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## The Reform of Equalization Payments

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Queen's Economics Department Working Paper No. 1121

## The Reform of Equalization Payments

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## The Reform of Equalization Payments<sup>1</sup>

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June, 2007,

**Abstract** A reasonable and fair interpretation of the mandate for equalization payments in Section 36(2) of the Canadian Constitution differs from the present equalization formula in these respects: Transfers *to* the poorer provinces would be financed by transfers *from* the richer provinces rather than from the Federal government. Entitlement to equalization payments would depend on provincial income rather than upon a tax-by-tax comparison of the provinces' many tax bases. For this comparison, provincial income would include revenue accruing directly to the provincial governments as well as private income of the residents of the province. Compensation would be made for the exemption of provincial resource revenue from Federal income tax. The most pronounced effect of these proposals would be to transfer the greater burden of equalization payments from Ontario to Alberta which is now, by far, the richest province.

Much of the confusion and controversy over the Canadian program of equalization payments stems from a mismatch between its constitutionally-sanctioned mandate and two other provisions of the Canadian Constitution.

The constitutionally-sanctioned mandate for equalization payments is Section 36(2).

“Parliament and the Government of Canada are committed to the principle of making equalization payments to ensure that provincial governments have sufficient revenues to provide reasonably comparable levels of public services at reasonably comparable levels of taxation”.

Without equalization payments, tax rates would have to be higher in poor provinces than in rich provinces for any given level of provincially-provided public services: health care, education, policing and so on. Equalization payments are designed not to enable all provinces to afford the same *dollar value* public services when the same *proportion* of taxpayers' incomes is taxed away by their provincial governments. Equalization payments do not *require* provinces to impose identical tax schedules or to supply identical public services, but they *enable* provinces to do so. A province may still supply higher (or lower) than average services at higher (or lower) than average tax rates, but the national average is to be within every province's grasp.

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<sup>1</sup>With thanks for helpful comments to my colleagues Robin Boadway, Steve Kaliski and James Thompson, to Frank Vermaeten and Duane Hayes of the Department of Finance, to Claude Vaillancourt of Statistics Canada and to the referees of an earlier draft of this paper.

The two other provisions of the Canadian Constitution - blocking what is claimed here to be reasonable interpretation of section 36(2) - supply the provinces with sole jurisdiction over resource revenues and stipulate that “the crown cannot tax the crown”. Specifically, these provisions are

Section 92A(4): In each province, the legislature may make laws in relation to the raising of money by.....taxation....of non-renewable natural resources in the province.

and Section 125: No Lands or Property belonging to Canada or any Province shall be Liable to Taxation<sup>2</sup>

I claim here that Section 36(2) warrants a simpler, fairer and more generally-acceptable system of equalization than what we have today: i) The present system of equalization “up-but-not-down” should be replaced by equalization “down-as-well-as-up” ( terms in quotes to be defined below), ii) The “representative tax system” in the present Canadian equalization program should be replaced by a “macro formula”, iii) The definition of provincial income in a macro formula should include both private income and collective income accruing directly to the government of the province. iv) An implicit Federal tax on provincial resource revenues should be incorporated into the equalization formula and v) The constraints in Sections 92A(4) and 125 can be circumvented by a fusing of equalization, broadly defined, into a more comprehensive Federal-provincial transfer. I justify these claims as best I can, and present rough estimates of what equalization payments would be if these proposals were adopted.

i) *Comparable levels of public services at comparable levels of taxation* is more appropriately accounted for by equalization down-as-well-as-up rather than by equalization up-but-not-down” as in the Canadian program of equalization payments today. The present system of equalization payments up-but-not-down is incomplete. Revenue is transferred from the Federal government to the poorer provinces, lowering provincial tax rates required in the poorer provinces to supply a given dollar value of public services per head, but not by enough to close the gap between required provincial tax rates in rich and poor provinces. Part of the gap remains because tax rates in the richer provinces are left unchanged while required tax rates in the poorer provinces are reduced only to the national average as it would be in the absence of equalization payments rather than to the national average as it becomes with equalization payments in place. Equalization down-as-well-as-up is would be a Federally-mandated transfer of revenue from rich provinces to poor provinces, automatically lowering tax rates required in the poorer provinces and raising tax rates required in the richer provinces to allow all provinces to supply the same dollar value of public services at the same tax rates with no net contribution

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<sup>2</sup>Sections 92A(4) and 125 are downright pernicious. Together, they imply that, though people’s earned income may be taxed to finance expenditure by the Federal government, people’s income acquired passively and effortlessly (in the form of provincial public services at lower than otherwise tax rates) by virtue of the province where they happen to reside is exempt.

from the Federal government.<sup>3</sup>

Imagine a country of two provinces with equal populations, different incomes per resident, but the same public expenditure. One province is rich with an income per resident of \$100,000, the other province is poor with an income per resident of \$50,000, but their public expenditures are both equal to \$15,000 per resident. To finance that expenditure in the absence of equalization payments, the rich province would need to impose a tax rate of 15%, the poor province would need to impose a tax rate a revenue of 30%, and the average provincial tax rate would be 20%  $[(15 + 15)/(100 + 50)]$ . To enable both provinces to finance their common expenditure of \$15,000 per resident by a common tax rate of 20%, as section 36(2) would seem to require, there would need to a transfer of \$5,000 per resident from the rich province to the poor province. Such a transfer would be down-as-well-as-up, for one province must lose what the other gains.

A system of equalization payments could be designed to create such a transfer, but that is not how the Canadian system works now. Instead, our system of equalization payments up-but-not-down would transfer \$5,000 per head to the poor province from the Federal government rather than from the province, lowering the required provincial tax rate in the poor province from 30% to 20%, raising Federal tax rates in both provinces to finance the transfer, but leaving the provincial tax rate of the rich province at 15% as before. Equalization up-but-not-down” violates Section 36(2) because it fails to eliminate the discrepancy between required provincial tax rates. By contrast, equalization down-as-well-as-up would conform to Section 36(2), but would violate Section 125 instead, for the Federal government would need to tax the government of the wealthier province or, equivalently, to impose a special surtax on the residents, rich or poor, of the wealthier province. The reason, so far as I can tell, why Canada has not adopted equalization down-as-well-as-up is that Section 125 is seen - wrongly in my opinion, for reasons to be discussed below - as an insurmountable barrier

ii) Regardless of whether equalization is up-but-not-down or down-as-well-up, a choice must be made about what exactly equalization payments are intended to equalize. The different provinces impose different tax rates on different tax bases. The reference to *levels of taxation* in Section 36(2) is vacuous until a standard of comparison of tax bases is imposed. The present Canadian system of equalization payments is based upon the “representative tax system”. Under this system, a province’s per capita entitlement to equalization payments is the sum over all taxes of “the difference between its per capita tax base and the average per capita tax base in the

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<sup>3</sup>Throughout this paper, I interpret the word “comparable” as a synonym for “equal”, but with enough wiggle room that no exact equalization formula can be imposed on the Department of Finance by the Canadian Supreme Court. The word comparable’ may not be the only wiggle room in Section 36(2). I have been told that the phrase “committed to the principle” is a signal to the cognoscenti that Section 36(2) is just an expression of intent, that it is not justiciable and that the Canadian Supreme Court would refuse to mandate the continuation of the equalization program if the Federal government chose to abandon it. I do not know whether this is true.

country as a whole” weighted by “the average tax rate on that base in the country as a whole”. It is an assessment of a province’s excess or shortfall in revenue tax-by-tax, with equalization payments supplied to make up a province’s aggregate shortfall, if any, for all taxes together. This is in practice a very complicated formula with pages and pages of detail and oodles of exceptions to account for special circumstances or to reflect compromises among provinces and the Federal government.

It is argued in this paper that *levels of taxation* is more appropriately represented by a “macro formula” according to which a province’s level of taxation required for any level of public services is the tax rate that would have to be imposed if all provincial revenue were acquired by proportional income taxation. Regardless the intricate detail of a province’s actual tax structure, each province’s tax base for the application of the macro formula would be its income per head, and its entitlement to equalization payments becomes “the difference between its income per head and the income per head in the nation as a whole” weighted by “the nation-wide ratio of provincial revenue to income in the province”. As will be shown below, the provinces’ entitlements under a macro formula can be calculated on the back of an envelope.

There are pros and cons of both systems, but it is argued here that the macro formula is much simpler, less quirky in response to taxes other than progressive income taxes, more likely to direct equalization payments to poor provinces and, all things considered, more in accordance with the spirit and purpose of 36(2).

iii) It should make no difference to a province’s entitlement whether income is private or collective. Only the total should matter. My private income is what I earn from work or as the return to assets I possess. My collective income is my share of income accruing directly to the province where I reside (rather than through taxation of the residents of the province). The main component of collective income is resource revenue. If my province has one million people and takes in one billion dollars of resource royalties, my collective income on that account is one thousand dollars. A province should be deemed rich or poor for the purpose of assigning equalization payments according to whether the *sum* of private income and collective income is large or small.

iv) The principle that collective income should be treated on a par with private income can be extended to the obligation to pay a share of the cost of the Federal government. A system of equalization payments could incorporate a deduction to compensate for the Federal income tax that would have been collected if resource revenue and other collective income had accrued in the first instance to people in a province rather than directly to the provincial government. If the average Federal income tax rate is 25%, a province with a billion dollars of resource revenue would be debited for a quarter of a billion dollars on the equalization account.

A distinction might be drawn between two degrees of interprovincial sharing of collective income. The lesser degree of interprovincial sharing of collective income is to treat such income as though it were private. If my province acquires an extra resource revenue of \$1000 per

resident, it seems only reasonable that, on my behalf, it should contribute the same proportion to the rest of Canada as I would be obliged to contribute if the income accrued to me directly. The greater degree of sharing is when income not automatically belonging to anybody in particular is automatically assigned to the nation as a whole. It is the sharing implicit in a unitary state, a state without provinces, or in a country where jurisdiction over natural resources and the right to tax their extraction lies exclusively with the central government. Sections 125 and 92A(4) of the Canadian constitution may be read as blocking both degrees of sharing. It is argued here that the lesser degree of sharing should be allowed even if the greater degree remains blocked.

Provincially-owned resource revenue is to the residents of the province like manna from heaven, either as the source of extra public services at no extra tax or as a tax reduction with no corresponding reduction in public services. In either case, it is income acquired by virtue of one's place of residence rather than from one's labour or property. It is, moreover, an especially privileged income because, unlike income from work, it appears at the door of the recipient free of all Federal tax. Together, rigid provincial jurisdiction over natural resources and the rule that the crown cannot tax the crown creates the peculiarity that earned income bears a share of the cost of the Federal government but income acquired effortlessly by virtue of one's place of residence does not. What was referred to above as the lesser degree of sharing is a corrective, ensuring that both forms of income are taxed alike. Both are made to contribute equally to the cost of the Federal government, including the cost of augmenting the revenue of the poorer provinces.

Since Alberta is now by far the richest province in Canada, the combined effect of these proposed modifications of the Canadian equalization program would transfer the greater part of the cost of equalization payments from the residents of Ontario onto the residents of Alberta. On the other hand, this redesign of the Canadian equalization program would seem to be a gross violation of Sections 92A(4) and 125 of the Canadian constitution.

v) There may be a way around these prohibitions. Payments *from* certain wealthier provinces - mandated by equalization down-as-well-as-up - could be reconstructed as deductions from Federal payments *to* all provinces in an enlarged transfer program incorporating the Canadian Health and Social Transfer along with the equalization program. If that is insufficient to cover all negative equalization payments, the Federal government might increase the Federal income tax or the Federal Goods and Services tax, and then return the extra revenue acquired from each province less any remaining money owed by the province under the equalization program narrowly defined. Provinces might choose to reduce provincial tax rates accordingly, leaving residents of recipient provinces neither better off nor worse off than they would otherwise be.

A constitutional sanction for this manoeuvre might be found in what has come to be called "the spending power". People may give gifts to whomsoever they please and may attach whatever conditions they please upon these gifts. So too, according to our Supreme Court, may governments, despite the fact that a government's gift is ultimately a publicly-mandated transfer

from one group of people to another. “The simple withholding of Federal money which had previously been granted to fund a matter within provincial jurisdiction does not amount to a regulation of that matter.” [Sopinka J. In *Re: The Canada Assistance Plan*, 1991]. It is uncertain whether the Supreme Court would extend the spending power far enough to encompass negative equalization payments transformed into smaller-than-otherwise Federal grants. If not, the constraints of Sections 125 and 92A(4) would remain binding and Canadians would continue to suffer the constitutional curse that what is mandated by one clause of the constitution is rendered imperfect, controversy-laden and divisive by another.

