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Financing Urban Infrastructure in Canada: Who Should Pay?

Enid Slack and Almos T. Tassonyi

UNIVERSITY OF TORONTO

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About IMFG

The Institute on Municipal Finance and Governance (IMFG) is an academic research hub and non-partisan think tank based in the Munk School of Global Affairs at the University of Toronto.

IMFG focuses on the fiscal health and governance challenges facing large cities and city-regions. Its objective is to spark and inform public debate and to engage the academic and policy communities around important issues of municipal finance and governance. The Institute conducts original research on issues facing cities in Canada and around the world; promotes high-level discussion among Canada's government, academic, corporate, and community leaders through conferences and roundtables; and supports graduate and post-graduate students to build Canada's cadre of municipal finance and governance experts. It is the only institute in Canada that focuses solely on municipal finance issues in large cities and city-regions.

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Financing Urban Infrastructure in Canada: Who Should Pay?

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Abstract

The poor state of municipal infrastructure is the subject of frequent complaint in Canada. Roads are congested, transit systems are in need of major investments, bridges are crumbling, and water treatment plants need to be replaced. Municipalities continue to seek financial assistance from the federal and provincial governments, but are transfers really the best way to pay for municipal capital investments? This paper provides an overview of how municipal infrastructure is funded in Canada with an emphasis on the extent to which the users of infrastructure pay the costs. The paper concludes that although user fees are increasing in Canadian municipalities, better pricing is needed to link those who benefit with those who pay for municipal infrastructure.

Keywords: municipal finance, user fees, infrastructure finance

JEL codes: H54, H71, H72

Financing Urban Infrastructure in Canada: Who Should Pay?

The poor state of municipal infrastructure in Canada – defined to include transportation (transit, highways, roads, bridges, street lighting, etc.), water and wastewater, solid waste collection and disposal, public libraries, and public recreation centres – is the subject of frequent news stories.[1] Roads are congested, transit systems need major investments, bridges are crumbling, water treatment plants need to be replaced, and the list goes on. Local governments, staggered by what they perceive to be a growing problem, have turned to the federal and provincial governments to help them out, and, to some extent, these governments have responded favourably with increased funding.[2] But are transfers from other governments really the best way to pay for municipal infrastructure?

Economists argue that proper pricing, where prices are set at marginal cost (the additional cost of producing one more unit of output), would be better than transfers because pricing rations the use of existing facilities and gives appropriate capital investment signals. Underpricing a service, on the other hand, results in overconsumption and greater demand for more of the unpriced infrastructure, which leads to more expensive infrastructure investment than is economically efficient (Bazel and Mintz 2014; Kitchen and Lindsey 2013; Slack 2016). Transfers generally mean that access to infrastructure is not being priced correctly, so the tendency is to overuse it. Although Canadian local governments can and do levy user fees mainly for public transit, water, and waste collection, few have embraced road or bridge tolls and few are applying marginal-cost pricing principles.[3]

This paper provides an overview of how municipal infrastructure is funded in Canada with a particular emphasis on the role that user fees play. The paper begins with a brief discussion of the infrastructure deficit and how it is measured. The second section sets out a rationale for user fees on the grounds that they are the best way to link revenues to expenditures. The third section provides an overview of capital expenditures and the sources of capital financing used by municipalities in one province – Ontario. The fourth section provides a more detailed discussion of the different sources of revenue to pay for infrastructure in Canadian municipalities. The final section suggests that user fees are increasing in Canadian municipalities but better pricing is needed to link those who benefit with those who pay for municipal infrastructure.

1. As an example, see Moore, Sachgou Les Perreaux, and Mason (2015).

2. Since 2002, the federal government has provided about $45 billion in municipal infrastructure grants. See Table 3 for more details.

3. In 2012, with the exception of international crossings, Canada had only eight tolled bridges, and less than 0.25 percent of paved roads were tolled (Bazel and Mintz 2014).

