Université de Montréal
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# TRANSFERS AND MUNICIPAL INFRASTRUCTURE EXPENDITURES IN CANADA: 1988-2003
# IS THERE A FLYPAPER EFFECT?

Rapport de recherche en vue de l'obtention de la maîtrise en sciences économiques
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## INTRODUCTION

Economic theory predicts a similar expenditure response from recipients to unconditional grants and tax revenues while empirical evidence suggests that sub-national government expenditure is more responsive to unconditional grants. This result is dubbed the "flypaper effect". However, in the case of specific grants, economic theory predicts a price effect. This price effect will only be observed if the specific grants are sufficiently large and their conditions are highly restrictive. We can interpret the specific transfers examined here in infrastructure as unconditional, or at least "less-conditional", grants given their size and nature.

The purpose of this paper is to examine whether specific transfers to Canadian municipalities in the 1994 – 2003 period aimed at furthering investment spending achieve their intended purpose. Even if these transfers are specific in theory, in particular, do we observe a "flypaper effect" in that the transferred money "sticks where it hits[1]" once in municipal coffers. As federal transfers since the early nineties have been aimed specifically at investment expenditures, this is of interest from a public policy perspective. We thus analyze the effect of specific transfers to municipalities on municipal infrastructure expenditures using a panel data set for Canadian provinces for the 1988 - 2003 period. Specific attention is paid towards asymmetries in the response towards positive and negative windfalls. The paper is divided in three parts. The first outlines the condition of public infrastructure in Canada and briefly presents the relevant literature. The second presents the model and the data used in the econometric analysis. The results are presented in the third and final section of this paper.

[1] As cited by: Hines and Thaler (1995)

## CHAPTER I: A REVIEW OF RELEVANT LITERATURES

This chapter is divided in two parts. The first one presents the recent dimension on the infrastructure deficit in Canada since this helps explain recent public policy in this field. The second summarizes key theoretical concepts used when analysing grants and the relevant empirical literature.

### *1.1. Infrastructure Deficit*

Since the 1980s several estimates have appeared regarding the infrastructure needs of different government sectors in Canada.

Before discussing the possible deficits, let us examine the importance of public infrastructure. As noted by Harchaoui, Tarkhani and Warren[2], total infrastructure capital stock went from 9.3 billion in 1961 to 157.3 billion in 2002 in current dollars. Another important observation from table 1 concerns the share of each level of government. Local authorities increased their share from 30.9% in 1961 to 52.4% of total public infrastructure capital in 2002, while provinces reduced their share to 40.8% in 2002. Federal authorities reduced their share from 23.9% in 1961 to 6.8% in 2002.

**Table 1 : Infrastructure capital stock of public administrations in Canada**

| | Total | | Federal | | | Provincial | | | Local | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $Billion | Share of Total Capital Stock of Pubic Administrations (%) | $Billion | Share of Federal Infrastructure Capital in the Public Administration Infrastructure Capital (%) | Share of Federal Infrastructure Capital Stock in the Federal Total Capital Stock (%) | $Billion | Share of Provincial Infrastructure Capital in the Public Administration Infrastructure Capital (%) | Share of Provincial Infrastructure Capital Stock in the Provincial Total Capital Stock (%) | $Billion | Share of Local Infrastructure Capital in the Public Administration Infrastructure Capital (%) | Share of Local Infrastructure Capital Stock in the Local Total Capital Stock (%) |
| 1961 | 9.3 | 68.4 | 2.2 | 23.9 | 41.7 | 4.2 | 45.3 | 88.5 | 2.9 | 30.9 | 81.5 |
| 1973 | 29.2 | 74.9 | 4.4 | 15.1 | 43.3 | 14.6 | 50.1 | 88.7 | 10.2 | 34.8 | 82.5 |
| 1979 | 64.4 | 77.2 | 7.7 | 12.0 | 43.4 | 33.2 | 51.5 | 88.7 | 23.6 | 36.6 | 83.1 |
| 1988 | 113.7 | 74.3 | 10.9 | 9.6 | 36.8 | 54.4 | 47.8 | 85.3 | 48.5 | 42.6 | 81.0 |
| 2000 | 155.2 | 70.9 | 11.2 | 7.2 | 29.5 | 65.1 | 41.9 | 83.3 | 78.9 | 50.9 | 76.7 |
| 2002 | 157.3 | 69.1 | 10.6 | 6.8 | 26.5 | 64.3 | 40.8 | 82.4 | 82.4 | 52.4 | 75.3 |

Note: Net of linear depreciation

Source: Vander Ploeg (2003) page 4

[2] Harchaoui, Tarkhani and Warren (2003)

It is important to note that all infrastructure deficits are a consequence of the manner in which infrastructure is defined. If the concept of infrastructure is not clear, any infrastructure deficit will be limited, and quantitative measures based on an unclear definition could strongly diverge.

Generally speaking, a deficit is the annual difference between the amount required and the amount available for a project or expenditure. Accordingly, we should first define infrastructure needs as the funding necessary to maintain or replace existing infrastructure, as well as the infrastructure required to meet the demands of population growth or to correct sub-optimal situations. Thus, we can define the infrastructure deficit as the annual shortfall in the funds available to meet required infrastructure spending for the year. Infrastructure debt is therefore the accumulation of past deficits.

Infrastructure deficit estimates are typically one of three types (according to the level of aggregation): total government sector, local government and specific public service areas. There are different methodologies: retrospective (looking backwards), prospective (predicting infrastructure needs) and a combination of the two. Some of the most popular methods are presented in the following paragraphs[3].

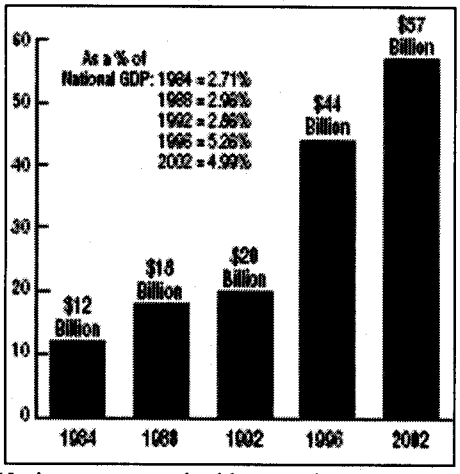
*Infrastructure Surveys*

Infrastructure surveys are the most common form of infrastructure needs estimate, and surveys of this type tend to receive the greatest media coverage. The Federation of Canadian Municipalities (FCM) conducted the first such survey in 1984, and has since updated it in conjunction with other organizations such as the Canadian Society for Civil Engineering (CSCE) and the Civil Engineering Department at McGill University. Results of these surveys are shown in Figure 1. The approach is retrospective. As seen in Figure 1, survey based municipal infrastructure debt estimates have grown from $12 billion in 1984 to almost $60 billion in 2002 in current dollars. These surveys appear to be somewhat self-serving as many of them are conducted by advocacy groups with a vested interest in the issues. A more pressing concern, however, is the admission by at least one author that the surveys tend to produce significant amounts of qualitative data, but little

[3] The discussion is a synopsis of Vander Ploeg (2003)

quantitative data (Mirza 2003[4]). Finally, the biggest problem revolves around the fact that the surveys are likely measuring perceived needs as opposed to objective data.

**Figure 1: Municipal Infrastructure debt**




Source: Various sources cited by Vander Ploeg (2003) page 8.

*Sector Specific Studies*

Methodologies employed by these studies are different. Some examples are:

*Canadian Water and Wastewater Association* (CWWA): 88.5 billion infrastructure debt for water and sewer services in 2012. The estimates were formulated based on both current and future needs.

*Council of Ministers Responsible for Transportation and Highway Safety* (1997): 17.4 billion infrastructure debt for Canada's highways.

*Public Policy Forum* (2002): 83.1 billion infrastructure debt across several sectors. This includes FCM's 1995 estimate of $44 billion for municipalities, 17.4 billion for highways, 3 billion for airports, and 4 billion for colleges and universities.

Specific estimates are more methodologically sound than the survey estimates as they clearly establish the required standards of service and then use existing data to identify the funding needed to bring those standards into play.

*Benchmarking From Other Studies*

For comparative purposes, some researchers have referred to the estimates of various other organizations and included them as benchmarks for their own estimates. As an example, US studies (1989-1998) estimated the costs of repairing U.S. infrastructure at

[4] Cited by Vander Ploeg (2003)

$1 trillion U.S. from 1990 to 2005. Assuming that Canada's needs are one-tenth that of the U.S., this indicates a $130 billion CAD infrastructure need in Canada. If the total public infrastructure debt in Canada is indeed around $125 billion, as noted by Mirza in 2003, then there appears to be some consistency between current U.S. and Canadian estimates. Still, there are questions as to whether the U.S. situation can be directly applied to Canada. U.S. infrastructure is generally in worse condition than that of Canada, which implies that Canada's infrastructure debt should be smaller than that of the U.S.

*Asset Management Approaches*

Researchers estimate the amount of actual infrastructure, and then simply choose a level of expenditures to maintain the infrastructure in place, usually between 2% to 4%. About 2% more can be added for new investment needed to meet an expanding population. One estimate finds 3.3 trillion dollars of infrastructure in place, implying that 85 billion must be spent annually. Given an annual level of spending at 30 billion, the infrastructure deficit is 55 billion per year. This method invariably results in large estimates.

*Optimizing Infrastructure*

This methodology takes an economic view. It operates on the assumption that there is an optimal level of public capital infrastructure investment that maximizes economic growth. All of the models using it are quite complex, producing widely divergent results. Some studies found that public investments in infrastructure have the same impact on productivity as private capital, while others found no impact at all. Cost-benefit analyses have found that carefully chosen investments could yield economic rates of return that are higher than the average return on private capital investment. In a policy brief outlining this work, Aschauer states that in the U.S., the optimum public capital stock (defined as the ratio of public capital to private capital that maximizes output or GDP growth) is 61.0% (including health and education). This seems extraordinarily high.

*Implied Deficits*

Finally, there are some who infer the presence of an infrastructure debt through comparisons. As an example we can consider the World Competitiveness Report

published by the Institute for management development (IMD) which ranked Canada's infrastructure in the sixth place behind the US, Switzerland, Finland, Sweden and Australia. Canada had the equivalent of the 82% of existing infrastructure in the US in 2003.

One can conclude that there is no precise way to measure or estimate an infrastructure deficit or debt. Each method has been strongly criticized. However, we note that for each method applied, estimates are invariably large.

In the other hand, we can presume that if public investment in infrastructure is not enough to satisfy demand, we should observe an aging of public infrastructure in place. On this regard we briefly present the Gaudreault and Lemirea[5] analysis of the age of public infrastructure in Canada, which consider only four infrastructure elements[6]. Figure 2 shows the evolution of average age of public infrastructure between 1963 and 2003. We observe that since 1994 the rapid aging of public infrastructure stopped.

In figure 3, we examine the age of public infrastructure by level of government. Federal infrastructure is older than sub-national governments' infrastructure but it is maintains approximately the same age while the condition of provincial and municipal infrastructure has worsened in the last 30 years. This could be taken as evidence that sub-national governments, provincial governments in particular, have not been spending enough in infrastructure.

**Figure 2: Average age of public infrastructure**

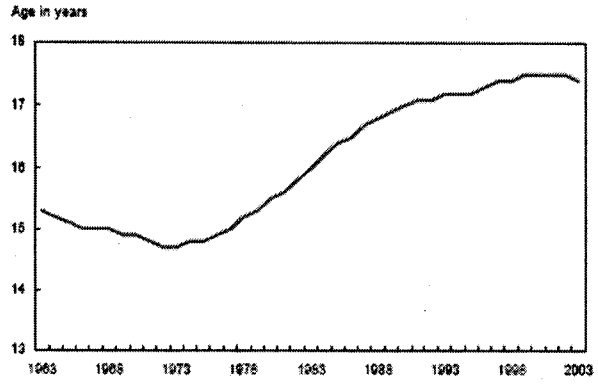
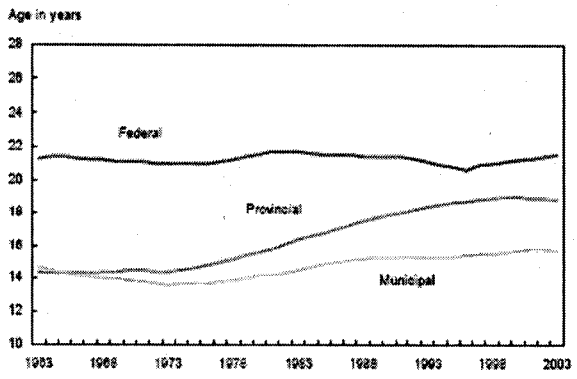



**Figure 3: Age by level of government**




source: Gaudreault and Lemire (2006) pages 3 and 4

[5] Gaudreault and Lemire (2006)

[6] Gaudreault and Lemire (2006) consider only four elements: roads and highways, sewer systems, wastewater treatment facilities, and bridges that represent 80% of public infrastructure.

*1.2. Theoretical effects of grants*

In this section we analyse the effects of different revenues in municipal budgets. This section is a synopsis of Wilde[7] as well as of Bird and Slack[8].