As long as the minimal required transfer is not too large, this method of equalization among provinces could be consistent with a fiscal balance between the Federal government and all provinces together. As I understand it, fiscal balance has to do with the apportionment of the nation’s total tax burden between the Federal and provincial governments. A mismatch between provincial revenue and provincial expenditure is seen to arise because the Federal government is good at collecting money while provincial governments are good at spending it, where “good” at collecting money means that total deadweight loss is lower in Federal taxation than in provincial taxation, while “good” at spending money means that important aspects of public expenditure are under provincial jurisdiction or that provincial governments are more sensitive to the needs of their residents. Problems arise if the Federal per capita transfer required to outweigh the largest provincial payment to the Federal government under the equalization program exceeds the per capital transfer that is generally deemed appropriate for the maintenance of fiscal balance.<sup>4</sup>

From here on, the paper examines these proposed reforms in greater detail. We begin with a comparison of formulas. The equalization formula as it is today is contrasted with the formula as it would become if the four proposed reforms were adopted. There follows a discussion of the purpose of an equalization program of equalization, of precisely what such a program might be designed to achieve. After that, comes a detailed discussion of the contrast between down-as-well-as-up and up-but-not-down, with emphasis on the derivation of the revised equalization formula and on the incorporation of resource revenues accruing directly to provincial governments rather than as deductions from the gross incomes of the residents of the province. There follows an examination of the macro formula with emphasis upon when it can be expected to conform well to the requirements of Section 36(2) and when it might fail to do so. The paper concludes with rough calculations of each province’s net gain or loss from the equalization program under the present Canadian system and under the proposed alternative.

### **A Comparison of Equalization Formula**

The Canadian system of equalization payments from the Federal government to the deficit provinces is up-but-not-down and tax-by-tax in accordance with the “representative tax

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<sup>4</sup>I am grateful to an anonymous reviewer for identifying this problem.



system”. The proposed alternative would assign equalization payments down-as-well-as-up and based upon differences among provinces in income per person in accordance with the “macro formula”.

Broadly speaking, the present Canadian system prescribes an equalization payment of  $E_i$  *per person* from the Federal government to province  $i$  where

$$E_i = \sum \tau_{jc} (B_{jc} - B_{ji}) \text{ as long as } \sum \tau_{jc} (B_{jc} - B_{ji}) > 0 \quad (1a)$$

and  $E_i = 0$  otherwise. (1b)

where the subscript  $i$  refers to a province,

the subscript  $j$  refers to a provincial tax base,

the subscript  $c$  (mnemonic for Canada) refers to the country as a whole

$B_{ji}$  is the  $j^{\text{th}}$  tax base *per person* in province  $i$ ,

$B_{jc}$  is the nation-wide average tax base *per person* for the  $j^{\text{th}}$  tax,

$\tau_{jc}$  is the nation-wide average provincial tax rate per person on the  $j^{\text{th}}$  tax base,

and  $\sum$  refers to the sum over all tax bases.

A tax base may be a dollar value or a physical quantity. When a tax base is a dollar value, the tax rate must be a percentage. When a tax base is a physical quantity, the tax rate must be in dollars per unit. A tax bracket for a graduated income tax is an example of the former. A tax per gallon of gasoline is an example of the latter.

Two variants of the of the proposed alternative differ according to whether they compensate for the absence of Federal taxation of collective income in the province. Payments without such compensation are

$$E_i = \tau_c [(y_c + r_c) - (y_i + r_i)] \quad (2a)$$

Payments with such compensation are

$$E_i = \tau_c [(y_c + r_c) - (y_i + r_i)] - \tau^F r_i \quad (2b)$$

where, once again,  $E_i$  is the equalization payment per head to province  $i$ ,

$y_i$  is pre-tax personal income per head in province  $i$

$r_i$  is provincially-owned resource revenue per head in province  $i$  (or other provincial revenue over and above revenue originating from taxation of the residents of province  $i$ )

$y_c$  is private income per head in Canada as a whole

$r_c$  is provincially-owned resource revenue per head in Canada as a whole

$\tau_c$  is the average provincial tax rate in Canada as a whole. It is the “sum over all provinces of total provincial revenue” as a proportion of the “sum over all provinces of total income” where total income is private pre-tax income augmented by resource revenues accruing directly to provincial governments

and  $\tau^F$  is the Federal income tax rate.

The two variants of the formula differ by  $\tau^F r_i$ , the increase in Federal income tax that would be levied upon residents of province  $i$  if resource royalties and other public revenue accruing directly to the government of the province had accrued to the residents of the province instead. Equalization payments may or may not be designed to take this into account. It is argued in this paper that they should be, as indicated in equation (2b). Equation (2a) replaces equation (2b) when, as in Canada today, no share of provincial resource revenue can be appropriated by the Federal government.

An essential difference between present Canadian equalization formula and the proposed alternative is that the former can only give while the latter may either give or take. To get around the prohibition against taking in Section 125 of the Canadian constitution, the equalization program might be combined with a uniform subsidy per head into one large program. Payments to or from the provinces in accordance with equations (2a) or (2b) would be combined with a subsidy of  $S$  dollars per person from the Federal government to all provinces, where  $S$  is made large enough to create a positive combined transfer,  $S + E_i$ , to every province.

### **What 36(2) is Intended to Achieve**

Translation of Section 36(2) into a precise equalization formula can be undertaken semantically or politically, that is, with reference to the meaning of the words of the Constitution or with reference to the objectives for which 36(2) seems to have been designed. But meanings and objectives are not entirely distinct. Meanings of the words in a clause of the constitution depend in part on what the clause is intended to promote or to prohibit. Consider first the language of 36(2). The clause refers to provincial governments having sufficient revenues to provide reasonably *comparable levels of services* at reasonably *comparable levels of taxation*. Though exceptions are discussed briefly below, it is assumed throughout most of this paper - and

it is implicit in the Canadian equalization formula as it is today - that *comparable levels of services* is appropriately measured as dollars worth of public expenditure per head. Implications of the phrase *comparable levels of taxation* are not so clear. There is considerable dispute as to whether comparable levels of taxation mandates a representative tax system or a macro formula.

A case might be made for the representative tax system when all provincial revenue is acquired by one and the same schedule of progressive income taxation. On the other hand, a macro formula would seem to be more appropriate when *comparable levels of taxation* is interpreted to refer to the total burden of provincial taxation upon the average taxpayer in the province, regardless of differences among the provinces in their choice of tax bases (one province relying relatively more upon a progressive income tax, another on property taxes, another on sales taxes and so on) and regardless of how provincial tax rates differ from a uniform schedule of progressive taxation. Implicitly, the macro formula interprets the level of taxation as the percentage of income that the provincial government appropriates, regardless of the route by which taxpayers' incomes are appropriated. The choice between the representative tax system and the macro formula will be discussed in detail below. A simple case presents a stark contrast between the two.

Imagine a triumph of the neocons in all ten provinces, leading to the replacement of the present tax system - with income taxes, sales taxes, property taxes and so on - by a head tax, a fixed dollar payment per person. To interpret *levels of taxation* in Section 36(2) as pertaining to tax rates on actual provincial tax bases, whatever the bases may be, is to accept "people" as the appropriate provincial tax base for the equalization formula in equation (1) in this case. Since all provinces have equal populations per capita and with population as the only tax base, all provinces are automatically enabled to supply comparable levels of services at comparable levels of taxation and no equalization payments can ever be warranted no matter how great the disparities among the provinces in their incomes per head. Some provinces may be filthy rich, and others desperately poor. The discrepancy in incomes per head warrants a substantial equalization payment under the macro formula in equation (2), but the equality in the tax bases - people - means that no equalization payment whatever is warranted under the representative tax system in equation (1).

My sense of the purpose of Section 36(2) is that equalization payments would still be warranted, but to justify that interpretation it seems appropriate to consider what the political and social objectives of Section 36(2) might be. Several partially distinct and partially overlapping objectives might be identified.

One such objective is efficiency, the maximization of the national income in the country as a whole. Two aspects of efficiency are especially relevant. A system of equalization payments may promote or detract from efficiency through its influence upon a) the allocation among provinces of labour and other mobile factors of production and b) the provinces' choices of tax rates on the different available tax bases. Consider these in turn. The interprovincial allocation of labour is efficient when the values of the services of equally-skilled carpenters or equally-skilled

doctors are the same in every province. The allocation of labour and other factors of production is efficient when people locate where their productivity is highest and not just where they get the best deal - low taxes or high public expenditure - from the provincial government. A system of equalization payments is intended to provide people with the same deal everywhere, so that productivity alone determines where people locate. Public finance typically involves a degree of sharing among citizens. Since it is better to share with the rich than with the poor, the poorer provinces must receive equalization payments if comparable levels of public services are to be supplied at comparable levels of taxation, as is required to maintain the efficient allocation of labour and other factors of production. On the other hand, equalization payments may induce inefficiency in provincial tax structures. It becomes advantageous for a province to replace one tax by another if that would generate a \$10 loss of output of the province but would entitle the province to an extra \$15 of equalization payments at the expense of the rest of the nation. In choosing among alternative systems of equalization payments, efficiency in the interprovincial allocation of labour and in the provinces' choice of tax rates need both be taken into account.<sup>5</sup>

Another objective is equality. A system of equalization payments promotes equality when it diminishes the variance of the distribution of post-tax income in the national as a whole. Though this consideration should not be ignored, it is hard to believe that equality per se would not be better promoted by an outright grant to poor people wherever they happen to reside than by the equalization program as it is today or as it might be altered. Redirected to the worst off 20% of Canadians, the \$11 billion dollars Canada spends on its equalization program would supply almost \$2,000 per head, or \$8,000 per year for a family of four. There is, of course, a serious difficulty in targeting money to poorest 20% of the population, but the personal income tax could be revised to channel a good deal of the money now devoted to equalization in that direction. If efficiency or equality were the principal object of a system of equalization payments, it is something of a mystery why Section 36(2) was included in the Constitution when so many other efficiency or equality-promoting measures were not.

A third objective is horizontal equity. There is some variation in the usage of the expression "horizontal equity". A common usage identifies horizontal equity with the absence of discrimination in taxation. People with high incomes may be taxed at higher rates than people with low incomes, but two people with the equal incomes should be taxed equally. A carpenter and a doctor who earn same income should be confronted with the same tax bill. On this interpretation, horizontal equity is a political virtue. The carpenter and the doctor are taxed the same to avoid the conflict and dissension that would arise if the government chose each trade's - or worse still each person's - tax rate separately.

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<sup>5</sup>On efficiency in the allocation of labour see, R. Boadway and F. Flatters, "Efficiency and Equalization Payments in a Federal System of Government", *Canadian Journal of Economics*, 1982, 613-33. See also L.S. Wilson, "Equalization, Efficiency and Migration: Watson Revisited", *Canadian Public Policy*, vol XXIX, No. 4, 2003, 385-96. For a more skeptical assessment, see D. Usher, *The Uneasy Case for Equalization Payments*, The Fraser Institute, 1995.

As a political virtue, horizontal equity has no bearing upon the comparison of tax rates among countries. It does not matter if people with the same incomes are taxed more heavily in England than in France because there is no common government to which heavily-taxed Englishmen can complain. Similarly, horizontal equity may have little or no bearing upon the comparison of tax rates among provinces because, for example, there may be no common government to which the people of Saskatchewan can complain if they are taxed more heavily by the government of Saskatchewan than people with the same income in British Columbia are taxed by the government of British Columbia. People can migrate from Saskatchewan to British Columbia, but whether or not that is desirable comes under the heading of efficiency, not horizontal equity.

There may be a closely-related political virtue in equalization payments. In so far as they are based upon universally-accepted principles and in so far as they substitute nation-wide sharing for province-wide sharing through taxation and public expenditure, equalization payments may serve to reduce conflict among provinces within a federal system of government. With no system of equalization payments, intra-provincial sharing converts a Federal tax advantage to anybody in Saskatchewan into an advantage to everybody in Saskatchewan by increasing the provincial tax base. With a perfect system of equalization payments, a benefit to some person in Saskatchewan contains no greater spill-over to another person in Saskatchewan than to another person anywhere else in Canada. That being so, equalization payments may lessen the attachments and the community of interest among people within a province, while at the time strengthening the bonds among people in Canada as a whole. One should be wary of this argument. While valid on its premises, it is easily reversed if, as seems to be the case much of the time, no solid principles of equalization are universally accepted. Dispute over the principles of equalization can easily degenerate into unprincipled demands for subsidies as each province defends the set of rules that maximizes its receipts or minimizes its share of the cost of the program.