1. Is There an Infrastructure Deficit?

Increasing concern has been expressed about the large and growing municipal infrastructure deficit in Canada. Perhaps the most often cited estimate of that infrastructure deficit is $123 billion, which was put forward by the Federation of Canadian Municipalities (FCM) in 2007. More recently, FCM has produced the *Canadian Infrastructure Report Card*, which is based on a survey of municipalities across the country. In it, they estimated that the replacement value of all assets in 2009–10 (including municipal roads, drinking water, and wastewater and stormwater infrastructure) was $538.1 billion, of which the replacement value of assets in very poor condition was almost $51 billion and those in fair condition, $121 billion (Federation of Canadian Municipalities 2012).[4]

Although the public discourse appears to have adopted these and similar numbers put out by other organizations, Fenn and Kitchen (2016) caution against taking these numbers at face value. For example, they argue that many of these estimates are based on surveys conducted by associations with a vested interest in making the number significant enough to attract federal and provincial funding. Similarly, some estimates are based on a benchmark or standard of identified needs, but again, those standards are often set by associations with an incentive to inflate the size of the deficit. Moreover, benchmarks are generally based on engineering standards and do not take economics into account – is there an asset management problem or is it a pricing problem? They also cite the lack of information on the quantity and quality of the capital stock, resulting in some questionable estimates.

The starting point has an important influence on the measure of the deficit – does the starting point necessarily reflect the right level of investment? Where deficits have been estimated, it is assumed that existing taxing and pricing policies for the services delivered by the assets will continue; there is no estimate of infrastructure needs if more effective demand management or conservation-based pricing policies were adopted, for example. Efficient prices for services such as road use, water, and wastewater would reveal the true demand for infrastructure because people know the cost of providing those services and they would give an indication of the efficient supply.

Notwithstanding the criticisms of the estimates of the infrastructure deficit, there is little doubt that municipal governments, on average, have underinvested in infrastructure. One indication of that underinvestment is the comparison of the net book value of assets (current value less depreciation) as a proportion of the costs of those assets. To preserve the value of capital assets, municipalities would have to invest at least the same amount of money as the amount of depreciation, but in general, they are not doing so (Tassonyi and Conger 2015). In 2015, for example, the net book value of municipal capital assets in Ontario was over $139 billion and the value of the assets at cost was almost $214 billion. In other words,

4. The Association of Municipalities of Ontario has estimated a gap of $60 billion for municipal infrastructure in Ontario, excluding social housing (AMO 2015).

municipal capital assets were worth only 65 percent of their original cost. In short, investment has not kept pace with depreciation and municipal assets are losing value.[5]

Similarly, in 2015, in Alberta, net book value was just over $56 billion and the value of the assets was $88 billion at cost or almost 64 percent of their original worth. Although there is no defined threshold to determine if a municipality's ongoing infrastructure investment is adequate, it is interesting that the average for Ontario and Alberta municipalities is similar. In both provinces, however, there is considerable variability across municipalities in the proportion of book value relative to capital cost. In Ontario, for example, Toronto is below the average (at 59 percent), as are many northern municipalities, but rapidly growing municipalities such as the City of Vaughan are at 90 percent (Slack, Tassonyi, and Grad 2015). In Alberta, Edmonton was close to the provincial average at almost 70 percent in 2013, while Wood Buffalo (Fort McMurray) was at almost 99 percent in the same year (Tassonyi and Conger 2015).

2. A Framework for Selecting Revenue Sources: Linking Revenues to Expenditures

For governments to operate efficiently, it is important to establish a clear link between expenditure and revenue decisions. Simply stated, those who make expenditure decisions should also make revenue decisions and the type of revenue should match the type of expenditure being funded. Sometimes referred to as the Wicksellian connection, this linkage should result in more accountable government with taxpayers being less averse to paying taxes as long as they know where their tax dollars are being spent.[6]

From this perspective, the optimal way to design a local tax system would be to determine what local services to deliver and how much, and then put in place the revenue system (a combination of user fees, taxes, and transfers) that gives local decision makers incentives to finance precisely that package of expenditures. To be efficient in allocating scarce investment resources, governments should allocate costs associated with a given benefit as much as possible to those individuals, firms, neighbourhoods, and groups that enjoy the benefit (Bazel and Mintz 2014).