*General non-matching (lump-sum, unconditional, or block grants)*

The grantor determines a fixed amount that is offered to the locality without restrictions. Where PP' is the initial budget constraint and point A is the pre-grant equilibrium, an unconditional grant in the amount of P'Q' will define the new budget line as QQ'. Consequently, the final equilibrium is at point B. Given that no relative price change is registered, both equilibriums must lie on the income consumption curve (ICC). The effect of this kind of transfer is exactly the same as an increase in own revenue.

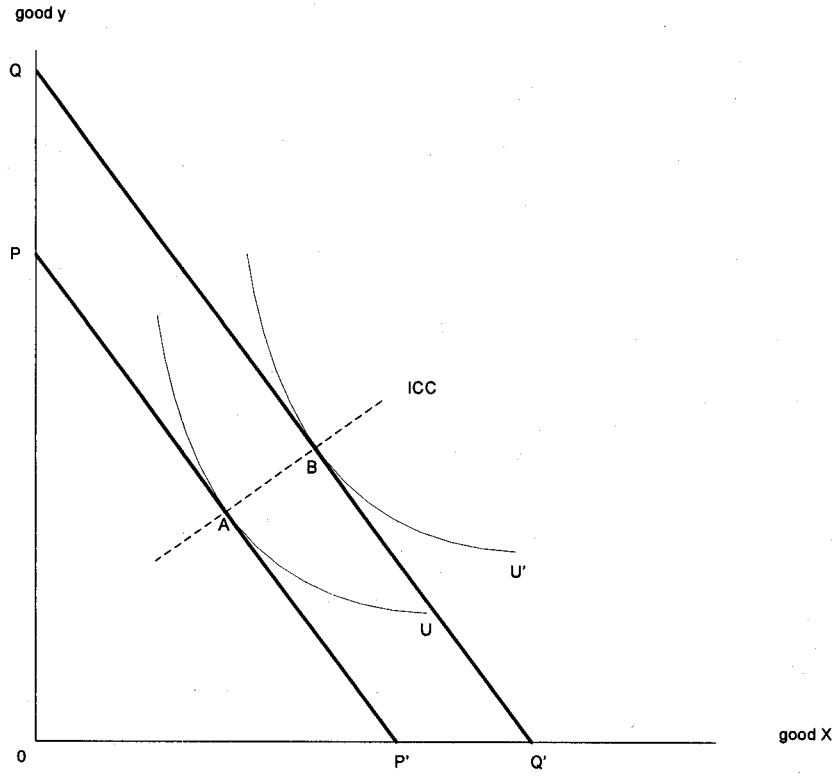



**Figure 4: General non-matching grants**

[7] Wilde (1968) and Wilde (1971)
[8] Bird and Slack (1993)

*Specific non-matching grant*

Here, the grantor determines a fixed amount that is offered to the locality with the restriction that this amount must be expanded in some particular aided good. Where PP' is the initial budget constraint and point A is the pre-grant equilibrium, a specific non-matching grant in the amount of P'Q' (or PS) will define the new budget line to be PSQ'. We can observe that in this case, the specific characteristic has been lost because we observe the same optimal situation as an unconditional grant; final equilibrium would also be in point B. The loss of the specific characteristic would persist until general non-matching grants equal the point Y on the income consumption curve. Beyond Y, the localities would have to expand spending in the aided good and the optimal choice will no longer be located on the ICC.

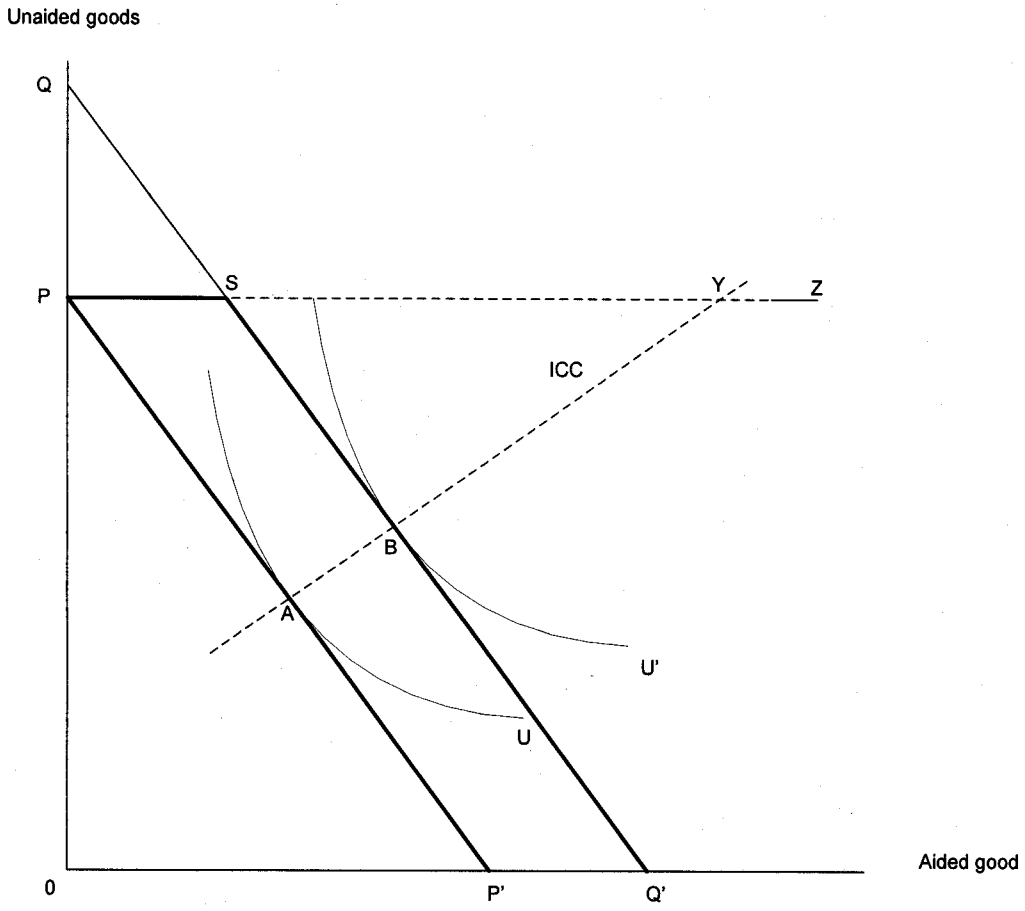



**Figure 5: Specific non-matching grant**

*Open-ended specific matching grants*

The grantor agrees to fund a constant percentage of a locality's expenditures on the aided good without a ceiling. Where PP' is the initial budget constraint and point A is the pre-grant equilibrium, an open-ended specific grant will change the relative price of the aided good. This appears in figure 5 as the new budget line PQ', where P'Q'/ OP' is the percentage of expenditures borne by the donor. The post-grant equilibrium will be on PQ' and we can observe that it will lie on the price consumption curve (PCC) rather than on the ICC. As noted by Bird and Slack[9], the increase of expenditures depends on the price elasticity of demand for the aided good. If the expenditure demand is of unitary elasticity, PCC is horizontal and expenditures would increase by the amount of the grant. Where the expenditure demand is price-elastic, expenditures will increase by more than the grant. Where this elasticity is less than one, expenditures increase by less than the grant.

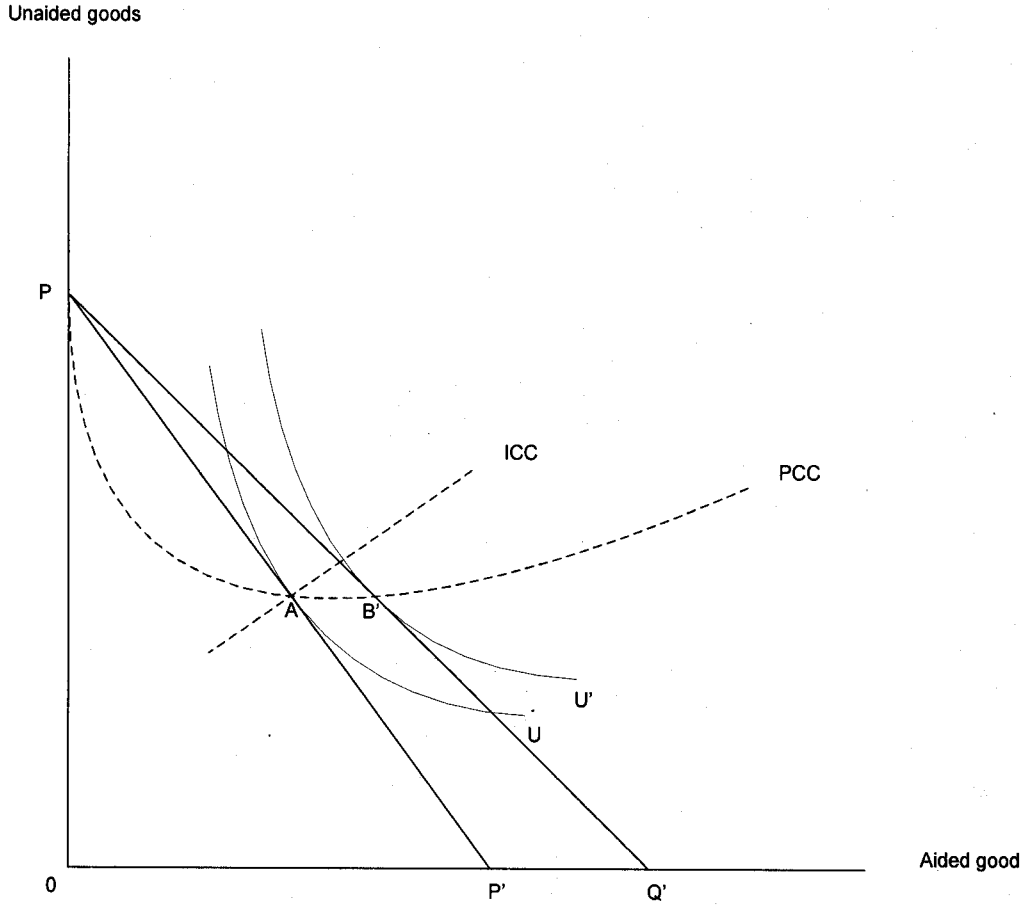



**Figure 6: Open-ended specific matching grant**

[9] Idem

*Close-ended specific matching grants*

In this case, the grantor agrees to fund a percentage of the locality's expenditures on the good with a ceiling. After the ceiling, all investments the locality decides to make in the aided good is paid entirely by its own resources. We note three possible scenarios, each reflecting different ceilings: First, if the donor government's maximum support on the aided good is Q3, the budget line becomes PZQ'. In this case the ceiling is not important because equilibrium occurs on the PCC, the same result as open-ended specific matching grants. Second, if the budget constraint is PYQ' (ceiling is Q2), a locality will maximize utility at point Y (neither on the PCC or the ICC). We can observe that the ceiling is effective in this case. Third, if the ceiling is set lower, in Q1, the locality chooses a point on the ICC. In this case is advantageous to extend expenditures on the aided good. This is an identical response to that of an unconditional or a specific non-matching grant.

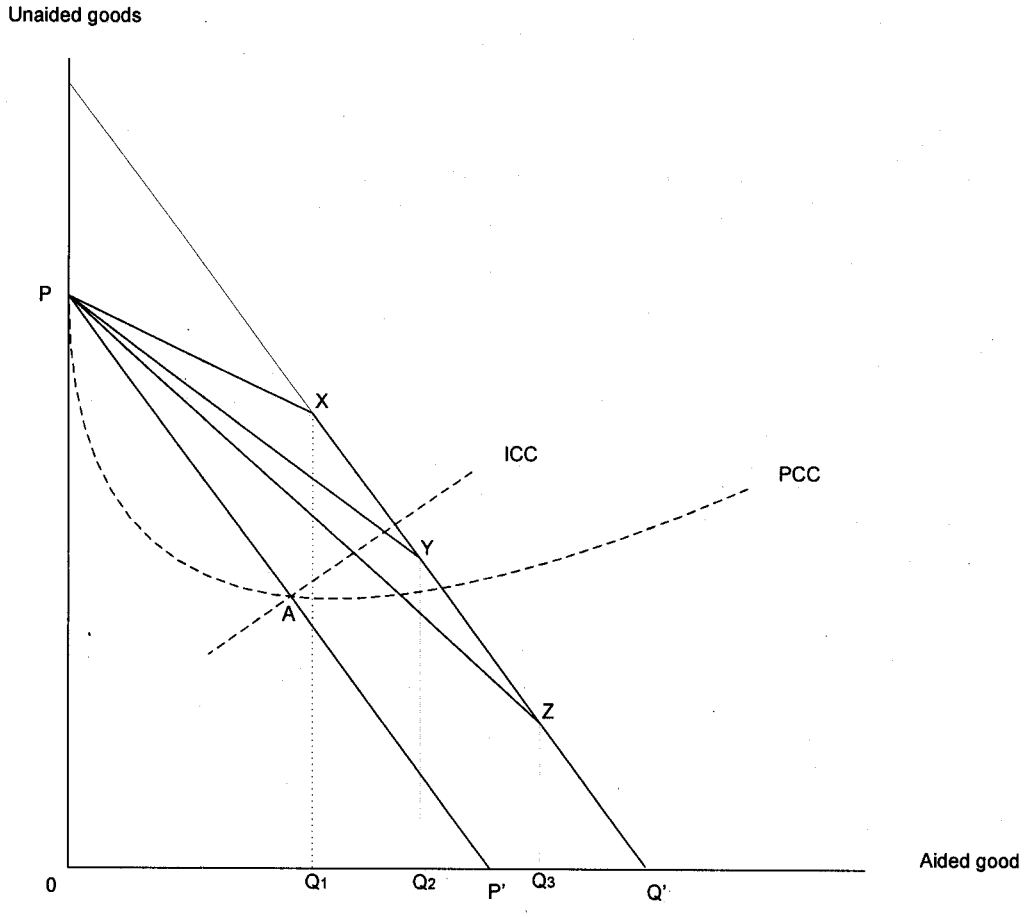



**Figure 7: Close-ended specific matching grants**

*1.3. Empirical studies*

*Wyckoff*[10] analyzed Michigan state aid to local school districts. Transfers to school administrations contained unconditional and close-ended specific matching grants. The final results is that "... a Michigan school district receiving a state block grant equal to 1 percent of private income in the district increases its school expenditures by as much as it would had it received no state grants while its private income grew by 11 percent."[11]

*Heyndels* and *Van Driessche*[12] recently analyzed the effects of both tax and grant windfalls in an ordinary least squares model that employed municipal per capita expenditures as the dependent variable. In their panel for 1989 to 1996 they found strong evidence that municipalities are more responsive to grants than to tax variations.