Section 36(2) imports into the Canadian federation some of the financial attributes of a unitary state. Every province is empowered to replicate nation-wide tax rates and public expenditure per head as these would be if there were no provinces and all public finance were under the authority of the federal government. Provinces still can choose how to spend their revenue, and a province's revenue per head may differ from the national average as long as taxes differ accordingly, but the balance between public expenditure and tax rates is to be the same for all provinces and is not to reflect private wealth as it would do automatically in the absence of equalization payments.

### **Up-but-not-down vs. Down-as-well-up**

In comparing these two equalization formulas, it is important to recognize that equalization payments are not ultimately transfers from the Federal government to the recipient provinces. They are transfers from people in some provinces to people in other provinces through

the intermediary of the Federal government. Thus, there is an important sense in which the sum over all provinces of the net payments under the equalization program must vanish. Under the present system of equalization up-but-not-down, the sum of all payments must equal the sum over all provinces of the extra Federal tax required to finance the program. Under a system of payments down-as-well-as-up, the sum of all equalization payments is automatically equal to 0. Gifts from the Federal government to a province are really imposed transfers through the intermediary of Federal income taxation to the residents of that province from the residents of other provinces. Gifts from the Federal government to all provinces simply cancel out. There are good reasons why it may be advantageous for Canada as a whole to raise money through the Federal government and to spend it through the provinces, but such reasons are only obscured by talk of gifts from the Federal government. A program of equalization payments can only be assessed with reference to the net gains to people in some provinces and the corresponding net losses to people in others.

To focus upon this aspect of equalization, it is helpful to begin with a simple economy where the tax base for the representative tax system and the macro formula would be one and the same. Imagine a country,  $c$ , where all public revenue, federal and provincial, is acquired by proportional income taxation and where people's incomes differ between provinces but not within them. Everybody in any province  $\alpha$  has the same income,  $y_\alpha$ , everybody in any province  $\beta$  has the same income,  $y_\beta$ , but  $y_\alpha$  and  $y_\beta$  are not the same. Incomes,  $y_\alpha$  and  $y_\beta$ , are to be thought of as net of Federal tax but as gross of provincial tax, allowing us to concentrate on transfers from the Federal government to the provinces without violating the Federal budget constraint. The provincial tax rate in any province  $i$  is designated as  $\tau_i$ . The Federal government makes two transfers to every province, a fixed transfer of  $S$  per head which is the same for every province, and a province-specific transfer of  $E_i$  per head which could be positive or negative.

It turns out that, for such an economy, the requirement in Section 36(2) is best satisfied by the equalization formula in equation (2b) above. Only this formula "provides reasonably comparable levels of public services at reasonably comparable levels of taxation". The route from Section 36(2) to the equalization formula in equation (2b) will be described in two stages, first for a nation with no provincially-owned resource revenue and then once provincially-owned resource revenue is introduced.

### With No Provincially-owned Resource Revenue

In the absence of equalization payments, the budget constraint of the government of each province  $i$  must be

$$p_i = \tau_i y_i + S \quad (3)$$

where  $S$  is a fixed transfer per head from the Federal government to every province. The government of province  $i$  must choose some combination of  $p_i$  and  $\tau_i$  in accordance with equation

(3) where, as between any two provinces  $\alpha$  and  $\beta$ , it must be the case that either  $p_\alpha > p_\beta$  or  $\tau_\alpha < \tau_\beta$  whenever  $y_\alpha > y_\beta$ . Either public expenditure is higher or the tax rate is lower in the wealthier province. A set of equalization payments  $E_i$  can be said to conform to Section 36(2) if it allows all provinces to supply the same combination of expenditure and taxation,  $p_c$  and  $\tau_c$ , where  $p_c$  is the average provincial expenditure per head in all provinces together and  $\tau_c$  is the average provincial tax rate. Some provinces may choose higher public expenditure per head, but only at the cost of imposing a higher tax rate.

A set of equalization payments converts the budget constraint of province  $i$  to

$$p_i = \tau_i y_i + S + E_i \quad (4)$$

and the average provincial budget constraint in the nation as a whole becomes

$$p_c = \tau_c y_c + S + E \quad (5)$$

where  $p_c$  is average expenditure per head,  $\tau_c$  is the average provincial tax rate,  $y_c$  is income per head in the nation as a whole and  $E$  is the average equalization payment per head in the nation as a whole.

It follows at once from equations (4) and (5) that the combination of  $p_c$  and  $\tau_c$  can only be available to all provinces at once when equalization payments are chosen so that

$$E_i = \tau_c (y_c - y_i) + E \quad (6)$$

but, since both  $S$  and  $E$  are nation-wide transfers per head, there is no harm in supposing  $E = 0$ . Any aggregate transfer per head can be attained with  $E = 0$  if  $S$  is appropriately chosen. Thus, without affecting anything of substance, it may be assumed that positive payments to poor provinces cancel out with negative equalization payments to rich provinces, in which case

$$\sum E_i n_i = 0 \quad (7)$$

where  $n_i$  is the population of province  $i$ . The requirement in Section 36(2) that comparable levels of public services be available at comparable levels of taxation is met with equalization payments down-as-well-as-up in accordance with equation (6) which is the proposed formula in equation (2a) when  $E$  is set equal to 0 and for the special case where there are no provincially-owned resource revenues. By contrast, the provincial average combination of  $p_c$  and  $\tau_c$  is not available to all provinces at once when equalization payments are up-but-not-down in accordance with equation (1).

Though some equalization payments are negative, the letter if not the spirit of Section 125 can be preserved by setting  $S$  large enough that  $E_i + S$  is positive for all provinces. The higher  $S$ , the lower  $\tau_c$  need be for any given value of  $p_c$ .

## Introducing Resource Revenue

The appropriate treatment of resource revenue in the equalization formula depends on how one defines the tax base for the assessment of “comparable levels of taxation” in Section 36(2). The tax base might be interpreted either as private income alone or as private income augmented by the collective income implicit in the presence of provincially owned resource revenue. On the former interpretation, a strict reading of 36(2) would require the complete Federal capture of resource revenue. On the latter interpretation, a strict reading of 36(2) would require provincially-owned resource revenue to be taxed at the same rate as ordinary private income and to be treated as any other source of income under the equalization formula.

If the tax base for the computation of “comparable levels of taxation” were private income alone (with no allowance for the provincially-owned tax revenue), the appropriate equalization payment for enabling all provinces to supply the same public services at the same tax rate would have to be

$$E_i = \tau_c(y_c - y_i) - r_i \quad (8)$$

where  $\tau_c$  is the average provincial tax rate, where  $r_i$  is the province’s resource revenue per head and where  $y_i$  and  $y_c$  are pre-tax personal incomes in province  $i$  and in the nation as a whole. In no other way can all provincial budget constraints conform to equation (5) when  $\tau_i = \tau_c$  and  $p_i = p_c$ . Equalization in accordance with this formula would, in effect, be a complete nullification of the constitutional assignment resource revenues to the provinces. Provincial resource revenue equalized in accordance with equation (8) is no resource revenue at all, or nothing more than the share accruing to the residents of the province if entitlement to resource revenue had been Federal rather than provincial.

This implication of the equalization down-as-well-as-up can be avoided by enlarging the scope of income in the equalization formula. Equalization payments could be computed *as though* resource revenue accrued not to provincial governments, but to the residents of the province, or, equivalently *as though* resource revenue in the hands of provincial governments were passed back to residents of the province and then treated as ordinary income by both Federal and provincial governments.<sup>6</sup> Residents’ net gain from a province’s resource revenue would then be twice diminished, but not eliminated altogether. It would be diminished first by the extra Federal tax that residents of the province would be obliged to pay and diminished once again through the equalization program. There would, nevertheless, remain a substantial net advantage to the residents of the province from the collective ownership of resource revenue

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<sup>6</sup>That gambit was proposed long ago by W. D. Gainer and T. L. Powrie, “Public Revenue from Canadian Crude Petroleum Production”, *Canadian Public Policy*, winter 1975, 1-12.



accruing in the first instance to the government of a province rather than to its residents.<sup>7</sup>

A new question arises: If resources are appropriately to be treated as though they accrued to the residents of the province directly rather than to the provincial governments, what exactly does section 36(2) require a system of equalization payments to equalize? The clause speaks of tax rates but does not say exactly how, or on what base, provincial taxes are to be assigned. I suggest that the proper criterion in conformity with the spirit of 36(2) is to equalize not tax rates *per se*, but the ratio of post tax income,  $z_i$ , to pre-tax income,  $y_i + r_i$ , as it would be if augmented by provincial resource revenue. Equalization payments would then be designed to equalize ratios among provinces of post-tax to pre-tax income as these ratios would be if a) all resource revenue accruing directly to provincial governments were immediately passed to the residents of the provinces, b) people in all provinces enjoyed the same provincial public services per head and c) provincial tax rates - levied on augmented income inclusive of resource revenues passed back from the provincial government - were the same in all provinces.<sup>8</sup>

The problem at hand is to determine the set of equalization payments required to allow every province to provide its residents with the average provincial public expenditure per head with the average provincial tax rate,  $\tau_c$ , and Federal tax rate,  $\tau^F$ , imposed not on actual personal income,  $y_i$ , but on personal income augmented by resource revenue,  $r_i$ , that accrued in the first instance to the provincial government but was then passed back to the residents of the province. Levied upon average income inclusive of resource revenue, the average provincial tax rate must be just sufficient to provide the average provincial expenditure over and above the Federal transfer per head,  $S$ . The average provincial tax rate becomes

$$\tau_c = (p_c - S)/(y_c + r_c) \quad (9)$$

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<sup>7</sup>This proposal has a family resemblance to a recent proposal by Tom Courchene in “Energy Prices, Equalization and Canadian Federalism: Comparing Canada’s Energy Price Shocks, *Queen’s Law Journal*, 2006, 644-96. Courchene proposed that 20% of each province’s resource revenue be placed in a fund to be administered by the provinces collectively rather than by the Federal government, and that the income in the fund be passed back to the provinces in proportion to their populations. Contributions to the fund would be voluntary, but Courchene believes resource-rich provinces would be induced by pressure from other provinces and by a concern for the country as a whole to supply their designated shares. The rest of the equalization program would remain more or less as it is now. The article contains an account of how the Canadian equalization program responded over the years to changes in the price of petroleum.

<sup>8</sup>This assignment of entitlement has been called “narrow based horizontal equity” as distinct from “broad based horizontal equity” which would in effect reassign all public revenue accruing directly to the province (rather than through the intermediary of taxation of the residents of the province) to all citizens equally regardless of where they lived. See Robin Boadway and Frank Flatters, *Equalization in a Federal State*, Economic Council of Canada, 1982.

For post-tax income to be the same proportion of augmented pre-tax income in every province, the post-tax income in province  $i$  would have to be

$$z_i = (y_i + r_i)(1 - \tau_c - \tau^F) \quad (10)$$

But provinces levy tax on ordinary private income,  $y_i$ , rather than on private income as it would be if government resource revenue accrued to people instead. Thus, to provide residents with the post tax income,  $z_i$ , in equation (10), the provinces must set different provincial tax rates, relatively high when resource revenue is small and relatively low when resource revenue is large. With tax levied on unaugmented income, the provincial tax rate,  $\tau_{ci}$ , in province  $i$  would have to be such that

$$z_i = y_i(1 - \tau_{ci} - \tau^F) \quad (11)$$

Together, the two personal budget constraints in equations (10) and (11) imply that

$$y_i(1 - \tau_{ci} - \tau^F) = (y_i + r_i)(1 - \tau_c - \tau^F) \quad (12)$$

so that the required provincial tax rate on personal income alone becomes

$$\tau_{ci} = \tau_c - r_i(1 - \tau_c - \tau^F)/y_i \quad (13)$$

Provincial tax rates,  $\tau_{ci}$ , must be lower in resource-rich provinces than in resource poor provinces if public expenditure,  $p_c$ , were the same, for in no other way could residents of resource-rich provinces capture the residual benefit of their resource revenue over and above their contribution to equalization payments and their share of the cost of the Federal government.

