - for any individual. Later Musgrave concluded that benefit taxes (b) were sufficient for horizontal equity. Buchanan disagreed with him and redefined the criteria as benefit taxation (b) plus identical service levels and tax burdens regardless of residence (c). If we assume individual demand for public goods do not shift as people move from one province to another (2) then Buchanan's revised definition is equivalent to requiring (a) plus (b) hold; that is, benefit taxes apply and taxpayer's surplus is constant regardless of residence. And lastly, Graham's definition requires that (a) and (c) hold simultaneously.

The second justification for equalization grants is fiscal need or horizontal fiscal imbalance between subordinate levels of government. Many of the reasons for fiscal need transfers are normative and therefore non-testable, however, Bargava-Hunter have developed a theory that justifies the grants as necessary for the maximization of national economic welfare. HFB occurs whenever $MSR_i \neq MSR_j$ and/or $MSC_i \neq MSC_j$. Equalization grants are therefore necessary to reach horizontal fiscal balance between provinces.

The purpose of this section is to build two simple models illustrating the types of equalization grants that would be required to achieve fiscal equity and/or fiscal need. I want to determine whether any of the above definitions provide a sound and practical rationale for unconditional grants and whether or not the two goals of fiscal equity and HFB can be jointly achieved. Must grants designed to achieve fiscal equity necessarily create HFB or vice versa?

Let us outline a simple model similar to Hunter (1977) where there exist two provinces, L, the low fiscal need and H, the high fiscal need province. L has lower fiscal need either due to its greater fiscal capacity, lower production costs for public services, and/or fewer special needs compared to province H. Assume each province provides its citizens with the same pure public good, g , produced under increasing cost conditions.(3) Benefit taxes are used so that $EMB = \Sigma_n - MC$ where n represents each province's residents. Taste differences and benefit

spillovers between the provinces are ruled out. Province L can have a larger or smaller population than H (e.g. compare Ontario and Alberta to Quebec) but we assume the population is greater in L since this is the usual case in practice. Horizontal fiscal balance (HFB) between the two provinces according to the fiscal need criterion will be achieved when $\Sigma MB^H = MC^H = \Sigma MB^L = MC^L$.

Let us assume one representative individual A whose marginal benefit curve from public goods is unaffected by place of residence. Fiscal equity for individual A is here easily defined due to our assumption of benefit taxation. Since Musgrave holds that benefit taxation alone is sufficient for fiscal equity we can ignore his definition as uninteresting. All the other definitions are now the same: fiscal equity is achieved under benefit taxation when A receives similar levels of services and taxes regardless of residence, or, alternatively, when A receives the same taxpayer's surplus in each province.

Figure 1 illustrates the initial situation A faces in province L or province H. H's MC and EMB curves for the public good g^H , are shown. Efficient provincial resource allocation implies $\Sigma MB^H = MC^H$ at point b so that g^H is initially provided. Given A's marginal benefit curve, A consumes g^H and pays $t_{A,PO}^H$ in taxes for a net taxpayer's surplus equal to the shaded area. If A were to reside in the low fiscal need province his/her consumption of g would be larger (g^L); the per unit tax price lower and the taxpayer's surplus larger. Fiscal inequity clearly exists giving A an incentive to live in province L in order to enjoy the greater public services at lower per unit cost.

The fiscal need criterion is not satisfied either in Figure 1. Both provinces are efficiently providing public goods to their citizens but province H (the lower fiscal capacity; higher cost, higher need province) supplies a smaller quantity at higher per capita cost per unit of g . Since $\Sigma MB^H > \Sigma MB^L$ and $MC^H > MC^L$ (compare points b and e) horizontal fiscal imbalance exists.

If these two criteria are to be achieved, the provinces must reorganize the supply of the public good and the distribution of the tax costs. They must first decide whether to form a unitary or federal system, and second, what are to be the economic goal(s) of this system. Let us examine some possibilities.