*Cohen*[13] finds that state and local spending on airports rose by between 75 to 90 cents when airport grants rose by 1 dollar and if interstate airport spending interdependencies were accounted for, the coefficient is about 0.62. Given that own revenue coefficient is about 0.01, Cohen finds a strong flypaper effect in the US airports context.

In 1995, *Hines* and *Thaler*[14] reviewed empirical literature about the flypaper effect; we present their main findings in table 2 along with results of the three above presented studies.

In general, the dependent variable is an expenditure measure. Independent variables used include: population (size and/or density), asymmetries variables as well as all income sources such as tax, sales, grants and others.

[10] Wyckoff (1991)
[11] As cited by Hines and Thaler.(1995)
[12] Heyndels and Van Driessche (2002)
[13] Cohen (2002)
[14] Hines and Thaler (1995)

**Table 2: Intergovernmental transfer effects: Empirical studies overview**

| Author and year of publication | Period and country studied | Sample | obs | Type of grants | Results (change in spending as grants changes) |
|---|---|---|---|---|---|
| Inman (1971) | US | Panel study of 41 city budgets | | Unconditional | 1.00 |
| Weicher (1972) | US | State aid to 106 municipal governments | | Unconditional | 0.90 |
| Weicher (1972) | US | State grants to independent school districts | | Unconditional | 0.40 |
| Gramlich and Galper (1973) | US | Federal grants to local and state gov. | | Unconditional | 0.43 |
| Gramlich and Galper (1973) | US | Federal and state aid to 10 large urban gov | | Unconditional | 0.25 |
| Bowman (1974) | US | Federal educations grants to west Virginia school district | | Unconditional | 1.06 |
| Bowman (1974) | US | State educations grants to west Virginia school district | | Unconditional | 0.50 |
| Feldstein (1975) | US | State grants to Massachusetts towns | | Unconditional | 0.60 |
| Olmsted, Denzeau, Roberts (1973) | US | Missouri state aid to local school districts | | Unconditional | 0.58 |
| Case, Hines and Rosen (1993) | 1970-1985 US | Federal grants to 48 states | | Unconditional | 0.65 |
| Wyckoff (1991) | 1978-1979 Michigan US | State aid to local school districts in Michigan Log of general expenditures | 202 | Unconditional and close ended matching | a grant of 1% of tax income increases school expenditures by as much as if tax income had grew 11 % |
| Heyndels and Van Driessche (2002) | 1989-1996 Flemish | Per capita municipal expenditure | 308 | Unconditional | 1.13 |
| Cohen (2002) | 1988-1996 US | State and local airport spending | 400 | Unconditional and close ended matching | Grants:0.62 Tax: 0.01 |

Source: Hines and Thaler (1995) and authors (gray zone of the table)

## CHAPTER II: MODEL AND DATA

In this chapter we first present our econometric model and then the dependent and independents variables.

### *2.1. Econometric model*

In practice we can formulate a general econometric model for sub-national public expenditures as follows:

$$y_t = \beta_0 + \beta_1 \text{ transfers}_t + \beta_2 \text{ tax}_t + \beta_3 Z_t + e_t$$

The dependent variable is the selected expenditures of sub-national governments, and the explanatory variables are the transfers of interest, the private income (tax) and the vector Z which contains other relevant independent variables as well as control variables.

*The flypaper effect* is the most documented empirical phenomenon in the fiscal federalism literature[15]. In short, empirical evidence suggests that sub-national governments are more responsive to grant windfalls than to changes in tax income, this result was dubbed the 'flypaper effect' by Arthur Okun[16]. These empirical findings go against the Bradford and Oates[17] proposition which argues that unconditional grants to a community should affect public spending in a similar way than an increase in own income. In this case, if we find that coefficient $\beta_1$ is statistically significant and $\beta_1 > \beta_2$, we conclude that the flypaper effect is present

*The asymmetry hypothesis:* The first empirical evidence of a flypaper effect was presented using data from the post World War II era, during which the size of the welfare state grew. The flypaper effect helped explain growing sub-national expenditures. Under the Reagan administration several federal grants to state and local governments were

[15] Heyndels and Van Driessche. (2002)
[16] As cited by: Hines and Thaler (1995)
[17] Bradford and Oates (1971)

reduced and this raised the question of whether the response to decreases in grants is similar in magnitude to the response to increases in these grants. Gramlich[18] suggested that localities responded to the cutbacks in grant support by increasing their own taxes and replacing the lost funds in order to maintain the existing programs. If this prediction is true, an asymmetrical response to grants revenues and cuts would be observed.

To test for asymmetry we follow Stine's[19] procedure. Asymmetry interactive variable is defined as:

$$\text{asymnetry} = \text{transfers}_t - \text{transfers}_{t-1} \quad (\text{if: transfers}_t < \text{transfers}_{t-1})$$
$$= 0 \text{ otherwise}$$

This variable is included in the model as an independent variable:

$$y_t = \beta_0 + \beta_1 \text{ transfers}_t + \beta_2 \text{ tax}_t + \beta_3 Z_t + \beta_4 \text{ asymmetry} + e_t$$

The null hypothesis is H0: $\beta_4 = 0$ which would indicate a symmetrical response to increases and cuts in grants. Thus, $\beta_1$ would indicate the expenditure response to an increase in grants, and $(\beta_1 + \beta_4)$ would indicate the expenditure response to a decrease in grants[20]. If $\beta_4 = 0$, we observe a symmetrical response. However, if we find that the asymmetry variable has a negative and significant coefficient and $(\beta_1 + \beta_4) < 0$, we can conclude that when grants fall, expenditures continue to rise.

[18] Gramlich (1987)
[19] Stine (1994)
[20] Gamkhar and Oates (1996)

## 2.2. Data

### *The dependent variable: Infrastructure expenditures*

Intuitively, the definition of *public infrastructure* is clear. This may include highways, sewer systems, wastewater treatment facilities, and bridges owned by governments. A more rigorous definition would be similar to the one offered by the City of Huntington Beach[21]:

> "Infrastructure is defined as capital assets owned by the city that require on-going maintenance and eventual replacement. It is the basic support structure for the community, which includes highways, streets, alleys, parking lots, bridges, sidewalks, curbs, parkway trees, landscaped median islands and parkways, block walls along arterial highways, traffic signals, street lights, flood control channels, storm drains and storm water pump stations, sewers, sewer manholes, sewer lift stations, public buildings, beach facilities, parks, sports fields, and the vehicles and equipment used for the operation, maintenance, and repair of infrastructure." (Huntington Beach, California 1991)

This definition does not include airports or ports and excludes non traditional infrastructure such as telecommunications and emerging technologies infrastructure. In general, infrastructure can be classified according to one or several of the following categories[22]:

*Basic Inter-Urban Infrastructure* contains elements that hold a nation together. Examples include highways, railways, airports, seaports, telecommunications, and energy utilities. This infrastructure is traditional, tangible, and hard; this infrastructure is essential to a functioning society.

*Basic Urban Infrastructure* is also traditional, tangible and hard, this infrastructure includes items unique to urban environments, including environmental and sanitary operations, street lighting, pedestrian walkways, civil protection and other public services.

*High-Tech Infrastructure* is both tangible and hard, but non-traditional in the sense that it includes physical systems that support a range of new and emerging technologies critical to modern society (cellular and satellite telecommunications, the Internet, and e-mail).

*Amenities* are traditional and tangible, but soft in the sense that it is not normally viewed

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[21] As cited by Vander Ploeg (2003)

[22] As cited by Harchaoui, Tarkhani and Warren (2003)

as part of national infrastructure. Some examples are developed green spaces, bicycle pathways and other leisure, recreation, cultural and community facilities.

*Knowledge-Based Infrastructure* is comprised of soft elements that can be traditional and non-traditional, tangible and intangible. This may include educational facilities, libraries, research facilities, and laboratories, amongst these are services such as Statistics Canada, electronic databases, information and research networks.

*Health Infrastructure* is traditional, tangible and hard, but their production value is intangible as it contributes to a healthy workforce and a higher quality of life.

There is no consensus on the definition of infrastructure; each city is free to choose some elements from the preceding categories to build its own particular definition. There is consensus on the expanding and changing nature of infrastructure, as it is unsurprisingly prone to subjective and varying interpretations between and within regions.

In the other hand, *investment*, as defined by Statistics Canada, refers to expenditures on goods intended for use as capital goods in the production process. The expected lifetime of such goods is usually more than one year, and can involve new investment as well as replacement investment. All governmental expenditures on capital goods are classified as public investment, whether it is at the federal, provincial or local level. Public investment is generally subdivided into the following categories:

- Public expenditures for the construction and renovation of government buildings
- Public expenditures to carry out civil engineering works (infrastructure)
- Public expenditures on machinery and equipment used by the public sector

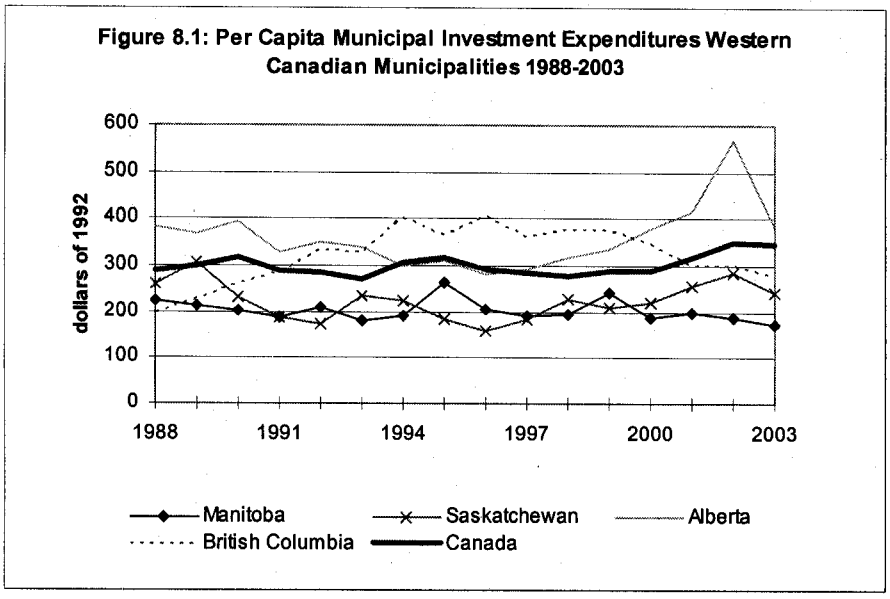
Ultimately, there are two broad infrastructure spending categories. The first relates to the acquisition of new assets to accommodate population growth. The second category is infrastructure spending to maintain, rehabilitate or replace existing assets. It is important to highlight the potential for confusion when discussing infrastructure investment, capital spending and capital investment, as these terms are often used interchangeably. The distinction between infrastructure spending and investment is negligible; nevertheless capital spending is not necessarily equivalent to infrastructure spending as capital often excludes maintenance expenditures. Furthermore, the term "capital" sometimes includes a range of assets that cannot be considered infrastructure, such as office supplies.

In conclusion, public investment in infrastructure can be defined as public spending on civil engineering works. Assets such as these usually have a service life of more than one year and may include new fixed capital formation and investment in replacement assets.

Turning to the available data, the dependent variable is Canadian municipal expenditures in infrastructure measured by annual investment in fixed capital and inventories. The data is taken from Table 384-0004 "Government sector revenue and expenditure, provincial economic accounts" in the CANSIM database and it is presented in current dollars and per capita terms. A brief overview of these expenditures follows.

Figure 8.1 shows the evolution of per capita municipal investment expenditures for western Canadian municipalities from 1988 to 2003[23]. Manitoba and Saskatchewan investment expenditures were below the Canadian average, British Columbia was above the average between 1993 and 2000 and Alberta remained above the average virtually the entire reported period.

