An Empirical Study of Matching Grants: The "cap on CAP"

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Abstract

Funding mechanisms for social expenditures are currently being reformed in many countries. While the theoretical implications of these changes are often easily identified, their empirical magnitude is not always as clear. For example, in federal systems social expenditure is often funded by matching grants, and estimates of the effect of varying matching rates on expenditures by sub-national governments vary widely. The ambiguity is due in part to inherent difficulties identifying price and income effects of federal grants given the structure of the funding mechanisms in most countries. In this paper, we examine a recent reform in Canada, in which federal grants for welfare expenditures were 'capped' (converted from an open-ended to a closed-ended matching grant). Importantly, the cap applied to only three of ten provincial governments. Our empirical strategy exploits the time series-cross section variation in the funding mechanism provided by the differential application of the reform. This approach potentially surmounts some of the difficulties which have beset earlier studies. We find that the affected provinces did respond to the reform by reducing the growth rate of expenditures. They were 6 to 8 percentage points lower than predicted in the absence of the cap over the medium term.

1. Introduction

Federal governments in many countries are reforming the mechanisms though which they contribute funds to the programs of sub-federal governments. For example, the Personal Responsibility and Work Opportunity Act (PRWOA), passed by the US congress in 1996, converts federal support for states' cash transfers to the needy under the Aid to Families with Dependent Children (AFDC) program from an open-ended matching grant to a block grant. Federal grants to provincial governments in Canada have also gone through similar changes in the past decade.

While in theory the consequences of these reforms are typically straightforward, predicting their empirical magnitude is seldom as easy. For example, in the case of the PRWOA, state expenditures on AFDC should fall as the matching rate is reduced to zero and the effective "price" of benefits increases.[1] Estimates of the elasticity of expenditures with respect to matching rates, however, vary widely. Gold and Lowenstein (1995) note that a dollar of (open-ended matching) AFDC grant has been estimated to stimulate anywhere from \$0.29 (about the same as a block grant) to \$1.23 (much more) of spending.[2] Clearly, these results, together with the related "flypaper effect"[3]—the phenomenon that lump-sum grants to states/provinces have considerably *larger* effects on spending than theory predicts—leave little basis for predicting the impact of the current wave of fiscal reforms being implemented in many countries.

As noted by Chernick (1995) and Hines and Thaler (1995), one of the reasons

[1] Any income effects due to changes in the overall level of the federal grant would lead to additional changes in state expenditures.

[2] Moffitt (1984, 1990) finds small effects of matching rates on AFDC benefits, and Craig and Inman (1986) find a similar result for total welfare spending. In contrast, Gramlich (1982), Gramlich and Laren (1984) and Inman (1985), among others, find much larger effects. See Chernick (1995) for a survey of these and other estimates in the literature.

[3] The results here are equally diffuse. Gold and Lowenstein (1995) report estimates of the stimulative effect of a dollar of federal funding ranging from \$0.20 to \$0.90 of additional spending on the aided program.

for this uncertainty is that measurement of the behavioural response is problematic in many shared cost programs. A common approach in the literature is to use cross section variation in matching rates or the level of grants for identification. The resulting estimates, however, may partly capture "permanent" differences across states or provinces in spending propensities, or the optimizing decisions of these governments facing a menu of matching rates. Furthermore, this strategy is inappropriate for programs in which there is no cross section variation in the financing parameters (e.g., the US Food Stamp program). These limitations and criticisms of the cross section approach suggest time series variation may be useful. The reforms of shared cost programs, however, are often universal. It can be difficult, therefore, to distinguish the effect of the reform from unobserved time effects. The upshot is that the very structure of many federal granting programs is a hindrance to empirical study in this area.

In this paper, we examine a matching grant program which lends itself to a particularly direct analysis. The Canada Assistance Plan (CAP) was a shared-cost program of the Canadian federal government which provided funds for provincially administered social assistance (welfare) programs. Historically, CAP was an open-ended matching grant, and all provinces faced a fixed matching rate of 100 per cent. In 1990, in an effort to control rising costs, the federal government converted CAP to a closed-ended grant for three of the ten provinces. Federal contributions to social assistance expenditures in the three provinces were constrained to grow by no more than five per cent annually, relative to 1989 expenditures, for the fiscal years 1990 through 1994. Any increases in the provinces' expenditures in excess of five per cent were therefore not subject to matching.

We examine this "cap on CAP" to provide new evidence of how matching grants affect recipient governments' expenditure decisions. The "experiment" is straightforward: where the ceiling is binding, the marginal matching rate falls from 100 percent to zero. The prediction of conventional theory is that, all else equal, social assistance expenditures should be smaller than in the absence of the ceiling. We argue that this case provides a firmer basis for inference than the cases analyzed in many previous studies. The response of the provincial governments to the change in the granting formula is identified by time series-cross section variation. Therefore, we can control for permanent differences in spending propensities across provinces, and the decisions of unaffected provincial governments (there are seven) provide a natural control for unobserved time effects which affect expenditures and are coincident with the application of the ceiling. Finally, the variation in the matching rate that we exploit is exogenous to the decision-making process of the affected governments, and is arguably orthogonal to other determinants of expenditure on social assistance.

Our results indicate the change in the matching rate led to a modest decline in the growth of CAP expenditures in the affected provinces. For the period 1990 through 1994, we estimate the growth rates in these provinces were 6 to 8 percentage points lower than they would have been had the ceiling not been in place.

