FEDERAL GRANTS AND PROVINCIAL EXPENDITURES AND REVENUE

THE EFFECT OF FEDERAL GRANTS ON PROVINCIAL EXPENDITURE AND

REVENUE DECISIONS: ONTARIO AND NEW BRUNSWICK COMPARED

By

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ABSTRACT

In this thesis, the response of a provincial government's budgetary decisions with respect to changes in Federal conditional and unconditional grants was investigated with special reference to whether or not the responses of a high income province (Ontario) differed from those of a low income province (New Brunswick).

In order to facilitate the analysis, a theoretical framework (called Model I) was set forth in which a province's expenditure and tax responses to changes in net provincial product and Federal grants could be derived. Using this framework, separate equations were estimated for Ontario and for New Brunswick for those expenditures aided by the National Health Grant Program, the Trans-Canada Highway Program, the Hospital Insurance and Diagnostic Services Program, and the categorical welfare programs and the Canada Assistance Plan; and for other aided expenditures, unaided expenditures, and revenue.

Since expenditure data were not available according to the definitions required for Model I, separate expenditure equations could not be estimated, within the context of Model I, for education, fish and game, forests, and lands (settlement and agriculture). Thus, an alternative framework (called Model II) was developed. In Model II, these data difficulties were taken into account through a reformulation of the province's quadratic utility function; this allowed the magnitude of the conditional and unconditional grant coefficients to be derived and interpreted prior to estimation. Nine expenditure equations and one revenue equation were estimated for Ontario and for New Brunswick

within the framework of Model II.

The major difference between the dependent variables used in Model I and Model II is that in the latter the dependent expenditure variable for each program area considered separately allows the inclusion of expenditures which may be both aided and unaided whereas in Model I the dependent variable for programs considered separately properly includes expenditures only on those goods and services which are specifically aided by federal conditional grants.

On the basis of the empirical estimates of Models I and II, the following conclusions may be drawn: first, Ontario and New Brunswick do not appear to respond to changes in Federal conditional and unconditional grants in the same manner. For example, the empirical estimates of Model I reveal that only New Brunswick's expenditures responded as predicted to the receipt of Federal limited conditional grants in the three limited grant programs considered separately, namely, the General Health Grants' Program, hospital construction, and the Trans-Canada Highway. On the other hand, the empirical estimates of Model II indicate that Federal conditional grants for hospital construction, hospital insurance and diagnostic services, social welfare, and lands (settlement and agriculture) stimulated both provinces' expenditures in these areas during the period from 1948 to 1970; and that Federal grants for the Trans-Canada Highway encouraged Ontario's total road expenditures while grants received under the General Health Grants' Program and under the various forestry programs stimulated New Brunswick's expenditures on general and public health and on forests, respectively. With regard to

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unconditional grants, only Ontario's expenditures on education and New Brunswick's expenditures on lands (settlement and agriculture) were stimulated by their receipt.

A second conclusion is that conditional grants stimulate spending on individual programs to a greater degree than do unconditional grants; and, third, unconditional grants are used as a substitute for own source revenue in the case of New Brunswick. In addition, the theoretical models' predictions that a province responds to the same extent to changes in net provincial product and unconditional federal grants is supported in the case of both Ontario and New Brunswick.

ACKNOWLEDGMENTS

I wish to thank my supervisor, Professor J.A. Johnson, for his advice and assistance during the preparation of this study.

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I

INTRODUCTION

1. General

Problems arise in federal systems because of the disparity

between the constitutional and political responsibilities of govern-

ments and their revenue-raising capacities. A large proportion of the

federal government's revenue is derived from personal and corporate

income taxes while the provinces and municipalities, which are respons-

ible for many basic government services such as education, health,

social welfare, transportation and communications, and protection of

property and persons, have less elastic revenue sources in the form

of sales taxes, property taxes, license fees, and profits from liquor

sales. In the case of the federal government, the progressivity of

the tax rate structure ensures that as long as national income grows,

federal revenues from personal and corporate income taxes will grow

at a faster rate. On the other hand, provincial revenues from its

own sources increase more slowly than national income and have lagged

behind the income-elastic demands for government services in recent

years.

This disparity between revenues and responsibilities has led

the provincial governments to seek financial aid from the federal

government. This federal aid has increased from $107 million in uncon-

ditional grants plus $115 million in conditional grants in 1948-49[1] to

$1,101 million in unconditional grants and $1,896 million in conditional

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grants in 1970-71.[2] The purpose of this thesis is to determine how two

provinces - one with a high per capita income (Ontario) and one with a

low per capita income (New Brunswick)[3] - have responded in their expend-

iture and revenue decisions to these Federal grants and whether or not

the responses which have been derived in previous studies of the effect

of Federal grants on total provincial expenditure are generally confirmed

when the individually aided programs are considered separately.

The balance of this Chapter will provide a brief review of the

major criticisms which have been levied against previous studies of the

effect of federal grants on subordinate government expenditures and will

indicate the ways in which this study overcomes these problems.

2. Empirical Studies: A Brief Review

One of the first empirical investigations of the determinants

of subordinate government expenditures was Fabricant's 1952 study of

the relationship between interstate variations in state and local expend-

iture and per capita income, population density, and the percentage of

the population living in urban areas.[4] With the discovery by Brazer[5]

and Kurnow[6] that the addition of federal grants as an independent vari-

able improved the performance of the regression equation, the now con-

siderable literature on grants was launched.[7]

The empirical studies on the effect of federal grants on sub-

ordinate government expenditures have been criticized on both theoretical

and statistical grounds.[8]

A majority of the early studies were one-equation models, with

no attempt being made to provide a theoretical framework.[9] In 1968,

an improvement in the theoretical development was made with the

appearance of two studies - one by Henderson[10] and the other by

Gramlich[11] - in which the equations to be estimated were derived from

a theoretical base. Although Henderson focused attention on the local

sector and Gramlich's study was concerned with the effect of federal

grants on state and local expenditures, both studies postulated

(albeit in somewhat different forms) that the state and/or local

government's utility is a function of per capita expenditures on

public and private goods subject to its budget constraint which

includes taxes from its own revenue sources, intergovernmental revenues,

and debt. Using Lagrangian multipliers, the government's utility func-

tion was maximized subject to the budget constraint, and the system

was solved for government expenditures and taxes. Henderson then used

one period cross-sectional data to estimate local government expenditure

and tax equations for both metropolitan and nonmetropolitan counties.

Gramlich estimated total state and local expenditure and tax equations

using time series data.

In a subsequent publication,[12] Gramlich divided the expenditure

and tax equations into several categories; however, since these equations

were still estimated on a total state and local basis, whether or not

federal grants affected the expenditure and tax decisions of the differ-

ent states to the same extent could not be determined. In addition,

since the expenditure categories were not disaggregated according to

the type of grant for which they were eligible, the effect of federal

grants on the specific programs to which they were directed could not

be discerned.

One of the fundamental statistical problems in dealing with the effect of federal conditional grants on a province's expenditures concerns the direction of causation between these two variables. As will be shown in Chapter II, not only do grants affect expenditures but also the expenditure demands of a province can determine the amount of federal conditional grants which it receives. Treating aid as an independent variable in this case would result in a simultaneous equations' bias if the method of ordinary least squares was used. One technique which would circumvent this problem is the use of a truly exogenous representation of grants, such as total grant allocation. This information, however, is not available for all aided programs. Another approach involves the use of a two-stage estimation procedure in which the first stage involves regressing grants on various variables which are the true exogenous determinants of federal grants, with the estimated grant amounts being used in the second-stage estimates of a province's expenditures. Since the causation from grants to expenditures will not be accurately measured with the latter approach unless grants are regressed on variables which very closely represent the true exogenous component of grants, Gramlich suggests that the usual practice of simply using grants may provide the best compromise, although caution must be exercized when interpreting statistical results if the grant coefficient appears to be high.[13]

Another problem, and one that may occur whether the conditional grant is limited or unlimited, is that the inclusion of aid as an independent variable in the regression equations results in expenditures,

to a large extent, being regressed on themselves, and a high degree of correlation is only to be expected if a province is required to spend the matching grant.[14] This, however, may not always occur since in reality a province is not required to spend the entire grant, to the extent that it can substitute the receipts from the federal government for expenditures which it would have made in the absence of the grant. On the other hand, if a province's demand is elastic for large changes in relative prices or if the provincial program would not exist were federal funds not forthcoming, then the increase in expenditures would be expected to be greater than the increase in the federal grant. This correlation problem may be overcome either by using provincial expenditures less federal grants as the dependent variable and grants as an independent variable[15] or by using total provincial expenditure including grants as a dependent variable but testing whether or not the coefficient of grants is significantly different from one rather than whether or not it is significantly different from zero.[16]

One of the unusual aspects of the statistical studies on the effects of federal grants on state and local, or provincial and municipal, expenditures is the predominance of cross-section studies.[17] Approximately three-quarters of the studies have used cross-section data while only one-fourth have used time-series data. The basic advantage of using the cross-sectional approach is the amount and variance of the available data for estimating the regression coefficients; however, two disadvantages must be noted. First, the structure may not be constant across units; for example, since the problems

faced by Ontario and New Brunswick are not identical, the response of
each province to external aid may also be different. Second, in one-
period cross-section studies, the period chosen may unduly influence
the estimates which result.[18] The latter problem may be overcome by
estimating pooled cross-section regressions. Maley used the pooled
cross-section approach in her study of the effect of Federal grants
on provincial budgetary decisions and included a separate additive
dummy variable for nine of the ten provinces. Her results, however,
do not indicate whether or not a differential response to Federal
grants occurs on the part of the various provinces.

3. This Study

Three important areas of controversy in the grants' literature
concern the lack of a theoretical basis, the direction of causation
between expenditures and grants, and the predominance of one-period
cross-section studies.

In this thesis, a theoretical basis is provided by the formula-
tion of a theoretical model in Chapter III. In addition, in order to
maintain consistency between the theoretical model and the empirical
results, the expenditure and tax equations which are derived from the
original utility function are estimated, not on a total basis for all
provinces, but for only one province at a time.

With regard to the problem of causation between provincial
expenditures and federal grants, the direction of causation is noted
in Chapter IV for each major program which is aided by the Federal
Government. This information is incorporated into the empirical estimates

of the theoretical model which are recorded in Chapter V.

Since the purpose of this study is to determine whether or not the response of a wealthy province to changes in federal grants, whether conditional or unconditional, was different from the response of a less wealthy province during the period from 1948 to 1970, a time-series approach is used since it is one of the most suitable methods for studying the effect of federal grants on two individual provinces' budgetary decisions over time.

4. Summary

This Chapter has outlined the major criticisms which have been levied against studies of federal grants as determinants of subordinate government expenditures and the methods used in this study to circumvent these problems. The next Chapter will focus attention on the theory of grants - as a prelude to the presentation of a theoretical model in Chapter III.

Footnotes - Chapter I

[1]These data were obtained from Canada, Statistics Canada, Financial Statistics of Provincial Governments, 1948 (Ottawa: Queen's Printer).

[2]These data were obtained from Canadian Tax Foundation, The National Finances, 1972-73 (Toronto: Canadian Tax Foundation, 1972), p. 145.

[3]In 1971, Ontario's per capita personal income was $3967 while New Brunswick's was $2469. While Newfoundland and Prince Edward Island had per capita personal incomes that were lower than New Brunswick's, neither was chosen as the representative of the less wealthy provinces since Newfoundland received special Federal grants as a result of its entry into Confederation in 1949 and since Prince Edward Island's population is exceedingly low (112,000 in 1971).

[4]Solomon Fabricant, The Trend of Government Activity in the United States Since 1900 (New York: National Bureau of Economic Research, In., 1952), pp. 112-139.

[5]Harvey E. Brazer, City Expenditures in the United States (New York: National Bureau of Economic Research, Inc., 1959).

[6]Ernest Kurnow, "Determinants of State and Local Expenditures Re-examined", National Tax Journal, XVI, No. 3 (September 1963), 252-255.

[7]A majority of these studies, which are noted in the bibliography, are on the effect of U.S. federal grants on state and local expenditures. Three of the Canadian studies are Nicholas A. Michas, "Variations in the Level of Provincial-Municipal Expenditures in Canada: An Econometric Analysis", Public Finance, XXIV, No. 4 (1969), 596-613; Jean McCans Maley, "The Impact of Federal Grants on Provincial Budgets: Canada", Ph.D. Thesis, University of Rochester, 1971; and Ronald G. Bodkin and David W. Conklin, "Scale and Other Determinants of Municipal Government Expenditures in Ontario: A Quantitative Analysis", International Economic Review, XII, No. 3 (October 1971), 465-481.

[8]See Elliott R. Morss, "Some Thoughts on the Determinants of State and Local Expenditures", National Tax Journal, XIX, No. 1 (March 1966), 95-103; Edward M. Gramlich, "The Effect of Federal Grants on State-Local Expenditures: A Review of the Econometric Literature", Proceedings of the Sixty-second Annual Conference on Taxation of the National Tax Association, Boston, Mass., September 29-October 3, 1969;

and Richard M. Bird, The Growth of Government Spending in Canada, Canadian Tax Papers, No. 51 (Toronto: Canadian Tax Foundation, 1970), pp. 39-45 and 209-224.

[9]For example, see the studies, as noted in the bibliography, by Glenn W. Fisher; Ernest Kurnow; Seymour Sacks and Robert Harris; and R.W. Bahl, Jr. and R.J. Saunders.

[10]James M. Henderson, "Local Government Expenditures: A Social Welfare Analysis", Review of Economics and Statistics, L (1968), 156-163.

