# Some Evidence on the Effect of the Separation of Spending and Taxing Decisions

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It is often argued that separation of public spending and taxing decisions engenders in the voter overoptimistic hopes that someone else will bear the cost of public services, thereby inducing an increase in the size of government. But are perceived tax prices systematically and persistently reduced by separation? Although in stock markets all agents' expectations may be unbiased, they may or may not be unbiased in political markets. This paper analyzes the separation created in federal states when the central government finances local expenditures. Evidence from a dynamic decisive-voter model is presented that indicates that the separation introduced by federal grants to Canadian provinces did in fact reduce the perceived tax price of provincial public services and raise provincial expenditures. The results suggest also that the effect of separation diminished over time.

## I. Introduction

An individual's decision to acquire more goods or services in the private marketplace involves a personal decision to commit simultaneously the resources required to finance the production of those goods. In political markets, as Wicksell (1958, p. 91) and others have noted, the absence of the same sort of simultaneity allows political coalitions to create false hopes with respect to the tax price of public services in order to direct additional resources through the public

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sector toward themselves.[1] When the link between public spending and taxing decisions is weak, the decisive voter cannot costlessly discount a political promise to reduce his tax price by shifting part of the cost to other taxpayers (Brittan 1977; West and Winer 1980).

However, while there is an obvious temptation for politicians to foster the belief that the cost of public services will fall disproportionately on someone else, the empirical question is whether the promises (or self-induced hopes) that the separation of spending and taxing permits can have a systematic and persistent influence on the size of government. Although all agents' expectations may be unbiased in stock markets, they may or may not be unbiased in political markets.[2]

This paper analyzes the separation created in federal states when the central government finances local expenditures in order to shed light on this question. Section II presents an estimating equation that tests the effect on both perceived tax prices and the size of government of the separation of spending (by the recipient) and taxing (by the donor) introduced by intergovernmental grants. Estimates and conclusions follow in the remaining two sections.

## II. Using the Political Economy of Federalism to Test the Effect of Separation

Since federal taxation is levied nationally, federal grants-in-aid to a particular province or state may induce a belief that part of the cost of additional provincial public services will be financed by nonresidents. Such a reduction in perceived tax prices could occur regardless of whether the grant was paid conditionally or unconditionally. If in the past the federal government has raised (say) 25 percent of its tax revenue in a recipient province or state, a new unconditional grant of $1.00 may appear to cost provincial taxpayers there no more than 25 cents. Thus an increase in unconditional grants relative to provincial taxation from own sources might reduce perceived marginal tax prices and increase expenditures. This could be the case even if it were not possible to shift taxes effectively to nonresidents via the grant system, so that all grants were in the end (but were not perceived to be) entirely financed by federal taxes levied in the province in question.

The econometric literature on the effects of grants on local expen-

[1] This view should be distinguished from Wicksell's argument in the same 1896 paper that the introduction of a system of unanimity and voluntary consent in public taxation might on balance lead to an increase in the aggregate size of the public sector.

[2] The difference between actual and perceived tax prices (or tax shares) has been referred to as "fiscal illusion." For a review of the fiscal illusion literature, see Staff (1978) and West and Winer (1980).

ditures, as reviewed by Gramlich (1977, p. 234), seems to indicate precisely this latter result. The evidence is that the positive effect on local spending of an unconditional grant outweighs the negative impact of an equivalent increase in federal taxes. Indeed, the conclusion that "money sticks where it hits" (the grant is not entirely returned to the voter via local tax cuts) was so uniform across various studies that Gramlich called for development of theory to explain the phenomenon.[3]

The suggestion above is that the so-called flypaper effect can be explained as the (Wicksellian) consequence of the separation created by the grant system.[4]

### *The Estimating Equation*

The preceding discussion suggests also that if separation does reduce perceived tax prices and raise expenditures, we should be able to observe these effects as consequences of the system of intergovernmental flows in a federal state.