2. The Canada Assistance Plan

The Canada Assistance Plan was created by an act of the Canadian federal Parliament in 1966.[4] Plan expenditures fall into three groups: 1) general assistance expenditures to persons in need (i.e., welfare),[5] 2) expenditures undertaken to extend welfare programs to aboriginal Canadians, and 3) expenditures undertaken to improve the employability of people who have trouble finding jobs or undertaking job training (so called Work Activity Projects). Provinces are permitted to sign sepa-

[4] The necessary legislation (Bill C-1) was introduced to Parliament on April 4, 1966 and received royal assent on July 23, 1966. The legislation was retroactive to April 1, 1966. Further detail on the history of CAP can be found in Hum (1983) and Human Resources Development Canada (1995).

[5] Programs in group 1 include financial assistance and homes for special care (e.g., homes for the aged, hostels, nursing homes and residences for individuals with special needs), certain health care costs for those in need, child welfare (primarily foster homes) and miscellaneous welfare services.

rate agreements with the federal government for each group, which provides some flexibility in the design of social assistance initiatives.

Initially, the federal government contributed 50 percent of the costs of programs in all three groups on an open-ended basis. In the February, 1990 budget, the increase in federal CAP contributions for the fiscal years 1990/91 and 1991/92 were limited to 5 percent a year for Alberta, British Columbia (B.C.) and Ontario.[6] This 5 percent annual ceiling was extended for these three provinces to the end of the 1994/1995 fiscal year in the February, 1991 budget.

The initial application of the ceiling was complicated by political and constitutional uncertainty. The B.C. government launched a court proceeding, in March, 1990, challenging the federal government's authority to place a ceiling on CAP expenditures. The British Columbia Court of Appeal ruled in favour of the province in June of that year. The federal government appealed the decision to the Supreme Court of Canada. The ceiling on CAP expenditures was suspended for the 1990/91 fiscal year pending the Court's decision. On August 15, 1991, the Supreme Court ruled that the federal government had not exceeded its jurisdiction, and so the suspension of the ceiling was lifted. Furthermore, any overpayment of funds to Alberta, B.C. and Ontario during the suspension period were recovered over the 1991/92 fiscal year.[7]

The choice of Alberta, B.C. and Ontario as the targets of the cap was not random: these are the three provinces which did not receive benefits under Canada's equalization program at this time.[8] The equalization program distributes federal

[6] The capping of CAP was accomplished through the *Government Expenditures Restraint Act* which was introduced as Bill C-69 on March 15, 1990. This act was passed in February 1991. For further detail on developments under CAP over this period see Health and Welfare Canada (1993a and 1993b).

[7] CAP was converted to a closed-ended matching grant for all provinces in the 1995/96 fiscal year. In 1996/97 the programs were revised, and federal transfers to all provinces now take the form of block grants.

[8] In fact, the federal government's actions were directed at all provinces which did not receive

tax revenues to provinces in the interest of equalizing fiscal resources in all areas of the country. Using the average national tax rate, each province's per capita revenue yield is compared to the per capita yield in five, so called representative, provinces: B.C., Manitoba, Ontario, Quebec and Saskatchewan. Provinces that are judged on this basis to have below "average" tax capacity–the "have-not" provinces–receive a payment from the federal government's general tax revenues. Provinces with above average tax capacity are not explicitly brought down to the average, so full equalization is not realized. Therefore, the ceiling was imposed on those provinces which in a specific sense had greater revenue capacities, although the differences were at least partially attenuated by the payments made under the program. For example, Boadway and Hobson (1993) report that in 1987/88 the post equalization per capita fiscal capacities of the have-not provinces were 98 percent of the national average. In comparison the corresponding percentages for the "have" provinces were 146 percent for Alberta, 104 percent for B.C. and 108 percent for Ontario.

The affected provinces had several degrees of freedom in their response to the cap.[9] The CAP requires provinces to provide financial assistance to "persons in need".[10] The administration, design and delivery of specific programs are the responsibility of the provinces, however, given that they meet the general requirements of the Plan.[11] In practice, provinces varied in their classification of beneficiaries as well as the structure of payments to the different classes. For example, provinces differed in their definitions of employable individuals, the incentives they provided for these individuals to seek employment, what items were covered by their "basic

equalization payments and not specifically at Alberta, B.C. and Ontario. For further information on Canada's equalization program see Boadway and Hobson (1993).

[9] Much of the following discussion is derived from National Council of Welfare (1997).

[10] These include unemployed persons, low-income workers, one-parent families, families or individuals in crisis, disabled persons, battered women, and abused or neglected children.

[11] All programs must obtain prior federal approval to receive cost sharing. Program parameters must adhere to CAP definitions of "persons in need," cannot impose a residency requirement for benefit eligibility, and must provide for an appeals process for decisions regarding social assistance.

benefit" and the types of supplemental benefits provided (e.g. housing, job training, health, etc.).

Although changing benefit rates might seem the obvious way for the capped provinces to reduce expenditures, casual evidence suggests that most provinces concentrated on more indirect methods over the sample period. These included programs to detect fraud and abuse by beneficiaries, changing the classification of some beneficiaries (e.g. from unemployable to employable), and changing the incentives for beneficiaries to seek employment. For example, Newfoundland substantially increased the number of fraud investigators, Alberta established a "snitch" line, and B.C. reclassified single parents from unemployable to employable once the youngest child reached the age of 12. Some provinces reduced the tax-back of benefits for employment earnings. Conversely, others undertook measures to limit the benefits a beneficiary would receive if he or she was employed. Finally, some provinces cut supplemental benefits such as shelter allowances, and dental and vision care.