To say that hypothetical provincial tax rates,  $\tau_{ci}$ , are lower in resource-rich provinces than elsewhere is not to say that actual provincial tax rates are lower too. Actual tax rates would have to be low if - as shown in equation (13) - provincial expenditure were really the same in all provinces. But people in resource-rich provinces might prefer to use some of their resource revenue to raise provincial public expenditure above the national average, or they might prefer to save resource revenue for a time when resources run out. In either case, provincial tax rates in resource-rich provinces would be higher than is suggested by equation (13). The meaning of equation (13) is that section 36(2) need not be interpreted to require the taxing away of all resource revenue accruing to the provinces.

A province's entitlement to equalization payments can now be inferred from its budget constraint when it supplies the average services per head,  $p_c$ , in accordance with equation (9) at the required provincial tax rate,  $\tau_{ci}$ , as indicated in equation (13). The budget constraint is

$$p_c = \tau_{ci}y_i + r_i + S + E_i \quad (14)$$

Together, equations (9) and (14) imply that

$$\tau_c(y_c + r_c) = \tau_{ci} y_i + r_i + E_i \quad (15)$$

Then, from equation (13), it follows that

$$\tau_c(y_c + r_c) = [\tau_c - r_i(1 - \tau_c - \tau^F)/y_i] y_i + r_i + E_i \quad (16)$$

from which it follows that

$$\begin{aligned} E_i &= \tau_c(y_c + r_c) - y_i [\tau_c - r_i(1 - \tau_c - \tau^F)/y_i] - r_i^F \\ &= \tau_c(y_c + r_c) - y_i \tau_c + r_i(1 - \tau_c - \tau^F) - r_i^F \\ &= \tau_c[(y_c + r_c) - (y_i + r_i)] - \tau^F r_i \end{aligned} \quad (17)$$

which is precisely the revised equalization formula in equation (2b) above. Each province's equalization payment becomes the difference between the national average provincial tax base and its own tax base (both augmented by provincially-owned resource revenues) weighted by the national average provincial tax rate on that augmented base, less the Federal tax "owing" on provincially-owned resource revenue.

By contrast, equalization up-but-not-down has the perverse effect that any increase in the resource revenue of a donor province (a province prosperous enough not to be entitled to equalization payments) increases entitlements of recipient provinces not primarily at the expense of the province where resource revenue has increased, but at the expense residents of other donor provinces that would be obliged finance the increase in equalization payments through an increase in Federal income tax rates. A rise in the price of oil harms Ontario twice over. Once because people in Ontario must pay more for the oil they consume. Again because of the increase in the equalization-induced transfer, through the Federal government, from the people of Ontario to the people in provinces receiving equalization payments. More will be said about this matter in the comparison between the representative tax system and the macro formula.

### **The Macro Formula vs. the Representative Tax System**

Regardless of whether equalization is to be up-but-not-down or down-as-well-as-up, a choice must be made about the specification of a common the tax base or set of tax bases from which *levels of taxation* may be compared. Equalization may be tax-by-tax or income-based; it may be in accordance with the representative tax system in equation (1) above or with a macro formula in equation (2). To focus exclusively on the contrast between the representative tax

system and the macro formula, it will be supposed within this section that equalization is down-as-well-as-up.

Relative merits of the two procedures depend very much on how provincial revenue is acquired. A case can be made for the greater conformity of the representative tax system to the letter and to the spirit of Section 36(2) in the event that all provincial revenue is raised by one and the same schedule of progressive income taxation, but, the greater the provinces' departure from a single progressive tax schedule and the greater their reliance on other sources of revenue, the more complex and arbitrary the representative tax system becomes and the greater the advantages of the macro formula.<sup>9</sup>

### Progressive Taxation

To focus on the comparison between formulas when all provincial revenue is acquired by progressive income taxation, consider a variation on the two-province example in the preceding section where people's incomes differ within provinces rather than between them. Country  $c$  has just two provinces,  $\alpha$  and  $\beta$ , and with equal populations. Within each province are two classes of people, rich and poor, such that all rich people have the same income,  $y_R$  and all poor people have the same income,  $y_P$ , regardless of where they reside. Province  $\alpha$  is the poor province because it has a small proportion of rich people, and province  $\beta$  is the rich province because it has a large proportion of rich people. Also both provinces have the same progressive income tax schedule, which means, in this context, that there are common provincial tax rates,  $t_R$  and  $t_P$ , on the incomes of rich people and poor people respectively. Progressivity means nothing more in this context than that  $t_R > t_P$ .

The population of each province is 100. Every rich person has an income,  $y_R$ , of \$600, that every poor person has an income,  $y_P$ , of \$300, no matter where they live. In both provinces, the tax rate on the rich,  $t_R$ , is 30% and the tax rate on the poor,  $t_P$ , is 10%. Numbers of rich and poor in the poor province,  $n_{R\alpha}$  and  $n_{P\alpha}$ , are 10 and 90, while numbers of rich and poor in the rich province are,  $n_{R\beta}$  and  $n_{P\beta}$ , are 50 and 50. Since the tax schedule is the same in both provinces, the province with the larger proportion of rich people must provide the larger public expenditure per person, unless this tendency is corrected by a system of equalization payments.

The tax bases for the representative tax system and the macro formula are shown in table 1. In the table,  $B$  refers to a tax base per person for use in the representative tax system in equation (1) above, and  $y_i$  refers to income per person for use in the macro formula in equation (2a) and (2b). The first two columns in the table show the numbers of rich and poor people in province  $\alpha$ , in province  $\beta$  and in the country as a whole,  $c$ . Province  $\beta$  is rich because, and only because, its proportion of rich people (50/100) is higher than that in province  $\alpha$  (10/100). The

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<sup>9</sup>For a more sympathetic treatment of the representative tax system, see Robin Boadway, *Revisiting Equalization Again: RTS vs. Macro Approaches*, Working Paper 2002 (2), IIGR, Queen's University.

next two columns show tax bases for the representative tax system. The base,  $B_{R\alpha}$ , is the income of rich people per person in province  $\alpha$ ; it is the combined income of all rich people in the province ( $600 \times 10$ ) divided by the total population of the province (100). The three other tax bases are defined accordingly. So defined, the two tax bases in each province add up to the income per head in the province,  $y_i$ , the tax base for the macro formula, shown in the final column of the table.

**Table 1: Tax Bases for the Representative Tax System and the Macro Formula**

[  $y_R = \$600$ ,  $y_P = \$300$ ,  $t_R = 30\%$ ,  $t_P = 10\%$  ]

	$n_{Ri}$	$n_{Pi}$	$B_{Ri}$	$B_{Pi}$	$y_i$
province $i = \alpha$	10	90	$(600)(10)/(100) = 60$	$(300)(90)/(100) = 270$	330
province $i = \beta$	50	50	$(600)(50)/(100) = 300$	$(300)(50)/(100) = 150$	450
the country $i = c$	60	140	$(600)(60)/(200) = 180$	$(300)(140)/(200) = 210$	390

Following equation (1) above, the required equalization payment per person to province  $\alpha$  under the representative tax system is

$$E_{\alpha, RTS} = t_R (B_{Rc} - B_{R\alpha}) + t_P (B_{Pc} - B_{P\alpha}) = (.3)(180 - 60) + (.1)(210 - 270) = 36 - 6 = \$30$$

As equalization is assumed here to be down-as-well-as-up, the payment to province  $\alpha$  and the payment from  $\beta$  are automatically the same.

Application of the macro formula requires a national provincial tax rate,  $t_c$ , for rich and poor people together. The required rate is the combined tax revenue in the two provinces together as a proportion of the total national income. The combined tax revenue is \$15,000 [ $(.3)(60)(600) + (.1)(140)(300)$ ]. The combined income is \$78,000 [ $(60)(600) + (140)(300)$ ]. The average tax rate,  $t_c$ , is therefore 19% [ $15/78$ ] and the required equalization payment per person to province  $\alpha$  under the macro formula is

$$E_{\alpha, macro} = t_c (y_c - y_\alpha) = (.19)(390 - 330) = \$11.4$$

The mandated equalization payment is considerably larger under the representative tax system to compensate for the combined effect of the larger number of rich people in province  $\beta$  and of their higher income tax rate.

A good case can be made for the representative tax system in a country where provinces are constitutionally required to raise every penny of their public revenue by progressive income taxation at nationally-invariant proportions between the tax rates on the different tax brackets.

[For instance, every province might be obliged to impose twice the rate on the income of the rich as on the income of the poor. A province might choose to increase its public revenue by raising rates on rich people and poor people from - say - 30% and 15% to 40% and 20%, but it would not be allowed to change the rate on rich people (or on poor people) alone.] The representative tax system would then enable all provinces to supply the same dollar value of public services, and would at the same time enable everybody with the same income to pay the same provincial tax in all provinces, a not unreasonable interpretation of Section 36(2). As will be shown, the case breaks down completely when provincial tax schedules are proportional or regressive rather than progressive, when provinces are free to choose the progressivity of the provincial income tax, when provinces tax things (like gasoline or houses) rather than incomes and, especially, when provinces have considerable discretion about what to tax, opening the way for provinces to manipulate their tax structures to maximize entitlement to equalization payments.

### Regressive Taxation

\_\_\_\_\_ The letter and the spirit of Section 36(2) would seem to diverge when provincial tax rates are regressive. To see why, it is sufficient to reverse the tax rates on rich and poor people. Suppose that  $\tau_r = 10\%$  and  $\tau_p = 30\%$  rather than the other way round. Several things would happen. When equalization payments are determined by the macro formula, province  $\alpha$  would keep its place as the recipient province because its income per head is less than that of province  $\beta$ . The equalization payment itself would increase because the effect of the larger number of poor people in province  $\alpha$  outweighs their smaller income per head in the determination of total tax revenue, while the total national income remains the same. Specifically, with the tax rates reversed, the combined tax revenue is increased from \$15,000 to \$16,200  $[(.1)(60)(600) + (.3)(140)(300)]$ , while the total income in the two provinces remains unchanged at \$78,000, increasing the average provincial tax rate from 19% to 21%, and increasing the equalization payment per head to province  $\alpha$  from 11.4 to 12.6.

The effect upon the representative tax system is much more dramatic. Though province  $\alpha$  remains the poorer province, it is no longer the recipient of equalization payments because regressivity imposes a high tax rate upon its relatively large base of poor people. Specifically, the required equalization payment per person under the representative tax system would have been

$$E_{\alpha, RTS} = \tau_r (B_{Rc} - B_{R\alpha}) + \tau_p (B_{pc} - B_{p\alpha}) = (.1)(180 - 60) + (.3)(210 - 270) = 12 - 18 = - \$6$$

implying that province  $\beta$  rather than province  $\alpha$  must be the recipient of equalization payments. As shown in Appendix B, payment to a poor province under a macro formula is less than, equal to or greater than payment under the representative tax system depending upon the income tax is progressive, proportional or regressive. If the provincial tax structure were so regressive that the dollar value of provincial tax paid is greater for a poor person than for a rich person, the representative tax system would actually designate the rich province rather than the poor province as the appropriate recipient of equalization payments, an odd consequence for a Federal

program that goes by the name of equalization.<sup>10</sup>

Now the best choice for the Federal government is not so clear. Should the Federal government respect provincial tax rates even when that means supplying equalization payments to the richer province, or should the reference to “comparable rates of taxation” in Section 36(2) be interpreted as an injunction to equalize average tax burdens regardless of the tax structures that the provinces choose to impose?

Earlier on in this paper, we considered the impacts of the two formulas when all provincial revenue is levied by a head tax. The macro formula still supplied equalization payments to the poorer province, but the representative tax system did not because the tax base per head (people per person) was necessarily equal to 1 in all provinces. That example lay upon the boundary between positive and negative payments to the poorer provinces as provincial tax structures become more and more regressive.

Another difficulty with the representative tax system is the incentive it creates for each province to levy high tax rates on its relatively small tax bases.<sup>11</sup> This comes out strongly in the example we have employed. Knowing that the equalization payment to province  $\alpha$  - ultimately a payment from people in province  $\beta$  to people in province  $\alpha$  - is an increasing function of the average progressivity of taxation in the two province together, the government in province  $\alpha$  has every incentive to make its tax system *more* progressive and the government in province  $\beta$  has every incentive to make its tax system *less* progressive than it would be in the absence of equalization payments. The representative tax system breeds progressivity in poor provinces and regressivity in rich provinces. Like the representative tax system, the macro formula allows the equalization payment to be influenced by the average tax rate in the two provinces together (Double all tax rates, and you double all equalization payments), but the macro formula is impervious to progressivity or regressivity. The representative tax system’s accommodation of progressivity must be set against its susceptibility to tax gambits by the provinces to increase their entitlements to or decrease their net contributions under the equalization program.