To begin the development of an estimating equation that embodies this idea, assume that the jurisdiction receiving a grant, hereafter referred to as a province, acts as if it maximizes the utility of the decisive voter in its jurisdiction. The arguments of this voter's utility function are his perceived public services $q$ and his perceived disposable income $y$. If this utility function, following McGuire (1978), is of the Stone-Geary type, it can be written as:[5]

$$\beta q \ln (q - \gamma_q) + \beta y \ln (y - \gamma_y), \tag{1}$$

where $q = \theta_1 Q$ and $y = x - \theta_2 R - \theta_3 G_T$. Here $Q$ and $R$ are, respectively, total (actual) provincial expenditures and total (actual) net revenues from own sources. The voter's gross income, $x$, is assumed known to him with certainty, and $G_T$ is the total (actual) value of federal grants to all provinces. The origin of the utility map is given by $\gamma_y$ and $\gamma_q$, which can be regarded as normalizing variables for estimation purposes.

The $\theta_i$'s translate fiscal aggregates into quantities relevant to the decisive voter. The decisive voter's perceived per dollar share of provincial public services is $\theta_1$ and of provincial tax revenues is $\theta_2$.[6] The

[3] Of course this suggests the cited evidence is not definitive.

[4] The attempt by politicians to profit from the effects of separation forms the basis for one theory of the existence of grants (e.g., Wagner 1971). This positive theory of grants is developed more fully in the longer version of this paper (Winer 1980). See also Greene (1970) and Rose-Ackerman (1981).

[5] See Green (1971, chap. 9) for the properties of the Stone-Geary utility function.

[6] In the present model $\theta_1$ includes the factor $1/N^{\alpha}$ in the Borcherding-Deacon (1972)

voter's perceived per dollar share of federal taxes required to pay for the system of grants in the country as a whole, including, of course, grants to his own province, is represented by $\theta_3$. The voter's perceived level of services is therefore $\theta_1 Q$, while his perceived disposable income is $x - \theta_2 R - \theta_3 G_T$. His perceived tax price is $(\theta_2 R + \theta_3 G_T)/\theta_1 Q$.

The province maximizes the above utility function over $Q$ and $R$ subject to its budget restraint

$$R + G = Q, \tag{2}$$

where $Q$ is assumed to have a constant unit cost of \$1.00.[7]

Maximization of (1) is subject also to institutional arrangements reflected in the Canadian data to be used here, which make conditional grants $G^c$ a relatively stable function of $Q$. That is, conditional grants are primarily of the open-ended matching type:

$$G^c = h \cdot Q, \tag{3}$$

where $G^c = G - G^u$ and $G^u$ is the unconditional grant component of $G$, which in Canada consists mainly of voluntary interregional transfers called equalization payments. The parameter $h$ may vary at discrete intervals.[8] Equation (3) is known and given to provincial governments and will therefore be incorporated into their optimal political plans along with (2).

It is important to note that in the present model the effect of a grant cannot be determined simply from the form it takes (see also Breton and Scott 1978). In particular, (3) does not imply that the price effect of matching grants depends on the size of $h$, as in most previous models (e.g., Slack 1980). As will become clear below, in the present model the price effect of any type of grant depends crucially on the extent to which the decisive voter believes tax shifting across jurisdictional boundaries is possible.[9]

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and Bergstrom-Goodman (1973) models, where $N$ is population and $\alpha$ is the degree-of-publicness parameter.

[7] An equivalent formulation (see, e.g., Bergstrom and Goodman 1973) is to maximize the decisive voter's utility subject to his budget restraint. The government budget restraint is then enforced by the condition that individual tax shares sum to one. The more convenient procedure used here enforces the government budget restraint explicitly. We also note that (2) is in highly aggregated form and only the totals of $Q$, $G$, and $R$ (which also includes the provincial deficit) appear. Needless to say, this simplifying assumption avoids my having to specify a complete theory of both the totals and their components, since such theories are not yet well developed. For a survey of research in this respect and an attempt at a public choice model of fiscal structure including the pattern of revenue sources, see Hettich and Winer (1981).

[8] See Boadway (1980) for a description of the Canadian grant system.

[9] Courant, Gramlich, and Rubinfeld (1979) and Filimon, Romer, and Rosenthal (1980) have attempted to explain the flypaper effect of grants by using models in which a grant reduces perceived (but not actual) tax prices because the voter forms a biased estimate of the size of the grant.

The first-order conditions give the following equation for total provincial expenditure:

$$Q^* = \omega x + \omega(\theta_2 - \theta_3)G + (-\omega\theta_3)\tilde{G} + \omega'\gamma_y + \omega''\gamma_q. \quad (4)$$

Here $G^c$ has been kept on the right-hand side rather than eliminated by substitution of (3);[10] $\tilde{G}$ represents grants to other provinces ($= G_T - G$), and the $\omega$'s are positive parameters.