Figure 1 illustrates that different fiscal tools are appropriate to pay for different types of infrastructure. User fees play an important role for those services with private-good characteristics (such as water, sewers, garbage collection and disposal, transit, and some recreation). Good user charges not only produce revenue for local governments, they also promote economic efficiency. When people are not explicitly charged for consuming a service, the implied value they

5. This percentage has been steadily declining from almost 68 percent in 2009.

6. The term Wicksellian connection was used by Breton (1996) in honour of the Swedish economist Knut Wicksell, who first set out this argument in 1896. For more on its application to financing local public services, see Bird and Slack (2014) and Slack and Bird (2015).

will rationally attach to the last unit they use is approximately zero. Consequently, more is consumed (and demanded) than people would be willing to pay for if they were faced with the real costs of providing the service (Bird and Slack 2014). Underpricing, or providing services for free, results in overconsumption and often in subsequent ill-advised investment.[7] For example, when subsidized roads become crowded, the political pressure to expand them becomes greater. Overinvestment in underpriced facilities leads to inefficient use of scarce public resources. Good user charges can avoid such waste.

Figure 1: Matching Fiscal Tools to Infrastructure Type

User fees	Taxes	Land value capture taxes	Development charges	Transfers	Borrowing	P3s
identifiable beneficiaries (transit, water)	short asset life (police cars, computers)	increase property values (transit)	growth-related costs; new development or redevelopment (water, roads, sewers)	spill over municipal boundaries (roads, transit)	large-scale assets with long life (roads, bridges)	large in scale; revenue stream; measurable results (toll roads)

Where user fees cannot be charged, local revenues to finance services and infrastructure should be collected only from local residents, preferably in relation to the perceived benefits they receive from local services. Revenues from other sources (including local business activities) should similarly match the benefits they receive from local services.

Services with public-good characteristics (for example, fire protection, neighbourhood parks, local streets, and street lighting) generate collective benefits that are enjoyed by local residents. Benefits from these services cannot easily be assigned to individual beneficiaries, and therefore it is difficult to levy specific fees or charges. In lieu of fees or charges, then, some form of local benefit-based taxation such as the property tax should be adopted. This type of tax permits individuals to express their collective demand for services. In this respect, the property tax is considered to be a generalized, or non-specific, user charge and is appropriate for infrastructure that has a short life (Kneebone and McKenzie 2003; Tassonyi 1997).[8] Property taxes (or pay-as-you-go financing methods more generally)

7. Another perspective suggests that the absence of pricing will lead to underinvestment in infrastructure because, when infrastructure is paid for out of taxes, there is a tendency to want to ease the burden on taxpayers. This underinvestment results in deferred maintenance and construction (Bazel and Mintz 2015).

8. A local sales tax or personal income tax could also play a role in paying for services with public-good characteristics (see Kitchen and Slack 2016).

are less appropriate for large infrastructure that lasts for 30 or 40 years because there would be a large spike in property taxes in the year of the investment. Land value capture taxes are a refinement of local taxes where infrastructure increases land values; development charges are appropriate for growth-related capital costs associated with new development or redevelopment.

For services where the benefits (or costs) spill over municipal boundaries but where local provision is still desirable, a federal or provincial transfer may be appropriate. Positive spillovers (externalities) occur if residents of neighbouring jurisdictions receive a service for free or at less than the cost of providing the service. For example, major roads constructed in one jurisdiction may be used by residents of another jurisdiction without any charge to the latter. The result is an underallocation of resources for that service because the providing jurisdiction bases its expenditure decisions on the benefits captured within its geographic boundaries alone. It does not take account of the benefits that accrue to those outside the jurisdiction.[9]

Borrowing for assets with a long life and public–private partnerships (where the private sector gets involved in some or all aspects of designing, building, financing, maintaining, and operating the facility) are financing tools rather than funding tools in the sense that municipalities still need to raise revenues to pay back what they borrowed or make availability payments to the private sector (if there are no user fees). Each of these fiscal tools will be discussed more fully in the fourth section, with the exception of public–private partnerships.[10]