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<sup>10</sup>There is some question about the implications of this result. There is no doubt that the Canadian income tax schedule is progressive, but it is at least arguable that the appropriate indicator of progressivity in this context is the progressivity of the tax structure as a whole, not just the income tax. A study done some time ago showed Canadian taxation to be on balance mildly regressive. Were that still so and if the progressivity or regressivity of the entire tax structure were the relevant consideration, equalization to poor provinces would be slightly larger under the macro formula than under the representative tax system. See W. Irwin Gillespie, *The Redistribution of Income in Canada*, Carleton Library #124, 1980.

<sup>11</sup>The locus classicus of this argument is Thomas Courchene and David Beavis, “Federal-Provincial Tax Equalization: An Evaluation”, *Canadian Journal of Economics*, 1973, pp.483-502.

Consider another example. Two provinces have identical populations and identical total incomes. In both provinces, total income consists of income from the production of apples and income from the production of oranges, but province  $\alpha$  generates \$1,000,000 from the production of apples and \$9,000,000 from the production of oranges, while province  $\beta$  generates \$9,000,000 from the production of apples and \$1,000,000 from the production of oranges. If equalization payments are determined by a macro formula or if both provinces impose the same rate of tax on apples and on oranges, then no equalization payments are warranted. By contrast, the representative tax system allows  $\alpha$  to generate equalization payments at the expense of province  $\beta$  by taxing oranges but not apples, and allows province  $\beta$  to generate equalization payments at the expense of province  $\alpha$  by taxing apples but not oranges.

If the population of province  $\alpha$  is one million Catholic and nine million Protestant while the population of province  $\beta$  is nine million Catholic and one million Protestant, if everybody's income is the same, and if equalization payments are in accordance with a representative tax system where the Federal government respects existing provincial tax rates and tax bases, then province  $\alpha$  can generate equalization payments for itself by taxing only Catholics, while province  $\beta$  can generate equalization payments for itself by taxing only Protestants.

### Fictitious Tax Bases and Tax Rates

If all provincial revenue were acquired by income taxation and if taxpayers' income in each tax bracket were the assigned tax bases for the computation of equalization payments under the representative tax system, there would be an immediate connection between the revenue acquired by the government at any given tax rate and to the burden of the tax to the taxpayer. The higher the tax rate, the larger the revenue and the larger the burden. This connection may be wholly or partially severed when the tax base becomes, as it must for some taxes, a value or volume of production rather than a portion of people's incomes. A base may be said to be fictitious when it represents something other than the income of people paying the tax. Among the fictitious bases in the Canadian equalization formula are the number of cigarettes for the tax on tobacco, the number of litres of diesel fuel, the volume of spirits sold in the province and the volume of production of petroleum.

To see how differences among provinces in tax base can fail to reflect differences in provincial revenue acquired, consider a two-province country where a natural resource is extracted in both provinces and where royalties to the provincial governments constitute one of the components of the equalization formula under the representative tax system. Suppose the "facts" are these: Production is 100 tons per head in province  $\alpha$  and 300 tons per head in province  $\beta$ . The selling price of the extracted resource is \$50 per ton everywhere. The cost of extraction is \$10 in province  $\alpha$  and \$40 per ton in province  $\beta$ . Provincial governments acquire the difference between price and cost of extraction in royalties. Royalties are \$4,000 per head in province  $\alpha$   $[(50 - 10) \times 100]$  and \$3,000 per head in province  $\beta$   $[(50 - 40) \times 300]$ . Suppose, finally, that the volume of production is the chosen tax base for the assignment of equalization payments under



the representative tax system.

Designate the tax on this resource as  $j$ . With volume of production as the assigned tax base, the  $j^{\text{th}}$  component of the equalization payment to country  $i$  in accordance with the equalization formula in equation (1) becomes

$$E_{ji} = t_{jc}(B_{jc} - B_{ji}) \quad (18)$$

In this example,  $B_{j\alpha} = 100$  tons,  $B_{j\beta} = 300$  tons,  $B_{jc} = 200$  tons (the average base in the two provinces together), and  $t_{jc} = \$17.50$  per ton, which is the royalty per ton in the two provinces together, equal to  $[(40 \times 100) + (10 \times 300)]/[100 + 300]$ . The mandated transfers to or from each province for this category of taxation are

$$E_{j\alpha} = \$1,750 \text{ per head and } E_{j\beta} = - \$1,750 \text{ per head}$$

These components of the total equalization payment are added in accordance with equation (1) to other components associated with different tax bases to determine whether the total payment is positive or nothing. Royalties are larger in province  $\alpha$  than in province  $\beta$  - \$4,000 per head as against \$3000 per head - but it is province  $\alpha$  that is the recipient of equalization payments in this category.

Fictitious tax bases can generate perverse payments under the representative tax system. By contrast, the macro formula would simply include royalties as part of the combined income of provincial governments in the computation of the implicit tax rate on the sum of collective and private income in all provinces together, so that, other things equal, the larger a province's royalties, the smaller its equalization payment would be.

Or consider the extreme case of a province that is like a stylized Gulf State where resource revenue is the one and only source of income and where such income accrues in the first instance to the government of the province and is then transferred back to residents. A rigid application of the representative tax system would treat the transfer from the provincial government to the residents of the province as a public expenditure, and would treat the governments' original acquisition of resource revenue as tantamount to a tax rate of a full 100% on the corresponding tax base, for tax base and tax revenue are one and the same in this case. The representative tax system would, in effect, mandate a complete sharing of that income nationwide, leaving nothing for its residents of the province over and above their share of the total resource revenue in all provinces together. Hence the enormous contradiction between the representative tax system on the one hand and Sections 92(a) and 125 on the other. Strictly speaking, the one mandates a 100% sharing among the provinces of all provincial resource revenue, while the other prohibits any sharing at all. Much of the ad hocery in the Canadian equalization formula is attributable to the attempt to wiggle out of this contradiction without appearing to do so.

## Administrative Discretion in the Application of the Representative Tax System

Ideally, the representative tax system should be as straightforward and mechanical as the macro formula. Rates and bases for the representative tax system would be the rates and bases that the provinces actually employ. In practice, there are no unambiguously correct measures. Suppose a house in the country costs half as much as the identical house in the city. Should the tax base for housing be graduated as the dollar value of the stock of houses with the tax rate graduated as a percent (in which case a country house is weighted as half as much as a city house), or should the tax base be graduated as the quality-corrected number of houses with the tax rate graduated in dollars per house (in which case identical houses in the country and in the city are weighted the same). Some tax bases are graduated in one way and some are graduated in the other. The choice between dollar value and quantity as the provincial tax base can have a substantial impact on the magnitude of equalization payments when some provinces are more urbanized than others, but there is no universally-accepted principle for choosing one procedure rather than the other. Many taxes are “macroed”. The implicit tax rate on provincial lotteries is taken to be the ratio provincial revenue from lotteries to total income in the province. In the absence of constitutional guidance as to how *comparable levels of taxation* in section 36(2) is to be translated into a set of tax bases for the representative tax system, each province’s entitlement to equalization payment is open to substantial administrative discretion by the Federal government.

Many ad hoc adjustments have at times been introduced into the Canadian equalization formula to deal with the perverse effects of the representative tax system or of equalization up-but-not-down. Resource revenue have been removed from the equalization formula. Quite arbitrarily and to avoid designating Ontario as a have-not province, Canada has abandoned the national average tax base in favour of a five-province average, the five being Quebec, Ontario, Manitoba, Saskatchewan and British Columbia. Subsidiary rules have been introduced to protect a portion of the resource revenue of provinces with a near-monopoly of some tax base from what amounts to expropriation of the revenue from that base through a reduction in entitlement to equalization payments.

The net effect of such ad hoc adjustments is the emergence of a serious risk of severing the connection between 36(2) and actual equalization payments, and of converting the design of the equalization formula into a justification for some pre-ordained allocation of benefits and costs among the different provinces, or, worse still, for allowing provinces’ entitlements to equalization payments to become the plaything of political pressure or public opinion. The bigger the chip on your shoulder, the larger your entitlement to equalization payments, or the smaller your share of the cost of financing other provinces’ equalization payments, will turn out to be. If God appointed a unique base for every provincial tax, the representative tax system would still be a long way from the ideal in Section 36(2). Without such divine intervention, the representative tax system can be politically divisive as well.

The macro formula is much better in this respect. It is more horizontally equitable in the

sense of conforming to well-formulated rules not easily modified under political pressure. It has less need for special arrangements to correct for this or that defect, notably the five-province average, the exemption of all or part of natural resource revenue, the rule for compensating provinces with a near monopoly on some tax base, and the difficulties in specifying a tax base for each and every source of public revenue. It with deals collective income naturally by treating all income, private or collective, alike. It is a reasonably accurate corrective differences among provinces in the burden of provincial taxation at any common level of public expenditure per head.

### **Some Measurement Problems**

**Tax Exporting:** Part of a province's tax revenue is borne by people who are not residents of the province. People in Saskatchewan pay sales tax in Manitoba. Taxes on business may be passed forward in higher price on goods purchased out of province. Tax exporting becomes problematic for the representative tax system because it is by no means obvious how best to assign a tax base. Consider the sales tax. On sales to residents of the province, the tax imposes a burden not unlike that of the income tax. On sales out of province, the revenue from the tax is like resource revenue accruing directly to the government rather than through the intermediary of the residents of the province. These very different aspects of the tax are ignored when total sales are treated as one of the bases in the representative tax system. The difficulty is compounded when the ratio of value added in the province to total sales is different from one province to the next.

There is no comparable difficulty with the macro formula. In computing the tax base for the macro formula, sales tax revenue acquired from non-residents would be treated as though it were passed back to residents of the province and taxed accordingly. Revenue acquired from taxation of non-residents could be included as part of  $r_i$  in equation (2a). The provincial tax base corresponding to the expression  $y_i + r_i$  in equation (2a) could be represented statistically in each province as the sum of "personal disposable income" and "own source revenue" of the provincial government. Personal disposable income would be defined net of all taxation, but tax paid by non-residents would be included, along with resource revenue and tax paid by residents, in the measure of own source revenue of the provincial government. A province's entitlement to equalization payments (or its obligation to contribute to the equalization program as the case may be) would then be the difference between its enlarged tax base per head and the comparable national average tax base per head, multiplied by the population of the province and by the national average provincial tax rate. This procedure is employed below in a comparison among provinces of equalization payments under a macro formula and under the system of equalization payments in Canada today.

In practice, tax exporting might be ignored because it is thought to be empirically insignificant or because it is not too different as a proportion of total income from one province

to the next. Measured and accounted for correctly, tax exporting is actually less of a problem for the macro formula than for the representative tax system because of the sensitivity of the representative tax system to the mix of taxes a province chooses to impose.<sup>12</sup>

Differences among Provinces in Expenditure Needs: Decrepit old folks go to British Columbia to retire, imposing a considerable cost on the health system of the province. Differing in the mix of industries and in the age distribution of the population, provinces also differ in the cost per person of maintaining uniform standards of health care, road construction and maintenance, crime prevention and so on. *Levels of public services* might therefore be interpreted as the cost per head of meeting certain needs rather than as actual public spending per head. A system of equalization payments might be designed to take account of interprovincial differences in needs along with interprovincial differences in tax bases per head. Interprovincial differences in needs would be automatically accommodated if services were provided by the Federal government rather than by the provinces, and a system of equalization payments designed to replicate the financial implications of a unitary state might follow suit. I believe that we do not now have a needs-based standard because differences among provinces in needs are so difficult to measure that the attempt to incorporate needs into the equalization formula would degenerate into a quarrel among provinces, each claiming its needs to be greater than the Federal government is prepared to recognize.

Differences among Provinces in Price Levels: *Levels of public services* might be interpreted as dollar values or as real values. The practice in the Canadian equalization program is to ignore inter-provincial differences in price levels. The pros and cons of correcting for price level differences among provinces are probably much the same under a macro formula with equalization down-as-well-as-up as under the representative tax system as it is today.

Special Characteristics of Natural Resources: It is sometimes argued that provincial royalties from natural resource should be less than fully incorporated into the equalization formula because there is no self-evidently correct tax base, because investment in natural resources is to be encouraged, because resource revenue is non-renewable or because benefits to resource-owning provinces are postponed through something like a Heritage Fund.