Model 1: form a unitary system

If the two provinces agree to merge into one system, then the regional governments and boundaries are dissolved and a uniform level of public goods and uniform tax structure apply throughout the system. If the goal of the unitary government is to provide an efficient supply of public goods, it will do so by vertically summing ΣMB^H and ΣMB^L to get the total national demand for g (now assumed to be a pure national

good). In the simplest case, the marginal production costs of g would be the vertical sum of MC^H and MC^L . (4) Efficient production is reached at g in Figure 1, where from Appendix 1:

$$EMRS = MRT \quad \text{or}$$

$$\frac{\Sigma(\Sigma MB^H + \Sigma MB^L)}{g} = \frac{\Sigma(MC^H + MC^L)}{g}$$

Production of the public good expands in the higher need area (states no longer exist) and contracts in the low need area. Since individuals pay according to their marginal benefits, the low need area contributes $orig^U$ while the high need area contributes $oqdg^U$ in tax revenues. As it would have cost the low need area $oskg^U$ (and the high need area $opcg^U$) to produce g^U , it is clear that unification means an implicit subsidization of area H by area L equal to $pcdg$ or $rfks$. This is the implicit equalization grant necessary to provide a uniform standard of public goods across the country paid for by benefit taxation. The goal of fiscal equity is clearly satisfied in a unitary state since A's consumption of g , total tax payments and A's taxpayer's surplus are unaffected by choice of residence. (See Figure 1.) The goal of HFB no longer matters since only a unitary government exists.

Is economic welfare maximized in this unitary system? As most public finance theorists would expect, the answer is no. Uniformity of consumption imposes welfare losses on citizens which can be called the "costs of centralization". These are easily measured using Figure 1. The gain in taxpayers' surplus from the unitary system is $mbdq$ in state H; the loss in state L is $rfen$. The gain in producers' or government surplus in state H is $mpeb$; the loss in state L is $snek$. The total gains are therefore $qpebd$; total losses are $srfek$. Since $rfks = pcdq$ that means net welfare losses equal to triangles bed plus fek arise from unification. (6) As a result, fiscal equity can be achieved for any one individual in a unitary system but at the expense of losses in total economic welfare.

Model 2: form a federal system

Suppose instead the two provinces retain their federal structure but decide to cooperate and maximize national rather than provincial economic welfare. Since H and L now retain their separate status no spillovers of benefits from public services occur between provinces. The total amount nationally supplied is therefore the sum of the quantities supplied by each province. The total amount nationally demanded is similarly equal to the sum of the two provincial quantities demanded. The economic goal of the federal system is thus maximization of national economic welfare subject to the constraint that the national quantity of g supplied must equal the national quantity demanded ($g_S^H + g_S^L = g_d^H + g_d^L$). Appendix 2 demonstrates that the Bergava-Hunter criterion is indeed the correct one:

$$\Sigma MB^H(\kappa_d^H) = MC^H(\kappa_S^H) = \Sigma MB^L(\kappa_d^L) = MC^L(\kappa_S^L)$$

where the d, s subscripts represent quantities demanded and supplied respectively.

This procedure is illustrated in Figure 11. In the absence of cooperation between H and L, L provides a larger quantity of g at a lower per unit price to each resident. Since $\Sigma MB^L < \Sigma MB^H$ and $\Sigma MC^L < \Sigma MC^H$ horizontal fiscal imbalance exists. Individual A would prefer to live in province L since $g_O^L > g_O^H$, his/her per unit tax is lower, and taxpayer's surplus higher. Neither fiscal equity nor HFB therefore occur initially.

Efficient allocation of the public good depends significantly on the distinction between production and provision of g. Province L can produce g at lower marginal cost than H due to its greater fiscal capacity and/or lower production costs. Clearly, given the choice, production should be shifted from H to L until $MC^H = MC^L$. However, since the summed marginal benefits from the public good are higher in H than L due to H's greater needs and/or smaller population, provision of g should be shifted from L to H until $\Sigma MB^H = \Sigma MB^L$. In effect, H is a high need - high cost province compared to L and national welfare can be increased by shifting production to L, the low cost province and provision to H, the high need one. This is illustrated in Figure 11 where national welfare is maximized when $\Sigma MB^H = MC^H$ (points d and c) = $\Sigma MB^L = MC^L$ (points f and k). In province H, g_O^L is produced and only g_d^L provided; the difference is transferred to province L to fill the excess demand = $g_d^H - g_s^H$. In H initially total taxes of opg_O^H are paid while in L total taxes are opk_O^L . Now in H, total taxes fall to $oncg_O^H$ with the excess demand being filled with public goods from L equal to $g_s^H - c d g_d^H$. In province L the tax bill has risen to $opkg_O^L$ with $g_d^L - f k g_s^L$ being used to finance public goods for province H. Here the equalization grant occurs in kind, actual physical transfers of g between L and H with one province's payment equalling the other's receipt. In practice, such fiscal need transfers could be monetary - the excess of revenues over expenditures in L paying for budget deficits in L. The point is that horizontal fiscal balance clearly requires the transfer of resources from the low fiscal need province to the high fiscal need in order to maximize economic welfare.