The message, therefore, is that the reforms available to the provinces were not exclusively changes to benefit rates. They could also include adjusting eligibility requirements, better monitoring, shifting funding across different types of beneficiaries, and encouraging beneficiaries to seek employment.

3. A Theoretical Framework

These considerations can be summarized in a simple, reduced-form model of welfare policies and the effects of federal grants. Suppose that provincial governments design welfare policies to maximize a political objective function $W(R, B, T, Z)$, where B is the number of welfare beneficiaries, R is the average cash transfer to beneficiaries, T is the per capita tax payment required to finance the program, and Z is a vector of exogenous characteristics influencing preferences for welfare spending. This formulation captures the notion that governments have considerable discretion in determining the number of recipients for any benefit level, and that the political costs of raising taxes to increase benefit rates may differ from those of expanding beneficiaries. Welfare expenditures are subsidized by the federal government at rate s,[12] so that a welfare policy (R, B) is chosen to

$$\max W(R, B, T, Z)$$

subject to the provincial government budget constraint

$$T = \frac{(1-s)RB}{N}$$

where N is the number of taxpayers. Optimal policy functions are then

$$R = R^*((1-s)/N, Z)$$

$$B = B^*((1-s)/N, Z)$$

where $(1-s)/N$ is the effective tax price of raising total program expenditures by \$1. If R and B are normal goods in government preferences, then both functions are predicted to be non-increasing in the tax price.

This formulation abstracts from some important considerations. Benefit rates and the number of beneficiaries need not be independent choice variables for governments, particularly if changes in rates induce changes in market incomes or interprovincial migration by potential beneficiaries. This possibility might be addressed by simultaneous-equations estimation of the effect of the cap on both benefit rates and beneficiaries. Because we lack adequate instrumental variables for beneficiaries, however, we do not attempt this approach. Instead, we begin by examining the effect of the reforms on total program expenditures RB in a reduced form specification. Since both R and B are non-increasing in the tax price, the product of the two

[12] Under CAP, provincial expenditures were matched dollar-for-dollar prior to the reform, so the effective subsidy rate was $s = 0.5$.

is as well. Given the many avenues of adjustment available to provinces to accommodate the cap, its effects should be most readily discernible in total expenditure rather than in its components. Nevertheless, we subsequently attempt to decompose the total impact of the reform into its separate effects on benefit rates and numbers of beneficiaries.

Our focus on total expenditures and the number of beneficiaries, in addition to benefit rates, deviates somewhat from the conventional practice of examining benefit rates exclusively.[13] We believe this approach better accommodates the realities of the CAP program in the 1990's as documented in Section 2. We make another break from tradition in that much of our empirical analysis concerns the impact of the cap on the *growth rates* of expenditures, beneficiaries and benefits rates. Our reasons for this decision are twofold. The first is pragmatic. The ceiling on transfers was specified in terms of the growth rates of provincial expenditures, with the nominal ceiling increasing five per cent annually. Therefore, growth rate specifications are the best way to test a null hypothesis that the cap had no effect on the affected provinces' spending decisions. The second is the observed tendency of government expenditures, and particularly of redistributive programs like CAP, to grow over time. Recently, for example, Peltzman (1992, 327) has argued "a central fact of recent US and world economic history is that public expenditures have been growing faster than private incomes", this despite the observed hostility of voters to such growth. This stylized fact of modern economies has been extensively analyzed in recent years, and a number of explanations for the phenomenon have been advanced.[14] Direct tests of these theories are outside the scope of this paper. They do, however, suggest that steady-state growth in government expenditure is to be expected, and

[13] But see Craig and Inman (1986).

[14] See Borcherding (1985), Mueller (1989), and Lindert (1996), among others, for surveys and tests of these arguments.

that impacts of policy reforms may be more readily discernible in growth rates of expenditures than in levels.

4. The Empirical Framework

The base empirical specification is

$$\Delta \log(Y_{it}) = P_i + D_t + \Delta X_{it}'\beta + \alpha_1 \cdot NDP_{it} + \lambda \cdot Cap_{it} + \epsilon_{it} \tag{1}$$

where Δ is the first difference operator. As discussed above, the dependent variable (Y_{it}) of primary interest is real CAP expenditures in province i in year t,[15] although we also present estimates of (1) when Y_{it} is the number of cash welfare beneficiaries or various assistance rates. The P_i are a full set of province effects and the D_t are a full set of year effects. X_{it} is a vector of control variables that initially includes the logs of population, real GDP, the unemployment rate for prime age males (ages 25-44) and the number of new immigrants settling in the province. These variables, measures of economic and labour market conditions and socio-demographic trends, capture the demand for social assistance. While it might be preferable to use disposable income as a control variable, tax revenues and CAP expenditures are likely to be jointly determined. We therefore use GDP as a proxy. We also include a dummy variable for years in which the provincial government is controlled by the New Democratic Party (NDP_{it}). This is included to control for any ideological proclivity these governments might display for social spending. The NDP is a left wing party which has historically been associated with bigger government. Cap_{it} is a dummy variable equal to 1 if $t \geq 1990$ for the provinces of Alberta, B.C., and Ontario. Therefore, the estimate of λ is a measure of the cap's effect on the growth in social assistance expenditures in these provinces.[16]

[15] Note that the CAP expenditure data is by fiscal year, while our control variables are measured on a calendar year basis.

[16] The sources of all variables used in the analysis are reported in the Appendix.