Choice of a tax base is problematic for the representative tax system but not for the macro formula. When a provincial government acquires revenue from an income tax, a sales tax or a property tax, there is tax base in the private sector - income, sales or houses - on which the tax is levied. There is no comparable base for a province's resource royalties. It is even arguable that resource royalties are their own base, requiring what amounts to a 100% sharing of a province's

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<sup>12</sup>On tax exporting, with emphasis upon the choice between the macro formula and the representative tax system and with a comparison between Canadian and American practice, see Stephen M. Barro, "Macroeconomic Versus RTS Measures of Fiscal Capacity: Theoretical Foundations and Implications for Canada", Working Paper #2002(7), Institute of Intergovernmental Relations, Queen's University.

resource revenue through the equalization program. The difficulty is avoided in the macro formula where resource royalties are treated as one among many sources of income in the province, so that the proportion shared with other provinces through an equalization program is the same as that for any other source of public revenue.

The investment argument depends very much on whether investment in natural resources is public or private. In so far as investment is private, the revenue from the sale of natural resources must cover the cost of investment, extraction and royalties, for why else would a company be in the resource extraction business? Only in so far as costs are borne by the provincial government in the development of infrastructure might some partial exemption of resource revenue be warranted. Even here, the argument is questionable. The premise is that resource extraction creates special needs for public expenditure, needs that should then be taken into account in the determination of equalization payments. The counter-argument is that expenditure “needs” are never been taken into account in the computation of equalization payments. Provinces may differ in their needs for a variety of reasons. One province needs more miles of roads because its population is widely dispersed. Another province needs greater than average expenditure on education because its residents are relatively young. What has to be shown is that resource revenue creates special needs in resource-rich provinces over and above the special needs of other provinces.

Non-renewability itself seems irrelevant, at least for a province that spends resource royalties in the year when they are acquired. A province that is poor because it has no resource royalties should receive equalization payments. If that province becomes rich because natural resources are discovered, it should be a net contributor to the equalization program. Once non-renewable resources exhausted, the province might become a recipient of equalization once again. That a province is to become a recipient of equalization payments tomorrow when it is poor is no reason for not contributing to the program today when it is rich.

How best to account for a heritage fund is more problematic. In so far as a province’s resource royalties are invested in preparation for the day when resources run out, there may be a case for recognition of resource royalties by the equalization program when revenue is withdrawn from the fund rather than revenue is deposited. Suppose \$100 of resource royalties is invested by the province at a rate of interest of 6% forever. For the computation of equalization payments, the \$100 might be included as part of the income of the province this year, or the \$6 of interest might be included every year from now on, but it would be double-counting to include both.

There are several opposing considerations. In so far as the double-counting argument is valid, it would mandate recognition of resource royalties in the determination of equalization payments when the royalties are acquired or when they are spent. It would certainly not warrant the exclusion of royalties altogether, as is sometimes proposed. To recognize resource royalties as part of provincial income when they are spent would require the strict accounting of deposit and withdrawal of income from the heritage fund to ensure that no money is removed by the back

door. The double-counting argument itself is somewhat dubious. It is analogous to the case for the consumption tax as opposed to the income tax to avoid the double taxation of saving. As we do not make special provision for provincial saving of other sources of revenue, it is not clear why we should do so for saved resource royalties. To make such an adjustment would be like treating an ordinary deficit as part of the income of the province, and treating a budgetary surplus as a deduction from the income of the province for the purposes of the equalization program. If a choice must be made between exempting deposits into a heritage fund and exempting withdrawals, the latter may be preferable, for the benefit of the exemption would be more likely to occur when the province is in greater need of the extra revenue.

There is, on the other hand, an argument for the imposition of an especially high Federal tax on provincially-owned resource revenue and for an especially large dip into resource royalties to finance equalization payments. It is that resource revenue appears to the typical resident of resource-rich provinces like manna from heaven rather than as a reward for work or a return to property. If God dropped manna selectively, with plenty in some places and nothing in others, there would be a good case for compulsory sharing, to escape the inefficiency that would inevitably arise as people located themselves where manna is likely to fall rather than where they can produce the most valuable goods and services. That is the rationale for the broader macro formula in equation (2b) rather than for the narrower formula in equation (2a).

### **Dollar Values of Equalization Payments to or from Each Province**

**a) under a Macro Formula, with Equalization Down-as-well-as-up, but *without* Correction for the Exemption of Provincial Resource Revenue from Federal Income Taxation,**

**b) under a Macro Formula, with Equalization Down-as-well-as-up, and *with* Correction for the Exemption of Provincial Resource Revenue from Federal Income Taxation, and**

**c) under the Present Canadian Formula based upon a Representative Tax System with Equalization Up-but-not-down.**

Dollar values are compared in tables 2, 3 and 4. Table 2 traces the steps in computing payments *per head* with a macro formula, with equalization down-as-well-as-up and with an adjustment for the exemption of provincial resource revenue from Federal taxation. Table 3 shows each province's net transfer per head for each of the three equalization formulas. Table 4 shows *total* payments to or from each province. Data for the construction of these tables are presented and discussed in Appendix A.

**Table 2: Payments *per Head* Computed with a Macro Formula for Equalization  
Down-As- Well-As-Up in Accordance with Equations (2a) and (2b)  
(\$ per Head 2005)**

provincial income:  $y_i + r_i$  in equations (2a) and (2b) measured as the sum of personal disposable income (PER DIS in the Appendix table) and provincial government own-source revenue (PRO REV in Appendix A)

surplus:  $(y_c + r_c) - (y_i + r_i)$  where  $(y_c + r_c)$  is the Canada-wide average, shown in the Appendix to equal \$33,124.

equalization payments: equation (2a):  $\tau_c[(y_c + r_c) - (y_i + r_i)]$  where  $\tau_c$  is the average provincial tax rate, shown in the Appendix to equal 26.9%.

resource revenue: provincial resource revenue (RES REV in the Appendix table) divided by population of the province (POP in the Appendix table)

imputed Federal tax on resource revenue: estimated as 25% of “resource revenue”

equalization payments: equation (2b): “equalization payments: equation (2a)” less “imputed Federal tax on resource revenue”

actual Canadian equalization payments: total payments (CAN EQU in the Appendix table) divided by population (POP in the Appendix table)

province	provincial income	surplus	equalization payments: equation (2a)	resource revenue	imputed Federal tax on resource revenue	equalization payments: equation (2b)	actual Canadian equalization payments
Newfoundland	26,557	- 6,567	1,767	77	19	1,748	1,665
P E I	26,529	- 6,597	1,775	7	2	1,773	1,645
Nova Scotia	28,928	- 4,196	1,129	11	3	1,126	1,433
New Brunswick	27,643	- 5,481	1,474	128	32	1,442	1,795
Quebec	31,607	- 1,517	408	34	9	399	634
Ontario	34,005	881	- 237	28	7	- 244	0
Manitoba	29,643	- 3,581	963	168	42	921	1,366
Saskatchewan	31,772	- 1,352	364	1,584	386	- 22	82
Alberta	40,473	7,349	- 1,977	4,625	1,156	-3,133	0
B C	31,850	- 1,274	343	1,051	263	80	140
Canada	33,124	0	0	684	171	- 171	341

Table 2 shows equalization payments per head in accordance with equations (2a) and (2b), together with the corresponding payments in the actual Canadian program. The table is largely self-explanatory. The first column is provincial income per head inclusive of all collective income accruing directly to the provincial government. The next column is each province's surplus income per head over and above the national average. The third column is the required equalization payment in accordance with equation (2a), a macro formula with equalization down-as-well-as-up but with no adjustment for the exemption of provincially-owned resource revenue from Federal income taxation. That adjustment is computed in the next three columns, showing resource revenue per head, the extra Federal revenue that would be acquired by taxation of provincially-owned resource revenue at a rate of 25%, and the equalization payment per head in accordance with equation (2b). For comparison, the final column shows actual Canadian equalization payments per head. Above the table, column headings are defined and linked to the data in the appendix.

A switch from the present Canadian formula to a macro formula, with equalization down-as-well-as-up but with no adjustment for the exemption of provincial resource revenue from Federal tax, would lead to a slight increase in payments per head to the Atlantic provinces, to decreases of about a third in payments to Quebec and Manitoba, and to more than a doubling of payments to Saskatchewan and British Columbia. The big losers are Ontario and especially, Alberta. Neither receives equalization payments under the present equalization formula, but they are both net payers under the alternative formula. Ontario would be required to pay about \$250 per head, and Alberta would be required to pay just under \$2,000 per head. This should not be at all surprising. Alberta's income per head is over \$7 thousand above the national average and, of this, almost \$5 thousand can be attributed to resource revenue of the provincial government. Correcting for the exemption of provincial resource revenue from Federal taxation makes little difference to most of the recipient provinces, but eliminates the payment to British Columbia, converts Saskatchewan into a small net contributor and adds an extra \$1,000 per head to the contribution of Alberta.

Total equalization payments per head to all provinces together are shown in the bottom rows of the appropriate columns of the table. Under the present Canadian formula, there is a total payment *from* the Federal government of \$341 per head. There is no net payment to or from the Federal government when equalization is down-as-well-as-up no deduction to compensate for the exemption from Federal taxation of provincial resource revenue. There is a payment \$171 per head *to* the Federal government when equalization is down-as-well-as-up with a deduction to compensate for the exemption from Federal taxation of provincially-owned resource revenue. The total payment is the equivalent of the extra Federal tax revenue that would have been acquired.

Table 3 adjusts table 2 to account for the distribution among provinces of the cost to the Federal government of the equalization program. No adjustment is required for equalization in accordance with equation (2a) by a macro formula with payment down-as-well-as-up but without adjustment for the exemption of provincial resource revenue from Federal taxation.



Reapportionment of net Federal revenue raises net all payments when equalization is in accordance with equation (2b), and lowers all net payments in the actual Canadian program. The sum of all payments to or from every province is apportioned among the provinces according to their shares of Federal tax paid (FED SH) as shown in the Appendix table. The story is essentially the same as in table 2 , but table 3 is perhaps the better indicator of people’s gains and losses in switching from one method of equalization to another.

**Table 3: Net Transfers Per Head to (+) or from (-) Each Province  
(\$ per Head for the Year 2005)**

Province	macro formula with equalization down-as-well-up but <i>without</i> correction for the exemption of provincial resource revenue from Federal taxation	macro formula with equalization down-as-well-up <i>with</i> correction for the exemption of provincial resource revenue from Federal taxation	actual equalization payments in Canada today
Newfoundland	1,767	1,876	1,415
P E I	1,775	1,932	1,333
Nova Scotia	1,129	1,267	1,156
New Brunswick	1,474	1,574	1,535
Quebec	408	615	207
Ontario	- 237	-55	-376
Manitoba	937	1,030	1,094
Saskatchewan	364	111	- 201
Alberta	- 1,977	- 2,925	- 418
B C	343	234	- 166

Table 4 converts net payments from dollars per head into millions of dollars. The table as constructed by multiplying numbers in the corresponding columns of table 2 by the population of the province. The main story in table 4 is how large total Federal transfer would have to be to ensure that payments to all provinces remain positive when equalization is based upon a macro formula computed down-as-well-as-up and with a deduction to account for the absence of Federal taxation of resource revenue accruing to the provincial government.

**Table 4: Total Equalization Payments to (+) or from (-) Each Province  
(\$ million for the Year 2005)**

Province	proposed alternative <i>without</i> imputed Federal tax on resource revenue	proposed alternative <i>with</i> implicit Federal tax on resource revenue	actual Canadian equalization payments
Newfoundland	915	904	861
P E I	245	245	227
Nova Scotia	1,060	1,057	1,344
New Brunswick	1,108	1,084	1,348
Quebec	3,092	3,027	4,798
Ontario	- 2,953	- 3,040	0
Manitoba	1,101	1,052	1,601
Saskatchewan	362	- 32	82
Alberta	- 6,377	- 10,310	0
British Columbia	1,447	338	590
Canada	0	- 5,466	10,851

To preserve the fiction that the crown cannot tax the crown, the Federal government would need to supply a high enough transfer to all provinces to preserve a positive net transfer to the province with the largest required payment under the expanded equalization program. As shown in the middle column of table 4, the largest required contribution is just over \$10 billion from Alberta. Since Alberta contains about a tenth of the entire Canadian population, a per capita transfer sufficient to supply Alberta with \$10 billion must supply about \$100 billion to all provinces together, out of a total Canadian national income of about \$1,400 billion. However, of that \$100 billion, over \$60 billion is already supplied in Federal-provincial transfers, another \$5 billion would be returned to the Federal government as an implicit Federal tax on provincially-owned resource revenue, and additional transfers might be designed to match the allocation among provinces of the extra Federal revenue acquired. Clearly, some Federal taxes would have to be increased and some provincial taxes would be reduced accordingly. This outcome would be welcome by those who believe there to be a large fiscal imbalance in which the Federal government is currently supplying too small a share of provincial public expenditures.