The gains in welfare from this reallocation of production and provision are easily seen in Figure 11. The gain in consumers' surplus in H is nmdb; the loss in L is qpfe. The loss in producers' surplus in H is nmcb; the gain is qpke. The consumers' gain outweighs the producers' loss in H by triangle cbd while the producers' gain outweighs the consumers' loss in L by triangle fke. The net national gains are thus triangles cbd + fke.(7)

Fiscal equity for individual A, however, is not achieved in this system. Although g_d^L and g_s^H are now more similar, it is highly unlikely that they are equal except by chance. If A lives initially in province L, he/she consumes g_O^L at price t_A^L ; if A lives initially in H, consumption is g_O^H at price t_A^H . If A lives in province L, now the level

of services is lower and the tax payment higher in order to finance the fiscal need transfer to province H. A receives g_d^L but must pay to produce g_s^L . Since benefit taxation is used, A pays a unit tax price equal to MB_A from g_d^L , but pays this price for all units produced for a total tax payment of t_{AS}^L . When all residents in L do this, total tax revenues of opk_s^L are raised to finance consumption of g_d^L at home and the equalization grant for province H. If now A lives in province H, his/her consumption rises to g_d^H but taxes now need only be raised to finance g_s^H . Under benefit taxation, A pays t_A^H per unit for a total tax bill of t_{AS}^H . A's personal taxes are therefore considerably increased in province L and reduced in H (note the shaded areas in Figure 11) while the differences in service levels are smaller. (8)

Fiscal need transfers therefore cause the grant-receiving province to 1) cut back its production of the public good; 2) increase its consumption via equalization grants; 3) reduce its per unit tax price for each resident and 4) reduce each taxpayer's tax bill under benefit taxation. In the low fiscal need province, the effects are reversed: 1) production increases while 2) consumption declines; 3) each taxpayer faces a higher tax price and 4) a greater total tax bill. Clearly taxpayers in the high fiscal need province gain while taxpayers in the low fiscal need province lose. If production of g is carried out under constant cost conditions, these are the only gains and losses, so obviously residents of L lose substantially under a system of fiscal need transfers. However, assuming increasing costs, there are producers' gains in L from reallocating production of g to L and these gains offset any taxpayer losses. Similarly in H, the producer losses due to production shifts are outweighed by the taxpayer gains.

In summary, HFB can be achieved in a federal system but at the expense of fiscal equity. Consumption levels of g are now closer and taxpayers' surpluses more similar but only by chance would true fiscal equity be achieved.

V. Equalization Grants in Canada in Practice

It is clear from these two models that the goals of fiscal equity and horizontal fiscal balance are to some extent in conflict. In order to achieve fiscal equity, an individual must be able to receive the same level of services and pay the same taxes in each province. This constraint forces all provinces to offer the same bundle of pure public goods at substantial loss in producer and taxpayer surpluses. In order to achieve HFB, production must be reallocated to the low cost province and consumption to the high demand province. This results in more similar service levels and per unit tax costs, but fiscal equity is unlikely to be achieved. Maximization of economic welfare is thus in conflict with equal treatment of equals in a federal system.