**Figure 8.1: Per Capita Municipal Investment Expenditures Western Canadian Municipalities 1988-2003**

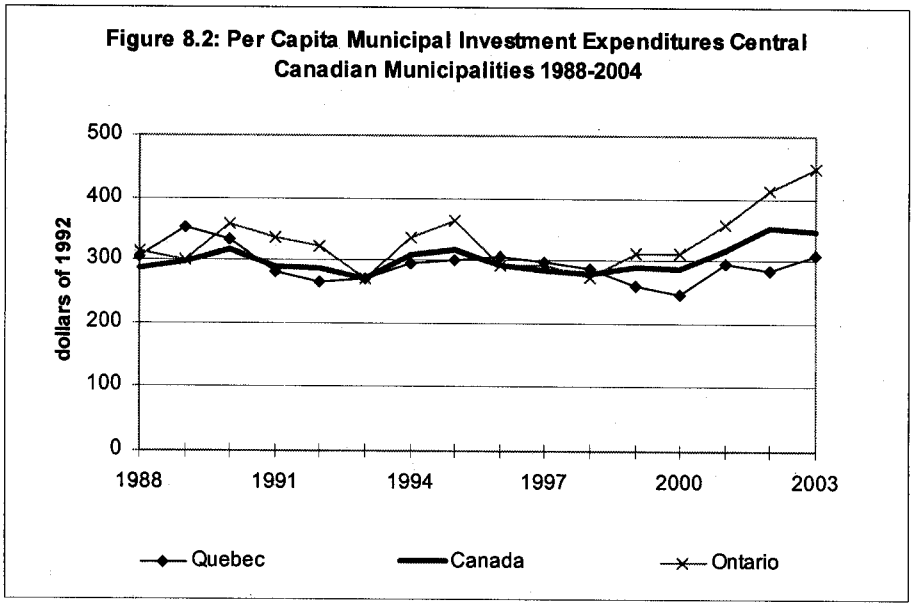



Source: Statistics Canada. See data in nominal values in annex A.

Figure 8.2 shows the evolution of per capita municipal investment expenditures for central Canadian municipalities from 1988 to 2003. Ontario's municipalities were above

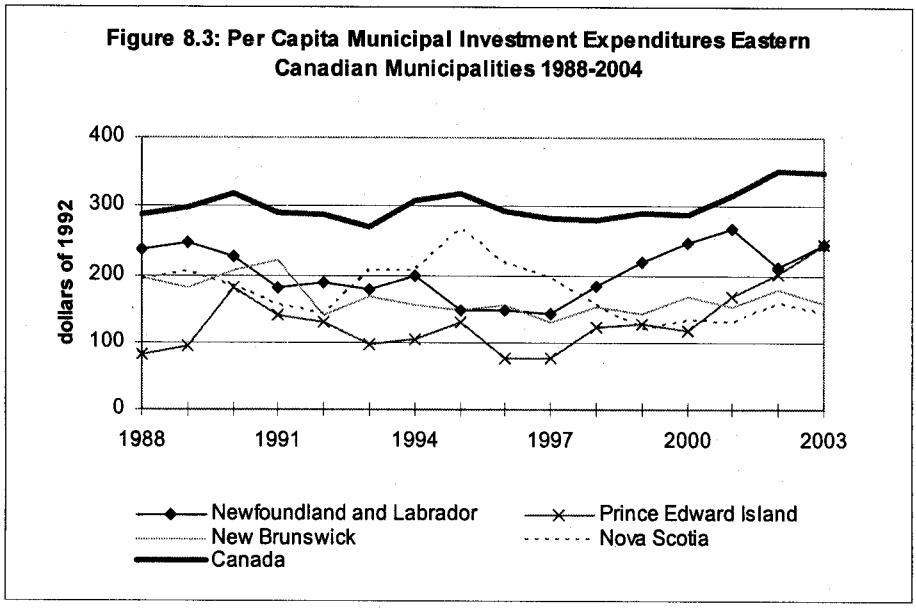
[23] In order to clarify the evolution of municipal investment expenditures we present figures in constant dollars of 1992. For the econometric analysis current dollars are used.

the Canadian average while Quebec's municipal investment expenditures were generally below this average.




Source: Statistics Canada. See data in nominal values in annex A.

Figure 8.3 shows the evolution of per capita municipal investment expenditures for eastern Canadian municipalities from 1988 to 2003. These expenditures were below the Canadian average for the entire reported period. Three province's municipalities, besides Nova Scotia, followed the Canadian tendency.




Source: Statistics Canada. See data in nominal values in annex A.

*Independent variables*

Various combinations of local revenues are used as independent variables[24], along with population density and GDP.

*Municipal revenues independent variables.* Table 385-0004 "Local general government revenue and expenditures" is a detailed local revenues' dataset which presents data for Canadian provinces and territories on an annual frequency since 1988 until 2004. Table 3 below presents the relevant categories of table 385-0004 used in this study.

Based in different assumptions, we used the general model before presented on various combinations of municipal revenues. The first regression implies the use of all specific grants lumped together as well as tax revenue and other revenue (oth1 in table 3), defined as the difference between total income and the other independent variables included in the model. A second regression consists in a more detailed break down of specific transfers into federal and provincial specific transfers.

Still, we know that specific transfers contain considerable amounts not related to infrastructure, as health and social service transfers. On the other hand, if the transfers have been allocated ex-post to a specific category, we can not regress investment expenditures on a specific transfer category because we would be in a situation where the expenditure explains the transfer. In order to avoid this problem and get closer to the answer, it seems reasonable to use two approaches: **top-down**, in which we subtract some specific transfers that we believe are not linked with infrastructure spending. Thus, general services, protection of persons and property, health, social services, housing and other federal specific transfers were excluded from specific federal transfers used in the regression. For provincial specific transfers the same transfers were excluded as well as transfers for debt charges. The other, **bottom-up** approach implies the addition of some specific transfers. In both federal and provincial cases, we include transportation and communication, resource conservation and industrial development, environment and regional planning and development transfers.

[24] For this study we have extensively used CANSIM II (Canadian Socio-Economic Information Management System) that is the Statistics Canada's computerized database of time series covering a variety of social and economic aspects of Canadian life. Main data extraction carried out on December 05th, 2005

**Table 3: Municipal revenues: Definition of independent variables**

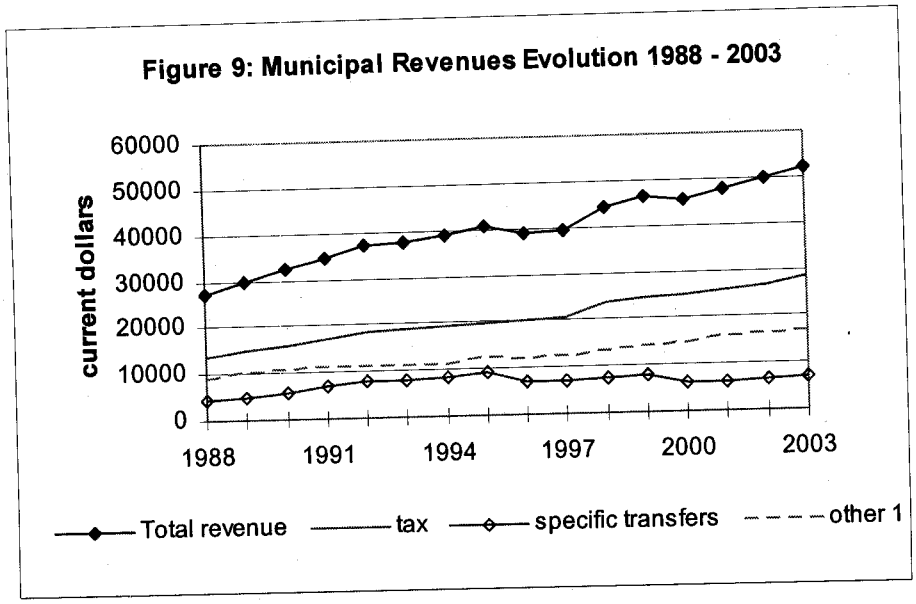
| Independent variables | average % | Equation 1 | | | Equation 3 | | | | Eq.5 Top-down | | | | Eq.7 Bottom-up | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total revenue** | 1988 – 2003<br>100,00% | spe tr | tax | oth 1 | fed tr | pro tr | tax | oth 1 | fed tr | pro tr | tax | oth 2 | fed tr | pro tr | tax | oth 3 |
| ***Own source revenue*:** | 79,26% | | | | | | | | | | | | | | | |
| Tax | 65,29% | | + | | | | + | | | | + | | | | + | |
| Sales of goods and services | 26,36% | | | + | | | | + | | | | + | | | | + |
| Others | 8,35% | | | + | | | | + | | | | + | | | | + |
| ***Transfers, general and specific*** | 20,74% | | | | | | | | | | | | | | | |
| General purpose transfers | 17,78% | | | + | | | | + | | | | + | | | | + |
| Specific purpose transfers | 82,22% | + | | | | | | | | | | | | | | |
| Federal government, specific purpose transfers | 4,98% | | | | + | | | | + | | | | | | | |
| General services | 4.34% | | | | | | | | - | | | + | | | | + |
| Protection of persons and property | 2.54% | | | | | | | | - | | | + | | | | + |
| Transportation and communication | 20.32% | | | | | | | | | | | | + | | | |
| Health | 0.34% | | | | | | | | - | | | + | | | | + |
| Social services | 7.59% | | | | | | | | - | | | + | | | | + |
| Resource conservation and industrial development | 3.94% | | | | | | | | | | | | + | | | |
| Environment | 9.13% | | | | | | | | | | | | + | | | |
| Recreation and culture | 8.53% | | | | | | | | | | | | | | | + |
| Housing | 37.43% | | | | | | | | - | | | + | | | | + |
| Regional planning and development | 1.40% | | | | | | | | | | | | + | | | |
| Other federal government specific purpose | 4.39% | | | | | | | | - | | | + | | | | + |
| Provincial governments, specific purpose transfers | 95,11% | | | | | + | | | | + | | | | | | |
| General services | 1.61% | | | | | | | | | - | | + | | | | + |
| Protection of persons and property | 1.05% | | | | | | | | | - | | + | | | | + |
| Transportation and communication | 21.54% | | | | | | | | | | | | | + | | |
| Health | 6.65% | | | | | | | | | - | | + | | | | + |
| Social services | 45.94% | | | | | | | | | - | | + | | | | + |
| Resource conservation and industrial development | 1.94% | | | | | | | | | | | | | + | | |
| Environment | 8.60% | | | | | | | | | | | | | + | | |
| Recreation and culture | 4.18% | | | | | | | | | | | | | | | + |
| Housing | 2.92% | | | | | | | | | - | | + | | | | + |
| Regional planning and development | 0.49% | | | | | | | | | | | | | + | | |
| Debt charges (interest) | 4.45% | | | | | | | | | - | | + | | | | + |
| Other provincial government specific purpose | 0.62% | | | | | | | | | - | | | | | | + |

Source: Statistics Canada CANSIM II table 385-0004. + / - implies that this revenue category should be added / subtracted to/from the independent variable Spe tr=total specific purpose transfers, oth1=other revenues equations 1 and 3, oth2=other rev. eq. 5, oth3=other rev. eq.7, fed/pro tr=specific federal /provincial transfers, fed/pro td= top-down approach specific federal/provincial transfers, fed/pro bu= bottom-up approach specific federal/provincial transfers

We present the evolution of the different measures of municipalities revenues used in this study.

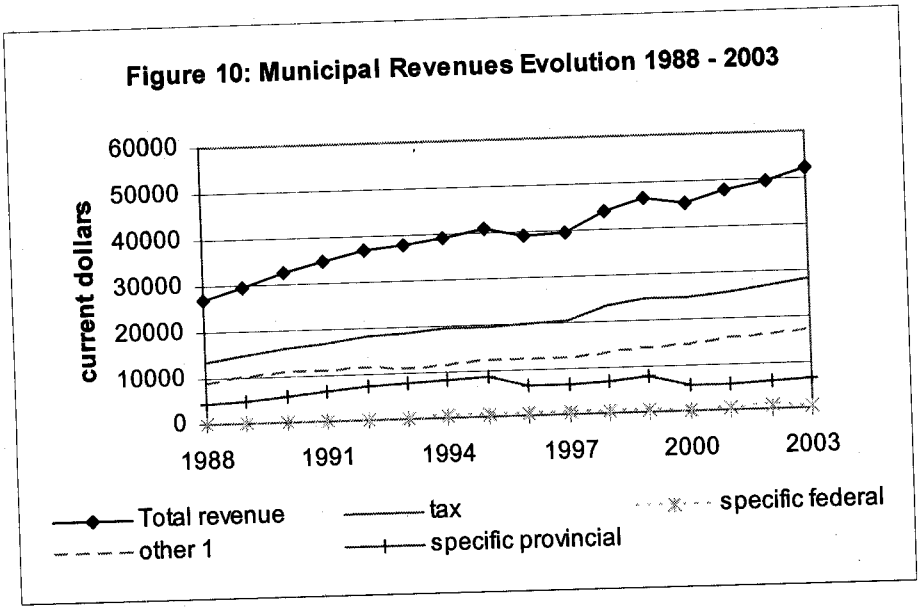
Figure 9 shows the evolution of municipal revenues and its components in the 1988-2003 period. Revenues are broken out in three; each of these components is an independent variable in equation 1. Municipal revenues continuously increased over the reported period. These increase in mainly due to own source (taxes, sales and services and others) revenues expansion. Specific transfers in nominal terms increased until 1995 and then fell until the end of the reported period.