## **The Impact in Ontario of an Increase in Resource Revenue in Alberta**

The story in the preceding section is reinforced a rough and ready estimate of the net gains and losses to the different provinces when a rise in the world price of petroleum leads to an increase in the resource revenue of the province of Alberta.

Consider a stylized Canada with a total population of 30 million and with three provinces, Alberta, Ontario and a third province less prosperous than the other two and the recipient of equalization payments from the Federal government. Alberta has 10% of the population and pays 12% of Federal tax. Ontario has 40% of the population and pays 43% of Federal tax. The third province has 50% of the population and pays 45% of Federal tax. When Federal expenditure is increased or decreased, the increases or decreases in tax payment by residents of the different provinces are proportion to their shares of Federal tax revenue. The Federal income tax rate and the Canadian average provincial tax rate are both 25%, Alberta alone acquires provincial revenue from natural resources. [These assumptions simplify the calculation, but they can be relaxed considerably without changing the essence of the example.] Equalization payments are assigned in accordance with the Canadian equalization formula in equation (1) above.

Suppose an increase in the world price of petroleum causes an increase of \$30 million in the resource revenue of the province of Alberta: \$10 per person in Alberta, or \$1 per person in Canada as a whole.

Under our stylized version of the Canadian system of equalization payments - with equalization up-but-not-down, with a 10-province average and with 100% inclusion of resource revenues - the increase in the resource revenue in Alberta must give rise to an increase in equalization payments of \$1 per resident in the recipient province, an increase that can only be financed - since the recipient province is half the population of Canada - by an increase in Federal tax revenue of 50¢ per person in the country as a whole.<sup>13</sup> Of that 50¢ increase, 6¢ [50 x

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<sup>13</sup>The required increase in equalization payments per person in the recipient province can be read off the Canadian equalization formula in equation (1) above. As no tax base in the recipient province is affected by the increase in resource revenue in Alberta, all  $B_{ij}$  where  $i$  refers to the recipient province and  $j$  refers to a tax base must remain unchanged. Nor, with the exception of the tax base on resource revenue, can there be any change in any national average provincial tax base per head. All  $\Delta B_{jc} = 0$  with the exception of  $\Delta B_{kc}$  where  $k$  refers to provincial resource revenue. As the increase of \$30 million of resource revenue is an increase of \$1 per person in the nation as a whole, it must be the case that  $\Delta B_{kc} = 1$ . The corresponding tax rate,  $\tau_k$ , must equal 1 as well, because collective income accruing in the first instance to the government of a province is logically equivalent to a provincial tax rate on that income of 100%. With these substantial restrictions on the variables in equation (1), the required change,  $\Delta E_i$ , in the equalization payment to the recipient province becomes

$$\Delta E_i = \tau_k \Delta B_{kc} N_i$$

.12] is borne by the residents of Alberta, 21.5¢ [50 x 0.43] is borne by the residents of Ontario, and the remaining 22.5¢ [50 x .45] is borne by the residents of the recipient provinces themselves. Since the population of Alberta is 10% of the population of Canada, a payment by Alberta of 6¢ per resident of Canada becomes a payment of 60¢ per resident of Alberta, leaving Alberta with a net gain of \$9.40 [10 - .6] per resident of the province. Almost all of the increase in resource revenue remains as a net increase in the incomes of the people of Alberta.

Similarly, as Ontario has 40% of the population of Canada, its tax burden of 21.5¢ per resident of Canada requires a tax payment of 54¢ [21.5 / .4] per resident of Ontario, with no compensating benefit. As the recipient province has 50% of the population of Canada, its tax burden of 22.5¢ per resident of Canada requires a tax payment of 45¢ per resident of the recipient province, leaving them with a net benefit of 55¢ [1 - .45] per person, the difference between their gain from the increase in equalization payments and their loss from the extra Federal tax to finance it.

All but 6% of the increase in the resource revenue of Alberta remains as an increase in the collective income of the people of Alberta, but it is a peculiarity of the Canadian system of equalization payments that the increase in resource revenue in Alberta triggers a substantial transfer from Ontario to the equalization-receiving provinces. A gain of \$9.40 per resident of Alberta triggers a gain of 55¢ per person in the recipient provinces and a loss of 54¢ per person in Ontario. The total increase in equalization payments amounts to \$15 million or half the increase in resource revenue that gave rise to it.

A very different pattern emerges under a macro formula with equalization down-as-well-as-up and with the a correction for the exclusion of provincial resource revenue from Federal tax taxation in accordance with equation (2b). The increase of \$30 million in the resource revenue amounts to an increase of \$10 in the income per person of Alberta and of \$1 in the income per person of the nation as a whole. With income as the base of the macro formula and as the provincial tax rate is assumed to be 25% in all provinces, there must be an increase in the equalization entitlement of 25¢ everywhere but Alberta. [Ontario pays 25¢ less per person though it remains a net contributor the system as a whole.] To finance these increases in equalization payments, Alberta must increase its payment by \$2.25 [25¢ x 9 because it constitutes 10% of the population of Canada]. Since the Federal income tax rate is also 25%, Alberta's additional equalization payment in lieu of Federal tax on resource revenue would be \$2.50 per person. Of its increase in resource revenue of \$10 per person, Alberta would lose \$4.75 under the equalization program, leaving it with a net gain of \$5.25 per person. As the beneficiary of the

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The increase in the required equalization per person in the recipient province becomes

$$\Delta E_i / N_i = \tau_k \Delta B_{kc} = 1$$

because both  $\tau_k$  and  $\Delta B_{kc}$  are equal to 1.

windfall, Alberta rather than Ontario would bear the cost of the partial sharing with the recipient province. The proposed reforms avoid the anomalous situation in which Alberta's good fortune triggers a transfer from Ontario to the poorer provinces of Canada, redirecting the additional cost of the program of equalization payments to the province from which originated the extra revenue that gave rise to the extra equalization payments.<sup>14</sup>

## **Final Observations**

Equalization payments are not ultimately a transfer from the Federal government to the governments of the provinces. They are a transfer through the intermediary of the Federal government from Canadians in some provinces to Canadians in other provinces. Section 36(2) is reasonably clear about who is whom. Beneficiaries are to be people who would otherwise bear a larger than average burden of taxation to finance a given level of provincially-supplied public services. The main purpose of this article is to show how the equalization program might be reformed to correspond as closely as possible to the letter and spirit of section 36(2). Comparable levels of services at comparable levels of taxation warrants the replacement of the current mechanism by equalization down-as-well-as-up and in accordance with a macro formula.

A subsidiary purpose is to show how the constraints of Section 125 and 92A(4) might be circumvented by the fusion of the equalization program and other Federal transfers into a single program large enough that every province appears as a recipient. There is some question as to whether that procedure would be either constitutionally or politically acceptable. Perhaps some other fix would be preferable. Perhaps Section 125 is not quite as rigid as has been supposed. Otherwise, the import of this article is simply that the natural interpretation of Section 36(2) is blocked by other portions of the Constitution, in which case Canadians must either live with the discrepancy or reconsider the entire equalization program. Equalization cannot be maintained indefinitely with virtually no contribution from Canada's richest province because of the form in which that province's revenue accrues.

Another advantage of the proposed reform is simplicity. The representative tax system is infinitely complex, with pages and pages of rules and vast numbers of exception designed to direct the benefits of the program to those whom designers of the rules see as worthy beneficiaries. The system is not merely unfair; it is in danger of converting equalization payments into Federal rewards for provincial good behaviour or Federal bribes in response to

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<sup>14</sup>There has recently been some debate in Canada as to whether all resource revenue, 50% of resource revenue or no resource revenue at all should be included in the equalization formula. Suffice to say here that it is one thing to include resource revenue in the formula when the recipient of additional resource revenue is the payer of additional equalization payments as would be the case with equalization down-as-well-as-up, but quite another thing to include resource revenue in the equalization formula when additional resource revenue in one province gives rise to additional equalization payments that must in the end be financed by people in a different province as is the case with the system of equalization in Canada today.

provincial threats. No system of equalization can avoid these pitfalls altogether, but the macro formula with equalization down-as-well-as-up is simple enough that each province's entitlement can be estimated on the back of an envelope, and, once adopted, it leaves little room for Federal-provincial negotiation.

## Appendix A: Data for the Construction of tables 2, 3 and 4

All of the data for the construction of equalization payments and corresponding net transfers of incomes among the provinces are presented in the table A below.

### Table A: Data for the Derivation of Equalization Payments, 2005.

POP = population (thousands), Cansim 051-0005

PER DIS = personal disposable income (\$ million), cansim 384-0012

PRO REV = provincial and local government own-source revenue (\$million), cansim 385-0001

RES REV = resource revenue of provincial governments (\$ million), Communication from Statistics Canada

FED SH = percentage of Federal revenue collected in each province in 2003, *Achieving National Purpose*, Department of Finance, 2006, figure 3, page 27

CAN EQU = actual equalization payments in Canada today (\$ million), *Achieving National Purpose*, Department of Finance, 2006, table 1, page 31

PROVINCE	POP	PER DIS	PRO REV	RES REV	FED SH	CAN EQU
Ten Provinces	31,976	77,3997	285,182	21,873	-	10,900
Newfoundland	517	10,404	3,326	40	1.2	861
P E I	138	2,805	856	1	0.4	227
Nov Scotia	938	20,582	6,552	10	2.4	1,344
New Brunswick	751	15,708	5,052	96	1.8	1,348
Quebec	7,569	168,092	71,141	257	20.8	4,798
Ontario	12,450	316,327	107,037	346	43.1	0
Manitoba	1,175	25,568	9,263	197	2.9	1,601
Saskatchewan	995	21,821	9,792	1,576	2.6	82
Alberta	3,223	93,384	37,060	14,905	12.4	0
British Columbia	4,220	99,306	35,103	4,435	11.9	590

The actual Canadian equalization payments per head to each province, in the final column of table 2, are constructed by dividing total payments (CAN EQU) by the population (POP) of the province. The proposed alternative without correction for implicit Federal taxation of resource revenue is in accordance with equation (2a)

$$E_i = \tau_c[(y_c + r_c) - (y_i + r_i)] \quad (2a)$$

The estimate of the term  $\tau_c$  in this expression is

$$\tau_c = [\text{PRO REV}]/[\text{PER DIS} + \text{PRO REV}] \text{ for all ten provinces combined}$$

$$1. = [285,182]/[773,977 + 285,182] = 26.9 \%$$

It is the proportional tax rate that would be required to raise existing provincial revenue in the province if total income in the province - private and public alike - accrued in the first instance as pre-tax private income.

The estimate of average Canada-wide pre-tax income per person (as it would be if all income in the province accrued in the first instance privately) is

$$y_c + r_c = [\text{PER DIS} + \text{PRO REV}] / [\text{POP} \times 1,000] \text{ for all ten provinces together}$$

$$= [773,977 + 285,182] / [31.976] = \$33,124$$

Similarly, the estimate of pre-tax income per head in any province  $i$  (as it would be if all income in the province accrued in the first instance privately) is

$$y_i + r_i = [\text{PER DIS} + \text{PRO REV}] / [\text{POP} \times 1,000] \text{ for that province alone.}$$

The equalization payment in accordance with equation (2b) are converted from equalization payments in accordance with equation (2a) by deducting the extra Federal tax that would be paid by the residents of the province if resource revenue had accrued to the residents of the province rather than to the provincial government. From each payment to or from the province is deducted 25% of RES REV, 25% being the assumed rate of Federal income tax.

Table 3 presents estimates of the implicit transfers among people in the different provinces resulting from each of the three variants of equalization payments. Each of the entries in table 3 is the corresponding entry in table 2 less the provinces share of the Federal revenue required to finance the program as a whole. For each column, the amount deducted is

$$\text{FED SH} \times \text{the total Federal expenditure for all provinces together}$$

By construction, the total of each column in table 3 must be 0. Table 4 is constructed by multiplying all entries in table 2 by the appropriate population of the province.