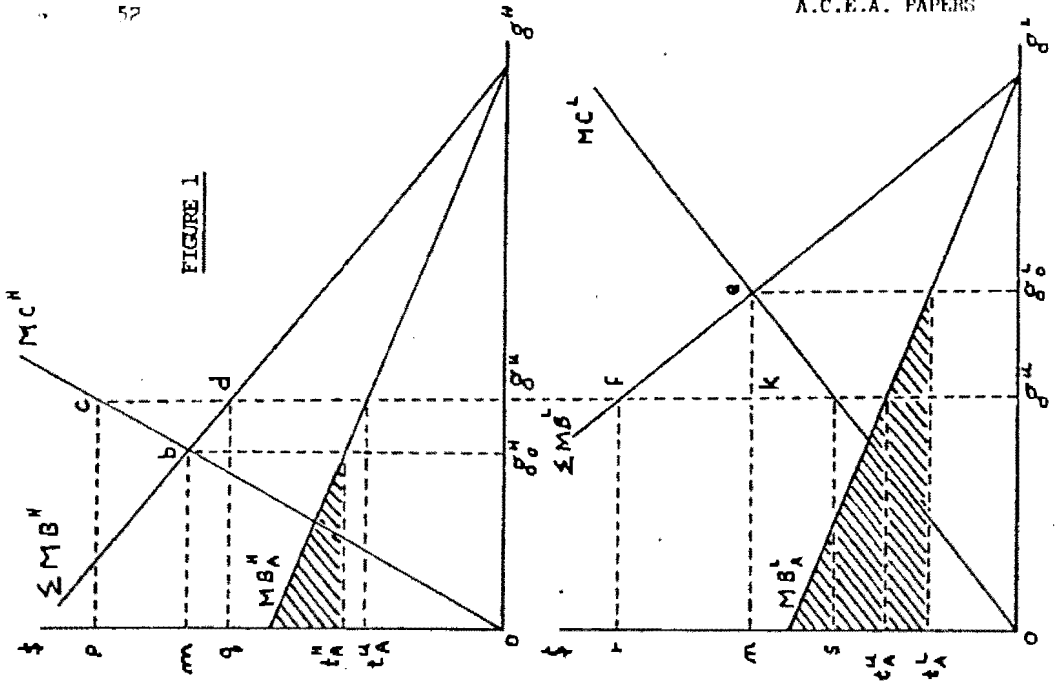
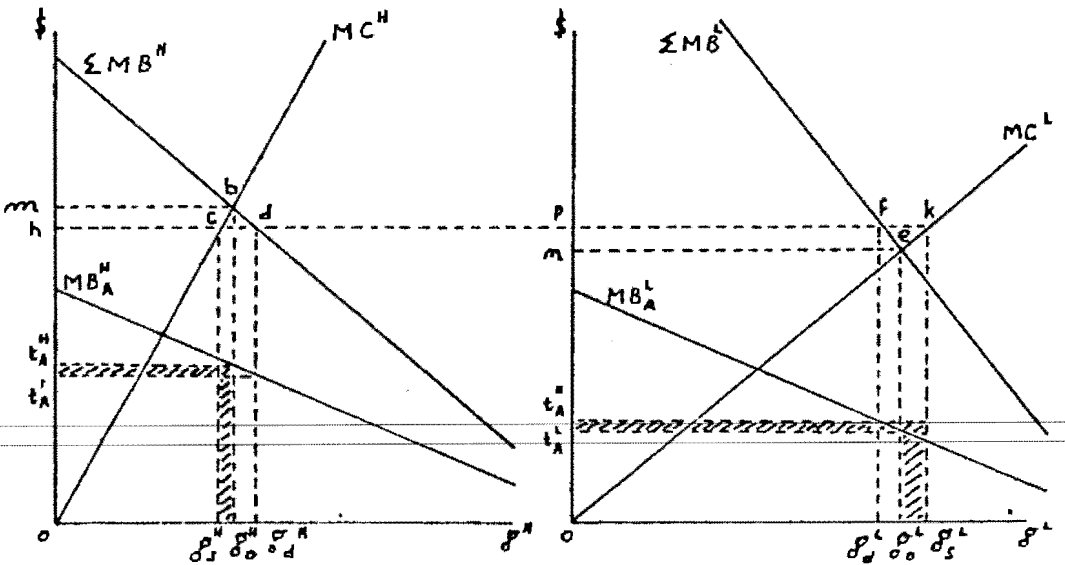


FIGURE 2



In order to determine which (if either) goal is being achieved in practice, questions such as the following must be answered: Do individuals pay the same tax burdens and receive the same level of public services under the current equalization grant scheme? If not, are differences between provinces shrinking over time? Are marginal production costs and benefit levels approximately equal for similar services across provinces? If we are to assess the effectiveness of grants as a policy tool, these issues must be addressed. Unfortunately, these questions must await a more in-depth study than this one.

The aim of this section is much simpler - to provide some measures of the importance of equalization grants in Canada and their changing role over the period 1963-64 to 1978-79. These years were chosen at five year intervals to coincide with the following Federal-Provincial Arrangements: 1962-67, 1968-71, 1972-77, and 1978-82. In the first period, only three revenue sources were equalized; this was expanded to sixteen in the second and twenty-three sources in the third period. In 1974-75, equalization with respect to oil and gas was limited to one-third of "windfall" revenues. In the 1977-82 agreement, each province's grant is calculated as the sum total of its positive and negative entitlements from twenty-nine revenue sources. An entitlement is determined as the difference between each province's percent share of the national tax base and its share of the population applied to the aggregate tax collections for that base. Only one-half of provincial revenues from non-renewable resources are included and equalization with respect to these revenues is subject to a ceiling of one-third of total equalization payments.