In equation (1) the province effects partial out any unobserved fixed differences in the growth rates of expenditures across provinces. This is equivalent to province specific linear trends in the levels of the dependent variable, which allows for slow changing unobserved province effects. The X_{it} and NDP_{it} terms directly control for observable heterogeneity which is related to changes in expenditures. We also present results from specifications that incorporate a full set of interactions between the province effects and these variables.

Our primary control for unobserved period specific effects is the actions of unaffected provinces. Our estimate of the effect of the cap is constructed relative to the concurrent actions of these other provinces as captured by the common year effects. The application of the ceiling was not random, however, and this could potentially bias our inference. Alberta, B.C. and Ontario have larger than average fiscal resources, as measured by the equalization program, over the sample period. It is possible that provinces with greater resources make different decisions about the growth of social assistance expenditures than have-not provinces. The most obvious systematic difference in expenditures between capped and uncapped provinces is due to income effects, which we control for explicitly with real GDP. Note also, that Alberta, B.C. and Ontario did not receive equalization payments in any year of our sample period. Therefore, if the manifestation of the larger tax capacity in these provinces is a different response to changes in the demand for social assistance (e.g., in a recession), this will be captured by interactions of the province effects and the control variables. Likewise, the province effects will capture any (unobserved) effect of these greater resources to the extent they are fixed over time. Finally, while six of the seven uncapped provinces received equalization payments throughout the sample period, Saskatchewan received payments only in the fiscal years 1980/81 and 1986/87-1994/95. Therefore, we can exploit the change of status in this province and enter a separate common fixed effect in equation (1) for provinces which do not receive equalization payments.

We also try to address the possibility of a period specific shock, co-incident with the imposition of the cap, which systematically affects capped provinces differently than uncapped provinces.[17] Using the share of CAP expenditures in total provincial expenditures as the dependent variable in (1) will account for any province specific shocks to spending to the extent they are common to all expenditure categories. More precisely, it guards against the possibility that estimates of the effect of the ceiling are merely capturing general reductions in provincial spending in the affected provinces.

5. Results

We noted that the reform converted CAP to a closed-ended matching grant, which would increase the marginal "price" of provincial spending when expenditures exceeded the ceiling level specified by the federal government. We begin by showing that in the absence of provincial responses to the reform, the ceiling would indeed have been binding on provinces. In table 1, we compare the five per cent annual growth in the ceiling to inflation and population growth in the affected provinces over the period of the cap. The sum of these latter two variables provides a rough account of how much CAP-eligible expenditures would need to rise to remain constant in real, per capita terms. Five per cent annual growth provided for a 28 per cent cumulative increase in expenditures between 1989 and 1994 before the ceiling was binding. This is lower than the cumulative effects of price and population growth in British Columbia (31 per cent) and just slightly greater than cumulative

[17] In this same vein, it is possible that the reform affected the decisions of the uncapped provinces if they anticipated being capped in the future. Certainly it seems unlikely that any of the uncapped jurisdictions anticipated becoming a "have" province in the early 1990s. Furthermore, our discussions with provincial officials do not reveal any strategic behaviour on the part of the uncapped provinces during this period related to expectations of whether the cap would eventually be extended. Nevertheless, to the extent that these sorts of anticipatory effects are present we will overestimate the effect of the cap.

growth in Alberta and Ontario (24 per cent). Nevertheless, in the absence of a real change in spending, the ceiling would have been binding for all three provinces in the initial years of the reform. In fact, expenditures rose substantially in real per capita terms in the initial years: for example, by 1992 the proportion of eligible costs in Ontario reimbursed by the federal government had fallen from 50 per cent to 28 per cent (Advisory Group on Social Assistance Legislation, 1992).

The growth in real per capita expenditures in the initial years of the reform is partly explained by other changes in environment which shift demand for welfare spending, and which are not accounted for in Table 1. For example, in 1990 the Canadian economy entered a recession. Moreover, governments may respond gradually to changes in federal transfers due to transactions costs or the realities of parliamentary governance.[18] If this is the case, expenditures might not fall to long-run equilibrium levels immediately, or more particularly over the five years following the policy reform that we examine. If governments are responding to federal policies over the short term, however, growth rates of expenditures should be more sharply affected.

More concrete evidence of an effect of the policy reform is found in a comparison of the growth rates of CAP expenditures in the capped and uncapped provinces before and after the ceiling was imposed.[19] Between 1980 and 1989, the average growth rate in Alberta, B.C. and Ontario was twice that in the other provinces (6.4% versus 3.2%). In the 1990's the average growth rate in the uncapped provinces rose

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[18] Note that no provinces had balanced budget laws at this time, so the fiscal consequences of a lagged response could be accommodated through deficit financing.

[19] The total expenditure data are from special tabulations performed by Human Resources Development Canada and various provincial governments for the fiscal years 1980/81 through 1994/95. These data are constructed by year of expenditure. CAP eligible expenditures are more commonly reported on a year of recovery basis (i.e., recovery of the matching portion from the federal government). Over the years of the ceiling the data for the capped provinces were obtained directly from the relevant provincial governments. A full description of the data is provided in the Appendix. Note that we exclude Prince Edward Island because we were unable to obtain a complete set of the variables used in the subsequent regression analysis for this province.

sharply (to 5.9%), most likely in response to deteriorating economic conditions, while in the capped provinces it fell marginally (to 6.0%). A simple difference-in-difference estimate of the effect of the cap is $((0.060 - 0.064) - (0.059 - 0.032))$ -0.031, which suggests that the growth of CAP expenditures was lower in the capped provinces once the ceiling was imposed.