[11]Edward M. Gramlich, "Alternative Federal Policies for Stimulating State and Local Expenditures: A Comparison of Their Effects", National Tax Journal, XXI, No. 2 (June 1968), 119-127. See also Robin Barlow, "A Comment on Alternative Federal Policies for Stimulating State and Local Expenditures", National Tax Journal, XXII, No. 2 (June 1969), 282-285; and Edward M. Gramlich, "A Clarification and a Correction', National Tax Journal, XXII, No. 2 (June 1969), 286-290.

[12]Edward M. Gramlich, "State and Local Governments and Their Budget Constraint", International Economic Review, X, No. 2 (June 1969), 163-182.

[13]Gramlich, "The Effect of Federal Grants on State-Local Expenditures: A Review of the Econometric Literature", pp. 581-582.

[14]Morss, pp. 97-99.

[15]Morss, p. 98.

[16]Gramlich, "The Effect of Federal Grants on State-Local Expenditures: A Review of the Econometric Literature", p. 582.

[17]In most other areas of applied econometrics, the time-series approach has been used. See Gramlich, "The Effect of Federal Grants on State-Local Expenditures: A Review of the Econometric Literature", p. 578.

[18]This is aptly demonstrated by Thomas F. Pogue and L.G. Sgontz, "The Effect of Grants-in-Aid on State-Local Spending", National Tax Journal, XXI, No. 2 (June 1968), pp. 190-199.

[19]Maley, p. 130.

II

THE THEORY OF GRANTS

1. Introduction

The receipt of a federal grant by a provincial government will alter the latter's budget constraint. The extent of this alteration is determined by the nature of the grant received. Federal grants can be conditional or unconditional, matching or non-matching - with the former group relating to whether or not the federal government has stipulated the expenditure category on which the grant funds must be spent and the latter group relating to whether or not the provincial government must finance a given percentage of the expenditures on the aided category before the federal funds will be forthcoming. In addition, federal grants can be limited or unlimited, i.e., the federal government may or may not set an upper limit to the funds which it will give to a province for any given expenditure category.

In this Chapter, the relative effects of the following four grant categories, which have been used in Canada, will be considered: conditional matching unlimited, conditional matching limited, conditional non-matching limited, and unconditional non-matching limited.[1]

2. The Relative Effects of Federal Grants

Microeconomic theory may be used to analyze the effect of federal government grants on a provincial government's expenditures through the utilization of the indifference curve analysis used in the study of consumer behaviour.[2]

Assume that each province's budgetary decisions are made by a rational decision-maker who seeks to maximize a utility function subject to the budget constraint faced by the given provincial government. For simplicity, assume that the utility function of the provincial government contains only two arguments: E_1, which represents a public good that is aided by federal grants, and E_2, which represents a public good that is not eligible for federal aid.[3] Assume, also, that both the per unit prices of E_1 and E_2 and that the total amount of funds available for the use of the provincial government at a given point in time are known. The original budget line AA shown in Figures II-1 to II-5 thus represents the possible combinations of E_1 and E_2 which can be purchased with the province's own revenue sources. The original equilibrium point at a represents the point of tangency between the original budget line and the highest indifference curve which can be reached, given AA. In Figures II-1 to II-5, the income consumption line, OI, and the price consumption line, AacP, have been shown in lieu of the family of indifference curves.

2.1 Conditional Federal Grants

The effect of the receipt of an unlimited matching conditional grant is to reduce the per unit cost of the aided program, E_1, thus enabling a province to purchase a greater number of units with the same provincial outlay. As shown in Figure II-1, the new budget line facing the provincial government becomes AC', and the equilibrium position moves from a to c. The extent of the increase in the province's purchases of the aided public good, and whether or not the province

FIGURE II-1

THE EFFECT OF A FEDERAL UNLIMITED MATCHING CONDITIONAL GRANT

ON THE CHOICE BETWEEN TWO PUBLIC GOODS
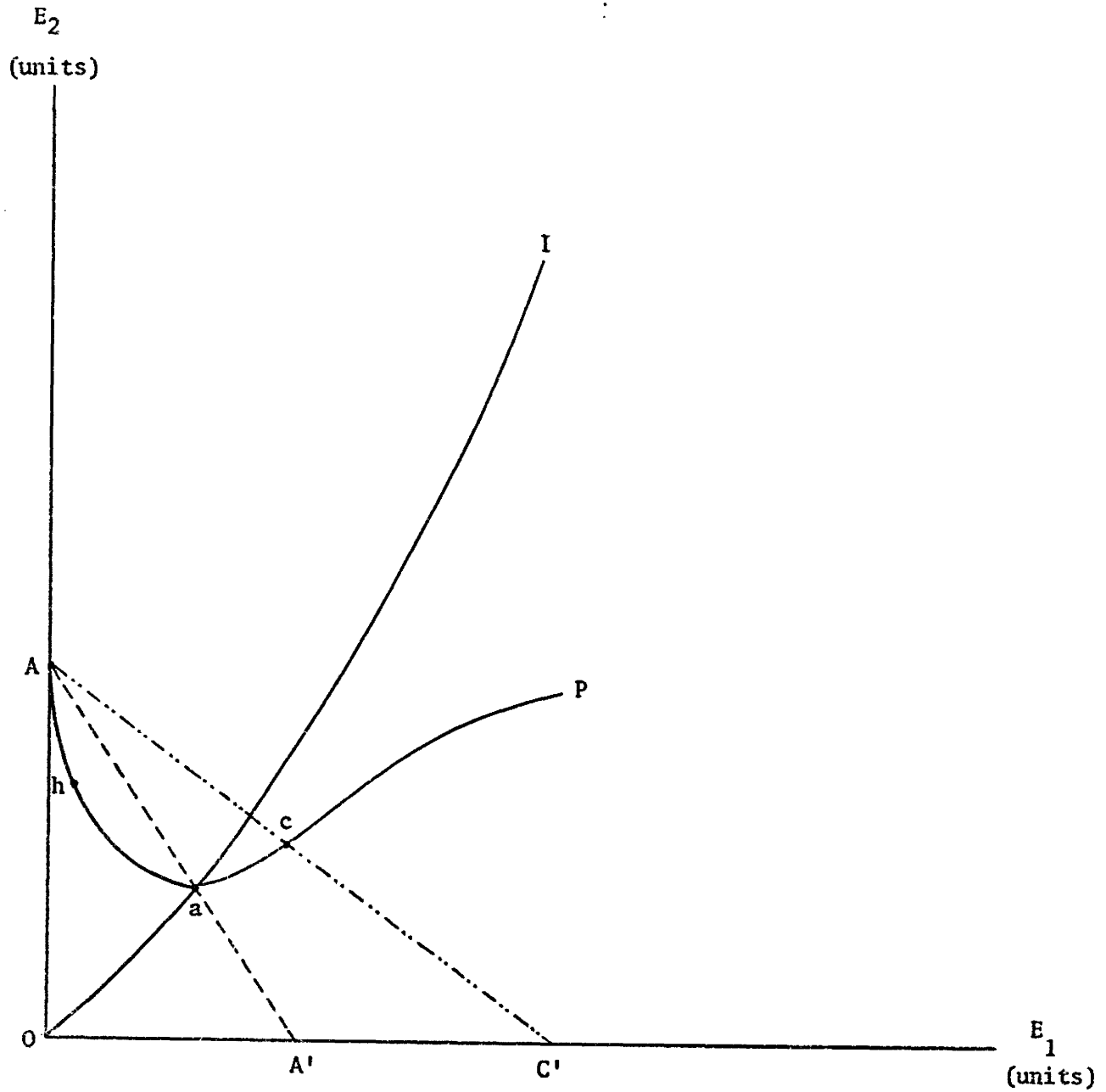
will increase or decrease its purchases of the unaided good, will be determined by the province's price elasticity of demand for E_1. In the case shown in Figure II-1, i.e., a movement from point a to point c, the province will increase its expenditure on both the aided and the unaided public goods. If, however, the initial per unit price of the aided good had been higher and the original equilibrium point had been on the elastic portion of the price consumption line, say, at point h, then the receipt of a matching conditional grant from the federal government would have resulted in an expenditure increase on the aided good that is greater than the amount of the grant, combined with a decline in the province's purchases of the unaided public good.

If the federal government wishes to finance only a given number of units of E_1, the relative price of the aided good will revert to its original level once the total federal allocation of funds has been taken up by the provincial government. Figure II-2 illustrates the effect of three different federal limited matching conditional grants on a province's choice between the two public goods. First, if faced with budget line AdD', the province would choose point d' - a position which is to the right of the "kink" in the budget line at d. Second, if faced with budget line AcB', the province would choose point c - a position which is at the kink in the budget line. Third, if faced with budget line AeE', the province would choose point c - a position which is to the left of the kink in the relevant budget line. In the third case, the federal grant limit is not effective, i.e., the point chosen is identical to that which would have been chosen had the

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FIGURE II-2

THE EFFECT OF A FEDERAL LIMITED MATCHING CONDITIONAL GRANT

ON THE CHOICE BETWEEN TWO PUBLIC GOODS

conditional grant been unlimited. In fact, any federal limit greater than c would be ineffective, given the province's price elasticity of demand for the aided public good.

The effect of a non-matching conditional grant is to make the aided good costless to the province until the limit of the grant is taken up. Figure II-3 illustrates two budget lines which would be faced by the provincial government, depending upon the extent of the federal limit for a conditional non-matching grant. A federal grant of AB would alter the budget constraint of the provincial government from AA' to Ab'B', with the budget constraint returning to its original slope after the grant limit has been passed. In this instance, the equilibrium point would move from a to b - the latter being a position to the right of the kink at b'. On the other hand, if the amount of the federal grant were AF, the province would choose point f - a position which is at the kink in budget line AfF'. In fact, for any federal conditional non-matching grant greater than or equal to AF, the new equilibrium point for the provincial government would be at the kink of the given budget line.

2.2 Unconditional Federal Grants

Figure II-4 illustrates the impact of an unconditional grant of AB on the expenditure opportunities of a provincial government. In this case, the original budget line shifts upward to BB', and the equilibrium point now moves from a to b. As in the case of the fore-going three types of conditional grants, provincial expenditure on both the aided and the unaided public goods has increased.