Tables 1 - 3 measure equalization grants as a percent of federal transfers, provincial own gross revenues and provincial GDP. They highlight the increasing dependence of the receiving provinces, especially the Atlantic Provinces, on these grants. Table 1 measures the share of equalization payments in total federal transfers to the provinces. For provinces receiving equalization, the share has risen from 21 percent to 45 percent of federal transfers. In the Atlantic Provinces, equalization grants now account for over 50 percent of all federal transfers. Equalization grants as a percent of provincial own gross revenues also show a dramatic increase in Table 2. In 1963-64, the grants were 9 percent of revenues for provinces receiving equalization; in 1978-79 this climbed to 17 percent. In the Atlantic Provinces, the grants now represent between 48-63 percent of provincial own revenues. Table 3 demonstrates the same increasing role of equalization grants with respect to provincial GDP. Grants now range between 7-12 percent of GDP in the Atlantic Provinces compared to 3 percent for all receiving provinces.

Clearly the grants have grown significantly over this period although their relative growth has been slower since 1973-74. The Atlantic Provinces are dependent on the grants to a much greater extent than any of the other provinces and this is unlikely to change in the foreseeable future. Some indication of the effects of these grants on

Table 1

Equalization Grants as a Percent of Total Federal Transfers to Provinces
1963-1978

Province	Equalization as % of Federal Transfers				Total Federal Transfers to Provinces 1978-9 \$ Million
	1963-4	1968-9	1973-4	1978-9	
Nfld	20.4%	48.5%	54.4%	54.3%	\$ 579.8
PEI	20.4	47.6	48.2	51.6	147.4
NS	31.1	45.0	54.7	55.6	709.3
NB	27.4	49.7	49.4	51.1	634.9
QUE	21.4	43.3	45.9	44.2	3,055.1
ONT	-	-	-	-	2,304.8
MAN	19.8	30.7	38.5	38.7	602.4
SASK	34.5	12.9	53.3	7.3	362.0
ALTA	2.3	-	.0	-	650.9
BC	-	-	-	-	754.5
Total	14.2%	24.5%	29.3%	27.8%	\$9,801.1
Total Receiving Provinces	21.4%	41.2%	48.1%	44.7%	\$6,090.9

* Alberta treated as non-receiving province in 1973 in all Tables
(grant was \$286 in 1973)

Sources: - Statistics Canada, Provincial Government Finances-Revenues and Expenditures, Catalogue No. 68-207, various years.
- Canadian Tax Foundation, Provincial and Municipal Finances, 1979.

Table 2

Equalization Grants As A Percent Of Provincial Gross
Revenues From Own Sources, 1963-1978

Province	Equalization as % of Own Gross Revenues				Own
	1963-4	1968-9	1973-4	1978-9	Gross Revenues 1978-9 \$ Million
NFLD	30.6%	62.8%	56.8%	52.5%	\$ 599.3
PEI	26.3	52.9	51.9	62.8	121.0
NS	23.3	47.7	42.9	51.7	762.8
NB	23.6	44.4	39.8	48.4	670.0
QUE	7.6	12.8	11.8	12.3	10,943.2
ONT	-	-	-	-	11,696.6
MAN	9.0	13.0	19.5	20.5	1,138.7
SASK	10.4	4.0	32.0	1.6	1,637.8
ALTA	.0	-	.0	-	5,975.7
BC	-	-	-	-	4,058.0
Total	4.7%	7.4%	8.3%	7.2%	\$37,603.1
Total Receiving Provinces	8.9%	17.7%	19.1%	17.1%	\$15,872.8

Sources: - Statistics Canada, Provincial Government Finances-Revenues and Expenditures, Catalogue No. 68-207, various years.
- Canadian Tax Foundation, Provincial and Municipal Finances, 1979.