3. Brief Overview of Infrastructure Expenditures and Revenues

Information on annual capital expenditures and the revenues used to finance those expenditures is not available on a uniform basis for municipalities across Canada. Statistics Canada does not provide information on capital expenditures and sources of capital finance, and each province provides municipal financial information in a different format. In particular, capital expenditures are often not separated from operating expenditures.[11]

For these reasons, Table 1 shows the distribution of municipal capital expenditures for only one province – Ontario. In 2015, Ontario municipalities

9. Another way to internalize externalities would be to provide the service at a metropolitan or regional level or have it provided by a provincial government.

10. See Siemiatycki (2017) for a discussion of public-private partnerships in this context.

11. This differentiation has been particularly problematic since 2009, when municipalities moved to accrual accounting as the basis for financial reporting. This move was accomplished with significant effort, difficulty, and controversy. Municipal budgeting and rate decisions for taxes and fees still reflect rules based on the modified accrual and fund accounting concepts. On balance, the introduction of the accrual framework is a positive development, but the gaps created in published and retrievable data suggest a need for a stronger effort by both provinces and municipalities to provide information that can be readily understood. For more on cash versus accrual accounting, see Boothe (2007), Dachis and Robson (2015), and Dahlby and Smart (2015).

spent just over $11 billion on capital expenditures (also referred to as the acquisition of tangible capital assets). Forty-five percent of these expenditures were for transportation, and of these expenditures 40 percent were for transit (or 16 percent of total capital expenditures). Environmental expenditures (water, sewers, and solid waste collection and disposal) were the next largest expenditures at 32 percent of total capital expenditures. Based on the earlier discussion of how to pay for services, user fees would be most appropriate to pay for transportation and environmental expenditures, which account for almost three-quarters of total capital expenditures in Ontario municipalities.

Table 1: Distribution of Capital Expenditures, Ontario Municipalities, 2015 (Percent)	
General government	5.0
Protection (fire and police)	3.1
Transportation (roads and transit)	45.1
Environmental (water, sewers, solid waste)	31.6
Health and social services	2.1
Social housing	2.6
Recreation and culture	9.3
Planning and development	0.5
Other	0.8
Total	**100.0**

Source: Ontario Ministry of Municipal Affairs, Financial Information Returns

In terms of sources of capital financing (Table 2), user fees and charges account for less than 2 percent of the total, and property taxes for just under 4 percent.[12] The largest component of own-source revenues (that is, revenues excluding transfers) is reserves and reserve funds. Reserves include user fees and property taxes that were collected in previous years as well as development charges that were previously levied and placed in (dedicated) reserve funds. Development charges are a significant source of revenue to pay for growth-related capital costs in new developments, accounting for nearly 12 percent net of other contributions. Transfers from the federal and provincial governments accounted

12. On the operating side (not shown in Table 2), approximately $9.4 billion was collected in user fees and service charges by Ontario municipalities in 2015: 21.3 percent was used to finance transportation operations and capital, of which nearly 90 percent went to transit; 54.2 percent was used to fund environmental services, split almost equally between water and wastewater; and 7.1 percent was spent on recreation. These estimates are based on the authors' calculations from information in Ontario Ministry of Municipal Affairs, Financial Information Returns (Schedule10).

for nearly 19 percent of total revenues for capital purposes. Municipal borrowing, with a share of 12.5 percent, also represents a significant proportion of the sources of capital financing.

Table 2: Percentage Share of the Sources of Capital Financing, Ontario Municipalities, 2015	
Municipal user fees and service charges	1.3
Municipal property tax	3.6
Development charges and other contributions	23.5
Other sources	3.6
Transfers	
Federal capital grants	4.8
Canada gas tax transfer	6.2
Provincial capital grants	5.4
Provincial gas tax transfer	1.2
Transfers from other municipalities	1.3
Total transfers	**18.9**
Borrowing	12.5
Reserves and reserve funds	36.5
Total	**100.0**

Source: Ontario Ministry of Municipal Affairs, Financial Information Returns

4. Sources of Revenue to Pay for Infrastructure

The following discussion describes the use of different revenue sources to pay for infrastructure and suggests that few Canadian municipalities apply the Wicksellian connection, although some funding options do link those who benefit with those who pay.