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FIGURE II-3

THE EFFECT OF A FEDERAL LIMITED NON-MATCHING CONDITIONAL GRANT

ON THE CHOICE BETWEEN TWO PUBLIC GOODS
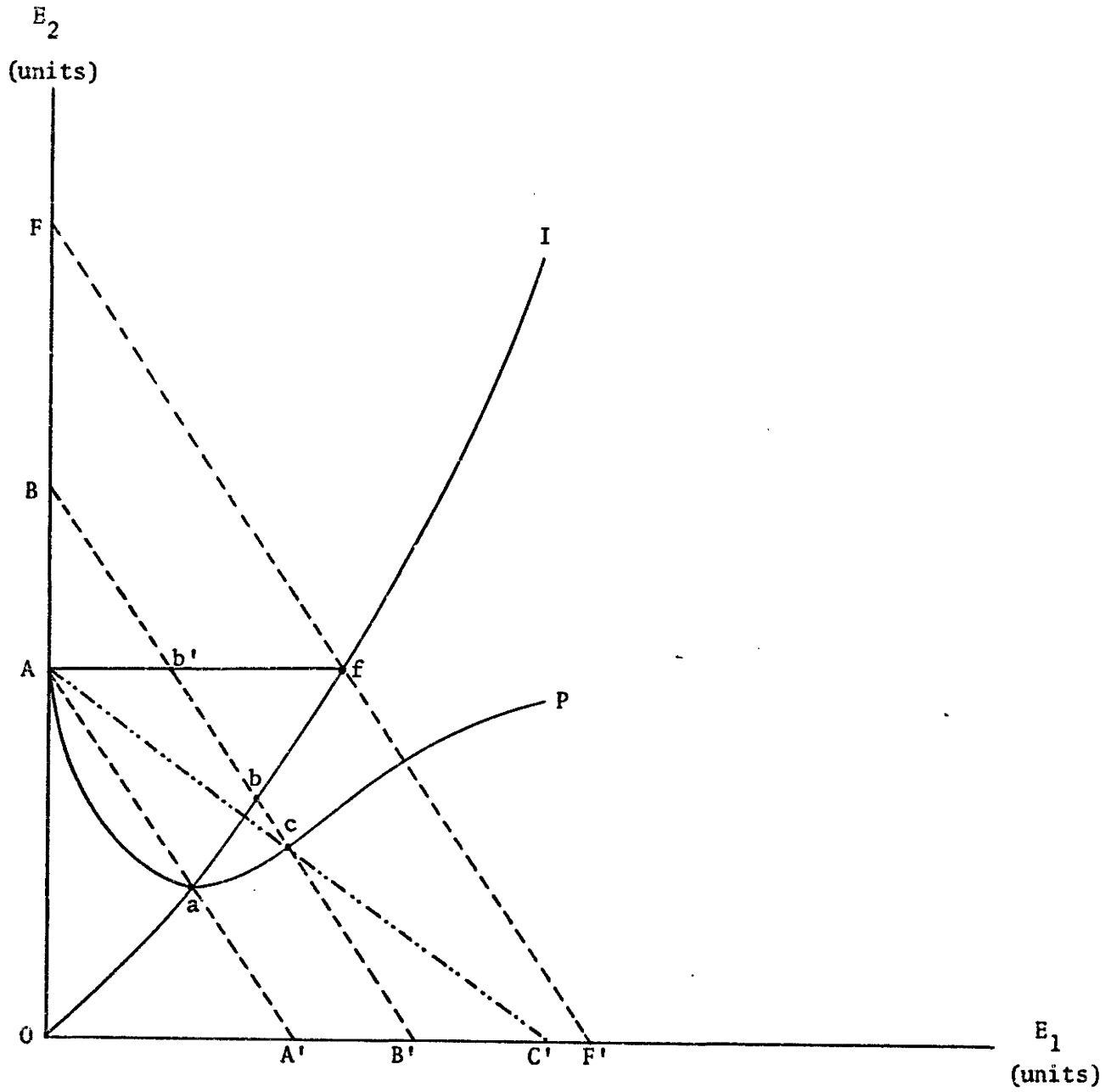
FIGURE II-4

THE EFFECT OF A FEDERAL UNCONDITIONAL GRANT

ON THE CHOICE BETWEEN TWO PUBLIC GOODS
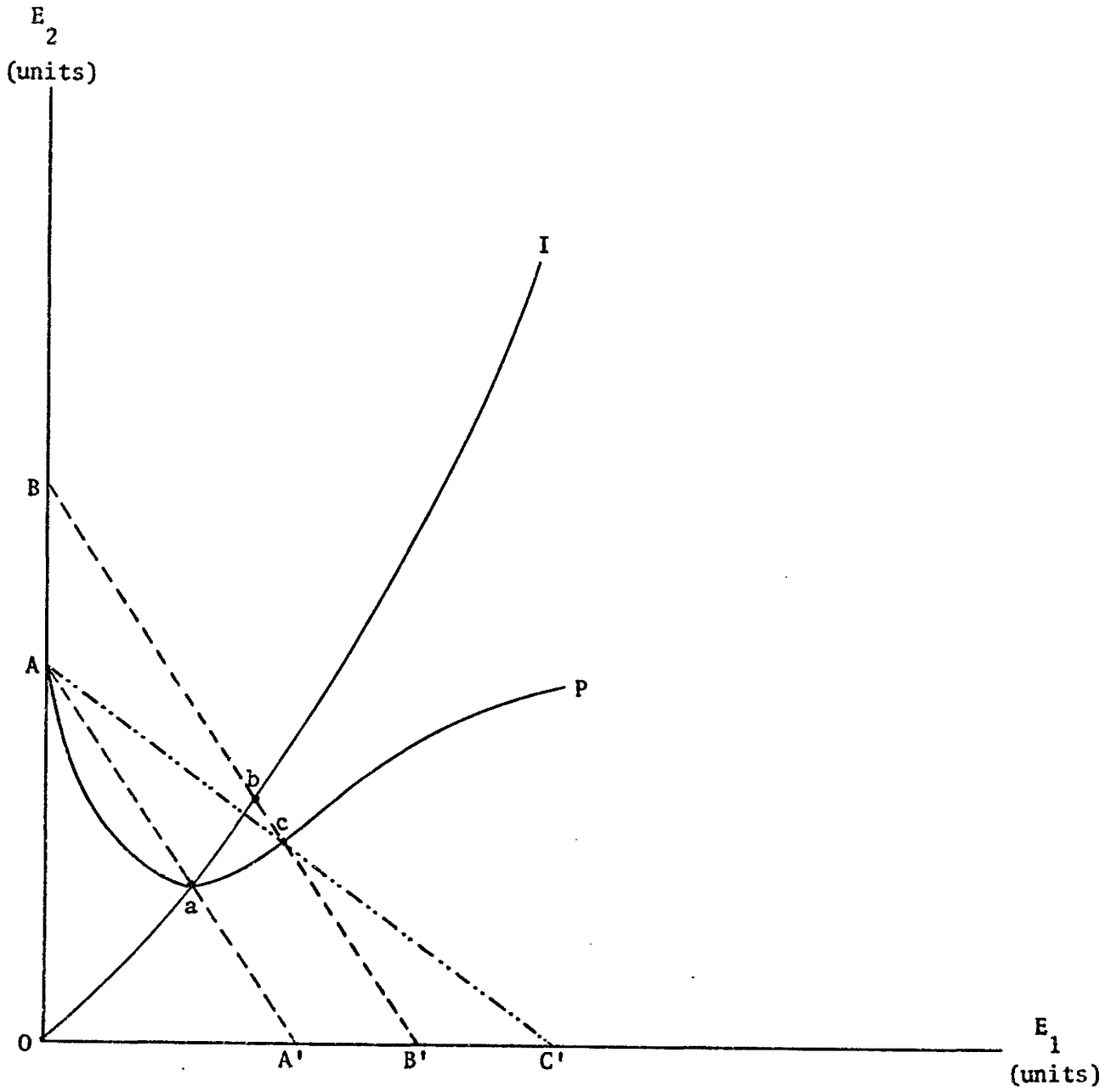
3. Summary

Figure II-5 illustrates the relative effects of the four types of grants just considered, given the province's marginal propensity to consume and price elasticity of demand for the aided public good. To the extent that this model is realistic, the following conclusions may be drawn:

First, a limited non-matching conditional grant will stimulate the same amount of expenditure on the aided good as will an unconditional grant of the same size until both grants exceed AF in size. For grant amounts greater than AF, the conditional grant will be more stimulative (compare points g and g').

Second, whether or not a limited matching conditional grant will stimulate a greater amount of expenditure on the aided good than will an equal amount unconditional grant depends upon whether or not the limit of the conditional grant is effective. Only if the federal grant is larger than AJ will the limited matching conditional grant result in greater expenditure on the aided good than will an unconditional grant of the same size. The same conclusion holds when the unconditional grant is replaced by a limited non-matching conditional grant of equal size.

Third, an unlimited matching conditional grant will always stimulate more expenditure on the aided good than will a non-matching conditional grant of equal size and will never stimulate less expenditure on the aided good than will a limited matching conditional grant of the same dollar amount.

FIGURE II-5

THE RELATIVE EFFECTS OF FEDERAL CONDITIONAL AND UNCONDITIONAL GRANTS

ON THE CHOICE BETWEEN TWO PUBLIC GOODS
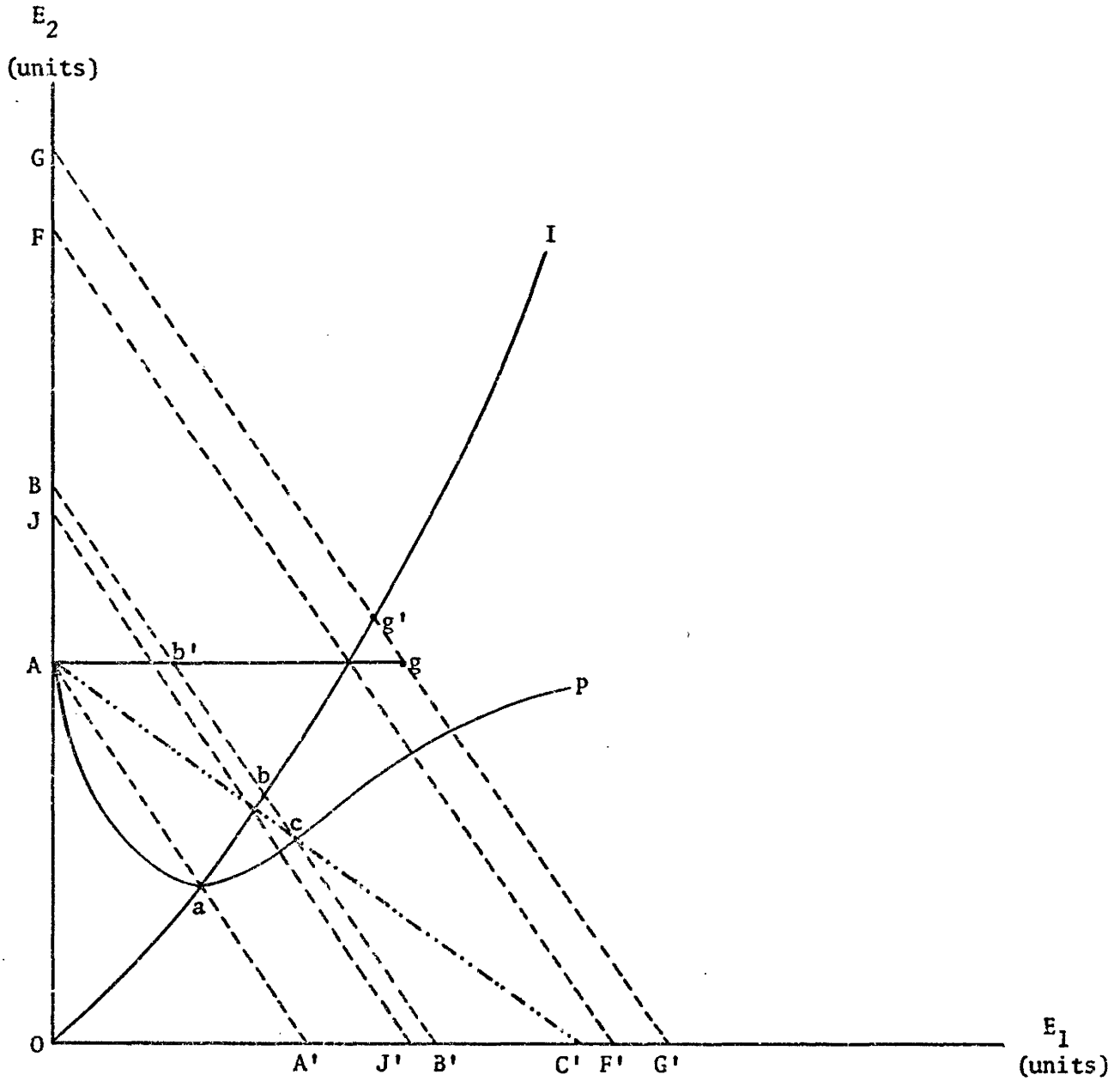
Finally, an unlimited conditional matching grant will stimulate expenditure on the aided good to a larger extent and expenditure on the unaided good to a lesser degree than will an unconditional grant of the same dollar amount (compare points $\underline{b}$ and $\underline{c}$). This occurs because in the case of the conditional grant both the income and the substitution effects are present, while in the case of the unconditional grant the increased expenditure on the aided good will depend only on the province's marginal propensity to consume E_1.

Footnotes - Chapter II

[1]Wilde has suggested that since an unconditional matching grant could be used by a provincial government for transfer payments to its residents, similar to a tax cut, it is clearly impractical because it would have no limit. See James A. Wilde, "The Expenditure Effects of Grant-in-Aid Programs", National Tax Journal, XXI, No. 3 (September 1968), 340, fn. 3.

[2]See A.D. Scott, "The Evaluation of Federal Grants", Economica, New Series, XIX, No. 76 (November 1952), 377-394; and Wilde, "The Expenditure Effects of Grant-in-Aid Programs", and "Grants-in-Aid: The Analytics of Design and Response", National Tax Journal, XXIV, No. 2 (June 1971), 143-155. For an alternate approach see D.F. Bradford and W.E. Oates, "Towards a Predictive Theory of Intergovernmental Grants", American Economic Review, LXI, No. 2 (May 1971), 440-448.

[3]Both E_1 and E_2 are assumed to represent normal goods; they are not, however, assumed to represent pure public goods in the Samuelsonian sense. See Paul A. Samuelson, "The Pure Theory of Public Expenditures", Review of Economics and Statistics, XXXVI, No. 4 (November 1954), 387-389, and "Diagrammatic Exposition of a Theory of Public Expenditures", Review of Economics and Statistics, XXXVII, No. 4 (November 1955), 350-356.

III

A THEORETICAL MODEL

1. Introduction

The relative effects of federal conditional and unconditional grants noted in the previous Chapter can also be derived through the use of a theoretical model presented in algebraic rather than in geometric terms. The algebraic model provides the focal point of this Chapter. First, a basic model will be set forth; second, the effect of the receipt of unconditional and then conditional federal grants on a province's budgetary decisions will be noted; and, finally, the model which will be used as the framework for the empirical estimates will be presented.

2. A Basic Model

For purposes of the theoretical development, the basic model and all subsequent variations are assumed, first, to be within the context of a one-good model, i.e., only one good which may be used for a variety of purposes is assumed to exist. Since, under this latter assumption, changes in relative prices do not arise, prices are not explicitly included in the theoretical development,[1,2] and the real and money values of the variables considered are identical. Second, there is only one provincial government decision-maker for each province. Third, the provincial government decision-maker has a consistent set of preferences for both public and private goods and services. These preferences include supplying two public goods,[3] E_1 and E_2, and

maximizing the private after-tax income of the province's residents. Fourth, both borrowing and taxes, as alternative ways of financing the province's expenditures on public goods, provide disutility.

In addition, the economy is assumed to be at full employment. This assumption allows net provincial product, Y, to be considered as an exogenous variable.

Finally, a province is assumed to maximize its utility subject to the budget constraint, i.e.,

maximize $U = U[E_1, E_2, (Y-T), -B]$

subject to $E_1 + E_2 - T - B = 0$

where E_1 and E_2 represent total expenditure on public good E_1 and on

public good E_2, respectively;

Y represents the net provincial product of a given province (less federal taxes plus federal transfers);[4]

T represents the total tax receipts of a given province; and

B represents total borrowing by a given province.

In the absence of federal grants, the one-period constrained utility function may be written as follows:[5]

(1) $\quad L = a_1 E_1 - \frac{1}{2} a_2 E_1^2 + a_3 E_2 - \frac{1}{2} a_4 E_2^2 + a_5 (Y-T) - \frac{1}{2} a_6 (Y-T)^2 - a_7 B$

$\quad\quad - \frac{1}{2} a_8 B^2 + \lambda(E_1 + E_2 - T - B)$

where the a_i are assumed to be positive.

The (Y-T) term represents the private after-tax income of a province's residents; $E_1 + E_2$ represents the province's total expenditures; and T + B represents the province's total receipts. The squared terms

represent diminishing marginal utility in the case of public goods'
expenditures and private after-tax income, and increasing marginal
disutility in the case of borrowing on the part of a province.