Table 3
 Equalization Grants As A Percent of Provincial Gross Domestic Product At Market Price

1963-1978

Province	Equalization as % of Provincial GDP				Provincial GDP 1978 \$ Million
	1963-4	1968-9	1973.4	1978-9	
NFLD	2.5%	7.4%	9.8%	10.5%	\$ 2,987.8
PEI	2.5	6.9	9.5	12.0	633.7
NS	1.7	4.3	6.0	7.0	5,636.1
NB	1.9	5.3	6.2	7.4	4,396.5
QUE	0.6	1.5	2.0	2.4	56,180.9
ONT	-	-	-	-	89,940.0
MAN	0.6	1.3	2.4	2.5	9,300.3
SASK	1.0	0.5	3.8	0.3	9,661.5
ALTA	0.1	-	0.0	-	28,128.9
BC	-	-	-	-	27,890.7
Total	0.3%	0.8%	1.2%	1.2%	\$234,756.4
Total Receiving Provinces	0.7%	1.9%	3.0%	3.1%	\$ 88,796.8

Sources: - Statistics Canada, Provincial Economic Accounts: Experimental Data, 1978.
 - C.T.F.; Provincial and Municipal Finances 1979.

provincial per capita gross revenues and expenditures can be seen in Table 4. This table compares each province's per capita revenues (expenditures) to the national average. Newfoundland, P.E.I. and Alberta consistently have above average per capita revenues (expenditures) while Quebec moved above the average and British Columbia below the average over the period. If one compares the average for provinces receiving equalization to the average for nonreceiving provinces, it is clear that receiving provinces on average now have higher per capita revenues and expenditures than the non-receivers (Ontario, Alberta, B.C.).

Higher per capita expenditures can be indicative of higher costs or service levels. Some indication of changing service levels can be seen in Table 5 which shows provincial employees per 1,000 provincial population. In 1963, there were on average 16 provincial employees for every 1,000 residents with the highest numbers in Saskatchewan and Alberta. The average has now risen to 22 (with New Brunswick recording an astonishing 41) civil servants per 1,000 residents. The Atlantic Provinces recorded higher than average per capita employment levels over the whole period. Given the fixed overhead nature of many public services, it is probably true that substantial economies of scale in public employment exist so that small provinces such as Atlantic Provinces require higher per capita employment levels to provide a given level of service. A rough measure of how rapidly provincial public employment has grown as provincial population increases can be seen by computing the elasticity of employment with respect to population changes. (see Table 5.) With the exception of New Brunswick and Saskatchewan, these estimates are moderately elastic.

In summary, this section demonstrates the increasing importance of equalization grants particularly to the Atlantic Provinces. Per capita revenues and expenditures of equalization grant receiving provinces now exceed those of nonreceiving provinces. Perhaps as a result of these grants provincial civil service employment in grant-receiving provinces has expanded more rapidly than the national average.

VI. Conclusions

The purpose of fiscal need transfers is to enable each province to provide adequate service levels without unduly high tax rates. The purpose of fiscal equity transfers is to enable each citizen to receive the same public services at the same tax cost where ever he/she resides. Individual citizens can be treated equitably under a federal system if equalization grants are used to provide similar service levels across the nation. The cost of achieving fiscal equity is the efficiency loss that accompanies uniform production and consumption of the public good. If horizontal fiscal balance is the objective, maximum national welfare can be achieved by reallocating production of public goods to low cost producers and consumption to high demand consumers. Differences in service levels and per unit benefit tax rates are reduced but fiscal equity is unlikely to occur.

Table 4

Per Capita Gross Provincial Revenues and Expenditures By
Province As A Percent Of National Average Per Capita
Provincial Revenues and Expenditures

1963-1978

Province	Per Capita Revenues by Province as % of National Average				Per Capita Expenditure by Province as % of National Average			
	1963-4	1968-9	1973-4	1978-9	1963-4	1968-9	1973-4	1978-9
NFLD	103%	106%	103%	102%	119%	123%	115%	106%
PEI	107	102	121	109	114	102	123	107
NS	81	91	96	86	84	100	98	89
NB	88	103	104	93	94	111	105	96
QUE	92	98	106	110	98	98	105	114
ONT	97	98	92	82	96	99	98	86
MAN	85	92	94	84	92	88	96	88
SASK	129	102	98	105	119	98	89	103
ALTA	125	116	116	166	106	114	104	127
BC	120	106	101	94	113	95	92	96
National Average Per Capita \$	\$240	\$488	\$1,014	\$2,020	\$252	\$498	\$995	\$2,054
Average for Provinces Receiving Equalization	\$236	\$478	\$1,048	\$2,093	\$253	\$494	\$1,022	\$2,197
Average for Provinces Not Receiving Equalization	\$245	\$498	\$986	\$1,962	\$251	\$501	\$972	\$1,938
Ratio of Receiving Average to Non Receiving Average	0.96	0.96	1.06	1.07	1.01	0.99	1.05	1.13

Sources:- Statistics Canada, Provincial Government Finances-Revenues and Expenditures, Catalogue No. 68-207, various years.
- Canadian Tax Foundation, Provincial and Municipal Finances, 1979.