**Figure 9: Municipal Revenues Evolution 1988 - 2003**



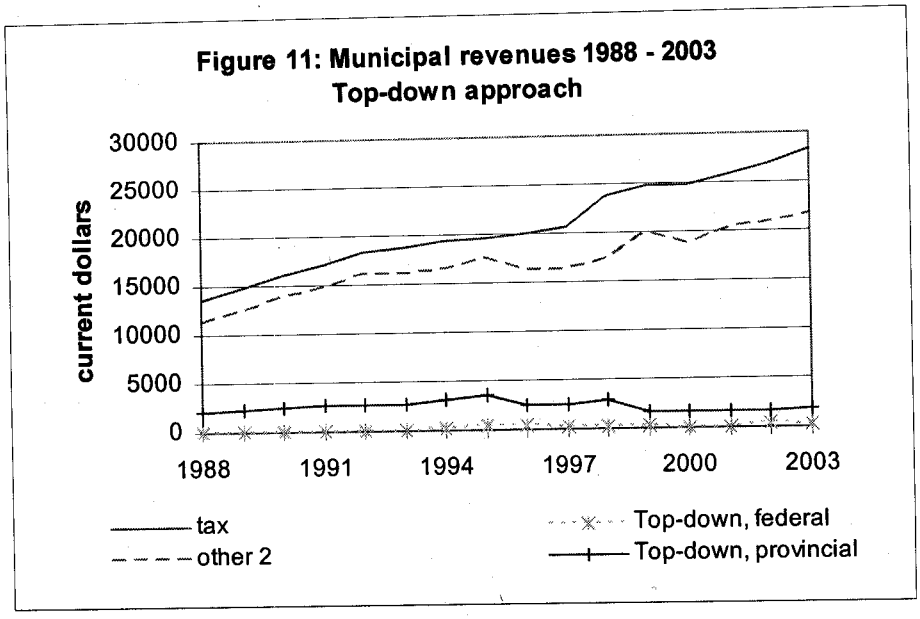

Source: Statistics Canada

Figure 10 is similar to figure 9, but it presents specific transfers broken out in two, federal and provincial specific transfers. Specific provincial transfers are more important in municipal budgets and they determine the tendency of all specific transfers. These variables are used in equation 3.



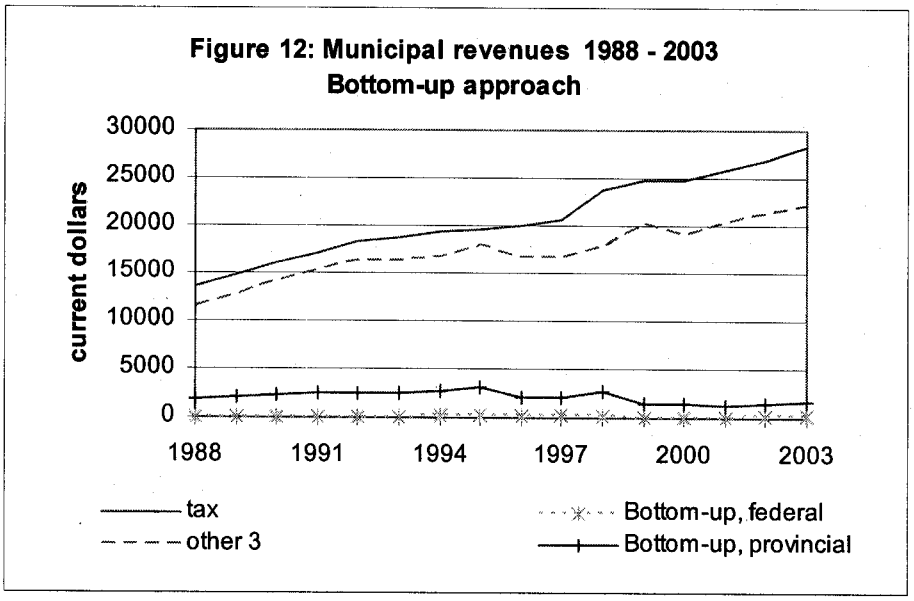

Source: Statistics Canada

Figure 11 shows the evolution of municipal revenues' components in the 1988-2003 period. Revenues are broken out in four: tax, specific purpose provincial and federal transfers, as defined by the top-down approach, and other revenues (oth2 in table 3).




Source: Statistics Canada

Figure 12 is similar to figure 11, but this time we show the bottom-up approach instead of the top-down approach.




Source: Statistics Canada

We can argue that an analysis of the transfers' impact on municipal expenditures should concentrate on specific purpose provincial transfers to municipalities. These transfers are specific and matching. A confirmation of the matching characteristics was provided by the Federal/Provincial analysis section of the Public Institutions Division[25] of Statistics Canada, confirming that the money funding infrastructure programs were initially a one third federal to province transfer, and then a two third grant from province to municipalities. The municipality contributed the last third for every project. Similarly, government budgets are defined in advance; we can thus easily affirm that the majority of Canadian specific matching grants are close-ended. As a conclusion, our main interest is to measure the impact of specific close-ended grants on investment expenditures, and using figure 7 in chapter 1, we can note that virtually every empirical response would be consistent with economic theory.

Keeping in mind the nature of Canadian public transfers to municipalities, we could expect a different coefficient for transfers and tax revenues. However, we believe that municipalities have always some discretion in grants allocation. Furthermore, we observe that a price effect will only be observed if the specific grants are sufficiently large.

[25] Information provided by Claude Vaillancourt (Chief Provincial Analysis. Federal/Provincial Analysis Section. Public Institutions Division. Statistics Canada)

Discretion and magnitude of grants combined with the flexibility of the grant's conditions can help us to interpret specific transfer in infrastructure as an unconditional, or at least a "less-conditional" grant. We could thus expect the same, or approximately the same empirical response. In this case, if we find that coefficients $\beta_1 > \beta_2$, in the model on page 14, we conclude that the flypaper effect is present.

*Binary variables.* As observed in the last three figures, the average Canadian investment expenditures increased in 1994 -1995 and in the period after 2000. These increases seem to be a consequence of the two federal initiatives described below.

*The Canada infrastructure works program* (CIWP) was initiated in 1994. The Program involved the participation of three levels of government – federal, provincial, and municipal – in an effort intended to boost employment and maintain and develop local infrastructure. The Program was temporary in nature, and was originally slated to end after two years, but with disbursements to be allowed over three years. In its 1995 Budget, the federal government extended the program until 1998 – 99, but without additional funding. By the time the program ended in March 1999, the three levels of government had spent in excess of $8.3 billion[26].

*Infrastructure Canada*[27]: since 2000, in partnership with provincial, territorial and local governments, First Nations and the private sector, the central government started launching different infrastructure programs and funds. Infrastructure Canada was established as a new department in August 2002. This department is in charge of the following national programs:

- Canada Strategic Infrastructure Fund, ($4 billion). The $2 billion Canada Strategic Infrastructure Fund announced in Budget 2001and an additional $2 billion set-aside for this Fund in Budget 2003.
- Border Infrastructure Fund ($600 million) Initiated in 2002.

[26] Extracted from: John Williams, M.P *Eleventh Report* Standing Committee on Public Accounts Electronically available at:
http://192.197.82.11/infocomdoc/36/2/PACC/Studies/Reports/PACCRP011-e.htm#Concl

[27] Information compiled from Infrastructure Canada website. Available at:
http://www.infrastructure.gc.ca/index_e.shtml

- Municipal Rural Infrastructure Program ($1 billion) announced in 2003.
- Infrastructure Canada Program ($2.05 billion) launched in 2000.

Since we are interested in the impact of these two federal initiatives on municipal infrastructure expenditures, we account for the impact of these programs by:

- including transfers as an independent variable as discussed before.
- including asymmetry variables as discussed in the model description.
- including two binary variables in select regressions; one for the existence of the CIWP (=1 if t $\epsilon$ [1994, 1998], 0 otherwise) and the other for the existence of Infrastructure Canada (=1 if t $\epsilon$ [2000, 2003], 0 otherwise).

Regarding the asymmetry variables, defined in page 15, we found enough observations of these interactive dummy variables in our dataset. Thus for equation 1 we found 82 observations different to zero. In equation 3 we found 92 observations for federal grants and 84 for provincial grants and a similar scenario for the top-down and bottom-up cases.

Other revenues 1, 2 and 3 are defined in table 3 and its evolution is shown in figures 9 to 12. We also used two variables to characterize the most relevant provincial differences. Provincial population in persons per square kilometer was obtained from Table 384-0013 "Selected economic indicators" and provincial GDP, in current dollars and per capita terms, was obtained from Table 384-0002 "Gross Domestic Product expenditure-based." Both tables are part of the Provincial Economic Accounts dataset.

With the information from all variables we constituted a panel data set from 1988 to 2003 with observations for each Canadian province (N=160).

## CHAPTER III: ECONOMETRIC RESULTS

We examine the impact of all specific transfers lumped together and of federal and provincial transfers broken out in table 4. In table 5, we present two approaches, bottom-up and top-down, considering that the transfers have been allocated ex-post to a specific transfer category[28].

In order to capture the effect of specific purpose transfers on investment expenditures, we used the data described before for the 1988 to 2003 period. We analyzed the impact of specific purpose transfers on investment expenditures by a panel regression for the 10 Canadian provinces[29].

With panel data, one must be cautious in the choice of the econometric estimation technique. We use the following sequence of tests to ascertain the proper estimation technique to employ:

1. Individual effects: We test for all $\mu_i = 0$, in order to ascertain if different provinces have significantly differents effects.
2. Hausman: the ordinary least squares (OLS) technique was used and we computed the Hausman test to compare the random-effects versus fixed-effects coefficients. H0 = equality of coefficients. If H0 is rejected we have to use the fixed effects that are always consistent. In the other case, we can not reject H0, we use the random effects that are best linear unbiased estimators BLUE.
3. Heteroskedasticity: taking into account the fixed or random effects found in 2, we test the null hypothesis (H0) "homoskedasticity", using the Breusch-Pagan test which consist of regressing the squared residuals from the OLS on the independent variables of the model and performing a F significance test.

[28] Again, information was provided by Claude Vaillancourt, Chief Provincial Analysis. Federal/Provincial Analysis Section. Public Institutions Division. Statistics Canada.
[29] using the statistical software STATA: Intercooled Stata 9.0 for Windows by StataCorp LP.

4. Inter-provincial correlation: modeling for heteroskedasticity /homoskedasticity we performed the Breusch-Pagan inter-individual autocorrelation test, which H0 is inter-individual residual independence .
5. Intra-provincial autocorrelation: Stata use the Wald[30] test where H0 is the absence of residual autocorrelation. This is a test for the AR1 form of autocorrelation.

The confidence level for every test was 5%.

Table 4 and 5 also contain the results of regressions including the dummies for the existence of federal infrastructure initiatives, we can note that none of these variables show a significant effect on investment expenditures. The preferred model is the one that excluded dummies, then, we will only comment the results of equations excluding these variables.

*3.1. Empirical results: investment expenditures on specific provincial & federal transfers*

Equations in table 4 have investment expenditures as the dependent variable. Other revenues include all other municipalities' revenue sources not included in the regression (sales, general transfers and others).

Table 4 shows equation 1 results, with all specific purpose transfers lumped together, as well as equation 3 results, with a breakdown of federal and provincial specific purpose transfers. Equation 1 contains fixed effects and needs to be corrected for heteroskedasticity, cross-section correlation and the AR1 specification; while equation 3 has random effects and should include the AR1 specification.