Estimates of equation (1) are presented in table 2.[20] We present the results for the variables of primary interest, and relegate additional parameter estimates to table A1 of the Appendix. In the first column is an estimate of the effect of the ceiling (Cap) from a specification that includes the year effects, but no province effects or other control variables. It indicates that CAP growth rates were marginally higher in the capped provinces after 1990, although the estimate is not statistically significant. In the next column, we add province fixed effects and find that our simple difference-in-difference estimate (-0.031), is not significant at conventional levels (e.g., 5 percent). In column 3, we add controls for various types of observable heterogeneity across provinces. Here the estimate of Cap is negative and significant. It indicates that after the imposition of the ceiling, the relative change in growth rates was 7.5 percentage points lower in capped provinces than in other provinces. Finally, in column 4 we add interactions between the control variables and the province effects. The estimated effect of the ceiling is very similar to the previous result. Also, we can marginally reject the hypothesis that the provincial interactions are jointly equal to 0.

While these estimates suggest that the cap did have some effect on the primary target (the growth of CAP expenditures), they do not indicate how this was accomplished. We attempt to fill in some of the details in the next 4 columns. As dis-

[20] Estimating the "levels equivalent" representation of (1) model provides a simple specification test of our inference. In fact, estimates of the effect of the cap from the levels equivalent specification are remarkably similar to those reported in table 2. These results are available from the authors on request.

cussed in Section 2, there are number of ways provinces could change the growth of CAP expenditures, including modifying the qualification criteria for different classes of beneficiaries, changing statutory benefit rates and enforcing existing regulations more aggressively.

In column 5 we use the growth rate of the number of beneficiaries of cash welfare assistance programs as the dependent variable. Roughly two-thirds of CAP expenditures are for these programs.[21] The estimated effect of the cap on the growth of welfare beneficiaries mirrors the result for total expenditures, although it is slightly smaller in magnitude. The growth rate in welfare beneficiaries was relatively lower in the capped provinces after the ceiling was applied.

In column 6 we examine a measure of average CAP expenditure, dividing total CAP expenditures by the number of cash welfare beneficiaries. Note there is not an unambiguous prediction for the effect of the cap on average expenditure. For example, a province's reaction to the ceiling could include canceling certain programs that while limiting the growth rate of total expenditures might cause average expenditures per beneficiary to rise. That said, the estimate of *Cap* here, is small and statistically insignificant.

In columns 7 and 8, we use statutory benefit rates for two children families, with one or two parents respectively, as the dependent variable.[22] The results are largely consistent with the estimate for our measure of average expenditure. There is no evidence here that benefit rates were the margin of adjustment for the capped

[21] Calculating the total number of all kinds of beneficiaries (especially recipients of in-kind social services) proves to be difficult as it is not possible to adjust for double counting across published counts for different categories of programs.

[22] We are indebted to Pierre Lefebvre, Philip Merrigan, and Martin Dooley for providing us with their data on statutory benefit rates. It would also be helpful to examine the benefit rates for single, employable individuals, because the political costs of reducing these benefits might be the lowest. It appears difficult to construct a consistent series on the benefits for these individuals over our sample period, however, due to changing definitions of an employable individual. That said, if these sorts of argument were important we would expect to observe some difference in the results across single parent and two parent families.

provinces.

We have reported OLS standard errors in table 2. We have also calculated standard errors corrected for heteroskedasticity and autocorrelation using the method of Newey and West (1987).[23] The estimated standard error, by this method, for the *Cap* on total expenditure reported in table 2, column 3, is 0.027 using two lags of the residual. The corresponding result for the *Cap* on welfare beneficiaries (table 2, column 3) is 0.040.

In table 3, we provide some further evidence of the robustness of our results for the growth rates of CAP total expenditures and cash welfare beneficiaries. In columns 1 and 5 we exclude the data from 1990. Recall that the ceiling was temporarily suspended in this year pending the resolution of the court challenge. Given the favourable decision of the B.C. Court of Appeals in June 1990, the affected provinces may have anticipated that the Supreme Court decision would be in their favour, and therefore did not modify their behaviour. Alternatively, legislative lags may have delayed a response to the ceiling. In any case, this modification leads to marginally larger estimates of the effect of the ceiling.

In columns 2 and 6 we add a separate fixed effect for provinces which did not receive equalization payments over the sample period (NEQP). This helps control for the non-random assignment of the ceiling to the extent the differences between have and have-not provinces are fixed (in growth rates) over time. For total expenditures the estimate of NEQP is positive, but not significant at conventional levels. For beneficiaries the estimate is close to 0. Regardless, the estimates of the effect of the cap are very similar to their counterparts in table 2.[24]

[23] In the following results we use two lags of the residual in the calculation of the standard errors. Very similar results were obtained when the lag was varied around this value. For example, the estimated standard error for the *Cap* on total expenditure reported in table 2, column 3, is 0.025 using no lags (White correction) and 0.027 using 3 lags.

[24] We have also experimented adding interactions between the NEQP fixed effect and our control variables, allowing the provinces with greater resources to react differently to our proxies for demand. The F-tests indicate we can reject the hypothesis that the interactions are jointly equal to zero.