4.1 User Fees

User fees are levied by local governments in Canada to pay for at least part of the costs of a number of services. Fees range from fixed charges that are unrelated to consumption to charges that vary with the quantity consumed or a combination of the two. Decisions related to pricing depend on a number of considerations – local tradition, the type of service, the tastes and preferences of residents, and the willingness (or lack thereof) of local politicians and bureaucrats to substitute prices for local taxes (Althaus and Tedds 2016; Kitchen and Tassonyi 2012).

Economists have been making the case for pricing municipal infrastructure for a long time and yet few Canadian municipal governments price services correctly.[13] Current practice in setting user fees in Canada almost always deviates from what is fair, efficient, and accountable (Fenn and Kitchen 2016; Kitchen and Tassonyi 2012; Slack 2016). The tendency is to set fees to generate revenue rather than to allocate resources to their most efficient use. By not pricing municipal services correctly (by setting prices equal to marginal cost), unintended subsidies can occur. For example, lower fares for seniors on a transit system could result in a single mother on social assistance subsidizing an older, wealthier lawyer going to the office (Kitchen 2015). If these types of subsidies were made explicit, they would surely be unacceptable. Some examples of pricing services in Canadian municipalities follow.[14]

Water and Wastewater

User fees for water in Canadian municipalities tend to take one of four structures (Fenn and Kitchen 2016; Kitchen and Tassonyi 2012): constant unit rates; declining block rates; increasing block rates; and a fixed charge that does not vary with consumption but may vary by type of property (residential, commercial, industrial) or by characteristics of the property (number of rooms, number of water-producing fixtures, etc.). The first three structures are all based on volume. As Kitchen (2017) has noted, the majority of municipalities across Canada use constant unit rates; the use of a fixed charge has declined significantly over the last 20 years. Sewage collection and treatment are generally recovered through surcharges on the water bill and are not based on sewage flow. Flat-rate sewage charges are the most common not only in municipalities with flat-rate water charges but also in municipalities with metered water (Kitchen and Tassonyi 2012). For other municipalities, the sewage charge is calculated as a percentage of the water bill.

As a share of disposable income, Canadians pay one of the lowest water supply and sanitation rates among 22 OECD countries – 1.2 percent of disposable income compared to 2.3 percent average for the OECD countries (OECD 2010, as reported in Elgie et al. 2016). In Ontario, wastewater pricing is based largely on volumes of water used rather than on volume discharged. Some municipalities (for example, Ottawa, Toronto, and Durham Region) levy over-strength discharge fees that are intended to recover the additional costs of treating substances at higher concentrations than allowed by sewer bylaws.

By not charging marginal cost for water and sewage, considerable inefficiencies result. In particular, the consumption of water is higher because there is no

13. See, for example, the classic work by Bird (1976) on charging for public services.

14. The discussion of user fees in this paper is not meant to be exhaustive. For example, user fees are also used by libraries, recreation centres, and other facilities. See Kitchen and Tassonyi (2012) for a discussion of some of these other user fees.

incentive to restrict water use or to use the service efficiently. The result is overinvestment in water and sewage treatment facilities relative to what the level of investment would be with a more efficient pricing policy. Underpricing has also been said to discourage innovation in alternative water and sewage technologies.