Of primary interest in (4) is the sign of the coefficient on $G$, since this measures the extent to which an increase in separation will reduce perceived tax prices and thereby induce an increase in the size of the provincial public sector. When this coefficient is positive, that is, when $\theta_2 > \theta_3$, greater reliance on grants will increase provincial expenditure even if they are in fact entirely financed within the province in question. Figure 1 illustrates this case. In this figure the decisive voter's perceived level of services $q$ is on the horizontal axis and his perceived disposable income $y$ is on the vertical. In the absence of grants, the line $[x, (\theta_1/\theta_2) \cdot x]$ represents the possible combinations of $y$ and $q$ that are consistent with the pregrant government budget restraint $R = Q$. Now suppose that separation increases. That is, suppose the province in which this voter lives reduces revenue from own sources $R$ by $G$ dollars, and the federal government increases taxes in the province by $G$ dollars and returns this to the province in the form of an unconditional grant of the same amount. As a result, the line representing the feasible combinations (for the provincial government) of $y$ and $q$ such that $R + G = Q$ shifts out as indicated, if we assume grants to other provinces are held constant. Since the Stone-Geary utility map has a linear expansion path and $\theta_2 > \theta_3$, equilibrium for the government moves from $E$ to $E'$ and the provision of provincial public services expands by $BA/\theta_1$.

### *A Dynamic Formulation and Other Considerations*

Equation (4) defines the recipient government's optimal level of public services, $Q^*$, and could be regarded as the basis for an estimating equation. But there is no reason to assume that a government will

[10] Substitution of (3) into (4) is not desirable because some of the provinces in the data used here received essentially no unconditional grants over all or part of the sample period. Note that in (4) conditional and unconditional grants have the same effect. However, when this issue has been explicitly considered (Johnson and Tomola [1977] and McGuire [1978] in the United States; Strick [1971] and Bella [1979] in Canada), the conclusion has been that for the particular cases considered conditional grants were effectively transformed to unconditional ones. Thus it seems safer to make the assumption concerning this that is embedded in eq. (4) rather than the equally strong assumption that no part of any conditional grant is inframarginal to the recipient's budgetary decisions.

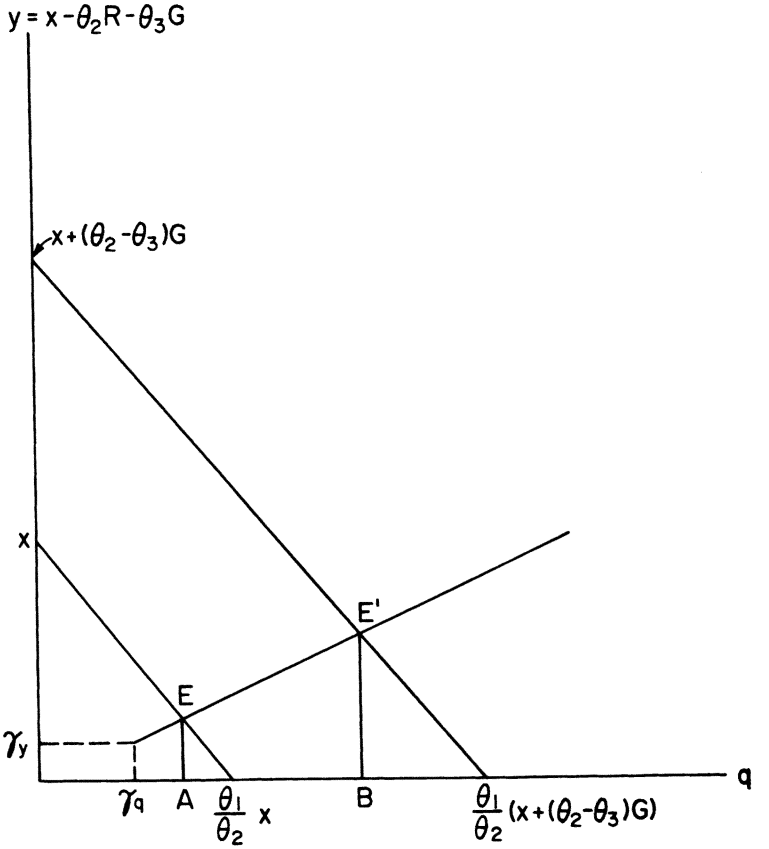


FIG. 1.—The effect of an unconditional grant entirely financed in the recipient jurisdiction, when $\theta_2 > \theta_3$.

adjust to its politically optimal plan within each period. At the very least we should expect some recognition and administrative lags following changes in gross incomes or demographic factors.