Maximizing equation (1) with respect to the policy variables
under the control of a provincial government, namely, E_1, E_2, T, and
B, along with the constraint parameter λ, for a given level of Y yields

(2a) $\dfrac{\partial L}{\partial E_1} = a_1 - a_2 E_1 + \lambda \quad = 0$

(2b) $\dfrac{\partial L}{\partial E_2} = a_3 - a_4 E_2 + \lambda \quad = 0$

(2c) $\dfrac{\partial L}{\partial T} = -a_5 + a_6 (Y-T) - \lambda = 0$

(2d) $\dfrac{\partial L}{\partial B} = -a_7 - a_8 B - \lambda \quad = 0$

(2e) $\dfrac{\partial L}{\partial \lambda} = E_1 + E_2 - T - B \quad = 0$

Solving the above system for expenditures and taxes yields the
following structural equations:

(3a) $E_1 = \dfrac{a_1 - a_7}{a_2 + a_8} + \dfrac{a_8}{a_2 + a_8} (T - E_2)$

(3b) $E_2 = \dfrac{a_3 - a_7}{a_4 + a_8} + \dfrac{a_8}{a_4 + a_8} (T - E_1)$

(3c) $T = \dfrac{a_7 - a_5}{a_6 + a_8} + \dfrac{a_6}{a_6 + a_8} Y + \dfrac{a_8}{a_6 + a_8} (E_1 + E_2)$

Solving for the reduced form of equations (3a) to (3c) yields
the following:

$$(4a) \quad E_1 = \frac{a_4[a_6 + a_8(1-a_5-a_7)] + a_6a_8(1-a_3)}{a_2a_4(a_6+a_8) + a_6a_8(a_2+a_4)} + \frac{a_4a_6a_8}{a_2a_4(a_6+a_8) + a_6a_8(a_2+a_4)} Y$$

$$(4b) \quad E_2 = \frac{a_2a_3(a_6+a_8) + a_6a_8(a_3-1) - a_2(a_6a_7+a_5a_8)}{a_2a_4(a_6+a_8) + a_6a_8(a_2+a_4)} + \frac{a_2a_6a_8}{a_2a_4(a_6+a_8) + a_6a_8(a_2+a_4)} Y$$

$$(4c) \quad T = \frac{a_2a_8(a_3-a_5) + a_2a_4(a_7-a_5) + a_4a_8(1-a_5)}{a_2a_4(a_6+a_8) + a_6a_8(a_2+a_4)} + \frac{a_2a_4a_6 + a_6a_8(a_2+a_4)}{a_2a_4(a_6+a_8) + a_6a_8(a_2+a_4)} Y$$

While the signs of the three constant terms are indeterminate, the coefficient of Y in each case lies between zero and one, indicating that an increase in a province's net product will result in increased consumption by the residents of the province of both public and private goods (the latter being due to a tax response which is less than one).

2.1 Unconditional Federal Grants

The receipt of an unconditional grant, G, from the federal government alters a provincial government's budget constraint and results in the following Lagrangian function:

$$(5) \quad L = a_1E_1 - \tfrac{1}{2}a_2E_1^2 + a_3E_2 - \tfrac{1}{2}a_4E_2^2 + a_5(Y-T) - \tfrac{1}{2}a_6(Y-T)^2 - a_7B$$
$$- \tfrac{1}{2}a_8B^2 + \lambda(E_1 + E_2 - G - T - B)$$

Maximizing the above function with respect to the policy variables under the control of the provincial government results in the following reduced form equation responses:[6]

$$(6a) \quad \frac{\partial E_1}{\partial Y} = \frac{\partial E_1}{\partial G} = \frac{a_4a_6a_8}{a_2a_4(a_6+a_8) + a_6a_8(a_2+a_4)}$$

(6b) $\dfrac{\partial E_2}{\partial Y} = \dfrac{\partial E_2}{\partial G} = \dfrac{a_2 a_6 a_8}{a_2 a_4 (a_6 + a_8) + a_6 a_8 (a_2 + a_4)}$

(6c) $\dfrac{\partial T}{\partial Y} = \dfrac{a_2 a_4 a_6 + a_6 a_8 (a_2 + a_4)}{a_2 a_4 (a_6 + a_8) + a_6 a_8 (a_2 + a_4)}$

(6d) $\dfrac{\partial T}{\partial G} = \dfrac{-a_2 a_4 a_8}{a_2 a_4 (a_6 + a_8) + a_6 a_8 (a_2 + a_4)}$

The above responses indicate that a province's expenditures on a given public good would increase by an identical amount regardless of of whether net provincial product had increased or whether the federal government had instituted a program of unconditional grants. On the tax side, however, the receipt of an unconditional grant results in a reduction in a province's tax revenues, indicating that the federal funds are being substituted for a province's own tax effort.

2.2 Conditional Federal Grants

Consider now the effect of a conditional matching grant, C_1, which is given to aid a province's expenditure on E_1. The receipt of a conditional grant from the federal government reduces the per unit cost of the aided good to the province. If the conditional grant is unlimited, the amount of the grant, C_1, is determined by the extent of a province's spending on the aided good, i.e., $C_1 = m_1 E_1$ where m_1 is the percentage of the total cost of E_1 which the federal government is willing to assume. In this case, the budget constraint becomes $E_1 + E_2 = C_1 + T + B$ or $(1-m_1)E_1 + E_2 = T + B$, and the resulting reduced form responses are

(7a) $\quad \dfrac{\partial E_1}{\partial Y} = \dfrac{a_4 a_6 a_8 (1-m_1)}{a_2 a_4 (a_6 + a_8) + a_6 a_8 [a_2 + a_4 (1-m_1)^2]}$

(7b) $\quad \dfrac{\partial E_2}{\partial Y} = \dfrac{a_2 a_6 a_8}{a_2 a_4 (a_6 + a_8) + a_6 a_8 [a_2 + a_4 (1-m_1)^2]}$

(7c) $\quad \dfrac{\partial T}{\partial Y} = \dfrac{a_2 a_4 a_6 + a_6 a_8 [a_2 + a_4 (1-m_1)^2]}{a_2 a_4 (a_6 + a_8) + a_6 a_8 [a_2 + a_4 (1-m_1)^2]}$

In this case, the size of the matching ratio affects the relative size of the reduced form coefficients, all of which lie between zero and one.

If, on the other hand, the federal government sets an upper limit of C_{10} to its conditional grant, two possibilities emerge: First, if the provincial government does not take up the total amount of the matching grant, $m_1 E_1 < C_{10}$, and the budget constraint and resulting solutions are identical to those shown for the case of an unlimited conditional grant; second, if the optimal solution in the case of an unlimited grant were such that $m_1 E_1 > C_{10}$, the grant enters as an exogenous variable in the budget constraint, i.e., the budget constraint becomes $E_1 + E_2 = C_{10} + T + B$, and the reduced form expenditure and tax responses are as follows:

(8a) $\quad \dfrac{\partial E_1}{\partial Y} = \dfrac{\partial E_1}{\partial C_{10}} = \dfrac{a_4 a_6 a_8}{a_2 a_4 (a_6 + a_8) + a_6 a_8 (a_2 + a_4)}$

(8b) $\quad \dfrac{\partial E_2}{\partial Y} = \dfrac{\partial E_2}{\partial C_{10}} = \dfrac{a_2 a_6 a_8}{a_2 a_4 (a_6 + a_8) + a_6 a_8 (a_2 + a_4)}$

$$(8c) \quad \frac{\partial T}{\partial Y} = \frac{a_2 a_4 a_6 + a_6 a_8 (a_2 + a_4)}{a_2 a_4 (a_6 + a_8) + a_6 a_3 (a_2 + a_4)}$$

$$(8d) \quad \frac{\partial T}{\partial C_{10}} = \frac{-a_2 a_4 a_8}{a_2 a_4 (a_6 + a_8) + a_6 a_8 (a_2 + a_4)}$$

The expenditure and tax responses to changes in net provincial product are as noted previously. An increase in conditional limited grants will result in increased expenditures by a provincial government and decreased tax receipts as the grants provide an alternate source of revenue for a province.

Limited non-matching conditional grants may be considered as a special case of the limited matching conditional grants with $m_1 = 1$. The effect of a non-matching grant is to make the aided good costless to the province until the limit of the grant is received. In terms of the diagrammatic analysis in Chapter II, if the indifference curves are downward sloping they can never be tangent to the zero-sloped budget line which results until the limit of the non-matching grant is taken up and, hence, one would expect that the province would be either at the kink or to the right of the kink in this case. On the other hand, in the case of a matching limited grant in which the total amount of the grant is not taken up by the province concerned, it is theoretically possible for the province to be to the left of the kink. In the case of a non-matching grant, if the province is to the right of the kink the solution will be the same as responses (8a) to (8d). If the province is at the kink, the solution in the case of the good being aided would be $E_1 = C_{10}/m_1$ regardless of whether the grant is matching or non-matching.

Whether or not the province will choose a position which is to the left, to the right, or at the kink in the budget line as shown in Figure II-2, Chapter II cannot be determined a priori.

3. Model I

For estimation purposes, the above model is extended by assuming that the province, in its expenditure decisions, differentiates between a public good which is aided by limited conditional grants (E_{11}), one which is aided by unlimited conditional grants (E_{12}), and one which is not aided by federal grants (E_2).

Assuming that the province takes up the total amount of any conditional limited grants, the revised Lagrangian function may be written as follows (with the b_i assumed to be positive):

$$(9) \quad L = b_1 E_{11} - \tfrac{1}{2} b_2 E_{11}^2 + b_3 E_{12} - \tfrac{1}{2} b_4 E_{12}^2 + b_5 E_2 - \tfrac{1}{2} b_6 E_2^2 + b_7 (Y-T)$$

$$- \tfrac{1}{2} b_8 (Y-T)^2 - b_9 B - b_{10} B^2 + \lambda (E_{11} + E_{12}(1-m_{12}) + E_2 - C_{10} - G - T - B)$$

Taking partial derivatives of the above equation with respect to the policy variables under the control of the provincial government, setting these partial derivatives equal to zero, and solving the resulting system leads to the following reduced form equations:

$$(10a) \quad E_{11} = \Big[\frac{b_1 b_8 b_{10} (b_6 + b_{10})(1-m_{12})^2 - b_3 b_6 b_8 b_{10}(1-m_{12})}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10}(1-m_{12})^2 + b_4 b_6 b_8 b_{10}}$$

$$+ \frac{b_4 b_6 [b_8 (b_1 - b_9) + b_{10}(b_1 - b_7)] + b_4 b_8 b_{10}(b_1 - b_5)}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10}(1-m_{12})^2 + b_4 b_6 b_8 b_{10}} \Big]$$

$$+ \frac{b_4 b_6 b_8 b_{10}}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10}(1-m_{12})^2 + b_4 b_6 b_8 b_{10}} (Y+G+C_{10})$$

$$(10b) \quad E_{12} = \left[\frac{b_2 b_3 b_6 (b_8 + b_{10}) + b_3 b_8 b_{10} (b_2 + b_6)}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} \right.$$

$$\left. - \frac{[b_6 b_8 (b_1 b_{10} + b_2 b_9) + b_2 b_{10} (b_5 b_8 + b_6 b_7)] (1-m_{12})}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} \right]$$

$$+ \frac{b_2 b_6 b_8 b_{10} (1-m_{12})}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} (Y + G + C_{10})$$

$$(10c) \quad E_2 = \left[\frac{b_2 b_4 [b_8 (b_5 - b_9) + b_{10} (b_5 - b_7)] + b_2 b_8 b_{10} (b_5 - b_9) (1-m_{12})^2}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} \right.$$

$$\left. + \frac{b_4 b_8 b_{10} (b_5 - b_1)}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} \right]$$

$$+ \frac{b_2 b_4 b_8 b_{10}}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} (Y + G + C_{10})$$

$$(10d) \quad T = \left[\frac{b_4 b_6 [b_2 (b_9 - b_7) + b_{10} (b_1 - b_7)] + b_2 b_4 b_{10} (b_9 - b_7)}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} \right.$$

$$\left. + \frac{b_2 b_6 b_{10} [b_3 (1-m_{12}) - b_7 (1-m_{12})^2]}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} \right]$$

$$+ \frac{b_2 b_4 b_8 (b_6 + b_{10}) + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} Y$$

$$- \frac{b_2 b_4 b_6 b_{10}}{b_2 b_4 [b_6 (b_8 + b_{10}) + b_8 b_{10}] + b_2 b_6 b_8 b_{10} (1-m_{12})^2 + b_4 b_6 b_8 b_{10}} (G + C_{10})$$

As in the previous formulations of the basic model, the coef-
ficients attached to net provincial product, unconditional grants, and
conditional limited grants all lie between zero and one in the three
expenditure equations. This suggests that all of the increase in net
provincial product or in federal grants will not be devoted to increasing
expenditures on only one expenditure item, with the b_i dictating how the
increases in the exogenous variables will be distributed among the
various expenditure categories. In addition, in the tax equation, the
coefficient attached to net provincial product lies between zero and one
while the coefficient attached to both unconditional and conditional
limited grants is negative. The former may be expected since the marginal
tax rate is less than one while the latter indicates that federal grants
provide a substitute for a province's revenues from its own sources.

Expansion of equation (9) to include all of the various programs
which are aided by limited and unlimited conditional grants results in
expenditure and tax equations in which the coefficients of the exogenous
variables are complicated expressions of the b_i and the various matching
ratios. In this case, the number of equations will be equal to the
number of aided programs considered separately plus two.[7]

4. Summary

In this Chapter, a theoretical model was developed from a simplified
utility function of a province's decision-maker, and the expected expendi-
ture and tax responses to the various exogenous variables were noted.