In column 3 and 7 we present the results when we control for the rate of change of other transfers from the federal to the provincial governments. This is potentially an endogenous regressor, but the exercise provides some evidence whether our estimates of the effect of the ceiling are partly capturing the re-shuffling of provincial budgets in response to changes in some other granting program. There is no evidence that this is the case, however, as the estimates of *Cap* are very similar to those in table 2.[25]

During the period the cap was in place, the fiscal orientation of the Alberta government took a distinct turn. Ralph Klein assumed the leadership of the governing Progressive Conservative (PC) party (and thus the premiership of Alberta) in December 1992, and proposed dramatic reductions in government spending. He secured a mandate for this reform through the re-election of the PC party in the early summer of 1993. A possible objection to our inference so far is that our estimate of the cap is being driven by this ideological change of direction in Alberta. One, albeit extreme, way of accounting for this possibility is to enter a dummy variable for the years Klein was in power (1993 and 1994). Here we effectively assume the election of the Klein government was an exogenous event, and its subsequent move to lower government spending was solely the result of ideology and unrelated to the cap. The negative estimate of the *Klein* dummy variable (column 7) indicates the growth rate of CAP expenditures fell quite dramatically in Alberta in these two years. The estimate of *Cap* remains negative, however, although it is somewhat smaller than previous results. The election of Klein is also correlated with a dramatic decline in the

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Nevertheless, the estimated effects of the ceiling are in line with previous results: -0.114 (0.021) for total expenditures and -0.095 (0.030) for welfare beneficiaries (standard errors in parentheses).

[25] We have also tried entering the first difference of the ratio of budget balance to GDP as an explanatory variable. Again the budget balance is presumably determined simultaneously with CAP expenditures, but this variable provides some control for the deteriorating fiscal conditions most provinces experienced over the period of the cap. Nevertheless, the results indicate that this modification has very little effect on our original inference. The estimates of *Cap* are -0.084 (0.021) for total expenditures and -0.076 (0.028) for welfare beneficiaries (standard errors in parentheses).

growth rate of welfare beneficiaries. Here, the estimate of Cap declines by roughly the same proportion as it did for total expenditures, although in this case the result is a statistically insignificant coefficient. Nevertheless, the estimate retains its sign and its relative magnitude.[26]

The discussion of a Klein effect raises the possibility (discussed above) that aggregate changes in provincial spending are driving the estimates of Cap; that is, we have not allowed for the chance that the growth of "other" government spending was declining at a similar rate in the capped provinces over the period of the reform. If this were the case, it would be difficult to attribute our estimates of the relative deceleration in CAP expenditures to the change in the matching rate. In table 4 we present estimates of Cap using the CAP expenditure share as the dependent variable (the specification is otherwise as in table 3). The null hypothesis is that we have been identifying the effect of the ceiling with common shocks to provincial expenditures, and therefore the CAP expenditure share should display no correlation with the change in the matching rate. We can easily reject this hypothesis: the estimates of Cap are negative and statistically significant. The fact the estimates of Cap are uniformly larger (in absolute value) than their counterparts in tables 2 and 3, suggests that CAP and other government expenditures were moving in opposite directions over the period the ceiling was in place. This could reflect the fact that the change in the matching rate made CAP expenditures relatively more expensive, and so the affected governments substituted into other categories.

In summary, our results allow us to reject, decisively, the hypothesis that Alberta, B.C. and Ontario did not respond to the elimination of federal matching aid. This inference is robust to alternative specifications of the estimating equation, and is arguably free of many of the biases which plague earlier studies of this issue. The magnitude of provincial responses appears, however, to have been modest, at least

[26] Adding the NEQP fixed effect to this specification leads to very similar results.

over the relatively short period covered by the data set.[27]

Results from related studies using U.S. data are often reported as elasticities of spending with respect to the federal matching rate (see Chernick, 1995, for a survey). While such a calculation would facilitate comparisons between our estimates and this research, it is not feasible given the non-linearity in provincial government budget constraints induced by the cap. Since the reform converted the CAP program to a closed-ended matching grant for the affected provinces, the matching rate falls to zero only to the extent the cap was binding on a province. The reform, therefore, is equivalent to an increase in the marginal tax price of expenditures, plus an increase in the "virtual income" (i.e. the intercept of the linearized budget constraint) of the provincial government. Due to this income effect, our estimates of the decrease in expenditures associated with cap will understate the pure price effect (assuming CAP expenditures are normal goods). Estimating the virtual income effect directly is not possible with our data, and we are not aware of any estimates of this effect for Canada in the literature. Note, however, that the implied adjustment to our estimates is unlikely to be large, given that expenditures eligible for matching were a small part of total provincial government spending.

7. Conclusions

We examine the conversion of federal funding for welfare expenditures in Canada from an open-ended to a closed-ended matching grant. Similar types of reforms are being considered or have already been enacted in other countries. Robust empirical evidence of the reaction of state or provincial spending to the level or type of federal

[27] Because we model the cap as a linear effect in the first-difference of expenditures, our results do not allow us to recover the new long-run equilibrium level of expenditures in the affected provinces. Furthermore, the funding mechanism for CAP was changed again in 1995 and 1996, and it is debatable whether an equilibrium resulting from the initial reform would be observable in the short period it was in place (1990-1994). Therefore, our main objective is to determine if the reform had any effect on the behaviour of provincial governments over the medium term.

grants is an important input to predicting the likely consequences of these changes. The wide range of empirical results in the literature, therefore, make such predictions a precarious exercise.

A reason for this uncertainty is the inherent difficulty of obtaining an estimate of the behavioural response given the structure of shared cost programs in many countries. This observation highlights the value of the Canadian evidence: federal funding was capped – i.e., converted to a closed-ended grant – for only three of ten provinces. We observe the actions of these three affected provinces both before and after the reform, and we can use the decisions of unaffected provinces as a control group for other changes in the environment which are coincident with the imposition of the cap. Our use of this time series-cross section variation potentially addresses many of the criticisms that have been leveled at previous empirical studies.