Hence the following dynamic version of equation (4) has been chosen for estimation in addition to (4):

$$Q = \alpha Q^* + \delta \Delta G + (1 - \alpha) Q_{-1}. \tag{5}$$

In (5), the impact effect on expenditure of an increase in grants to the representative province is equal to $\alpha\omega(\theta_2 - \theta_3) + \delta$, while the long-run effect is given by $\omega(\theta_2 - \theta_3)$.[11]

[11] As is well known (Brainard and Tobin 1968; Smith 1975), a simple stock-adjustment version of the two first-order conditions for $Q$ and $R$ implies instantaneous adjustment of both these variables. Eq. (5) is one dynamic version of (4) that does not

In order to convert (5) (as well as [4]) into a form suitable for estimation using pooled time-series, cross-section data, it is assumed that the normalizing factors take the form

$$\gamma y_{jt} = \gamma_j^0 + \gamma^1 N_{jt} \tag{6}$$

and

$$\gamma q_{jt} = \gamma_j^2 + \gamma^3 N_{jt}, \tag{7}$$

where $N_{jt}$ is the population of province $j$ receiving grants at time $t$.

Substituting (4), (6), and (7) into (5) and rearranging terms gives the dynamic estimating equation[12]

$$\begin{aligned} Q_{jt} = {} & \beta_0 x_{jt} + \beta_1 G_{jt} + \beta_2 \bar{G}_{jt} + \beta_3 \Delta G_{jt} \\ & + \beta_4 Q_{jt-1} + \beta_5 N_{jt} + \beta_{6j} + e_{jt}, \end{aligned} \tag{8}$$

where $\beta_0 = \alpha\omega$, $\beta_1 = \alpha\omega(\theta_2 - \theta_3)$, and $\beta_2 = -\omega\theta_3$. The term $\beta_1$ will be positive only if $\theta_2 > \theta_3$. We should expect $\beta_2$ to be negative regardless of the effect of separation.

The income of the decisive voter, $x_{jt}$, can be proxied by per capita income in the province, if we assume that the decisive voter's income and per capita income are proportional.[13]

All variables in (8) including $x_{jt}$ are in real terms and, except for $G_{jt}$ and therefore $\Delta G_{jt}$, are assumed to be predetermined at time $t$. Because equation (3) makes $G_{jt}^c$ a function of $Q_{jt}$, $G_{jt}$ is endogenous. Under appropriate assumptions about the $e_{jt}$,[14] the equation above can be consistently estimated by two-stage least squares.[15]

This estimating equation differs from those used in other studies of

have this implication and that also satisfies the appropriate adding-up constraints on its coefficients implied by eq. (2).

[12] The actual definition of the dependent variable to be used, and the only such data available for the entire sample period, is "net provincial expenditure." This is equal to total provincial expenditure, $Q$, less conditional grants from the federal government, $G^c$. However, (3) implies that net expenditure can be written as $Q(1 - h)$. Multiplication of both sides of (8) by the positive parameter $(1 - h)$ thus leaves net expenditures as the dependent variable, while all coefficients are essentially unaffected.

[13] For further discussion of this assumption see Winer (1980) and Romer and Rosenthal (1979).

[14] It is assumed that the errors $e_{jt}$ are normally distributed with zero mean, are homoscedastic for given $j$, and are both serially independent for each $j$ and independent across jurisdictions. Heteroscedasticity across cross-section units for given $t$ has been eliminated in the usual manner by estimating (8) for each province alone and then using the inverse of computed standard errors to transform the equation.

[15] Since eq. (8) is part of a system consisting of itself, the analogous equation for $R_{jt}$, and the budget restraint (2), estimation must preserve the appropriate cross-equation adding-up constraints. As is well known (e.g., Smith 1975), a two-stage technique in which the same instruments are used for each first-stage regression will produce consistent estimates.

the effects of grants (e.g., Henderson [1968] and Gramlich [1969] in the United States or Auld [1976] and Slack [1980] in Canada) principally because of the presence of $\tilde{G}_{jt}$, $\Delta G_{jt}$, and $Q_{jt-1}$ as explanatory variables. The first of these variables is present because the financing of the grant system by the donor has been explicitly considered, while the latter two enter because we do not assume instantaneous adjustment by political agents.