Since the number of equations to be estimated within the context of
Model I is determined by the number of aided programs to be considered
separately, Chapter IV will focus attention on the various programs which
are aided by federal conditional grants before the empirical results are
presented in Chapter V.

Footnotes - Chapter III

[1]This approach differs from the usual microeconomic approach in which the expenditure items are in quantity terms and the revenue items are in money terms, with prices (which are assumed to be known) entering the budget constraint in order to convert the expenditure quantity items into money terms. For a description of this latter approach, See James M. Henderson and Richard E. Quandt, Microeconomic Theory (2nd ed.; New York: McGraw-Hill, 1971), Chapter 2. Gramlich, while omitting any discussion of prices in his theoretical presentation, transforms the expenditure equations into real terms before estimation ("State and Local Governments and Their Budget Constraint", pp. 164 and 172-173). On the other hand, Maley's theoretical development follows the usual microeconomic approach; however, this approach is abandoned in several ways during subsequent formulations of her model and in the final empirical estimates; for example, the dependent variables used in the estimated expenditure equations do not conform to the expenditure definitions considered in the original theoretical development; in addition, the expenditure equations are estimated in money rather than in real terms ("The Impact of Federal Grants on Provincial Budgets: Canada", pp. 62-136).

[2]Use of the one-good model approach in Chapter II would have resulted in E_1 and E_2 having been expressed in dollar rather than in quantity terms. In addition, the slope of the provincial government's budget line would have been -1 since the price of each good is identical due to the fact that the two public goods are only different uses of the only good in the economy. In this case, as in the case of the microeconomic approach used in Chapter II, a change in the slope of the budget line due to the receipt of a federal grant does not indicate that the relative prices of the two goods have changed but only that the relative cost to the provincial government has changed. The relative prices of both goods remain the same; however, now a portion of the price of the aided good is paid by the provincial government and the balance is paid by the federal government through its grant.

[3]These two public goods are but alternative uses of the one good which is assumed to exist. The former are not assumed to be pure public goods in the Samuelsonian sense. See Chapter II, footnote 3.

[4]These transfers do not include federal transfers to provincial governments. For the use of a similar concept of provincial income, see Gramlich, "Alternative Federal Policies for Stimulating State and Local Expenditures", p. 120.

[5]A quadratic utility function was adopted for convenience as in H. Theil, Optimal Decision Rules for Government and Industry (Amsterdam: North-Holland Publishing Company, 1964), Chapter 2.

[6]The partial derivatives rather than the complete reduced form equations are shown since they indicate the information in which we are interested, namely, the province's responses to changes in the various exogenous variables.

[7]The other two equations are for unaided expenditures and for revenue.

IV

PROGRAMS AIDED BY FEDERAL GRANTS

1. Introduction

This Chapter provides a description of the various shared-cost

programs which were in effect in Canada during the period from 1948 to

1970.

2. The National Health Grant Program

One of the first Federal grants in aid of health was established

in 1919 for venereal disease control.[1] Although this grant was can-

celled in 1932, the smooth functioning of this program set a precedent

for the argument that conditional grants-in-aid could be successfully

used in the field of health. In addition, the Rowell-Sirois Commission,

although generally opposed to conditional grants in other fields, stated

that

> "Provided provinces are not thereby tempted to forego or
> starve other needed services, we can see no serious objection
> to small grants-in-aid for particular provincial services,
> and especially for specialized health services where scien-
> tific standards for measuring efficiency are relatively easy
> to apply. . . ."[2]

In 1945 the Federal Government submitted its proposals for

public health grants to the Dominion-Provincial Conference on Reconstruc-

tion,[3] but these proposals were not implemented due to the failure of

the Conference to reach an agreement. Nevertheless, in May 1948, the

Federal Government announced the establishment of a National Health

Program under which financial assistance would be made available to

the provinces for the extension and improvement of services in specific health fields.[4]

The original grants under this program were for a health survey,[5] general public health, tuberculosis control, mental health, venereal disease control, crippled children, professional training, public health research, cancer control, and hospital construction.[6] In 1953 the National Health Grant Program was altered by a 50 percent reduction in the Hospital Construction Grant[7] and by the addition of grants for laboratory and radiological services, medical rehabilitation, and child and maternal health. On January 1, 1958 the Hospital Construction Grant was raised from $1,000 to $2,000 per bed and its terms extended to include the renovation of obsolete hospitals. In addition, the grant for beds in nurses' residences was increased and additional funds were made available for the construction of accommodation for interns. These latter changes were designed to encourage the construction of new hospitals and the renovation of existing structures in anticipation of the increased accommodation which would be required once the hospital insurance plan was introduced.

With the introduction of the hospital insurance programs in the provinces in 1960, the National Health Grant Program was once again altered in order to reflect the changing situation in certain specific areas and to facilitate integration of the administration of the health grants and the provincial hospital insurance programs. The Laboratory and Radiological Services Grant, the Crippled Children's Grant, and the Venereal Disease Control Grant were eliminated as

separate entities. The General Public Health Grant was increased in order to cover assistance for the control of venereal disease and to cover those areas in the field of laboratory and diagnostic services which were not covered under the Hospital Insurance and Diagnostic Services Act. The Crippled Children and Medical Rehabilitation Grants were combined; the Professional Training Grant and the Public Health Research Grant were nearly tripled in order to cover additional needs[8] while the Child and Maternal Health Grant and the Tuberculosis Control Grant were reduced. In total, however, the amount of money available to the provinces remained unchanged.

The introduction of Medicare, together with the extension of provincial hospital insurance plans, resulted in many of the grants under the National Health Grant Program being phased out over a three-year period which ended on March 31, 1972. The Public Health Research Grant and the Professional Training Grant, however, are still in effect. The Hospital Construction Grant ended on March 31, 1970.

All of the National Health Grants are limited, with a majority of the payments being determined on the basis of a flat grant and population.[9] Only the grants for hospital construction and for cancer control require that a province match the Federal contribution on a 50-50 basis; the other grants are non-matching.[10]

Federal grants received by Ontario and New Brunswick under the National Health Grant Program, for selected years, are shown in Table IV-1.[11]

TABLE IV-1

FEDERAL GRANTS RECEIVED UNDER THE NATIONAL HEALTH GRANT PROGRAM BY ONTARIO AND NEW BRUNSWICK, SELECTED YEARS[a]

($ thousand, except for the per capita amounts)

Program	1948 Ont.	1948 N.B.	1953 Ont.	1953 N.B.	1958 Ont.	1958 N.B.	1963 Ont.	1963 N.B.	1968 Ont.	1968 N.B.	1970 Ont.	1970 N.B.
Professional Training	69	21	201	24	267	19	411	49	558	69	698	69
Mental Health	55	70	1,571	217	2,003	263	2,700	279	2,878	297	1,362	138
Tuberculosis Control	711	131	647	182	817	165	784	105	479	63	237	29
Public Health Research	28	-	130	3	126	-	497	7	1,352	35	785	55
General Public Health	102	70	1,601	182	2,140	272	3,091	514	6,778	555	3,269	262
Child and Maternal Health	-	-	21	19	461	78	347	38	36	74	-	34
Crippled Children	23	20	123	35	152	20	(336	(76	(109	(95	(82	(39
Medical Rehabilitation	-	-	-	-	142	41						
Laboratory and Radiological Services	-	-	-	-	461	283	-	-	-	-	-	-
Venereal Disease Control	29	11	130	22	144	20	-	-	-	-	-	-
Cancer Control	57	122	346	125	1,182	123	1,416	110	648	65	310	30
Health Survey	23	5	-	-	-	-	-	-	-	-	-	-
General Health Grants												
- Total	1,097	450	4,770	809	7,895	1,284	9,582	1,178	12,838	1,253	6,743	656
- Per Capita	.26	.90	.96	1.83	1.35	2.24	1.47	1.95	1.76	2.00	.89	1.04
Hospital Construction												
- Total	48	3	2,552	556	4,229	448	7,500	1,003	6,949	165	-	-
- Per Capita	.01	.01	.51	1.04	.72	.78	1.15	1.64	.95	.26	-	-

[a]Fiscal year beginning April 1 of year indicated.

Source: Calculated from data obtained from Ontario, Public Accounts, Annual; New Brunswick, Department of Health and Welfare, Annual Report; and Canada, Department of National Health and Welfare, "Amounts Expended under the General Health Grants for the Fiscal Year 1968-69"(mimeographed, no date). The latter source was used for New Brunswick's hospital construction data for 1968.

3.   The Hospital Insurance and Diagnostic Services Program

The Hospital Insurance and Diagnostic Services Act was passed in 1957. Ontario inaugurated its hospital insurance program on January 1, 1959 while New Brunswick joined the program on July 1, 1959 - with coverage extending to 99 percent and 100 percent of their respective populations.

Under the Act, the Federal Government shares with the provinces a specified share of the cost[12] of hospital care and diagnostic services to patients insured by these Agreements.[13] The shareable costs include both in-patient and out-patient services but do not include services to which any person is entitled under a Federal or Provincial Act specified in the Agreements, e.g., veterans schemes and workmen's compensation, or services in tuberculosis hospitals and sanitoria, hospitals or institutions for the mentally ill, and institutions providing custodial care such as nursing homes and homes for the aged.[14]

The provinces are free to choose their methods of financing the provincial share of the costs. Ontario uses a combination of premiums and general revenue while New Brunswick's costs are financed from its general revenue. Ontario administers its Plan through a separate hospital commission while New Brunswick operates its Plan as part of its Department of Health.

The annual Federal contribution is the aggregate of 25 percent of the national per capita cost of approved patient services and 25 percent of the provincial per capita cost of approved patient services (less any deterrent charges levied) multiplied by the average number

of insured persons in the province in the year. Use of this formula results in the high-cost provinces receiving a lower percentage of their total expenditures from the Federal Government than is the case for the low-cost provinces.[15]

Since the total amount of the Federal grant is completely determined by the matching ratio and the extent of a province's spending on the aided program, a province's expenditures on those services covered under this Program can be considered as being aided by unlimited matching grants. Grant funds received by Ontario and New Brunswick under the Hospital Insurance and Diagnostic Services Program are shown, for selected years, in Table IV-2.

4. Social Welfare

The original Old Age Pensions Act, passed in 1927, provided for Federal payment of 50 percent of the cost of pensions which were to be administered by the provinces.[16] An amendment in 1931 increased the Federal share to 75 percent, with a province assuming the excess cost if its monthly pension payment was greater than the maximum provided for in the Federal-Provincial Agreements.[17] By 1936, Agreements had been entered into by all of the provinces and the Northwest Territories. In 1937, the Old Age Pensions Act was amended to provide pensions to blind persons 40 years of age and over.[18]

On January 1, 1952, the Old Age Pensions Act was superseded by the Old Age Security Act, the Old Age Assistance Act, and the Blind Persons Act. All provinces and territories signed the Agreements under the Old Age Assistance Act and the Blind Persons Act.[19] Under the Old

TABLE IV-2

FEDERAL GRANTS RECEIVED UNDER THE

HOSPITAL INSURANCE AND DIAGNOSTIC SERVICES ACT BY

ONTARIO AND NEW BRUNSWICK

SELECTED YEARS[a]

	Ontario		New Brunswick	
Year	($ thousand)	($ per capita)	($ thousand)	($ per capita)
1959	71,893	11.97	4,575	7.83
1963	136,040	20.87	12,611	20.67
1968	284,665	39.03	22,713	36.28
1970	368,786	48.59	28,077	44.64

[a]Fiscal year beginning April 1 of year indicated.

Source: Calculated from data obtained from Canada, Department of National Health and Welfare, Annual Report on the Operation of the Agreements with the Provinces under the Hospital Insurance and Diagnostic Services Act.

Age Assistance Act, the Federal Government paid for 50 percent of

payments for assistance to persons 65 years of age and over who were

not eligible to receive Old Age Security payments. Under the Blind

Persons Act, the Federal Government paid for 75 percent of the allow-

ances to all blind persons who fulfilled the age, residence, and

income requirements. Effective January 1, 1955, under the terms of

the Disabled Persons Act, the Federal Government shared with the

provinces and the territories 50 percent of the allowances paid to

totally disabled persons 18 years of age and over who met the residence

and income requirements.

In 1956, the Unemployment Assistance Act was passed to provide

for Federal sharing, on a matching basis, of assistance payments made

by the provinces to persons unemployed and in need. Rates of payment

and conditions for receipt of unemployment assistance were determined

by the provinces. This program was unlimited in nature, i.e., there

was no ceiling either on individual assistance or on total assistance

payments which would be shared by the Federal Government.

In 1966, the Canada Assistance Plan came into effect. Under

this Plan, a province could choose to replace the existing categorical

shared-cost programs by one general co-ordinated program for assisting

all needy persons regardless of the cause of the need. By August 1967

all provinces had exercized this option. Under the Canada Assistance

Plan, the Federal Government covers 50 percent of a province's total

assistance costs in the above areas in addition to providing for an

extension of Federal assistance into a number of areas which were not

previously included under Federal-Provincial shared-cost programs.

Total and per capita grants received by Ontario and New Brunswick under the categorical welfare programs[20] and under the Canada Assistance Plan are shown in Table IV-3.

5. Education

The Federal Government has used various means of sharing the cost of education with the provinces. The two major areas of assistance have been for technical and vocational training and for post-secondary education.