•

[30] We must use the command "xtserial" that is a user written program. For more details visit: http://www.stata-journal.com/software/sj3-2/st0039/

**Table 4**
**Regression results for per capita investment expenditures on specific transfers, panel data 1988-2003**

| | *Equation 1* *Without dummies* *Coef / (z)* | Equation 2 With dummies *Coef / (z)* | *Equation 3* *Without dummies* *Coef / (z)* | Equation 4 With dummies *Coef / (z)* |
|---|---|---|---|---|
| specific transfers | *0.131* | 0.134 | - | - |
| | *(3.10)*** | (2.95)** | - | - |
| specific federal | - | - | *0.566* | 0.429 |
| | - | - | *(1.82)* | (2.11)* |
| specific provincial | - | - | *0.144* | 0.122 |
| | - | - | *(2.37)** | (2.73)** |
| tax revenues | *0.066* | 0.078 | *0.097* | 0.091 |
| | *(1.84)* | (2.09)* | *(1.62)* | (2.39)* |
| other revenues (1) | *0.117* | 0.118 | *0.125* | 0.065 |
| | *(2.22)** | (2.24)* | *(1.57)* | (1.20) |
| population density | *-2.819* | -3.346 | *-1.511* | -3.855 |
| | *(1.90)* | (2.31)* | *(0.89)* | (2.74)** |
| Gdp | *0.005* | 0.004 | *0.004* | 0.005 |
| | *(4.14)*** | (3.52)** | *(2.43)** | (3.73)** |
| CIPW (1994-1998) | - | -7.073 | - | -9.788 |
| | - | (0.88) | - | (1.21) |
| Inf Can (2000-2003) | - | 4.324 | - | -0.162 |
| | - | (0.35) | - | (0.01) |
| Asymmetry | *-0.075* | -0.080 | - | - |
| | *(1.60)* | (1.61) | - | - |
| provincial asymmetry | - | - | *-0.128* | -0.104 |
| | - | - | *(1.80)* | (2.14)* |
| federal asymmetry | - | - | *0.211* | 0.309 |
| | - | - | *(0.55)* | (1.23) |
| Constant | *56.577* | 59.592 | *41.745* | 56.658 |
| | *(2.25)** | (2.39)* | *(1.19)* | (2.24)* |
| Log likehood | *-725.818* | -726.7171 | *$R^2$ (between ) = 0.8068* | -726.0287 |
| **Test results** | | | | |
| Individual effects | *yes* | yes | *yes* | yes |
| Hausman test | *fixed effects* | fixed effects | *random effects* | fixed effects |
| Heteroskedasticity | *yes* | yes | *no* | yes |
| Inter-province corr | *yes* | yes | - | yes |
| AR1 | *yes* | yes | *yes* | yes |

Source: Authors. Absolute value of z statistics in parentheses * significant at 5%; ** significant at 1%

*Findings from equation 1:*

- Equation 1 shows a flypaper effect for total specific purpose public transfers to municipalities. Thus, 13 cents of each dollar from specific transfers was expended in investment in fixed capital and inventories, while the effect of municipal own revenue is not statistically different from zero.
- When specific transfers are lumped together, the asymmetry variable has a negative but insignificant coefficient.

*Findings from equation 3:*

- Equation 3 suggests that the federal specific transfers' effect on municipal investment expenditures is not statistically different to zero.
- We observe a flypaper effect for provincial specific transfers. Thus, 14 cents of each dollar from provincial specific transfers was spent in investment in fixed capital and inventories, while the effect of municipal tax revenue is not statistically different from zero.
- In both cases the asymmetry variables are not statistically significant. Hence, we find a symmetric response for grants expansions and contractions.

*3.2. Empirical results: Alternative approaches. Investment expenditures on some specific provincial & federal transfers*

Equations in table 5 have investment expenditures as the dependent variable and specific provincial and federal transfers separately. As in the first equations, other revenues include all the other municipality revenue sources not included in the regression. We observe that all equations must be corrected for heteroskedasticity and cross-section correlation and should include the AR1 specification.

*Top-down approach, equation 5:*

- Equation 5 shows a flypaper effect for provincial specific transfers to municipalities. Thus, 45 cents of each dollar from selected specific transfers versus only 11 cents of tax revenue were spent in fixed capital and inventories investment.
- Provincial asymmetry has a negative and significant coefficient, where provincial grants fell by 1 $, municipal expenditures increased by 6.6 cents (0.446 - 0.512).
- Federal grants do not have a significant impact on investment expenditures.

*Bottom-up approach, equation 7:*

- Again, we observe a flypaper effect for provincial specific transfers. For every dollar of specific transfer, municipalities spent 52 cents in investment expenditures, while only 10 cents of tax revenue was allotted to this purpose.
- Provincial asymmetry has a negative and significant coefficient; when provincial grants fell by 1$, expenditures increased by 10 cents.
- Federal grants do not have a significant impact on investment expenditures.

**Table 5**
**Regression results for investment expenditures on specific provincial & federal transfers, panel data 1988-2003**

| approach | Top-down | | Bottom-up | |
|---|---|---|---|---|
| | *Equation 5* | Equation 6 | *Equation 7* | Equation 8 |
| | *Without dummies* | With dummies | *Without dummies* | With dummies |
| | *Coef / (z)* | | *Coef / (z)* | |
| specific federal | *0.315* | 0.318 | *0.265* | 0.273 |
| | *(1.74)* | (1.64) | *(1.47)* | (1.43) |
| specific provincial | *0.446* | 0.421 | *0.523* | 0.512 |
| | *(4.09)*** | (3.33)** | *(4.49)*** | (3.84)** |
| tax revenues | *0.106* | 0.116 | *0.104* | 0.113 |
| | *(3.17)*** | (3.29)** | *(3.28)*** | (3.43)** |
| other revenues (2...3) | *0.054* | 0.061 | *0.049* | 0.060 |
| | *(1.69)* | (1.65) | *(1.55)* | (1.67) |
| population density | *-2.043* | -2.472 | *-2.074* | -2.246 |
| | *(1.44)* | (1.70) | *(1.54)* | (1.67) |
| gdp | *0.004* | 0.004 | *0.004* | 0.004 |
| | *(3.93)*** | (3.06)** | *(3.97)*** | (2.96)** |
| CIPW (1994-1998) | - | -3.362 | - | -2.810 |
| | - | (0.45) | - | (0.37) |
| Inf Can (2000-2003) | - | 8.666 | - | 12.322 |
| | - | (0.72) | - | (1.02) |
| provincial asymmetry | *-0.512* | -0.568 | *-0.627* | -0.724 |
| | *(2.76)*** | (2.74)** | *(3.29)*** | (3.41)** |
| federal asymmetry | *0.326* | 0.306 | *0.335* | 0.304 |
| | *(1.46)* | (1.30) | *(1.54)* | (1.33) |
| constant | *45.163* | 46.220 | *50.686* | 51.226 |
| | *(1.75)* | (1.81) | *(2.03)** | (2.11)* |
| Log likehood | *-724.0067* | -725.931 | *-723.8362* | -725.6122 |
| **Test results** | | | | |
| Individual effects | *yes* | yes | *yes* | yes |
| Hausman test | *random effects* | random effects | *fixed effects* | random effects |
| Heteroskedasticity | *yes* | yes | *yes* | yes |
| Inter-province corr | *yes* | yes | *yes* | yes |
| AR1 | *yes* | yes | *yes* | yes |

Source: Authors. Absolute value of z statistics in parentheses * significant at 5%; ** significant at 1%

*Conclusions*

- An asymmetric flypaper effect appears to exist in the case of provincial specific purpose transfers to municipal governments in Canada. The effect of federal transfers in municipal investment expenditure is not statistically significant.
- For the specific purpose provincial transfers we verify the existence of the flypaper effect. If we consider all specific transfers, 14 cents from each dollar are spent in investment expenditures. Using the top-down approach, 45 cents from each dollar are spent with the same purpose. Finally, using the bottom-up approach, 52 cents from each dollar are spent on municipal investment expenditures. From each dollar of own revenue, roughly 10.5 cents are consumed in municipal investment expenditures.
- In all cases the provincial transfers asymmetry variable has a negative and significant coefficient, that is, when grants fall, expenditures continue to rise. This implies that Canadian municipalities facing a cut in grants, increase tax revenues in order to maintain the investment expenditures in place. We validate the asymmetry hypothesis formulated by Oates. Specifically, the "fiscal replacement" form of asymmetry.
- Specific federal transfers, increases or cuts, appear not to have an effect on municipal investment expenditures. This conclusion was expected because infrastructure programs funds from the federal government went to provinces before going to municipalities, they then are quantified as provincial specific purpose transfers in our dataset.
- CIWP and Infrastructure Canada dummies are not statistically significant in the explanation of municipal investment expenditures. We can conclude that the only effect that these programs generated is an increase of transfers, therefore the effects of these programs are completely captured in our transfer coefficients.

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Stata: Intercooled Stata 9.0 for Windows by StataCorp LP. For more details visit: http://www.stata.com/

## ANNEX A: Table 6
## Canada: Investment expenditure

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 115 | 9 | 147 | 121 | 1773 | 2630 | 210 | 228 | 797 | 512 |
| 1989 | 127 | 11 | 163 | 119 | 2174 | 2699 | 208 | 277 | 821 | 647 |
| 1990 | 122 | 22 | 155 | 142 | 2173 | 3437 | 210 | 217 | 938 | 802 |
| 1991 | 103 | 18 | 139 | 162 | 1963 | 3461 | 205 | 184 | 839 | 947 |
| 1992 | 109 | 17 | 131 | 105 | 1879 | 3401 | 233 | 174 | 924 | 1158 |
| 1993 | 105 | 13 | 195 | 129 | 1972 | 2947 | 206 | 241 | 920 | 1192 |
| 1994 | 116 | 14 | 196 | 119 | 2172 | 3715 | 220 | 230 | 828 | 1505 |
| 1995 | 87 | 18 | 259 | 115 | 2262 | 4132 | 310 | 194 | 885 | 1443 |
| 1996 | 88 | 11 | 214 | 123 | 2358 | 3444 | 249 | 170 | 832 | 1659 |
| 1997 | 84 | 11 | 198 | 105 | 2338 | 3541 | 236 | 203 | 892 | 1532 |
| 1998 | 107 | 18 | 157 | 125 | 2283 | 3364 | 242 | 250 | 997 | 1622 |
| 1999 | 129 | 19 | 124 | 119 | 2092 | 3968 | 305 | 234 | 1098 | 1660 |
| 2000 | 148 | 18 | 141 | 144 | 2057 | 4143 | 243 | 251 | 1292 | 1595 |
| 2001 | 162 | 27 | 142 | 133 | 2532 | 4962 | 265 | 300 | 1485 | 1425 |
| 2002 | 130 | 33 | 176 | 159 | 2507 | 5954 | 261 | 340 | 2104 | 1475 |
| 2003 | 155 | 41 | 194 | 146 | 2832 | 6713 | 245 | 294 | 1474 | 1416 |

Source: Statistics Canada. CANSIM

## ANNEX B: Table 7
## Canada: Total municipal revenues

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 284,2 | 29,3 | 740,5 | 392,7 | 6285,0 | 11771,3 | 946,3 | 834,2 | 3139,1 | 2588,2 |
| 1989 | 285,5 | 33,3 | 803,7 | 417,3 | 6815,2 | 13214,0 | 1005,4 | 852,7 | 3360,3 | 2983,8 |
| 1990 | 306,7 | 37,0 | 868,6 | 455,1 | 7257,5 | 14651,7 | 1050,6 | 883,9 | 3681,0 | 3284,3 |
| 1991 | 322,0 | 38,5 | 1136,3 | 482,8 | 7611,1 | 16097,6 | 1117,4 | 872,4 | 3685,6 | 3425,2 |
| 1992 | 340,6 | 39,0 | 976,2 | 496,4 | 8389,1 | 17134,0 | 1197,5 | 867,9 | 3935,9 | 3761,0 |
| 1993 | 350,0 | 41,0 | 981,6 | 508,6 | 8863,7 | 17322,3 | 1231,9 | 826,1 | 3607,5 | 3982,6 |
| 1994 | 366,2 | 44,0 | 1006,8 | 526,9 | 9103,0 | 17850,9 | 1286,6 | 867,3 | 3921,7 | 4110,3 |
| 1995 | 379,6 | 53,5 | 1058,4 | 559,9 | 9330,8 | 18367,8 | 1318,9 | 906,6 | 4459,4 | 4465,2 |
| 1996 | 358,6 | 54,0 | 894,8 | 558,9 | 9156,4 | 16996,5 | 1320,4 | 919,4 | 4195,4 | 4645,8 |
| 1997 | 373,1 | 53,2 | 903,3 | 551,6 | 9214,7 | 17056,8 | 1380,1 | 937,7 | 4445,3 | 4653,2 |
| 1998 | 384,1 | 54,3 | 924,0 | 572,1 | 9585,7 | 20935,5 | 1387,1 | 956,5 | 4666,7 | 4592,9 |
| 1999 | 381,2 | 51,4 | 934,6 | 602,0 | 9516,7 | 21460,9 | 1286,0 | 999,7 | 4744,8 | 6417,9 |
| 2000 | 379,2 | 52,5 | 972,2 | 608,4 | 9929,0 | 21052,8 | 1362,2 | 1029,5 | 5207,1 | 4830,9 |
| 2001 | 400,5 | 56,3 | 989,2 | 618,5 | 9955,3 | 22541,0 | 1373,7 | 1109,4 | 5551,9 | 5015,8 |
| 2002 | 433,3 | 60,5 | 1052,9 | 657,1 | 10033,9 | 24115,8 | 1401,8 | 1272,3 | 5599,3 | 5099,2 |
| 2003 | 417,2 | 62,1 | 1091,5 | 691,2 | 10571,9 | 25112,8 | 1434,7 | 1206,9 | 5936,9 | 5564,2 |
| 2004 | 422,8 | 63,4 | 1117,0 | 717,4 | 10560,9 | 25626,8 | 1449,0 | 1216,4 | 6024,9 | 5778,5 |