## III. Estimation

### *The Data*

In order to determine the sign of the coefficient on $G$, equations (4), (8), and certain variations on (8) to be introduced below have been estimated using pooled time-series, cross-section observations on the Canadian provinces. The main sample period extends from fiscal year 1952–53 to fiscal 1969–70, and estimates based on several subperiods are also reported.[16]

The fiscal history of the Canadian federation between 1952 and 1970 provides a good basis for a test of the effect of separation. Table 1 illustrates the growing relative importance of grants in provincial finances during the 1950s and 1960s.

### *Grouping of Provinces by Per Capita Income*

The equations above have been estimated also using data grouped by provincial per capita income. This is of interest for two reasons. First, considering only high income provinces (Ontario, Alberta, and British Columbia) that do not receive equalization grants ensures that a positive sign on the coefficient on $G$ does not simply reflect the receipt of equalization by some provinces.[17] The existence of a national pro-

[16] The earliest available observations (for fiscal 1950–51) are unreliable and, since (8) includes one lag, the main sample begins with 1952–53. Public-expenditure data after the 1969–70 fiscal year are not compatible with prior years (being measured on a gross rather than the older net basis), while the period 1952–53 to 1969–70 would appear to be a good basis for a test of the effect of separation, as table 1 indicates. Because the data for Quebec are not strictly comparable with those for other provinces, the estimates reported are based only on data for the other nine provinces (see Winer [1980] for elaboration). However, the results remain essentially the same whether Quebec is included in the data pool or not.

[17] These high income provinces did not receive equalization payments (see table 1) except for a very small amount (relative to own tax revenue) paid to British Columbia in the late 1950s and early 1960s and a somewhat larger amount to Alberta. In the latter case equalization rapidly fell to zero by 1965. But in any case, the fact that equalization was diminishing for some of the rich provinces reinforces the conclusions stated below, because this reduction would result in smaller coefficients on $G$ in the context of the model used here.

TABLE 1

RATIOS OF TOTAL GRANTS $G$ AND CONDITIONAL GRANTS $G^c$ TO PROVINCIAL TAX REVENUES FROM OWN SOURCES, SELECTED FISCAL YEARS 1952–53 TO 1969–70

| | British Columbia | Alberta | Saskatchewan | Manitoba | Ontario | Quebec | New Brunswick | Nova Scotia | Prince Edward Island | Newfoundland |
|---|---|---|---|---|---|---|---|---|---|---|
| 1952 | .06 | .06 | .08 | .12 | .07 | .07 | .13 | .11 | .24 | .40 |
| | (.05) | (.04) | (.06) | (.08) | (.06) | (.06) | (.09) | (.06) | (.13) | (.08) |
| 1960 | .24 | .24 | .47 | .49 | .20 | .26 | .79 | .89 | 1.22 | 1.66 |
| | (.21) | (.14) | (.20) | (.26) | (.20) | (.12) | (.24) | (.26) | (.27) | (.31) |
| 1969 | .22 | .27 | .39 | .44 | .24 | .41 | .79 | 1.025 | 1.32 | 1.38 |
| | (.22) | (.27) | (.34) | (.29) | (.24) | (.24) | (.30) | (.40) | (.45) | (.36) |

SOURCE.—Given in Winer (1980).

NOTE.—Figures in parentheses are ratios of conditional grants to tax revenues from own sources; figures above these include unconditional grants.

gram of interregional redistribution implies $\theta_2 > \theta_3$ in (poor) recipient provinces even though separation may not reduce perceived tax prices. If $\theta_2$ was *less* than $\theta_3$ in these provinces, the increase in fungible resources equalization grants provide could be financed more cheaply via an increase in provincial tax revenue from own sources.

Second, a comparison of results for the rich provinces with those for a group of poor provinces (Newfoundland, Prince Edward Island, Nova Scotia, and New Brunswick) can be used to confirm the reasonableness of the results as a whole. When compared with estimates for the rich provinces, we should find the elasticity of $Q$ with respect to $G$ to be greater for the poor provinces and that with respect to $\tilde{G}$ to be smaller, reflecting the poor provinces' receipt of equalization in addition to any effect of grants due to separation.