Federal grants for technical and vocational training have been in existence since 1919 when the Technical Education Act was passed.[21] This program was subsequently extended, and new programs were introduced in 1939 for training employed youth and in 1942 for apprenticeship training and vocational training of discharged military personnel.[22] These programs continued without interruption until 1960 when the Technical and Vocational Training Assistance Act was passed.[23]

Under the latter Act, the Federal Government reimbursed the provinces for 75 percent of the latter's expenditures on technical and vocational school facilities, alteration costs to buildings or machinery and equipment used for retraining programs for the unemployed, and provincial expenditures for training employed persons in industry; and 50 percent of financial assistance to trainees or 90 percent of living allowances to unemployed persons taking training. Under the Training Allowance Act, effective July 1, 1966, the Federal Government

TABLE IV-3

FEDERAL GRANTS RECEIVED UNDER THE

CATEGORICAL WELFARE PROGRAMS[a] AND THE CANADA ASSISTANCE PLAN

ONTARIO AND NEW BRUNSWICK

SELECTED YEARS[b]

	Ontario		New Brunswick	
Year	($ thousand)	($ per capita)	($ thousand)	($ per capita)
1948	20,856	4.85	4,157	8.30
1952	5,219	1.08	1,388	2.63
1956	7,164	1.31	1,851	3.34
1961	30,529	4.88	4,396	7.37
1966	66,893	9.72	6,129	9.93
1970	140,357	18.65	13,727	21.82

[a]The categorical welfare programs include old age assistance, blind persons' allowances, disabled persons' allowances, and unemployment assistance.

[b]Fiscal year beginning April 1 of year indicated.

Source: Calculated from data obtained from D.B.S., Financial Statistics of Provincial Governments, Annual, 1948 to 1961; D.B.S., Provincial Government Finance, Revenue and Expenditure, Annual, 1962 to 1968; and D.B.S., Provincial Government Finance, Revenue and Expenditure, Estimates, 1970.

offered to reimburse the provinces completely for the cost of a basic training allowance of $35 per week plus 90 percent of any supplementary allowance up to $55 per week for persons taking a training or retraining course.

Conditional grants to the provinces under the Technical and Vocational Training Assistance Act were originally scheduled to expire on March 31, 1967; however, transitional arrangements were made whereby capital grants were available, without limit as to time, until they reached, for each province, $800 per capita of its population aged 15 to 19 as of 1961. Since $150 million in grants for technical and vocational training schools still remained to be paid to the provinces on July 8, 1970, the Minister of Finance suggested that arrangements be made for the balance to be paid during 1970-71 and 1971-72.[24]

In summary, Federal conditional grants for technical and vocational training are both limited and unlimited, with the Federal Government's share ranging from 50 to 100 percent.[25] Total and per capita conditional grants received by Ontario and New Brunswick for expenditures on education, during selected years, are shown in Table IV-4.

Under the 1967-72 Federal-Provincial Fiscal Arrangements, the form of assistance to post-secondary education was changed, with the extent of the Federal Government's commitment being increased.[26] This arrangement provided for a fiscal transfer to each province of equalized tax abatements (4 percent of basic individual income tax and 1 percent of corporation taxable income) and a cash adjustment payment to a total

TABLE IV-4

FEDERAL CONDITIONAL GRANTS RECEIVED FOR

EDUCATIONAL EXPENDITURES

ONTARIO AND NEW BRUNSWICK

SELECTED YEARS[a]

Year	Ontario		New Brunswick	
	($ thousand)	($ per capita)	($ thousand)	($ per capita)
1948	1,064	.25	326	.65
1953	1,517	.30	210	.39
1958	3,581	.61	307	.53
1963	72,369	11.10	2,504	4.10
1968	18,135	2.49	11,352	18.13
1970	33,291	4.39	13,011	20.69

[a]Fiscal year beginning April 1 of year indicated.

Source: Same as Table IV-3.

of either 50 percent of post-secondary education operating expenditures incurred in the province or, at the option of the province, an amount equal to $15 per capita (1967-68 population) escalated annually thereafter at the national rate of growth of post-secondary educational operating expenditures.[27] The 50 percent of cost option is irrevocable, but a province which has elected to use the per capita option may switch to the other should this become advantageous. In this study, these payments are included as part of the total unconditional grant payment to each province; however, they are shown separately in Table IV-5.[28]

6. Trans-Canada Highway

The Trans-Canada Highway Act was passed in 1949 in order to provide for the mutual sharing of the construction costs of a national highway. The Federal contribution was limited to $150 million while the target date for completion of the highway was set for December 9, 1956. Even though the Act was passed in 1949, the Federal Government agreed to pay up to 50 percent of construction costs on portions of the highway built during April 1, 1928 to December 9, 1949 and 50 percent of construction costs on portions of the highway built during December 10, 1949 to December 10, 1956.

In 1956, the construction period was extended to December 31, 1960, and the total Federal allotment was raised to $250 million. The 1956 amendment increased the Federal Government's contribution by an additional 40 percent for one-tenth of the mileage in each province to assist the provinces to finance areas of difficult construction and, as

TABLE IV-5

FEDERAL UNCONDITIONAL GRANTS RECEIVED FOR

POST-SECONDARY EDUCATION

ONTARIO AND NEW BRUNSWICK

1967 TO 1970[a]

	Ontario		New Brunswick	
Year	($ thousand)	($ per capita)	($ thousand)	($ per capita)
1967	19,479	2.72	2,369	3.81
1968	118,511	16.25	4,194	6.70
1969	135,486	18.24	4,661	7.42
1970	143,409	18.90	7,590	12.07

[a]Fiscal year beginning April 1 of year indicated.

Source: The 1969 data are calculated from data obtained from The National Finances, 1969-70, p. 147. Data for 1967, 1968, and 1970 are from the same source as Table IV-3.

of April 1, 1963, the Federal Government agreed to assume 90 percent

of the construction costs of the highway in the four Atlantic Provinces.[29]

In 1960, the maximum allotment of funds was raised to $400 million, and

in 1963 to $625 million. In addition, the construction period was once

again extended - to December 31, 1967. A final amendment extended the

construction period to December 31, 1970, with the maximum Federal con-

tribution being set at $825 million.

Final payments to the provinces were made by May 31, 1971. Any

further work which may be required will not be carried out under the

Trans-Canada Highway Program.[30]

Although the Trans-Canada Highway Program was originally set

up as a limited grant program, the continuous lifting of the Federal

ceiling on the amount of funds to be allocated to this program, in

retrospect, made it appear as an unlimited matching conditional grant

program. Since, however, at any point in time a ceiling was in effect,

a province could be expected to view this program as limited in nature

and, hence, it is considered as such. Federal grants received by

Ontario and New Brunswick under the Trans-Canada Highway Program, during

selected years, are shown in Table IV-6.

7. Natural Resources and Primary Industries

In the area of provincial expenditures on natural resources and

primary industries, three separate categories are considered: first,

fish and game; second, forests; and third, lands (settlement and

agriculture). Federal grants received for these three areas are shown

in Tables IV-7, IV-8, and IV-9, respectively.

TABLE IV-6

FEDERAL GRANTS RECEIVED UNDER THE

TRANS-CANADA HIGHWAY PROGRAM

ONTARIO AND NEW BRUNSWICK

SELECTED YEARS[a]

	Ontario		New Brunswick	
Year	($ thousand)	($ per capita)	($ thousand)	($ per capita)
1950	2,749	.61	-	-
1955	3,366	.63	1,286	2.34
1960	17,869	2.91	3,461	5.85
1965	3,054	.45	13,663	22.22
1970	8,005	1.05	4,153	6.60

[a]Fiscal year beginning April 1 of year indicated.

Source: Calculated from data obtained from Statistics Canada, Road and Street Mileage and Expenditure, Annual.

TABLE IV-7

FEDERAL GRANTS RECEIVED FOR

FISH AND GAME

ONTARIO AND NEW BRUNSWICK

SELECTED YEARS[a]

	Ontario		New Brunswick	
Year	($ thousand)	($ per capita)	($ thousand)	($ per capita)
1948	-	-	-	-
1953	75	.02	-	-
1958	75	.01	-	-
1963	129	.02	90	.15
1968	1	.00	562	.90
1970	1	.00	537	.85

[a]Fiscal year beginning April 1 of year indicated.

Source: Same as Table IV-3.

TABLE IV-8

FEDERAL GRANTS RECEIVED FOR

FORESTS

ONTARIO AND NEW BRUNSWICK

SELECTED YEARS[a]

	Ontario		New Brunswick	
Year	($ thousand)	($ per capita)	($ thousand)	($ per capita)
1948	-	-	-	-
1953	447	.09	725	1.36
1958	1,573	.27	404	.70
1963	1,402	.22	367	.60
1968	837	.11	86	.14
1970	782	.10	493	.78

[a]Fiscal year beginning April 1 of year indicated.

Source: Same as Table IV-3.

TABLE IV-9

FEDERAL GRANTS RECEIVED FOR

LANDS (SETTLEMENT AND AGRICULTURE)

ONTARIO AND NEW BRUNSWICK

SELECTED YEARS[a]

	Ontario		New Brunswick	
Year	($ thousand)	($ per capita)	($ thousand)	($ per capita)
1948	83	.03	111	.22
1953	54	.01	59	.11
1958	91	.02	104	.18
1963	229	.04	212	.35
1968	3,296	.45	4,522	7.22
1970	4,439	.58	6,791	10.80

[a] Fiscal year beginning April 1 of year indicated.

Source: Same as Table IV-3.

Federal grants for fish and game during the period being considered in this thesis, namely, 1948 to 1970, are varied in nature and duration.[31] Federal grants received by Ontario are generally confined to the period between 1952 and 1963 and are for fur conservation. The grants received by New Brunswick cover the period from 1962 to 1970 and represent Federal-Provincial sharing of the cost of experimental work and studies in fishing techniques and related sciences.

Federal grants for forestry expenditures were first received by both provinces in 1952 under a program in which the Federal Government agreed to assume 50 percent of the cost of building and maintaining forest inventories and approximately 20 percent of the cost of reforestation of unoccupied Crown lands above specific levels.[32] In 1957-58, as part of its Winter Works' Program, the Federal Government offered to pay 50 percent of the provincial cost of providing forest access roads for fire protection and other aspects of forest management. In 1960, the latter became a year-round program.

New Federal-Provincial forestry agreements were signed on April 1, 1962 which combined all of the forestry agreements and, in addition, provided for Federal assistance for stand improvement. The portion received by each province of the $7.9 million allocated for Federal forestry aid was dependent upon the province's productive forest area. Each province was allowed to allocate its share to the different forestry fields; however, at least 40 percent had to be used for forest access purposes. In September 1966, the Minister of Forestry announced

that Federal participation in the shared-cost forestry agreements would
end with the current fiscal year; however, in 1967, Federal-Provincial
agreements were signed which provides for an inventory of all forest
lands in Canada.[33]

In addition to the foregoing, since 1953 the Federal Government
has assisted the Province of New Brunswick to combat the spruce budworm
infestation. This Federal grant is limited and matching, with New
Brunswick bearing one-third of the total cost of the program. The inci-
dence of infestation forms the basis for the Provincial apportionment
of Federal funds.

Aided programs under the category of lands (settlement and
agriculture) include 4-H Club activities (1900);[35] freight assistance
on livestock shipments to the Royal Winter Fair (1946); grants to
special fairs (1957); compensation for rabies control (1959); crop
insurance (1961); agricultural and rural development (1962);[36] barberry
eradication (1964); and the Fund for Rural Economic Development (1966).[37]
The grants for special fairs, agricultural and rural development, and
the Fund for Rural Economic Development have Federal ceilings.

Under the original Agricultural Rehabilitation and Development
Act agreements, which covered the period from April 1, 1962 to March 31,
1965, the joint Federal-Provincial projects were aimed at the rehabilita-
tion of rural lands and the development of the rural economy. New ARDA
agreements were signed by the provinces to cover the five-year period
from April 1, 1965. In May 1966, the Act was renamed the Agricultural
and Rural Development Act and its terms amended to extend assistance to

all rural areas, rather than just to the agricultural areas. The
Federal Government set aside $125 million for its share (usually one-
half) of the cost of approved ARDA projects during the five-year
period commencing in 1965. Of this total, $25 million in Federal
funds would be made available during each year.[38]

8. Unaided Program Areas

Provincial expenditure on areas not included in the afore-
mentioned aided categories constitutes the total expenditure on unaided
programs' category.[39]

Footnotes - Chapter IV

[1] For a comprehensive summary of the National Health Grant
Program from 1948 to 1961, see Canada, Department of National Health
and Welfare, National Health Grants, 1948-61 (Ottawa: Queen's Printer,
1962); for the years from 1962 to 1972, see Canada, Statistics Canada,
Canada Year Book, Annual (Ottawa: Information Canada).

[2] Report of the Royal Commission on Dominion-Provincial
Relations (repr. edition; Ottawa: Queen's Printer, 1954), II, 44.

[3] Dominion-Provincial Conference on Reconstruction (Ottawa:
King's Printer, 1946), 85-95.

[4] House of Commons Debates, May 14, 1948, pp. 3931-3940.

[5] This was a non-recurring grant which was to be used by the
provinces to determine their health needs and assist in the setting
up of machinery which would enable them to use the other health grants
most efficiently.

[6] Each grant, however, carried the condition that a province
would be required to at least maintain its previous level of expendi-
ture in the given health field.

[7] This reduction was considered possible since the original
objective of providing an additional 40,000 beds had been attained.

[8] These grants were now to be paid on a per capita basis so
that the amounts available under these programs would increase as the
population of Canada grew over time.

[9] In addition, however, payments for tuberculosis control are
partly based on the incidence of TB deaths; payments for child and
maternal health are based on a flat grant plus the provincial infant
birth and death ratio; and allotments for hospital construction are
based on estimated construction costs.

[10] The grants for medical rehabilitation can be considered as
being partially matching since the training of personnel and the
purchase of new equipment are eligible for non-matching grants while
the provision of new and extended services are aided by matching grants.
See New Brunswick, Department of Health, Annual Report for the fiscal
year ending March 31, 1954, p. 23.