Although there are many efficiency advantages to using marginal-cost pricing for water and sewers, Canadian municipalities rarely use it. Kitchen and Tassonyi (2012) list a number of reasons they do not: marginal-cost pricing is complex and not always able to match revenues with costs resulting in revenue instability, and a history of reliance on capital grants (often at 85 percent of replacement costs) has meant that there is no incentive to include replacement costs in prices. Moreover, municipalities cannot implement marginal-cost pricing properly if they do not include the opportunity cost of using water, if they do not set rates that capture differences in distance from the source of supply and differences in use by time of day, and if they do not include asset replacement costs in annual operating costs. However, better metering as well as pricing methodology could go some way to correcting the most glaring deficiencies in this area of municipal service provision. Furthermore, better inclusion of life-cycle costing, which includes the total cost of constructing, maintaining, renewing, and operating the infrastructure asset throughout its service life, would be appropriate.[15]

Stormwater Management

Stormwater is one area where a few Canadian municipalities have introduced better pricing mechanisms. For example, the City of Kitchener, Ontario, applies a tiered flat-fee stormwater rate to properties based on their impervious area.[16] The City of Edmonton levies a monthly stormwater utility charge calculated on the basis of the area of the property, development intensity (proportion of the lot that is used for intended development), and a runoff coefficient that is related to the permeability of the surface of the lot (Henstra and Thistlethwaite 2017).

In 2016, Mississauga introduced a stormwater levy that is based on the impervious area of the property (which correlates with the property's contribution

15. Two methods are generally used to calculate the cost of using an asset and to generate revenue to fund its replacement. The depreciation method (using the straight-line method or reducing-balance method) recognizes the reduction in the value of the asset through wear and tear and aging. The cost of a tangible capital asset with a limited life less any residual value is amortized over the asset's useful life. The second method is the sinking fund method, whereby the municipality estimates the future value of the asset at the time of replacement, using an appropriate rate of inflation, and calculates the appropriate annual contribution, including an allowance for growth with interest. This annual contribution forms a part of the annual estimate of necessary revenues. For a more detailed description of life-cycle costing, see Watson and Associates and Dillon Consulting (2012, 4.1–4.3).

16. In Ontario, Mississauga, Waterloo, and Richmond Hill also levy stormwater levies. Toronto is in the process of considering such a levy. However, the current staff proposal was rejected by the Executive Committee of Council (City of Toronto 2017).

of runoff volume to the collection system).[17] Different assessment methods are used for residential and non-residential properties. For single residential properties, the rate is based on the remote sensing of each property. The roofprint area (total surface area covered by the rooftops of all buildings on the property) is used to predict the total impervious area of the property and is used to assign a property to one of five tiers (smallest, small, medium, large, or largest). A fixed number of billing units is then assigned to each tier. For multi-residential and non-residential properties, the rate is based on an individual assessment of the total impervious area on each property using aerial imagery. The number of stormwater billing units assigned to each property is calculated by dividing the total impervious area by the area of one billing unit (267 m^2). To calculate the charge for each property, the number of billing units for each property is multiplied by a universal rate ($100). A credit program for multi-residential and non-residential properties rewards those property owners who reduce stormwater runoff volumes or peak flow rates or improve the quality of the runoff before it enters the municipal system.

User fees for stormwater management are fair because they are based on runoff contribution rather than property values and are thus more closely related to benefits received than is a property tax: owners of properties (residential or commercial/industrial) with a large impervious area pay higher user charges than those who do not burden the drainage system to the same degree (Aquije 2016).

Solid Waste Collection and Disposal

User fees require customers to pay for waste pickup on the basis of volume or weight, whereas tax revenues are unrelated to how much waste is put out on the curb. When waste collection is paid from taxes, the price per kilogram of waste discarded is zero, which certainly does not reflect the marginal cost of the service (Dewees 2002). Marginal-cost pricing would result in efficient waste management.

User fees provide not only a source of revenue to local governments but also a financial incentive to reduce, reuse, and recycle. User fees are generally charged in areas where there is a recycling program so that residents have an alternative to putting out waste. In some jurisdictions, customers are required to purchase special tags to be attached to each garbage bag – in some cases, each bag carries the same price; in other cases, customers receive one free tag per week per household and can purchase additional tags. A second method is to require customers to place all garbage in a special container and pay a fee for each container. The price may vary with the size of the container (as in Toronto, for example). In a third method the municipality weighs the waste as it is picked up and bills the customer according to the actual weight of the garbage.