*Results*

Consider now the results of estimation for all provinces together in the second and third columns of table 2. If separation by itself does increase the size of government, $\beta_1$, the coefficient on $G$, must be significantly positive, and this is the case in the column for equation (4). When the theoretically more desirable equation (8) is estimated the coefficient on $G$ becomes insignificant.[18]

However, the latter result is probably a consequence of autocorrelation. Given the autoregressive structure of (8), autocorrelation would be likely to bias the coefficient on $Q_{-1}$ toward 1 and that on $G$ (and the other explanatory variables) toward zero, while in the third column these coefficients are approximately one and zero, respectively.[19]

To allow for this possibility the following variation on (8) has been estimated:

$$Q_{jt} = \sum_{l=0}^{k} \beta_l^0 x_{jt-l} + \sum_{l=0}^{k} \beta_l^1 G_{jt-l} + \sum_{l=0}^{k} \beta_l^2 \tilde{G}_{jt-l} + \beta_5' N_{jt} + \beta_{6j}' + e_{jt}^*, \tag{8'}$$

where $\beta_0^1 = \alpha\omega(\theta_2 - \theta_3) = \beta_1$. This equation can be derived from (8) by successive substitution for the lagged value of $Q$, except that, to save degrees of freedom, (i) $N$ appears only for the current period because it behaves quite sluggishly, and (ii) the terms in $\Delta G$ and its lags and the term in $Q_{t-k-1}$ have been dropped because they did not

[18] Note that in the columns for eqq. (4) and (5) the coefficient on $\tilde{G}$ ($\beta_2$) is negative as predicted and significantly so; grants to other provinces financed at least partly by federal taxation in this province clearly result in lower perceived disposable incomes and hence in reduced provincial expenditure.

[19] On this see, e.g., Malinvaud (1980, chap. 13).

TABLE 2

TWO-STAGE LEAST-SQUARES ESTIMATES OF EFFECTS OF GRANT SYSTEM ON REAL PROVINCIAL EXPENDITURE

| | Equation (4) (1952–69) | Equation (8) (1952–69) | $k = 3$ (1954–69) | $k = 3$ (1956–67) | $k = 3$ (1961–69) |
|---|---|---|---|---|---|
| $x$ | 113.65** | 60.76** | 101.87 | 49.95 | 11.59 |
| | (3.26) | (3.37) | (1.51) | (.70) | (.13) |
| $x_{-1}$ | ... | ... | 58.11 | 65.07 | 94.65 |
| | | | (.75) | (.94) | (1.01) |
| $x_{-2}$ | ... | ... | 77.03 | 62.30 | 111.09 |
| | | | (1.13) | (.95) | (1.11) |
| $x_{-3}$ | ... | ... | 60.95 | 135.73* | 147.25 |
| | | | (.95) | (1.75) | (1.47) |
| $G$ | 1.20** | .10 | 3.79** | 3.20** | 2.86** |
| | (10.70) | (1.17) | (2.71) | (2.96) | (2.66) |
| $G_{-1}$ | ... | ... | −2.57** | −2.75** | −1.59 |
| | | | (−2.02) | (−2.38) | (−1.64) |
| $G_{-2}$ | ... | ... | .26 | .51 | .68 |
| | | | (.49) | (.90) | (1.29) |
| $G_{-3}$ | ... | ... | −.35 | −.14 | −.70 |
| | | | (−.64) | (−.30) | (−1.10) |
| $\Sigma G$ | ... | ... | 1.13** | .82 | 1.25** |
| | | | (4.71) | (.72) | (3.46) |
| $\tilde{G}$ | −.04** | −.02** | −.15** | −.09** | −.09** |
| | (−3.54) | (−3.03) | (−3.08) | (−2.42) | (−2.14) |
| $\tilde{G}_{-1}$ | ... | ... | .09 | .01 | .06 |
| | | | (1.54) | (.33) | (1.13) |
| $\tilde{G}_{-2}$ | ... | ... | −.03 | .01 | −.44 |
| | | | (−.80) | (.31) | (−1.26) |
| $\tilde{G}_{-3}$ | ... | ... | .01 | −.01 | −.04 |
| | | | (.22) | (−.32) | (−.95) |
| $\Delta G$ | ... | −.30 | ... | ... | ... |
| | | (−.88) | | | |
| $Q_{-1}$ | ... | 1.00** | ... | ... | ... |
| | | (18.91) | | | |
| $R^2$ | .97 | .99 | .93 | .95 | .97 |
| SEE | .80 | .17 | 1.20 | .91 | 1.02 |
| $df$ | 149 | 147 | 122 | 86 | 59 |
| D-W | .74 | 1.75 | 1.68 | 2.01 | 1.87 |

SOURCE.—Given in Winer (1980).