Our results indicate that provinces did respond to the reform by reducing the growth rate of expenditures, although the magnitude of the response over the medium term was modest. Growth rates were 6 to 8 percentage points lower than predicted in the absence of the cap. We also present evidence that the ceiling was accommodated through a reduction in the growth rate of beneficiaries. This suggests that the main avenues of adjustment were variation in eligibility requirements, monitoring, supplemental benefits and classification of beneficiaries rather than changes to statutory benefit rates. This is in accordance with anecdotal evidence of changes to CAP programs over this period.

Appendix

Data Sources

CAP eligible expenditures by province for the period fiscal years 1980/81-1994/95 were obtained from a special tabulation performed by Human Resources Development Canada (HRDC). In the years that the cap was imposed, information on expenditures for Alberta, British Columbia and Ontario were obtained directly from the relevant provincial governments. Data on beneficiaries of cash welfare assistance programs by province were also obtained from HRDC. Data on provincial GDP, population, unemployment rates, immigration inflows as well as the Canadian Consumer Price Index are taken from CANSIM. Information on the incidence of equalization payments over the period was obtained from Boadway and Hobson (1993).

Table A1: Additional Parameter Estimates from Regressions Reported in Table 2

	CAP Total Expenditures (TE)				BEN	TE/BEN	Benefits 1P2C	Benefits 2P2C
Constant	0.047 (0.021)	0.105 (0.026)	0.039 (0.026)	-2.41 (1.534)	0.064 (0.037)	-0.025 (0.026)	-0.032 (0.017)	-0.030 (0.015)
Y82	0.076 (0.029)	0.076 (0.028)	0.019 (0.029)	0.062 (0.035)	0.017 (0.040)	0.002 (0.028)	-0.006 (0.019)	0.010 (0.016)
Y83	0.003 (.029)	0.003 (0.028)	-0.008 (0.023)	0.048 (0.031)	-0.067 (0.033)	0.059 (0.023)	0.016 (0.015)	0.014 (0.013)
Y84	-0.016 (0.029)	-0.016 (0.028)	0.002 (0.024)	0.032 (0.031)	-0.013 (0.034)	0.015 (0.024)	0.056 (0.016)	0.051 (0.014)
Y85	-0.006 (0.029)	-0.006 (0.028)	0.013 (0.024)	0.035 (0.029)	-0.061 (0.034)	0.073 (0.024)	0.044 (0.016)	0.041 (0.014)
Y86	-0.023 (0.029)	-0.023 (0.028)	-0.005 (0.026)	-0.008 (0.034)	-0.024 (0.037)	0.019 (0.026)	0.052 (0.017)	0.055 (0.015)
Y87	-0.022 (0.029)	-0.022 (0.028)	0.006 (0.029)	-0.003 (0.039)	-0.039 (0.041)	0.045 (0.029)	0.052 (0.019)	0.045 (0.017)
Y88	-0.014 (0.029)	-0.014 (0.028)	0.026 (0.025)	0.012 (0.036)	-0.029 (0.036)	0.055 (0.025)	0.062 (0.017)	0.076 (0.015)
Y89	-0.034 (0.029)	-0.034 (0.028)	-0.020 (0.026)	-0.011 (0.037)	-0.036 (0.037)	0.016 (0.026)	0.028 (0.017)	0.025 (0.015)
Y90	0.021 (0.030)	0.032 (0.029)	0.052 (0.027)	0.066 (0.040)	0.044 (0.039)	0.008 (0.028)	0.032 (0.018)	0.027 (0.016)
Y91	0.044 (0.030)	0.055 (0.029)	0.048 (0.028)	0.068 (0.038)	0.041 (0.040)	0.007 (0.028)	0.015 (0.019)	0.019 (0.016)
Y92	0.067 (0.030)	0.078 (0.029)	0.065 (0.027)	0.070 (0.035)	0.011 (0.038)	0.054 (0.026)	0.047 (0.018)	0.046 (0.015)
Y93	-0.027 (0.030)	-0.016 (0.029)	-0.011 (0.026)	-0.006 (0.035)	-0.043 (0.036)	0.032 (0.025)	0.022 (0.017)	0.025 (0.015)
Y94	-0.046 (0.030)	-0.035 (0.029)	-0.006 (0.025)	-0.039 (0.037)	-0.037 (0.035)	0.031 (0.024)	0.049 (0.016)	0.043 (0.014)
NF		-0.068 (0.024)	-0.012 (0.022)	0.650 (0.400)	-0.020 (0.031)	0.008 (0.022)	-0.004 (0.014)	-0.003 (0.013)
NS		-0.054 (0.024)	-0.014 (0.021)	0.542 (0.330)	-0.018 (0.029)	0.004 (0.020)	-0.027 (0.014)	-0.023 (0.012)
NB		-0.092 (0.024)	-0.045 (0.021)	0.540 (0.355)	-0.049 (0.030)	0.004 (0.021)	-0.020 (0.014)	-0.016 (0.012)
QU		-0.075 (0.024)	-0.044 (0.020)	0.088 (0.090)	-0.043 (0.028)	-0.000 (0.019)	-0.020 (0.014)	-0.017 (0.011)
MB		-0.053 (0.024)	-0.054 (0.021)	0.433 (0.282)	-0.056 (0.030)	0.002 (0.021)	-0.005 (0.014)	-0.004 (0.012)

Table A1: (cont.)