TABLE 5

Employees Of Provincial Governments And Allied Agencies
Per 1,000 Provincial Population
Canada, 1963-1968

Province	Dec., 1963		Dec., 1968		Dec., 1973		Dec., 1978		Total Employment 1963-78	% Change in Population 1963-78	Elasticity	Population Oct., 1978 ('000)
NETL	19.1	25.6	22.7	29.0	29.0	79%	18.7%	4.2	571			
PEI	18.2	25.2	32.1	34.8	119	14.0	8.5	122				
NS	18.4	26.6	21.8	30.2	82	11.6	7.1	844				
NB	16.5	19.5	36.6	41.1	282	13.7	20.6	698				
QUE	N.A.	12.6	14.0	20.6	N.A.	14.9	-	6,285				
ONT	13.6	15.1	12.5	17.2	65	31.3	2.1	8,466				
MAN	18.9	22.9	13.5	24.5	40	8.5	4.7	1,031				
SASK	22.3	23.6	15.7	32.0	46	1.8	25.6	950				
ALTA	20.5	26.0	24.4	32.2	121	40.4	3.0	1,972				
BC	N.A.	N.A.	N.A.	N.A.	N.A.	50.1	-	2,544				
Average	16.3	17.4	15.7	22.4	78%	25.3%*	3.1*	23,483				

* average over eight provinces

Sources: - Statistics Canada, Provincial Government Employment, Catalogue No. 72-007, various years.
- C.T.F., Provincial and Municipal Finances, 1979.

In practice, Canadian equalization grants have transferred substantial revenues to the low fiscal capacity provinces. Since the grants are not directly paid by the high capacity provinces but by the federal government from its general revenues, the effects of the transfers are not as simple as the theory would suggest. In fact the term "equalization grant" is actually a misnomer since the Canadian grant formula does not equalize; it raises the fiscal capacity of the lower capacity provinces up to the national average. Because provinces with higher than average fiscal capacity do not pay a negative grant, differences still remain after equalization. A more accurate title is "fiscal capacity adjustment transfers" (Lynn, 1967) with the adjustments being paid out of federal revenues.

The aim of this paper is to review the philosophies of fiscal equity and fiscal need and to determine which (if either) offers a rational and useful basis for equalization grants. Clearly the uniform service levels required for fiscal equity result in substantial efficiency losses. Achievement of horizontal fiscal balance is efficient and increases national economic welfare, but it too is not without costs. Marginal benefits and costs of public goods must be measured and compared in order to efficiently allocate production and consumption. Problems of preference revelation; interpersonal comparisons of utility, and measurement of production costs plague any attempt to measure EMSB and MSC for each province in practice. Allowing for spillovers of benefits and economies of scale in production would complicate the analysis. A testimony to the severity of these problems has been the reluctance of the Canadian government to measure the expenditure needs of each province. Subjective judgements would have to be made by the federal government (or some government body) in order to compare interprovincial EMSB and MSC.

In practice, the current Canadian grant system achieves neither fiscal equity nor HFB. It increases the fiscal capacity of the low tax revenue provinces up to the national average. These extra revenues, now equal to 17 percent of provincial own revenues are used by the receiving provinces to raise service levels and/or reduce tax burdens. Perhaps achievement of fiscal equity and/or horizontal fiscal balance is impossible in practice and the Canadian system is a reasonable compromise with reality.

The success of this compromise is at present being severely tested by the rapid growth in Alberta's oil and gas revenues which increase the differences in provincial fiscal capacities and raise the level of equalization grants. The federal government may be forced into an assessment of provincial needs in order to prevent equalization grants from skyrocketing. Clearly the national efficiency gains from a system of fiscal need grants justify the retention of the grants. The problem is to establish a grant scheme such that all provinces share in the benefits, not just the receiving provinces.

Footnotes

(1) Once one allows for local public goods and local taxation (both of which exist in unitary states) this is of course no longer true.