NOTE.—Quebec is excluded. The dependent variable is net provincial expenditure, $Q$. $x$ = per capita income, $G$ = grants to this province, $\tilde{G}$ = grants to other provinces. $R^2$ is unadjusted. Degrees of freedom are for $t$-statistics given in parentheses. $k$ = number of lags in eq. (8′). Sample periods are for fiscal years ended nearest December 31 of the years named. Coefficients on population and provincial dummy variables are not reported. Instruments include all predetermined variables as well as lagged values of right-hand-side variables except population and the provincial dummies, and a shift variable which steps in the fiscal year following the renegotiation of federal-provincial fiscal arrangements.

* Significant at 10 percent.

** Significant at 5 percent.

prove significant in preliminary estimation.[20] Because (8′) contains additional positively autocorrelated variables not in (8) (i.e., lagged values of $x$, $G$, and $\tilde{G}$), $e^*_{jt}$ should be expected to exhibit, in general, less autocorrelation for each $j$ than $e_{jt}$. But (8′) and (8) should both yield a coefficient on $G$ that is not significantly different from zero if the $e_{jt}$ are *not* autocorrelated and separation has no effect on voter perceptions.

Estimation of (8′) with $k = 3$ for all provinces together given in the last three columns of table 2 indicates that this is not in fact the case. The coefficient on $G$ in (8′) is positive and significant for all sample periods considered.[21]

The disaggregated results in table 3 show that the positive coefficients on $G$ in table 2 are not simply due to the existence of equalization grants. For the high income provinces alone (cols. 4–6) the coefficients on $G$ are still positive and significant. The results as a whole clearly indicate, therefore, that the separation created by the grant system over the 1952–70 period did reduce perceived tax prices and increase provincial expenditure.

Tables 2 and 3 suggest also that these effects of separation diminished with time but did not disappear completely. This is consistent with the existence of significant lags in the processes by which political competition in the federation generates, and voters acquire, information about true tax prices. The long-run coefficient on grants, given by the sum of the coefficients on $G$ and its lags, is denoted $\Sigma G$ in tables 2 and 3. In table 2 the long-run coefficients are smaller than the impact coefficients, but with one exception (the 1956–67 period) the long-run coefficients are still significant. In table 3 the long-run effects of grants are less than the impact effects for half the samples considered, though with one exception (col. 2) only the coefficients on the current values of $G$ are significant. Again, the long-run coefficients are significant with one exception (col. 3).

Finally, as a check on the estimation as a whole, we can compare the elasticities on $G$ and $\tilde{G}$ for the poor provinces with those for the rich provinces. In table 3 the impact elasticity $\eta(G)$ of $Q$ with respect to $G$ for the poor Atlantic provinces is about twice as large as that for the rich provinces for comparable sample periods, while the coefficients on $\tilde{G}$ and therefore the corresponding expenditure elasticities are

[20] Alternatively, (8′) can be regarded as another dynamic version of the first-order condition (4) of the general form $\Sigma_{l=0}^{k}\alpha_l Q^*_{jt-l}$, where only the current value of $N$ appears for the reason given above. Previous remarks concerning the specification and estimation of (8) apply to (8′) as well.

[21] Estimation of (8′) for $k = 1$–$4$ consistently yields a significantly positive coefficient for $G$.