	CAP Total Expenditures (TE)			BEN	TE/BEN	Benefits 1P2C	Benefits 2P2C
SK	-0.073 (0.024)	-0.053 (0.021)	0.378 (0.288)	-0.040 (0.030)	-0.013 (0.021)	-0.015 (0.014)	-0.013 (0.012)
AB	-0.070 (0.023)	-0.053 (0.019)	0.135 (0.140)	-0.063 (0.027)	0.010 (0.019)	-0.053 (0.012)	-0.045 (0.011)
B.C.	-0.041 (0.023)	-0.054 (0.018)	0.177 (0.161)	-0.028 (0.026)	-0.025 (0.028)	-0.063 (0.012)	-0.055 (0.011)

Notes: Standard errors in parentheses. The reported coefficients are from the regression reported in table 2. BEN=welfare beneficiaries. 2P2C=two parents, two children. 1P2C=one parent, two children. Y82 through Y94 are year effects. NF=Newfoundland, NS=Nova Scotia, NB=New Brunswick, QU=Quebec, MB=Manitoba, SK=Saskatchewan, AB=Alberta, BC=British Columbia. The estimated coefficients on the interactions between the province effect and the explanatory variable (fourth column) are not reported.

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Table 1: Inflation and Population Growth over the Period of the cap on CAP

		British Columbia		Alberta		Ontario	
Year	Inflation	Population Growth	Sum	Population Growth	Sum	Population Growth	Sum
1990	4.8	2.8	7.6	2.0	6.8	2.0	6.8
1991	5.6	2.5	8.1	1.8	7.4	1.4	7.0
1992	1.5	2.8	4.3	1.7	3.2	1.6	3.1
1993	1.8	2.8	4.6	1.5	3.3	1.6	3.4
1994	0.2	2.7	2.9	1.2	1.4	1.2	1.4
Cumulative			30.6		24.0		23.5

Notes: Inflation is the year over year increase in the Canadian Consumer Price Index (all items). For each province, Sum is Inflation added to the relevant population growth rate. Cumulative is the compounded effect of Sum over the period. These results can be compared to a cumulative cushion of 27.6 percent under the terms of the cap. Source: CANSIM.

Table 2: Estimates of the cap on CAP

	CAP Total Expenditures (TE)				Welfare Beneficiaries (BEN)	TE/BEN	Welfare Rate One Parent Two Children	Welfare Rate Two Parents Two Children
Cap	0.001 (0.020)	-0.031 (0.024)	-0.084 (0.021)	-0.094 (0.028)	-0.074 (0.029)	-0.010 (0.021)	0.004 (0.014)	0.004 (0.012)
Real GDP			-0.263 (0.161)		-0.723 (0.227)	0.460 (0.159)	-0.120 (0.106)	-0.157 (0.092)
Population			3.553 (0.819)		3.951 (1.156)	-0.398 (0.807)	2.702 (0.537)	2.315 (0.469)
Prime Age Male UR			0.087 (0.040)		0.108 (0.057)	-0.021 (0.040)	0.036 (0.026)	0.031 (0.023)
New Immigrants			0.006 (0.038)		-0.037 (0.054)	0.031 (0.038)	-0.020 (0.025)	-0.011 (0.022)
New Democratic Party			0.082 (0.017)		0.611 (0.024)	0.022 (0.016)	-0.010 (0.011)	-0.008 (0.010)
Province Effects	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Provincial Interactions	No	No	No	Yes	No	No	No	No
F-test				1.49 (0.085)				

Notes: Standard errors and p-values in parentheses. UR = unemployment rate. The sample period is 1981-1994. All expenditures and dollar rates converted to 1994 dollars. All variables measured in logs except the dummy variable for the New Democratic Party (NDP). The reference regression equation is $\Delta \log Y_{it} = P_i + D_t + \Delta \log X_{it}'\beta + \alpha \cdot NDP_{it} + \lambda \cdot CAP_{it} + \varepsilon_{it}$ (see equation 1) where Y_{it} is the indicated dependent variable, P_i are province effects and D_t are time effects. The F-test is for the hypothesis that the interactions of the province effects with the control variables are jointly equal to 0.

Table 3: Further Estimates of the cap on CAP

	CAP Total Expenditures (TE)				Welfare Beneficiaries (BEN)			
Cap	-0.088 (0.024)	-0.087 (0.021)	-0.085 (0.021)	-0.054 (0.020)	-0.107 (0.032)	-0.070 (0.029)	-0.074 (0.028)	-0.030 (0.029)
No Equalization Payments		0.033 (0.031)				-0.005 (0.042)		
Other Transfers			0.106 (0.054)				0.140 (0.074)	
Klein				-0.169 (0.039)				-0.249 (0.055)
1990	No	Yes	Yes	Yes	No	Yes	Yes	Yes

Notes: Standard errors in parentheses. The sample period is 1981-1994. All expenditures and dollar rates converted to 1994 dollars. In addition to the reported variables, the regression equation includes province effects, time effects, the first differences of the log prime age male unemployment rate, the log of new immigrants, the log of real GDP, the log of population, and a dummy variable for years in which the New Democratic Party is in power.

Table 4: Estimates of the cap on CAP: Expenditure Shares

	1	2	3	4
Cap	-0.107 (0.027)	-0.115 (0.032)	-0.111 (0.027)	-0.083 (0.028)
NEQP			0.032 (0.040)	
Klein				-0.136 (0.053)
Provincial Interactions	No	Yes	No	No
F-test		1.71 (0.032)		

Notes: Standard errors and p-values in parentheses. The dependent variable is the first difference of the log of the ratio of CAP expenditures to total provincial expenditures. The explanatory variables are decribed in the notes to table 3.