17. Historically, funding the stormwater program was based on development charges and property taxes. Since Mississauga is largely built out (which means development charge revenues are declining) and because the costs associated with the operation, maintenance, or replacement of existing infrastructure cannot be covered by development charges, the city needed to find other ways to pay for stormwater infrastructure.

A number of studies have examined the effects of user-pay systems in municipalities in Canada and the United States – most compared property-tax-supported garbage pickup with a per-bag fee. In general, they reported reductions in solid waste tonnage because consumers increased recycling, generated less waste, and increased the use of other options such as composting (for a summary of these studies, see Kelleher, Robins, and Dixie 2005). Moreover, the resulting lower costs for cities freed up property taxes for other services.[18]

In cases where municipalities operate a landfill site, the cost per cubic metre of waste needs to reflect the operating cost plus all amortized capital costs including closure and post-closure costs, the opportunity cost of the space, and the value of the environmental harm caused by the waste and its disposal (Kitchen and Tassonyi 2012). Government-operated landfills tend not to charge tipping fees that reflect future scarcity of landfill sites, however. Many charge only per-tonne fees to private haulers. The tipping fee for waste from municipal operators is more often paid by local taxes than by tonnage charges.

Transit

Transit is funded, at least in part, from user fees in cities across Canada. In the Greater Toronto and Hamilton Area, transit fare revenues cover between 70 and 80 percent of operating costs (one of the highest proportions in North America) but a smaller fraction of total costs when infrastructure investment is included (Kitchen and Lindsey 2013). Although it is generally believed that some of the costs of running the transit system should be covered by fares and the rest should be subsidized, the exact amount of the subsidy is difficult to determine. Part of the problem is that roads are not priced on a user-fee basis (see discussion of road pricing below). If road use were priced according to marginal cost (including pollution, congestion, and so on), public transit might not require a subsidy to be competitive with road use – or at least not the amount of subsidy it currently enjoys in some cities.

The efficiency of transit fares depends not only on the amount of the fare but also on its structure (Kitchen and Lindsey 2013). For example, fares should vary by distance since the social cost of transit trips increases with the distance travelled. By charging a uniform fare, riders who travel short distances subsidize riders who travel long distances. Thus flat fares do not meet the benefits-received principle and can encourage sprawl. Fares should also reflect the time of day that a trip is taken. Failure to charge higher fees during peak hours creates an incentive to overinvest in public transit infrastructure (Kitchen and Lindsey 2013).

Parking

Parking in large cities includes a mix of residential and non-residential spaces on private land, streets, surface lots, and parking garages. Parking is often inefficiently

18. One of the downsides of charging for waste collection is littering and illegal dumping, but these problems have largely been controlled in jurisdictions using pricing (Dewees 2002).

priced, encouraging more people to drive.[19] On-street parking in high-demand areas is often priced well below its scarcity value. As a consequence, drivers spend considerable time looking for a vacant spot (Shoup 2006). Excessive cruising leads to considerable traffic congestion and pollution, as well as inefficiencies and lost productivity (Grush 2013). Meanwhile, privately owned garage parking tends to be overpriced because operators possess a degree of monopoly power owing to their unique locations. Overpricing of garage parking contributes further to the stock of cars cruising for parking (Arnott and Rowse 2009), thus increasing traffic-related costs.

Local governments in Canada can and do charge for car parking on local roads, but do they charge efficiently? Efficient parking levies/taxes could help reduce the volume of traffic and lead to less congestion, faster trips, fewer traffic enforcement costs, and reduced demand for new and expanded roads and highways (Kitchen and Lindsey 2013). Parking levies could also generate much-needed revenue for improving and expanding public transit. Indeed, it has been argued that "underpriced parking does more to promote automobile use than good transit does to discourage it" (Grush 2013, 132). To overcome these concerns, three policies could be considered: a commercial parking sales tax, which is a special tax imposed on parking transactions and is used by Translink in Vancouver[20]; a parking levy, which is a special property tax applied to non-residential parking spaces, used in Montréal[21]; and changes in on-street and off-street parking practices (user fees).[22]