TABLE 3

DISAGGREGATED EFFECTS OF THE GRANT SYSTEM

| | Atlantic Provinces (Poor Recipients) | | | Ontario, Alberta, British Columbia (Rich Donors) | | |
|---|---|---|---|---|---|---|
| | 1954–69 (1) | 1956–67 (2) | 1961–69 (3) | 1954–69 (4) | 1956–67 (5) | 1961–69 (6) |
| $x$ | 14.80 | 81.33 | −135.65 | 631.78** | 603.87** | 905.90** |
| | (.16) | (1.15) | (−.37) | (3.48) | (2.37) | (3.21) |
| $x_{-1}$ | −38.18 | 32.56 | −137.18 | 72.56 | 205.70 | 535.28 |
| | (−.36) | (.50) | (−.30) | (.29) | (.65) | (1.48) |
| $x_{-2}$ | 5.33 | 33.31 | 292.32 | 251.55 | 139.34 | −71.6 |
| | (.06) | (.51) | (.74) | (.98) | (.51) | (−.20) |
| $x_{-3}$ | 41.74 | 59.09 | 708.96 | −57.59 | −6.05 | 310.97 |
| | (.50) | (.71) | (.97) | (−.25) | (−.02) | (1.10) |
| $G$ | 2.26* | 1.21** | 2.39 | 2.94** | 1.79** | 1.45** |
| | (1.98) | (2.94) | (1.17) | (3.77) | (2.32) | (3.16) |
| $\eta(G)$ | 1.26 | .68 | 1.48 | .61 | .37 | .34 |
| $G_{-1}$ | −.99 | −1.09* | −.90 | −.59 | −.26 | .67 |
| | (−1.10) | (−1.73) | (−.63) | (−.78) | (−.43) | (1.39) |
| $G_{-2}$ | −.04 | .75 | .39 | .53 | .37 | .52 |
| | (−.08) | (1.47) | (.41) | (.92) | (.70) | (1.09) |
| $G_{-3}$ | .55 | .38 | −.19 | −.11 | −.06 | −.50 |
| | (1.01) | (.91) | (−.10) | (−.23) | (−.14) | (−1.13) |
| $\Sigma G$ | 1.78** | 1.25** | 1.69 | 2.77** | 1.84** | 2.14** |
| | (5.63) | (2.55) | (1.68) | (6.57) | (2.50) | (4.04) |
| $\tilde{G}$ | −.05 | −.03 | −.11 | −.17* | −.12 | −.16* |
| | (−1.42) | (−1.35) | (−.93) | (−1.92) | (−1.18) | (−1.82) |
| $\tilde{G}_{-1}$ | .05 | .005 | −.05 | −.17* | −.96 | −.24** |
| | (1.09) | (.23) | (.56) | (−1.74) | (−.92) | (−3.06) |
| $\tilde{G}_{-2}$ | −.003 | −.008 | −.04 | .004 | .001 | −.13 |
| | (−.10) | (−.37) | (−.68) | (.04) | (.01) | (−1.58) |
| $\tilde{G}_{-3}$ | −.008 | −.03 | −.08 | .10 | −.03 | −.09 |
| | (−.26) | (−1.22) | (−1.00) | (.92) | (−.27) | (−.87) |
| $R^2$ | .93 | .96 | .93 | .99 | .99 | .99 |
| SEE | .75 | .46 | .97 | .64 | .51 | .44 |
| $df$ | 47 | 31 | 16 | 32 | 20 | 11 |

SOURCE.—Given in Winer (1980).
NOTE.—See table 2 n. $\eta(G)$ = the elasticity at the means of $Q$ with respect to $G$.
* Significant at 10 percent.
** Significant at 5 percent.

significantly negative only for the latter. These results are consistent with our a priori expectations as outlined above.

## IV. Summary and Conclusions

The empirical question dealt with in this paper is whether the separation of public spending and taxing decisions characteristic of most representative democracies can lead to a systematic and persistent reduction in perceived tax prices and thereby induce an increase in the size of government.

We have analyzed the separation of spending and taxing created in federal states when central governments finance local expenditures. If separation does lead to a reduction in perceived tax prices that in turn induces an increase in the size of government, we should be able to observe this chain of events as a consequence of the substantial separation introduced by a system of intergovernmental flows.

Evidence from a dynamic decisive-voter model of the effect of grants on Canadian provincial expenditures between 1952 and 1970 clearly supports the conclusion that the separation created by grants did reduce perceived tax prices and increase provincial expenditures. The same evidence also indicates that these effects diminished over time but did not disappear completely. It is strongly arguable, therefore, that the growth of the grant system was intended by political agents to create an informational advantage for them vis-à-vis the decisive voter and was successful in doing so for a considerable period of time.

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