(2) This rules out such geographically specific public goods as snow removal and marine transport.

(3) Most authors assume constant cost of production for public goods which implies that taxpayers' surplus equals total economic welfare. To illustrate the possible producer gains from federalism we assume increasing cost conditions.

(4) If economies of scale exist, then $MC^U < MC^L + MC^H$. We ignore this possibility since it unnecessarily complicates the analysis. (5) Or where $EMB_{g^u}^L - MC_{g^u}^L = MC_{g^u}^H - EMB_{g^u}^H$ as shown in Figure 1.

(6) If economies of scale in production of g exist, then these net welfare losses will be smaller. This point was earlier made by W. R. Oates (Fiscal Federalism, Harcourt Brace; 1972) where the potential losses from increased centralization of decision making must be compared to the potential cost savings from collective consumption. Economies of scale in production might justify central production of g which could then be distributed by lower levels of government (e.g. R.C.M.P. services versus local policy) rather than the formation of a unitary system, central provision, and the end of local governments. The distinction between production and provision of government services is important here.

(7) These gains are similar to W. R. Oates' gains from decentralization (1972).

(8) R.E. Robb has pointed out to me that if the EMB curves in the two provinces are identical, HFI arises only on the supply side due to differences in production costs and/or fiscal capacities. In this maximizing national welfare will mean $g_d^L = g_d^H$ after transfers. Since A now consumes the same level of public services and pays the same per unit tax price, it appears that both fiscal equity and HFR can be simultaneously achieved. This does not happen, however, because A pays t_A for each unit produced, not consumed. Since $g_S^L > g_S^H$, A's tax payer surplus will be smaller in the low fiscal need province. Also, similar EMB curves in two provinces, even assuming identical tastes, are probably unlikely in practice.

APPENDIX 1

$$(1) W^L = \int \sum_n MB^L(g^L) - TC^L(g^L)$$

$$(2) W^H = \int \sum_n MB^H(g^H) - TC^H(g^H)$$

where n represents the residents of each province and g , the quantity of the public good.

Maximize $W = W^L + W^H$ subject to the constraint that

$$g_n^L = g_n^H = g^L = g^H = g$$

$$(3) W = \int \left[\sum MB^L(g^L) - TC^L(g^L) \right] + \int \left[\sum MB^H(g^H) - TC^H(g^H) \right] + \lambda (g^H - g^L)$$

$$(4) \partial W / \partial g^L = \sum MB^L(g^L) - MC^L(g^L) - \lambda = 0$$

$$(5) \partial W / \partial g^H = \sum MB^H(g^H) - MC^H(g^H) + \lambda = 0$$

$$(6) \partial W / \partial \lambda = g^H - g^L = 0$$

which can be rewritten as:

$$(7) \sum MB^L(g) + \sum MB^H(g) = MC^L(g) + MC^H(g) = \lambda$$

where λ is the shadow price or the optimal implicit equalization grant per unit of the public good.

APPENDIX 2

$$(1) W^L = \int \sum_n MB^L (g_d^L) - TC^L (g_s^L)$$

$$(2) W^H = \int \sum_n MB^H (g_d^H) - TC^H (g_s^H)$$

where g_s represents the quantity produced of the public good and g_d represents the quantity provided.

Maximize $W = W^L + W^H$ subject to the constraint that

$$g_d^L + g_d^H = g_s^L + g_s^H$$

$$(3) W = \int \sum MB^L (g_d^L) - TC^L (g_s^L) + \int \sum MB^H (g_d^H) - TC^H (g_s^H) + \lambda (g_s^L + g_s^H - g_d^L - g_d^H)$$

$$(4) \partial W / \partial g_d^L = \int MB^L (g_d^L) - \lambda = 0$$

$$(5) \partial W / \partial g_s^L = -MC^L (g_s^L) + \lambda = 0$$

$$(6) \partial W / \partial g_d^H = \int MB^H (g_d^H) - \lambda = 0$$

$$(7) \partial W / \partial g_s^H = -MC^H (g_s^H) + \lambda = 0$$

$$(8) \partial W / \partial \lambda = g_s^L + g_s^H - g_d^L - g_d^H = 0$$

which can be rewritten as:

$$(9) \int MB^L (g_d^L) = \int MB^H (g_d^H) = MC^L (g_s^L) = MC^H (g_s^H) = \lambda$$

where λ is the shadow price or optimal equalization grant per unit of the public good.