Source: Statistics Canada. CANSIM

## ANNEX C: Table 8
## Canada: Municipal tax revenues

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 124,7 | 14,8 | 433,2 | 166,0 | 4385,0 | 5062,8 | 442,4 | 433,3 | 1171,6 | 1309,0 |
| 1989 | 129,2 | 16,9 | 473,8 | 182,9 | 4684,5 | 5722,0 | 480,1 | 443,4 | 1276,1 | 1446,0 |
| 1990 | 144,2 | 18,4 | 509,3 | 206,1 | 5006,5 | 6129,6 | 507,9 | 463,2 | 1404,7 | 1581,4 |
| 1991 | 156,8 | 20,2 | 673,8 | 227,7 | 5319,0 | 6568,5 | 546,3 | 471,3 | 1458,5 | 1721,8 |
| 1992 | 169,5 | 19,9 | 565,4 | 237,6 | 5868,9 | 6979,7 | 559,6 | 483,5 | 1524,6 | 1897,0 |
| 1993 | 179,4 | 20,7 | 581,9 | 248,1 | 6047,9 | 7045,8 | 579,2 | 474,3 | 1563,1 | 2104,5 |
| 1994 | 183,3 | 21,4 | 585,8 | 256,8 | 6158,3 | 7181,7 | 615,1 | 493,3 | 1743,5 | 2195,1 |
| 1995 | 188,3 | 31,4 | 598,6 | 272,1 | 6148,0 | 7259,0 | 564,0 | 493,2 | 1740,0 | 2237,4 |
| 1996 | 174,8 | 31,5 | 606,5 | 280,9 | 6098,3 | 7338,5 | 591,4 | 514,0 | 1901,6 | 2402,6 |
| 1997 | 175,1 | 32,4 | 620,4 | 289,9 | 6207,7 | 7671,1 | 619,7 | 549,1 | 1988,8 | 2448,2 |
| 1998 | 184,6 | 33,7 | 648,0 | 303,2 | 6347,4 | 10350,9 | 639,0 | 570,3 | 2123,2 | 2466,7 |
| 1999 | 192,6 | 35,1 | 665,3 | 320,8 | 6484,0 | 11059,7 | 637,7 | 600,3 | 2142,3 | 2565,2 |
| 2000 | 195,0 | 36,0 | 702,1 | 332,0 | 6623,4 | 10762,4 | 627,9 | 603,8 | 2282,2 | 2727,4 |
| 2001 | 214,1 | 38,4 | 738,5 | 347,5 | 6391,5 | 11488,5 | 609,8 | 647,3 | 2484,5 | 2848,3 |
| 2002 | 230,2 | 40,6 | 767,6 | 364,6 | 6582,1 | 12045,2 | 651,8 | 681,6 | 2573,6 | 2844,0 |
| 2003 | 235,0 | 42,4 | 793,0 | 385,7 | 6913,8 | 12749,4 | 647,6 | 694,7 | 2752,5 | 3058,5 |
| 2004 | 247,5 | 44,2 | 807,4 | 420,4 | 7074,5 | 13117,9 | 660,0 | 715,4 | 2839,3 | 3182,1 |

Source: Statistics Canada. CANSIM

## ANNEX D: Table 9
## Canada: Total transfers to municipalities

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 117,2 | 4,1 | 194,5 | 145,3 | 549,7 | 3670,4 | 248,5 | 155,8 | 689,2 | 390,4 |
| 1989 | 110,8 | 4,2 | 217,0 | 145,4 | 678,4 | 3898,2 | 258,5 | 156,0 | 700,1 | 451,1 |
| 1990 | 113,2 | 6,2 | 234,1 | 152,4 | 703,4 | 4529,9 | 271,8 | 163,8 | 785,5 | 506,5 |
| 1991 | 112,6 | 4,9 | 306,6 | 156,9 | 706,3 | 5676,2 | 285,2 | 146,2 | 747,5 | 474,0 |
| 1992 | 117,6 | 5,6 | 269,3 | 155,9 | 873,8 | 6354,4 | 324,6 | 118,9 | 863,0 | 546,4 |
| 1993 | 115,8 | 6,2 | 279,8 | 152,8 | 1091,6 | 6410,2 | 327,5 | 98,6 | 502,2 | 559,1 |
| 1994 | 122,8 | 8,0 | 286,2 | 155,4 | 1173,3 | 6603,1 | 343,0 | 107,9 | 547,9 | 537,1 |
| 1995 | 129,9 | 6,3 | 317,2 | 158,5 | 1267,9 | 6761,5 | 388,8 | 120,2 | 590,4 | 692,4 |
| 1996 | 125,1 | 5,1 | 127,0 | 148,4 | 1200,1 | 5424,4 | 352,9 | 111,1 | 529,0 | 679,9 |
| 1997 | 137,7 | 3,9 | 121,8 | 128,8 | 1141,6 | 4999,9 | 398,1 | 83,5 | 534,8 | 529,3 |
| 1998 | 129,3 | 3,5 | 94,5 | 117,0 | 1240,6 | 5706,1 | 354,4 | 87,6 | 580,3 | 428,2 |
| 1999 | 117,0 | 3,4 | 84,6 | 118,2 | 963,8 | 4696,6 | 229,0 | 91,5 | 586,7 | 2122,2 |
| 2000 | 113,1 | 3,9 | 77,0 | 103,1 | 967,5 | 4487,8 | 290,5 | 90,4 | 725,0 | 229,4 |
| 2001 | 108,4 | 4,0 | 65,1 | 95,2 | 1187,3 | 4608,0 | 320,0 | 101,9 | 721,8 | 197,1 |
| 2002 | 112,2 | 5,6 | 102,8 | 113,9 | 1248,5 | 5167,1 | 317,1 | 227,8 | 622,7 | 173,4 |
| 2003 | 93,2 | 5,0 | 92,1 | 117,8 | 1310,2 | 5463,8 | 329,8 | 129,1 | 662,7 | 229,6 |
| 2004 | 84,2 | 4,0 | 110,6 | 99,1 | 1314,9 | 5336,3 | 322,0 | 117,0 | 627,3 | 293,1 |

Source: Statistics Canada. CANSIM

## ANNEX E: Table 10
## Canada: Total specific purpose transfers

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 65,5 | 0,5 | 160,3 | 41,2 | 521,3 | 2806,3 | 175,2 | 71,5 | 476,8 | 279,2 |
| 1989 | 55,4 | 0,5 | 181,0 | 41,0 | 619,5 | 3034,1 | 185,2 | 72,2 | 480,1 | 324,6 |
| 1990 | 57,5 | 1,9 | 196,7 | 47,2 | 643,1 | 3626,3 | 194,4 | 79,6 | 567,2 | 363,9 |
| 1991 | 58,3 | 0,8 | 259,4 | 47,0 | 648,0 | 4722,3 | 215,6 | 66,9 | 524,7 | 348,9 |
| 1992 | 68,2 | 1,3 | 229,4 | 48,1 | 780,6 | 5390,6 | 251,3 | 51,5 | 496,9 | 408,7 |
| 1993 | 69,5 | 1,9 | 241,6 | 50,7 | 962,7 | 5687,3 | 253,3 | 35,1 | 333,8 | 417,3 |
| 1994 | 78,7 | 4,2 | 248,7 | 56,1 | 1053,9 | 5930,4 | 268,0 | 49,9 | 405,2 | 399,1 |
| 1995 | 86,1 | 4,0 | 296,5 | 61,6 | 1149,6 | 6091,8 | 310,2 | 61,3 | 481,3 | 549,3 |
| 1996 | 93,4 | 3,3 | 108,2 | 54,8 | 1078,6 | 4542,9 | 271,6 | 51,8 | 459,5 | 535,9 |
| 1997 | 109,2 | 2,1 | 101,5 | 42,9 | 1006,0 | 4325,9 | 306,9 | 49,3 | 468,7 | 445,7 |
| 1998 | 103,6 | 1,7 | 64,2 | 38,3 | 1166,3 | 4776,7 | 265,0 | 39,5 | 536,3 | 342,7 |
| 1999 | 94,6 | 1,4 | 52,1 | 40,1 | 882,5 | 4015,7 | 127,0 | 40,3 | 539,9 | 2076,0 |
| 2000 | 89,0 | 1,9 | 47,5 | 25,4 | 896,9 | 3933,9 | 102,4 | 41,7 | 662,5 | 165,1 |
| 2001 | 85,1 | 2,1 | 38,9 | 24,9 | 981,9 | 4017,8 | 106,9 | 53,6 | 677,9 | 128,4 |
| 2002 | 88,1 | 3,5 | 71,4 | 40,3 | 977,1 | 4497,6 | 125,7 | 172,6 | 583,7 | 106,4 |
| 2003 | 69,1 | 2,9 | 58,2 | 47,2 | 1011,7 | 4760,1 | 139,5 | 67,9 | 626,8 | 167,6 |
| 2004 | 59,3 | 2,0 | 76,8 | 32,1 | 995,7 | 4611,5 | 128,4 | 54,0 | 591,4 | 230,1 |

Source: Statistics Canada. CANSIM

## ANNEX F: Table 11
## Canada: Specific purpose federal transfers

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 8,9 | 0,1 | 3,0 | 6,3 | 12,7 | 104,5 | 11,1 | 2,8 | 15,8 | 28,1 |
| 1989 | 7,1 | 0,1 | 4,4 | 7,2 | 10,4 | 109,0 | 11,4 | 2,8 | 16,0 | 27,5 |
| 1990 | 4,8 | 0,1 | 3,2 | 4,2 | 12,4 | 109,3 | 12,6 | 2,0 | 15,5 | 26,6 |
| 1991 | 5,4 | 0,2 | 3,6 | 8,7 | 11,8 | 106,4 | 13,5 | 5,4 | 17,7 | 26,4 |
| 1992 | 5,5 | 0,2 | 3,5 | 5,8 | 10,6 | 119,4 | 16,5 | 3,0 | 20,4 | 28,0 |
| 1993 | 3,6 | 0,1 | 4,1 | 7,7 | 17,4 | 114,6 | 18,1 | 3,1 | 16,7 | 27,8 |
| 1994 | 8,9 | 1,0 | 14,5 | 14,4 | 16,7 | 176,1 | 26,2 | 4,3 | 28,6 | 31,7 |
| 1995 | 4,8 | 1,6 | 25,1 | 14,1 | 13,3 | 304,9 | 38,6 | 6,3 | 68,1 | 81,2 |
| 1996 | 8,4 | 1,4 | 12,9 | 14,7 | 15,3 | 263,7 | 24,3 | 13,5 | 55,2 | 87,3 |
| 1997 | 11,2 | 0,9 | 12,8 | 7,4 | 18,6 | 166,2 | 20,8 | 11,8 | 64,5 | 54,3 |
| 1998 | 9,1 | 0,5 | 9,8 | 6,8 | 25,4 | 150,0 | 8,8 | 12,3 | 33,4 | 36,3 |
| 1999 | 9,9 | 0,1 | 3,7 | 6,3 | 25,4 | 121,3 | 9,7 | 12,9 | 11,3 | 24,6 |
| 2000 | 6,5 | 0,1 | 3,0 | 2,7 | 27,8 | 119,7 | 7,1 | 10,2 | 10,9 | 18,5 |
| 2001 | 3,6 | 0,1 | 3,7 | 2,2 | 14,8 | 237,7 | 10,2 | 11,8 | 25,3 | 20,4 |
| 2002 | 2,7 | 0,5 | 24,8 | 7,1 | 15,0 | 495,6 | 19,8 | 129,0 | 55,9 | 25,5 |
| 2003 | 2,6 | 0,3 | 15,3 | 6,6 | 14,9 | 470,1 | 16,1 | 14,7 | 47,4 | 32,8 |
| 2004 | 2,5 | 0,1 | 25,7 | 3,0 | 16,3 | 441,1 | 17,0 | 14,2 | 68,6 | 65,1 |

Source: Statistics Canada. CANSIM

## ANNEX G: Table 12
## Canada: Specific purpose provincial transfers

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 56,6 | 0,4 | 157,3 | 34,9 | 508,6 | 2701,8 | 164,1 | 68,7 | 461,1 | 251,1 |
| 1989 | 48,2 | 0,5 | 176,6 | 33,8 | 609,1 | 2925,1 | 173,9 | 69,4 | 464,1 | 297,1 |
| 1990 | 52,7 | 1,8 | 193,5 | 43,0 | 630,7 | 3517,0 | 181,8 | 77,6 | 551,7 | 337,3 |
| 1991 | 52,9 | 0,6 | 255,8 | 38,3 | 636,2 | 4615,9 | 202,1 | 61,4 | 507,0 | 322,5 |
| 1992 | 62,7 | 1,1 | 225,8 | 42,4 | 770,0 | 5271,3 | 234,8 | 48,5 | 476,6 | 380,7 |
| 1993 | 65,9 | 1,8 | 237,5 | 43,0 | 945,3 | 5572,7 | 235,2 | 32,0 | 317,1 | 389,5 |
| 1994 | 69,9 | 3,2 | 234,2 | 41,7 | 1037,1 | 5754,3 | 241,7 | 45,6 | 376,6 | 367,4 |
| 1995 | 81,3 | 2,4 | 271,4 | 47,5 | 1136,3 | 5786,8 | 271,6 | 55,0 | 413,2 | 468,1 |
| 1996 | 85,0 | 1,9 | 95,3 | 40,1 | 1063,3 | 4279,2 | 247,3 | 38,2 | 404,3 | 448,6 |
| 1997 | 98,1 | 1,3 | 88,7 | 35,4 | 987,4 | 4159,6 | 286,1 | 37,5 | 404,1 | 391,5 |
| 1998 | 94,5 | 1,2 | 54,4 | 31,5 | 1141,0 | 4626,6 | 256,1 | 27,2 | 502,9 | 306,4 |
| 1999 | 84,7 | 1,3 | 48,4 | 33,9 | 857,1 | 3894,4 | 117,3 | 27,4 | 528,6 | 2051,4 |
| 2000 | 82,5 | 1,8 | 44,4 | 22,7 | 869,1 | 3814,2 | 95,3 | 31,5 | 651,6 | 146,6 |
| 2001 | 81,6 | 2,0 | 35,2 | 22,7 | 967,0 | 3780,0 | 96,7 | 41,8 | 652,5 | 108,0 |
| 2002 | 85,4 | 3,0 | 46,6 | 33,2 | 962,1 | 4001,9 | 105,9 | 43,6 | 527,7 | 80,9 |
| 2003 | 66,5 | 2,6 | 42,9 | 40,5 | 996,8 | 4290,0 | 123,4 | 53,2 | 579,4 | 134,8 |
| 2004 | 56,8 | 1,9 | 51,1 | 29,1 | 979,4 | 4170,4 | 111,4 | 39,8 | 522,8 | 165,0 |