[11]Since the grant data for the provinces are published on a fiscal year basis (April 1 to March 31), the population data, which are published on a calendar year basis, were converted to a fiscal year basis by multiplying the population recorded for year t by .75 and adding it to .25 times the population recorded for year (t + 1). The original population data were obtained from Canada, Statistics Canada, Estimated Population of Canada by Provinces (Ottawa: Information Canada, August 1972).

[12]These costs apply only to normal operating and maintenance costs and do not include any capital charges.

[13]For a description of the agreements and the changes which have taken place each year, see Canada, Department of National Health and Welfare, Annual Report on the Operation of the Agreements with the Provinces under the Hospital Insurance and Diagnostic Services Act, Annual.

[14]Note, however, that Ontario's provincial program includes insured services in mental hospitals and tuberculosis sanitoria. In addition, on April 1, 1972, Ontario extended its insured coverage to include nursing homes and home care, with a utilization fee of $3.50 per day being imposed.

[15]The hospital insurance regulations provide for advance payments to be made by the Federal Government so that the provinces are not required to wait for reimbursement of the funds which they are required to pay to hospitals on a continuing basis. The formula for the advance payment is 23½ percent of the per capita cost of in-patient services in Canada; and the amount of the advance, unlike the amount of the contribution itself, is calculated on the basis of provincial payments which may or may not be shareable costs as defined in the law. Thus, the total payment to a province for any given year includes both the monthly advance payments on a current year basis plus the payment of the final contribution based on shareable costs for some previous year.

[16]For a list of the changes from the inception of old age pensions to 1970, see Canada, Department of National Health and Welfare, Report on the Administration of Old Age Assistance in Canada, Fiscal year ended March 31, 1971 (Ottawa: Information Canada, 1972).

[17]In 1943 the original maximum monthly pension of $20 was increased to $25, in 1947 to $30, and in 1949 to $40. Only persons 70 years of age and over who could fulfill residence and income requirements were eligible to receive the pension. For a description of this

and the other Acts considered in this section, see Statistics Canada, Canada Year Book, Annual.

[18]The age requirement was lowered to 21 years in 1947 and to 18 years in 1955. This program has been administered under the Blind Persons Act since 1951.

[19]The Old Age Security Act provided for a Federal pension of $40 per month to all residents of Canada 70 years of age and over.

[20]The categorical welfare programs include old age assistance, blind persons' allowances, disabled persons' allowances, and unemployment assistance.

[21]For a discussion of these early grants see James A. Maxwell, Federal Subsidies to the Provincial Governments in Canada (Cambridge: Harvard University Press, 1937).

[22]The Vocational Training Co-ordination Act of 1942 was extended by successive amendments to include vocational correspondence courses, retraining of unemployed persons, training of the disabled, and capital and operational costs of provincial technical and vocational schools. (George E. Carter, Canadian Conditional Grants since World War II, Canadian Tax Papers, No. 49 (Toronto: Canadian Tax Foundation, 1971), p. 40).

[23]This Act is outlined in Canadian Tax Foundation, The National Finances, 1968-69 (Toronto: Canadian Tax Foundation, 1968), p. 204, and The National Finances, 1971-72, pp. 261-262.

[24]On April 1, 1972, the Federal Government assumed responsibility for the full cost of retraining adult workers through the Adult Occupational Training Act. In addition, the provinces receive compensation from the Federal Government for the capital costs of buildings and facilities used in the retraining courses.

[25]Federal grants for training allowances are limited with regard to the total weekly allowances which may be paid while a province's population sets the upper limit to the capital grants for which it is eligible.

[26]From 1951-52 to 1957, Federal grants to universities were paid directly to the appropriate institutions; from 1957 until March 31, 1966, Federal grants to universities were made to the Association of Universities and Colleges of Canada, and the Association distributed

these grants to the institutions concerned in all provinces except Quebec. During 1966-67, the average per capita payment was $5.00. For a history of these early grants, see The National Finances, 1962-63, p. 166. The 1967-72 arrangement is discussed in The National Finances, 1970-71, p. 146.

[27]Ontario has chosen the 50 percent of cost option while New Brunswick has chosen the per capita option.

[28]Since the data shown for New Brunswick in Table IV-5 are below $15 per capita, the balance is assumed to have been included in the other unconditional grant payments received by the Province under the 1967 Federal-Provincial Fiscal Arrangements Act.

[29]Canada, Department of Public Works, Annual Report under the Trans-Canada Highway Act (Ottawa: Queen's Printer, 1970).

[30]The National Finances, 1971-72, pp. 238-239.

[31]See Canada, Dominion Bureau of Statistics, Financial Statistics of Provincial Governments, Annual, 1948 to 1961 (Ottawa: Queen's Printer); Canada, Dominion Bureau of Statistics, Provincial Government Finance, Revenue and Expenditure, Annual, 1962 to 1967 (Ottawa: Queen's Printer); Canada, Dominion Bureau of Statistics, Provincial Government Finance, Revenue and Expenditure, 1968 (Ottawa: Information Canada, 1971); Canada, Statistics Canada, Provincial Government Finance, 1969 (Ottawa: Information Canada, 1972); and Canada, Dominion Bureau of Statistics, Provincial Government Finance, Revenue and Expenditure, Estimates, 1970 (Ottawa: Queen's Printer, 1970). Henceforth, these publications will be referred to under the following heading: Statistics Canada, Provincial Government Finance, Revenue and Expenditure, Actual and Estimates.

[32]The National Finances, 1966-67, pp. 163-164.

[33]The National Finances, 1967-68, p. 155.

[34]Statistics Canada, Canada Year Book, 1970-71, pp. 1159 and 1161.

[35]The year in which the program was established is shown in parentheses after each program.

[36]Approximately 90 percent of total provincial receipts for lands (settlement and agriculture) in Ontario and New Brunswick are due to the ARDA program.

[37]New Brunswick does not participate in the crop insurance or the barberry eradication programs; Ontario does not participate in the freight assistance on livestock shipments to the Royal Winter Fair, grants to special fairs, and Fund for Rural Economic Development programs.

[38]The National Finances, 1970-71, p. 161.

[39]Provincial expenditure under the Fitness and Amateur Sport Program, which was in effect from 1962 until 1970, is not included in the aided category since total provincial expenditure in this area accounted for less than one percent of total provincial expenditure on all aided programs by both Ontario and New Brunswick during this time period. In addition, expenditures eligible for grants under the Health Resources Fund Act of 1966 and under the Medical Care Act of 1966 were not included in the aided categories because these two programs have been in effect for relatively short periods of time. For example, Ontario began its participation in the Medicare program only on October 1, 1969 while New Brunswick did not join until January 1, 1971. Provincial expenditure on these and on areas assisted by Federal conditional grants not noted above is included in the unaided programs' category. To the extent that the expenditure response of a province to changes in the exogenous variables with respect to these aided programs differs from their response in the case of unaided programs, the expenditure estimates of the unaided programs' category will be biased.

V

MODEL I - EMPIRICAL ESTIMATES

1. Introduction

In this Chapter, the framework provided by Model I is used
to estimate equations for Ontario's and New Brunswick's expenditures
on the aided programs considered in the preceding Chapter. In addi-
tion, an unaided expenditure equation and a tax equation are esti-
mated in order to complete the estimated model.

The estimated equations are in the same format as equations
(10a) to (10d) in Chapter III with the following exceptions: first,
all variables are in per capita terms (unless otherwise noted) in
order to facilitate comparison between the two provinces considered;
second, several demographic variables, assumed implicit in the constant
term of each equation in Model I, were introduced into the estimated
equations in order to reflect influences which may be specific to
given programs;[1] and, third, the conditional grant variables for a
given program and for aid to other programs were introduced into the
regression equations as separate entities in order to capture their
specific effects on a province's expenditures on the given aided pro-
gram.

In Model I, the assumption of a full employment economy permit-
ted the use of an exogenous total net provincial product variable. In
the two provinces considered, however, full employment was not a
reality during the period considered and, thus, not only does the level

of a province's net product affect the level of a provincial govern-
ment's expenditures but, in addition, the level of a province's net
product is determined to some extent by the provincial government's
expenditure decisions. Under these latter conditions, inclusion of a
Y variable in the estimated model would result in a simultaneous equa-
tions' bias if the method of ordinary least squares was used. Model I
was, thus, assumed to be a sector of a larger econometric model, and
a two-stage approach was used in which the first stage involved regres-
sing Y on a number of variables which were considered exogenous or
predetermined in the context of this larger model in order to obtain
$\hat{Y}$, an estimate of Y, to be used in the second-stage estimates of a
province's expenditure and tax equations. The computation of $\hat{Y}$ is dis-
cussed in Appendix A.

The reduced form solutions in Model I indicated a similar
expenditure response by a province to changes in either its net prov-
incial product or unconditional grants received from the federal govern-
ment. Although net provincial product represents the total resources
available within a given province, the amount available for the use of
a provincial government depends on the portion which accrues to it
through the existing tax structure, with the balance accruing to the
private sector. Hence, an increase in Y may not totally be at the dis-
posal of the provincial government (since marginal tax rates are less
than one) while an identical increase in unconditional grants received
from the Federal Government will increase the province's consumption
opportunities by the amount of the grant. Thus, it is conceivable that

a provincial government may not respond in its expenditure decisions to the same degree to increases in net provincial product and unconditional grants. Whether or not this is the case was tested by estimating the expenditure equations twice - first, with $\hat{Y}$ and G entering the regression as one total (Regression A) and, second, with $\hat{Y}$ and G entering as separate variables (Regression B).

All estimates were derived using annual time series data for the fiscal years in which the programs were in effect.[2,3] In addition, all equations were estimated in constant (1961) dollars. Ideally, the most appropriate method for deflating the various current dollar values would be to use a separate price deflator for each component of each province's expenditures on goods and services; however, since these various deflators were not available, the constant dollar values were obtained by deflating Ontario's money variables by the Consumer Price Index for Toronto and New Brunswick's money variables by the Consumer Price Index for Saint John.[4] While a consumer price index is not the most satisfactory index with which to deflate a provincial government's expenditures on goods and services, it was considered to be a more representative indicator of regional costs than would have been the price index for total government expenditure on goods and services.

Finally, since a stepwise regression program, in which the variables were introduced in a computer-determined order (in accordance with their marginal explanatory power) was used to estimate the equations, the independent variables in a given equation for each province

may not be identical because of relative differences in the explanatory power of the various variables considered.[5] The basic variables included in each expenditure equation are net provincial product, unconditional grants, the conditional grant variable for the given program, and the conditional grants to other programs' variable. Additional variables are included if they add to the explanatory power of the regression equation.

2. Definitions

Three variables which appear in all of the estimated equations for Model I are defined and were derived as follows:

(a) $\hat{Y}$ represents estimated per capita net provincial product (constant dollars) in a given province. The actual level of net provincial product which was used in the estimation procedure in Appendix A was calculated as follows: Since data were not available for net provincial product but were available for personal disposable income on a provincial basis, a variable intended to approximate the former was calculated for each province by adding that province's total tax revenue to its total personal disposable income and then dividing this total by the province's population to convert it to a per capita basis.[6]

(b) G represents per capita Federal unconditional grants (constant dollars) received by a given province. These unconditional grants include statutory subsidies, share of the income tax on power utilities collected by the Federal Government, post-secondary education payments (1967 to 1970), equalization payments (including stabilization), and the Atlantic Provinces' Adjustment Grants (1958 to 1966).[7] New

Brunswick, but not Ontario, received payments under the latter two categories during the period considered in this study. While the definition of G appears fairly straightforward, the nature of the data, in which unconditional grant payments and tax revenues were combined, required the use of several assumptions in order to derive the data actually used.

Two tax rental agreements and two tax sharing arrangements were in effect during the period from 1948 to 1970.[8] Under the 1947 Dominion-Provincial Tax Rental Agreement, all provinces except Ontario and Quebec agreed to refrain from levying personal income taxes, corporation income taxes, other corporation taxes, and succession duties for a five-year period ending March 31, 1952. In lieu of these taxes, the provinces which signed the Tax Rental Agreement received a tax rental fee from the Federal Government.[9] Thus, in effect, this tax rental payment was each province's tax revenue from the three tax fields for the given years, with the Federal Government acting as the collection agent. The Tax Rental Agreement which was signed in 1952 to cover another five-year period was the same as the 1947 Agreement with two exceptions: first, Ontario signed the 1952 Agreement although it continued to impose succession duties and, second, the provinces which signed the Agreement no longer levied the 5 percent corporation income tax which had been collected for them by the Federal Government.

Under the 1957 Federal-Provincial Tax Sharing Arrangements Act[10] and under the subsequent Acts signed in 1962 and 1967,[11] the equalization payment, which had been implicit in the total tax rental payment

under the 1947 and 1952 Agreements, was explicitly set forth. Thus, the data for 1957 to 1970 permitted the separation of the tax portion and the equalization payments. Comparable data for the earlier period were calculated using the following assumptions:

In the case of Ontario, the total tax sharing payments which were recorded for 1952 to 1956 were assumed to be tax rental payments only, i.e., no equalization payments were assumed to be included in these data since no equalization payments had been paid during the period from 1957 to 1962.[12] Then, for the period from 1952 to 1962, the calculated and actual tax rental payments were subtracted from the total unconditional grant payments, and these former payments were included as part of the total tax revenue of the Ontario Government.

In the case of New Brunswick, the relationship between the tax rental payment as a percentage of total tax sharing for 1957 and for 1958 was assumed to have held for the earlier period. Thus, for the years from 1948 to 1956, 60.23 percent of the total tax sharing payment was designated as the tax rental payment, with the balance being designated as the equalization portion; and the former was added to New Brunswick's tax receipts while the latter was included in the unconditional grant total.