**Appendix B: With Tax Bases Stratified by Personal Income and with Equalization Down-as-well-as-up, Payments under the Representative Tax System are Greater than, Equal to or Less than under the Macro Formula Depending on whether the Tax Structure is Progressive, Neutral or Regressive**

This proposition is to be established for the simple case of a country with two distinct classes of people, rich and poor, allocated between two provinces with equal populations but different proportions of rich and poor, so that one can speak unambiguously of the rich province with a high proportion of rich people, and the poor province with a low proportion of poor people.

Designate income *per person*, population and tax rates as  $y$ ,  $n$  and  $\tau$  respectively, with subscripts representing the different provinces or income classes. Suppose

- 1) Everybody in this society has either a high income,  $y_R$ , or a low income,  $y_P$ , where, of course,  $y_R > y_P$ .
- 2) There are two provinces,  $\alpha$  and  $\beta$ .
- 3) In province  $\alpha$ , there are  $n_{\alpha R}$  rich people and  $n_{\alpha P}$  poor people.
- 4) In province  $\beta$ , there are  $n_{\beta R}$  rich people and  $n_{\beta P}$  poor people.
- 5) Province  $\beta$  is the richer province with the larger proportion of rich people.
- 6) Public revenue in both provinces is raised by a schedule of provincial income taxes, at rates  $\tau_{\alpha R}$  and  $\tau_{\alpha P}$  on rich and poor people in province  $\alpha$  and at rates  $\tau_{\beta R}$  and  $\tau_{\beta P}$  on rich and poor people in province  $\beta$ .

Equalization payments *per head* to provinces  $\alpha$  and  $\beta$  under the macro formula and under the representative tax system are  $E_{\alpha, \text{macro}}$ ,  $E_{\alpha, \text{RTS}}$ ,  $E_{\beta, \text{macro}}$  and  $E_{\beta, \text{RTS}}$  where

$$E_{\alpha, \text{macro}} = \tau_c(y_c - y_\alpha)$$

$$E_{\beta, \text{macro}} = \tau_c(y_c - y_\beta)$$

$$E_{\alpha, \text{RTS}} = \tau_R (B_R - B_{R\alpha}) + \tau_P (B_P - B_{P\alpha})$$

and  $E_{\beta, \text{RTS}} = \tau_R (B_R - B_{R\beta}) + \tau_P (B_P - B_{P\beta})$

where all  $\tau$  are tax rates, all  $B$  are tax bases per person, all  $y$  are incomes per person and the subscripts refer to rich, R, poor, P, province  $\alpha$  and province  $\beta$ . With equalization up-but-not-down, a negative entitlement under the representative tax system is disregarded. Components of

these measures of mandated equalization payments are as follows:

Populations of province  $\alpha$ , of province  $\beta$  and of the country as a whole are  $n_\alpha$ ,  $n_\beta$ , and  $n_c$  where

$$n_\alpha = n_{\alpha R} + n_{\alpha P}, \quad n_\beta = n_{\beta R} + n_{\beta P} \quad \text{and} \quad n_c = n_\alpha + n_\beta$$

Incomes *per head* in province  $\alpha$ , in province  $\beta$  and in the country as a whole are  $y_\alpha$ ,  $y_\beta$ , and  $y_c$  where

$$y_\alpha = (y_R n_{\alpha R} + y_P n_{\alpha P})/n_\alpha, \quad y_\beta = (y_R n_{\beta R} + y_P n_{\beta P})/n_\beta \quad \text{and} \quad y_c = y_R [n_{\alpha R} + n_{\beta R}] + y_P [n_{\alpha P} + n_{\beta P}]/n_c$$

These income measures are the tax bases in the macro formula. All tax bases in the representative tax system - for rich people and for poor people, and in province  $\alpha$ , in province  $\beta$  and in the country as a whole, c, - are incomes in the designated group per person in the province or country. Specifically,

$$B_{R\alpha} = y_R n_{\alpha R} / n_\alpha, \quad B_{P\alpha} = y_P n_{\alpha P} / n_\alpha, \quad B_{R\beta} = y_R n_{\beta R} / n_\beta, \quad B_{P\beta} = y_P n_{\beta P} / n_\beta,$$

$$B_R = y_R (n_{\alpha R} + n_{\beta R}) / (n_\alpha + n_\beta) \quad \text{and} \quad B_P = y_P (n_{\alpha P} + n_{\beta P}) / (n_\alpha + n_\beta)$$

It follows at once that

$$y_\alpha = B_{R\alpha} + B_{P\alpha} \quad y_\beta = B_{R\beta} + B_{P\beta} \quad \text{and} \quad y_c = B_R + B_P$$

because all tax bases in the representative tax system are “tax bases as components of income” when provincial revenue is raised by income taxation with different rates on different tax brackets.

Average tax rates - ratios of tax revenues to tax bases - in on rich people, on poor people and in the country as a whole - are designated as  $\tau_R$ ,  $\tau_P$ , and  $\tau_c$  where

$$\tau_R = (\tau_{\alpha R} n_{\alpha R} + \tau_{\beta R} n_{\beta R}) / (n_{\alpha R} + n_{\beta R})$$

$$\tau_P = (\tau_{\alpha P} n_{\alpha P} + \tau_{\beta P} n_{\beta P}) / (n_{\alpha P} + n_{\beta P})$$

$$\text{and} \quad \tau_c = \{y_R (\tau_{\alpha R} n_{\alpha R} + \tau_{\beta R} n_{\beta R}) + y_P (\tau_{\alpha P} n_{\alpha P} + \tau_{\beta P} n_{\beta P})\} / \{y_R (n_{\alpha R} + n_{\beta R}) + y_P (n_{\alpha P} + n_{\beta P})\}$$

$$\text{so that } \tau_c = \{y_R \tau_R (n_{\alpha R} + n_{\beta R}) + y_P \tau_P (n_{\alpha P} + n_{\beta P})\} / \{y_R (n_{\alpha R} + n_{\beta R}) + y_P (n_{\alpha P} + n_{\beta P})\}$$

$$= \tau_R \left[ \frac{\{y_R (n_{\alpha R} + n_{\beta R})\}}{\{y_R (n_{\alpha R} + n_{\beta R}) + y_P (n_{\alpha P} + n_{\beta P})\}} + \frac{\{y_P (n_{\alpha P} + n_{\beta P})\}}{\{y_R (n_{\alpha R} + n_{\beta R}) + y_P (n_{\alpha P} + n_{\beta P})\}} \right]$$

$$= \tau_R S + \tau_P(1-S)$$

where  $S$  is rich people's share of the national income as a whole. The national average provincial tax rate,  $\tau_c$ , is the share-weighted average of provincial tax rates,  $\tau_R$  and  $\tau_P$ , on rich and poor people. Under the macro formula, the mandated equalization to province  $\alpha$  becomes

$$\begin{aligned} E_{\alpha, \text{macro}} &= \tau_c(y_c - y_\alpha) = \tau_c[(y_\alpha n_\alpha + y_\beta n_\beta)/n_c - y_\alpha] = \tau_c[(y_\alpha n_\alpha + y_\beta n_\beta)/n_c - y_\alpha (n_\alpha + n_\beta)/n_c] \\ &= \tau_c[(y_\beta - y_\alpha)n_\beta/n_c] \end{aligned}$$

and, by symmetry,  $E_{\beta, \text{macro}} = \tau_c[(y_\alpha - y_\beta)n_\alpha/n_c] = -(n_\alpha/n_\beta)E_{\alpha, \text{macro}}$

so that  $n_\beta E_{\beta, \text{macro}} + n_\alpha E_{\alpha, \text{macro}} = 0$  as in equation (7) in the text. The same relation holds for the representative tax system.

What now needs to be shown is that  $E_{\alpha, \text{RTS}} > E_{\alpha, \text{macro}}$  if and only if the tax system is progressive which means in this context that  $\tau_R > \tau_P$  for any given average national tax rate  $\tau_c$ . This follows mechanically from the definitions of  $E_{\alpha, \text{RTS}}$  and  $E_{\alpha, \text{macro}}$ .

$$\begin{aligned} E_{\alpha, \text{RTS}} - E_{\alpha, \text{macro}} &= \tau_R (B_R - B_{R\alpha}) + \tau_P (B_P - B_{P\alpha}) - \tau_c(y_c - y_\alpha) \\ &= \tau_R (B_R - B_{R\alpha}) + \tau_P (B_P - B_{P\alpha}) - \tau_c(B_R + B_P - B_{R\alpha} - B_{P\alpha}) \\ &= (\tau_R - \tau_c)(B_R - B_{R\alpha}) + (\tau_P - \tau_c)(B_P - B_{P\alpha}) \end{aligned}$$

where  $(B_R - B_{R\alpha}) = y_R[(n_{\alpha R} + n_{\beta R})/n_c - (n_{\alpha R}/n_\alpha)] > 0$  because province  $\alpha$  is a poor province with less than the national average number of rich people,

where  $(B_P - B_{P\alpha}) = y_P[(n_{\alpha P} + n_{\beta P})/n_c - (n_{\alpha P}/n_\alpha)] < 0$  because province  $\alpha$  is a poor province with more than the national average number of poor people,

where  $(\tau_R - \tau_c) > 0$  and  $(\tau_P - \tau_c) < 0$  as long as provincial taxation is on the average progressive,

but where  $(\tau_R - \tau_c) < 0$  and  $(\tau_P - \tau_c) > 0$  if provincial taxation is regressive. It then follows at once that

$E_{\alpha, \text{RTS}} > E_{\alpha, \text{macro}}$  when provincial taxation is progressive and

$E_{\alpha, \text{RTS}} < E_{\alpha, \text{macro}}$  when provincial taxation is regressive. QED

It follows as a corollary to this proposition that, with equalization up-but-not-down, the rich province rather than the poor province is the recipient of equalization payments if the common tax rate on poor people is substantially higher than the tax rate on rich people. The mandated equalization payment to the poor province is

$$E_{\alpha, RTS} = \tau_R (B_R - B_{R\alpha}) + \tau_P (B_P - B_{P\alpha})$$

$$B_{R\alpha} = y_R n_{\alpha R} / n_{\alpha}, \quad B_{P\alpha} = y_P n_{\alpha P} / n_{\alpha}, \quad B_R = y_R (n_{\alpha R} + n_{\beta R}) / (n_{\alpha} + n_{\beta})$$

$$\text{and } B_P = y_P (n_{\alpha P} + n_{\beta P}) / (n_{\alpha} + n_{\beta})$$

so that

$$\begin{aligned} E_{\alpha, RTS} &= [\tau_R y_R][n_{\alpha R} / n_{\alpha} - (n_{\alpha R} + n_{\beta R}) / (n_{\alpha} + n_{\beta})] + [\tau_P y_P][n_{\alpha P} / n_{\alpha} - (n_{\alpha P} + n_{\beta P}) / (n_{\alpha} + n_{\beta})] \\ &= T_R Q_{R\alpha} + T_P Q_{P\alpha} \end{aligned}$$

where  $T_R$  is defined equal to  $\tau_R y_R$  and is the dollar values of the tax on the rich in both provinces

$T_P$  is defined equal to  $\tau_P y_P$  and is the dollar values of the tax on the poor in both provinces

$Q_{R\alpha}$  is defined equal to  $n_{\alpha R} / n_{\alpha} - (n_{\alpha R} + n_{\beta R}) / (n_{\alpha} + n_{\beta})$  and is the difference between the proportion of rich people in the poor province and in the country as a whole, and

$Q_{P\alpha}$  is defined equal to  $n_{\alpha P} / n_{\alpha} - (n_{\alpha P} + n_{\beta P}) / (n_{\alpha} + n_{\beta})$  and is the difference between the proportion of poor people in the poor province and in the country as a whole.

Since  $Q_{R\alpha} + Q_{P\alpha} = 0$  by definition, the equalization formula can be rewritten as

$$E_{\alpha, RTS} = [T_R - T_P] Q$$

where  $Q$  is the common absolute value of  $Q_{R\alpha}$  and  $Q_{P\alpha}$ . Thus,  $E_{\alpha, RTS}$  would be negative - indicating that the rich province rather than the poor province would be the recipient of equalization payments - if and only if  $T_R < T_P$ . This is never so when the provincial tax structure is progressive, proportional or even regressive as long as the degree of regressivity is not too large. It might be so if the provincial tax structure were very regressive. As mentioned at the beginning of this article, the head tax is right on the margin. With a head tax,  $T_R = T_P$  so that no equalization payments would be warranted under the representative tax system.