Source: Statistics Canada. CANSIM

## ANNEX H: Table 13
## Canada: Federal, top-down approach

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 6,9 | 0,0 | 2,5 | 4,7 | 11,0 | 30,4 | 5,8 | 2,3 | 5,8 | 9,8 |
| 1989 | 5,1 | 0,1 | 4,2 | 5,3 | 8,9 | 28,7 | 5,2 | 1,7 | 5,4 | 9,2 |
| 1990 | 2,7 | 0,0 | 3,0 | 2,7 | 10,5 | 19,4 | 4,8 | 1,3 | 4,8 | 5,5 |
| 1991 | 2,8 | 0,1 | 3,5 | 7,2 | 10,1 | 21,6 | 3,6 | 4,3 | 3,7 | 4,6 |
| 1992 | 3,9 | 0,1 | 3,5 | 4,1 | 8,9 | 24,4 | 3,9 | 1,8 | 7,8 | 4,4 |
| 1993 | 2,0 | 0,1 | 4,0 | 5,8 | 10,5 | 28,7 | 3,3 | 2,1 | 5,0 | 4,5 |
| 1994 | 6,8 | 1,0 | 13,8 | 12,4 | 9,3 | 84,6 | 11,0 | 2,6 | 13,4 | 10,9 |
| 1995 | 3,8 | 1,5 | 24,0 | 12,2 | 5,1 | 192,9 | 18,3 | 4,8 | 54,1 | 61,3 |
| 1996 | 4,3 | 1,3 | 12,4 | 12,4 | 5,4 | 168,4 | 8,1 | 12,0 | 41,8 | 65,1 |
| 1997 | 7,8 | 0,8 | 12,4 | 5,8 | 6,3 | 89,4 | 13,7 | 10,5 | 49,5 | 32,7 |
| 1998 | 5,8 | 0,5 | 8,9 | 5,1 | 11,0 | 71,6 | 4,6 | 11,0 | 24,7 | 13,6 |
| 1999 | 7,1 | 0,0 | 3,0 | 4,8 | 10,3 | 54,8 | 4,4 | 11,5 | 4,0 | 9,7 |
| 2000 | 4,6 | 0,0 | 2,4 | 1,3 | 9,4 | 49,4 | 3,3 | 9,1 | 4,8 | 7,4 |
| 2001 | 2,5 | 0,1 | 2,7 | 1,6 | 2,3 | 41,2 | 6,0 | 10,4 | 17,5 | 10,3 |
| 2002 | 1,8 | 0,2 | 22,1 | 6,5 | 2,3 | 115,7 | 8,7 | 128,4 | 38,9 | 13,5 |
| 2003 | 1,4 | 0,1 | 8,8 | 6,1 | 2,3 | 80,2 | 10,1 | 13,4 | 38,3 | 16,8 |
| 2004 | 1,3 | 0,1 | 15,2 | 1,8 | 3,4 | 48,0 | 13,1 | 13,5 | 41,5 | 42,0 |

Source: Statistics Canada. CANSIM

## ANNEX I : Table 14
## Canada: Provincial, top-down approach

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 33,0 | 0,4 | 42,8 | 29,3 | 241,7 | 1358,1 | 37,3 | 48,4 | 317,4 | 67,3 |
| 1989 | 24,7 | 0,4 | 50,1 | 28,0 | 317,6 | 1404,6 | 43,3 | 52,8 | 316,5 | 85,7 |
| 1990 | 26,7 | 1,7 | 50,9 | 36,1 | 333,7 | 1542,1 | 40,8 | 59,4 | 397,5 | 107,7 |
| 1991 | 24,5 | 0,5 | 54,3 | 31,3 | 337,2 | 1699,9 | 42,5 | 45,9 | 357,1 | 133,0 |
| 1992 | 32,7 | 1,0 | 52,1 | 35,3 | 434,2 | 1652,9 | 46,0 | 37,2 | 323,6 | 163,3 |
| 1993 | 30,4 | 1,6 | 49,3 | 35,4 | 603,7 | 1565,3 | 59,5 | 24,5 | 257,6 | 157,0 |
| 1994 | 36,5 | 2,9 | 45,2 | 35,4 | 697,4 | 1672,6 | 68,5 | 35,2 | 312,3 | 147,0 |
| 1995 | 44,2 | 2,1 | 55,9 | 42,3 | 773,7 | 1822,7 | 92,1 | 42,3 | 353,3 | 215,6 |
| 1996 | 37,0 | 1,5 | 33,2 | 35,1 | 715,9 | 1052,4 | 70,3 | 29,2 | 320,2 | 227,8 |
| 1997 | 56,4 | 1,1 | 32,8 | 30,9 | 632,4 | 1016,0 | 86,7 | 30,3 | 342,2 | 204,3 |
| 1998 | 57,1 | 1,0 | 30,1 | 25,5 | 714,7 | 1361,7 | 90,2 | 21,6 | 424,0 | 144,5 |
| 1999 | 49,1 | 1,2 | 26,5 | 30,1 | 506,7 | 367,3 | 78,7 | 21,3 | 453,6 | 103,1 |
| 2000 | 50,6 | 1,7 | 23,5 | 19,9 | 533,6 | 276,6 | 70,1 | 24,5 | 570,2 | 95,3 |
| 2001 | 46,8 | 2,0 | 15,8 | 19,9 | 588,9 | 160,9 | 71,7 | 32,3 | 571,0 | 69,5 |
| 2002 | 53,9 | 2,1 | 24,9 | 30,0 | 718,1 | 342,7 | 61,2 | 32,6 | 434,2 | 54,0 |
| 2003 | 33,9 | 2,3 | 21,8 | 36,6 | 750,3 | 384,5 | 64,5 | 28,7 | 466,2 | 84,4 |
| 2004 | 25,9 | 1,8 | 27,6 | 26,4 | 701,3 | 199,1 | 77,2 | 28,2 | 400,9 | 116,3 |

Source: Statistics Canada. CANSIM

## ANNEX J: Table 15
## Canada: Federal, bottom-up approach

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 5,4 | 0,0 | 1,7 | 3,5 | 8,6 | 22,5 | 5,1 | 1,8 | 5,3 | 5,0 |
| 1989 | 4,0 | 0,0 | 3,5 | 2,6 | 6,9 | 24,2 | 5,0 | 1,5 | 4,9 | 7,7 |
| 1990 | 1,9 | 0,0 | 2,0 | 0,6 | 8,3 | 16,1 | 4,3 | 1,0 | 4,4 | 3,5 |
| 1991 | 2,6 | 0,0 | 2,1 | 0,7 | 7,9 | 15,1 | 3,3 | 4,1 | 3,0 | 3,2 |
| 1992 | 3,7 | 0,0 | 2,4 | 2,8 | 6,9 | 19,0 | 3,8 | 1,5 | 7,4 | 2,4 |
| 1993 | 1,8 | 0,0 | 2,4 | 2,4 | 8,2 | 23,7 | 3,0 | 1,8 | 4,7 | 2,5 |
| 1994 | 5,4 | 0,9 | 11,6 | 7,8 | 7,2 | 70,2 | 10,8 | 2,2 | 11,7 | 8,9 |
| 1995 | 2,8 | 1,5 | 21,6 | 9,4 | 4,1 | 134,8 | 16,7 | 4,0 | 47,9 | 59,0 |
| 1996 | 3,6 | 1,2 | 11,1 | 11,7 | 4,5 | 98,2 | 7,4 | 11,6 | 38,0 | 60,4 |
| 1997 | 6,8 | 0,8 | 11,5 | 5,3 | 5,5 | 70,0 | 13,3 | 10,0 | 46,5 | 30,7 |
| 1998 | 4,4 | 0,5 | 8,2 | 4,2 | 9,1 | 61,3 | 4,4 | 10,5 | 23,0 | 11,7 |
| 1999 | 5,6 | 0,0 | 2,4 | 4,4 | 8,6 | 41,8 | 4,0 | 11,0 | 3,5 | 7,7 |
| 2000 | 3,3 | 0,0 | 1,7 | 1,0 | 7,8 | 31,8 | 3,2 | 8,8 | 4,7 | 5,0 |
| 2001 | 1,3 | 0,0 | 1,7 | 0,7 | 2,3 | 28,3 | 5,3 | 10,0 | 16,6 | 8,5 |
| 2002 | 0,9 | 0,2 | 20,6 | 4,5 | 2,3 | 100,4 | 8,0 | 128,1 | 35,7 | 8,6 |
| 2003 | 0,9 | 0,1 | 6,7 | 5,1 | 2,3 | 60,7 | 7,1 | 13,1 | 35,5 | 9,6 |
| 2004 | 0,9 | 0,1 | 13,4 | 1,5 | 3,4 | 32,4 | 9,2 | 13,2 | 15,8 | 32,1 |

Source: Statistics Canada. CANSIM

## ANNEX K: Table 16
## Canada: Provincial, bottom-up approach

| | millions of current dollars | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| year | NL | PEI | NS | NB | QC | ON | MA | SA | AL | BC |
| 1988 | 27,0 | 0,2 | 31,6 | 22,3 | 214,0 | 1265,8 | 32,3 | 36,8 | 270,3 | 53,4 |
| 1989 | 17,2 | 0,2 | 32,1 | 19,9 | 279,2 | 1320,5 | 36,1 | 43,3 | 250,9 | 77,0 |
| 1990 | 14,6 | 1,3 | 39,8 | 26,9 | 296,0 | 1455,3 | 34,7 | 47,5 | 341,0 | 92,6 |
| 1991 | 16,8 | 0,2 | 42,4 | 23,0 | 299,2 | 1600,4 | 36,6 | 35,9 | 298,5 | 113,7 |
| 1992 | 24,9 | 0,7 | 40,8 | 24,5 | 384,3 | 1561,0 | 40,2 | 27,4 | 265,2 | 137,2 |
| 1993 | 22,4 | 1,5 | 38,6 | 20,2 | 548,3 | 1492,6 | 51,6 | 16,2 | 201,0 | 139,9 |
| 1994 | 26,3 | 2,8 | 34,2 | 23,9 | 619,7 | 1584,5 | 53,8 | 26,8 | 272,6 | 128,2 |
| 1995 | 32,7 | 1,9 | 44,2 | 28,6 | 698,1 | 1682,3 | 70,9 | 33,3 | 298,9 | 193,3 |
| 1996 | 25,5 | 1,2 | 22,7 | 20,8 | 638,6 | 916,2 | 49,2 | 20,2 | 277,0 | 209,3 |
| 1997 | 45,5 | 0,9 | 19,4 | 18,7 | 556,5 | 957,8 | 68,1 | 21,3 | 301,4 | 185,9 |
| 1998 | 46,0 | 0,9 | 17,7 | 14,4 | 621,2 | 1324,3 | 71,4 | 12,0 | 378,2 | 126,9 |
| 1999 | 38,6 | 1,0 | 12,4 | 18,5 | 442,1 | 320,8 | 58,8 | 12,0 | 406,7 | 84,4 |
| 2000 | 39,4 | 1,5 | 10,7 | 8,1 | 468,8 | 232,1 | 50,6 | 14,1 | 523,3 | 74,3 |
| 2001 | 33,6 | 1,6 | 3,1 | 6,8 | 502,9 | 114,1 | 50,9 | 21,7 | 523,4 | 51,8 |
| 2002 | 39,1 | 1,9 | 12,0 | 18,0 | 643,6 | 281,3 | 40,4 | 21,4 | 383,6 | 42,4 |
| 2003 | 23,6 | 1,9 | 8,4 | 23,7 | 662,8 | 318,9 | 43,1 | 19,2 | 406,2 | 71,2 |
| 2004 | 16,0 | 1,3 | 13,8 | 13,2 | 621,7 | 143,1 | 55,2 | 17,2 | 318,6 | 86,6 |

Source: Statistics Canada. CANSIM