(c) Cl represents per capita limited conditional grants (constant dollars) received by a given provincial government from the Federal Government. These conditional grants include those received for the National Health Grant Program, the Trans-Canada Highway, education, fish and game, forests, and lands (settlement and agriculture).[13]

3. Empirical Results

Using the framework of Model I, equations were estimated for
the National Health Grant Program, the Hospital Insurance and Diagnostic
Services Program, social welfare, the Trans-Canada Highway, other aided
expenditures, unaided expenditures, and tax revenue.[14]

Rather than denoting the programs which are considered separately
by E_{11}, E_{12}, ..., E_{1n}, alphanumeric names were used in order to facili-
tate interpretation of the variables being considered. Alphanumeric
names were also used for the conditional grant variables for the indi-
vidual programs as well as for the demographic variables. These vari-
ables will be defined during the discussion of the individual program
results.

3.1 The National Health Grant Program

In Chapter IV it was noted that grants under the National Health
Grant Program covered several different areas. Ideally, an equation
should be estimated for each aided program; however, since some of the
grant programs were eliminated as separate entities during the course of
the Program's existence, thus preventing an accurate separation of
expenditure data for the individual programs, the National Health Grant
Program was divided into only two categories for estimation purposes.
All programs except hospital construction were grouped together to form
the first category, which will henceforth be referred to as the General
Health Grants' Program, with hospital construction alone comprising the
second category. The latter category is being considered separately
because expenditures in this area are of a capital rather than of a

current nature as is generally the case for those programs included in the General Health Grants' Program.

Separation of the General Health Grants' Program into two expenditure groups, namely, those aided by non-matching grants and those aided by matching grants, was not considered feasible due to the lack of appropriate expenditure data for both provinces. Because non-matching grants constitute approximately 80 percent of the total grant funds received under the General Health Grants' Program by Ontario and New Brunswick, and since the provinces were assumed to act rationally and thereby take the total amount of funds made available by the Federal Government, the equations estimated for the General Health Grants' Program were estimated in the format suggested for a program in which the total limit of the grant is taken up, i.e., the conditional grant is considered to be an exogenous variable.[15]

The estimated equations for the General Health Grants' Program are shown in Table V-1 where

GHGP   represents per capita expenditure (constant dollars) by a given province from its own revenue sources on those programs included in the General Health Grants' Program;[16]

CGHG   represents per capita limited conditional grants (constant dollars) received by a given province under the General Health Grants' Program;

Cl-CGH represents per capita Federal conditional grants (constant dollars) received by a given province for programs other than the General Health Grants' Program;

TABLE V-1

REGRESSION EQUATIONS FOR THE GENERAL HEALTH GRANTS' PROGRAM (GHGP)

ONTARIO AND NEW BRUNSWICK, 1948 TO 1970[a]

$N_r N^{\cdot}$

O N T A R I O

Regression A				Regression B		
Independent Variable	Estimated Coefficient	Standard Error		Independent Variable	Estimated Coefficient	Standard Error
Constant Term	2.156	.9219		Constant Term	2.525	.9514
$(\hat{Y} + G)$	-.00009	.00003		$\hat{Y}$	-.0001	.00005
				G	.0032	.0026
CGHG	-.0545	.0475		CGHG	-.0423	.0477
A45+	-.0666	.0301		A45+	-.0772	.0308
D54-64	.0547	.0225		D54-64	.0457	.0232

$\bar{R}^2 = .8492$
dw = 1.62

$\bar{R}^2 = .8543$
dw = 1.64

N E W   B R U N S W I C K

Regression A				Regression B		
Independent Variable	Estimated Coefficient	Standard Error		Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-.4550	.3987		Constant Term	-.8332	.6424
$(\hat{Y} + G)$	.0004	.0003 1.333		$\hat{Y}$	.0009	.0008 1.125
				G	-.0045	.0064 .7031
CGHG	.2100	.1016 2.0669		CGHG	.1693	.1158 1.4663
C1-CGH	.0084	.0090 .9333		C1-CGH	.0110	.0098 1.1327
D69-70	-.3714	.1929		D69-70	-.4465	.2191

$\bar{R}^2 = .5706$
dw = 1.67

$\bar{R}^2 = .5602$
dw = 1.90

[a]Fiscal year beginning April 1 of year indicated.

Note: dw stands for Durbin-Watson statistic.

A45+   represents the percentage of the population aged 45 years and
        over in a given province;[17]

D54-64 represents a dummy variable (= 1 for 1954 to 1964 inclusive
                                    (= 0 elsewhere;

D69-70 represents a dummy variable (= 1 for 1969 and 1970
                                    (= 0 elsewhere.

An examination of Regression A[18] for each province reveals that
conditional grants (CGHG) were a significant determinant of a province's
expenditures on the General Health Grants' Program only in the case of
New Brunswick.[19] The only other significant variable in the New
Brunswick equation was the dummy variable which was included to reflect
the phasing-out period of the General Health Grants' Program. The
coefficient was negative, as expected.

A majority of the General Health Grants aid the younger members
of society either directly through the immunization and medical rehab-
ilitation programs or indirectly through the preventative health programs.
Thus, the coefficient attached to A45+ would be expected to be negative.
This variable was both negative and significant in the Ontario estimate;
it did not improve the fit of the New Brunswick equations.

In the Ontario estimate, the coefficients attached to $(\hat{Y} + G)$
and the dummy variable were also both significant; however, the former
possessed an incorrect sign. The dummy variable was included to reflect
the increased per capita expenditures by Ontario which took place during
the period from 1954 to 1964. In Ontario's Regression A, C1-CGH, which
entered at the last step, was neither significant nor did it improve
the fit of the equation; hence, it was not included in the reported results.

The equations estimated for hospital construction are shown in
Table V-2 where

HCON   represents per capita expenditure (constant dollars) on hospital

   construction by a given province from its own revenue sources;[20]

CHCON   represents per capita conditional grants (constant dollars)

   received by a given province for hospital construction expenditures;

C1-CHC represents per capita conditional grants (constant dollars) received

   by a given province for programs other than hospital construction; and

R   represents the McLeod, Young, Weir bond yield average for ten

   provincial bonds.[21]

The dependent variable and the hospital construction grant variable
were both deflated, not by the regional consumer price index, but by the
price index for non-residential building materials (NRPI)[22] in order to
more clearly reflect the cost changes in this sector of the economy.

The coefficients of determination were relatively low, especially
in the case of Ontario. Hospital construction grants were a significant
influence on hospital construction expenditures in the case of New Brunswick.
$(\hat{Y} + G)$ was significant in the case of Ontario. The interest rate variable,
which was included to reflect the borrowing costs which might be incurred
were this alternative chosen by a province for the financing of its
share of hospital construction costs, was not significant.

Other variables which were tested but which were neither signif-
icant nor improved the fit of the equation included the percentage of
the given province's population aged 45 years and over to reflect the
demand for hospital beds since this age group accounts for the largest
number of hospital separations per 100,000 population;[23] the rated

TABLE V-2

REGRESSION EQUATIONS FOR HOSPITAL CONSTRUCTION (HCON)

ONTARIO AND NEW BRUNSWICK, 1948 TO 1970[a]

O N T A R I O

Regression A

Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-3.003	.9639
$(\hat{Y} + G)$	.0026	.0005
CHCON	-.6080	.6863
C1-CHC	-.0745	.0409

$\bar{R}^2$ = .5660
dw = 1.48

Regression B

Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-1.678	1.230
$\hat{Y}$	.0016	.0008
G	.0988	.0590
CHCON	-.2573	.6910
C1-CHC	-.0489	.0421

$\bar{R}^2$ = .6026
dw = 1.37

N E W   B R U N S W I C K

Regression A

Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-.4915	.6581
$(\hat{Y} + G)$	.0002	.0011 .1818
CHCON	.8490	.1283 6.6173
C1-CHC	-.0133	.0206 .6456
R	.1031	.2014

$\bar{R}^2$ = .7877
dw = 2.16

Regression B

Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-2.624	1.711
$\hat{Y}$	.0024	.0019 1.2632
G	-.0207	.0156 1.3264
CHCON	.7641	.1404 5.4423
C1-CHC	-.0126	.0201 .6264
R	.2121	.2128

$\bar{R}^2$ = .7974
dw = 2.08

[a]Fiscal year beginning April 1 of year indicated.

Note: dw stands for Durbin-Watson statistic.

hospital bed capacity per 1,000 population in order to reflect the existing stock of hospital beds; and dummy variables attached to the conditional grant variable in order to reflect the changes in the hospital construction grant conditions which took place in 1953 and 1958.

Examination of the per capita net expenditure on hospital construction data for both provinces (Appendix C) fails to reveal a definite pattern of expenditure. This may account for the relatively poor performance of the estimated equations.

3.2 The Hospital Insurance and Diagnostic Services Program

Table V-3 illustrates the equations estimated for the two province's expenditures on those goods and services covered under the Hospital Insurance and Diagnostic Services Act[24] where

HIDS represents per capita expenditure (constant dollars) on services aided by the Hospital Insurance and Diagnostic Services Program by a given province from its own revenue sources;[25] and

CPPD represents hospital costs per patient day (constant dollars) in a given province.[26]

Since a province's expenditures under the Hospital Insurance and Diagnostic Services Act are aided by unlimited matching Federal grants, these grants were not included as an independent variable in the estimated equations. The factor which appears to have the greatest influence on Ontario's expenditure is the hospital cost per patient day. In the case of New Brunswick, however, $(\hat{Y} + G)$ was the only significant variable.

TABLE V-3

REGRESSION EQUATIONS FOR HOSPITAL INSURANCE AND DIAGNOSTIC SERVICES (HIDS)

ONTARIO AND NEW BRUNSWICK, 1948 TO 1970[a]

O N T A R I O

Regression A				Regression B		
Independent Variable	Estimated Coefficient	Standard Error		Independent Variable	Estimated Coefficient	Standard Error
Constant Term	32.34	32.27		Constant Term	33.51	33.02
$(\hat{Y} + G)$	-.0360	.0288		$\hat{Y}$	-.0391	.0297
				G	-.2521	.2770
C1	.1479	.1603		C1	.0995	.1750
CPPD	2.220	1.832		CPPD	2.440	1.041

$\bar{R}^2$ = .9186
dw = 1.63

$\bar{R}^2$ = .9149
dw = 1.80

N E W   B R U N S W I C K

Regression A				Regression B		
Independent Variable	Estimated Coefficient	Standard Error		Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-10.62	2.008		Constant Term	-10.19	4.395
$(\hat{Y} + G)$	.0251	.0023 *10.913*		$\hat{Y}$	.0245	.0054 *4.573*
				G	.0305	.0476 *.6408*
C1	-.1437	.0726 *1.9793*		C1	-.1461	.0803 *1.8194*

$\bar{R}^2$ = .9793
dw = 2.32

$\bar{R}^2$ = .9764
dw = 2.25

[a] Fiscal year beginning April 1 of year indicated.

Note: dw stands for Durbin-Watson statistic.

Other variables which were tested but which were not significant included the percentage of the population aged 45 years and over, since this age group accounts for a majority of the hospital separations; and hospital admissions per 1,000 population in order to reflect cost changes which might be due to changes in admission rates.

3.3 Social Welfare

The estimated equations for social welfare expenditures by Ontario and New Brunswick are shown in Table V-4 where

SW1   represents per capita expenditure (constant dollars) by a given province from its own revenue sources on aid to the aged, blind, disabled, and unemployed and unemployables; on mother's allow-ances; and on child welfare;[27]

U   represents the unemployment rate for a given province;[28] and

D52-70 represents a dummy variable (= 1 for 1952 to 1970 inclusive
                                     (= 0 elsewhere.

The social welfare category is considered as being aided by unlimited matching conditional grants since, first, there was no Federal limit on the total amount of assistance which was available under the Old Age Assistance, Blind Persons' Allowance, and Disabled Persons' Allowance programs; second, over one-half of the total Federal payments made under the four categorical welfare programs until March 31, 1970 was for unemployment assistance[29] (the category aided by unlimited conditional grants); and, third, Federal grants under the Canada Assistance Plan are matching but unlimited. As a result, the grants received by Ontario and New Brunswick for their expenditures on social

TABLE V-4

REGRESSION EQUATIONS FOR SOCIAL WELFARE (SW1)

ONTARIO AND NEW BRUNSWICK, 1948 TO 1970[a]

O N T A R I O

Regression A

Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-2.056	1.057
$(\hat{Y} + G)$	.0046	.0006
CL1	.0719	.0420
U	.3900	.1968
D52-70	-1.843	.6758

$\bar{R}^2$ = .7870
dw = 1.78

Regression B

Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-1.908	1.838
$\hat{Y}$	.0045	.0012
G	.0122	.0770
CL1	.0749	.0522
U	.3864	.2060
D52-70	-1.816	.7464

$\bar{R}^2$ = .7745
dw = 1.77

N E W   B R U N S W I C K

Regression A

Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-8.836	2.777
$(\hat{Y} + G)$	.0161	.0026
CL1	-.0814	.0766
U	.2379	.1724
D52-70	-2.813	1.074

$\bar{R}^2$ = .8785
dw = 1.60

Regression B

Independent Variable	Estimated Coefficient	Standard Error
Constant Term	-11.10	6.136
$\hat{Y}$	.0187	.0068
G	-.0062	.0536
CL1	-.0745	.0801
U	.2610	.1859
D52-70	-2.988	1.183

$\bar{R}^2$ = .8728
dw = 1.66

[a]Fiscal year beginning April 1 of year indicated.

Note: dw stands for Durbin-Watson statistic.