Roads

Efficient road prices are widely recognized as an effective travel demand management tool because they influence all aspects of travel choice: trip frequency, destination, travel mode, time of day or week, route, and so on. To the extent that traffic demand is managed, cost pressure on local budgets is lowered because traffic-related costs should be reduced and infrastructure demands lowered. Furthermore, if revenues are dedicated to public transit and roads, they are more likely to gain public acceptance. Without proper road pricing, drivers lack

19. Furthermore, in some property tax systems, the assessment of land used for parking receives special treatment as either excess land or in the tax treatment of parking lots. See Bird, Slack, and Tassonyi (2012).

20. The parking tax is paid on the sale of a parking right and is calculated on the purchase price of parking rights within the Translink service region. It includes parking rights sold by the hour, month, year, or any other basis (Translink n.d.).

21. In Montreal, a parking lot tax is levied on indoor and outdoor parking spots located in non-residential buildings. Rates apply to the taxable area of the parking lots and vary by location and whether the parking spot is indoors or outdoors (City of Montreal n.d.).

22. See Kitchen and Lindsey (2013) for a more detailed discussion of parking practices and changes that could be made to improve them.

incentives to make efficient decisions about how often to use the road, where to live and work, and other economic decisions. The lack of efficient pricing has been a primary cause of excessive highway congestion, environmental degradation, lost productivity, and reduced economic activity in many large cities and urban areas in Canada (Kitchen and Lindsey 2013).

High-occupancy toll (HOT) lanes is a pricing scheme that is used in some metropolitan areas in the United States and was recently introduced as a pilot project on some highways in Ontario.[23] Tolling is applied only to vehicles that are below a minimum occupancy requirement – typically two or three people. Tolls can vary by time of day and location in order to maintain high speeds in the HOT lanes. The tolled infrastructure would be new, and it would offer drivers a choice of paying for a quicker trip or using the existing toll-free lanes. HOT lanes could also be constructed on some major local and arterial roads and highways that enter into or pass through large cities.[24] Tolling can now technically (if not often politically) be feasibly imposed through electronic registration of vehicle use.

A second, larger-scale mechanism is to toll major highways and possibly some major arterial roads and highways that run into or through cities. Tolls may be set as a flat charge or may vary by time of day (as is done on Highway 407 in the Greater Toronto Area and the Autoroute 25 in Montréal). Tolling all lanes at different rates is more efficient than tolling only some lanes because it is easier to control the total number of vehicles using the road as well as the distribution of traffic across lanes on the road. Advances in technology have made it much easier for local governments to impose road tolls, but there is still much debate about whether to do so. For example, Toronto City Council approved a proposal to levy tolls on the Gardiner Expressway and the Don Valley Parkway in December 2016. However, the provincial government refused to approve the City's request.

Of course, road pricing addresses congestion only on major roads, not in the downtown core. The congestion charge in London (U.K.), introduced in 2003, is a daily fee charged to most motor vehicles that drive into Central London on weekdays between 7:00 a.m. and 6:00 p.m. Although congestion charges have also been used in other locations such as Singapore and Stockholm, they have not been

23. HOT lanes may have become more politically feasible in the Greater Toronto and Hamilton Area because of general public acceptance of the temporary implementation of HOV (high-occupancy vehicle) lanes during the PanAm Games. During the PanAm Games, vehicles travelling with three or more passengers were permitted to access the HOV lanes for a one-month period. For three weeks in August, vehicles travelling with two or more passengers could access the HOV lanes. Electric and hybrid vehicles could also access HOV lanes regardless of the number of passengers. Under the pilot HOT scheme, drivers can apply for HOT lane permits that cost $180 for a three-month period.

24. Road pricing charges tend to be most effective if they are applied at a metropolitan or regional scale where there is a greater likelihood of managing inter-municipal traffic and a greater opportunity to minimize distortions that often arise from taxes or charges that are restricted to smaller geographic areas.

tried in Canadian cities. Nevertheless, Althaus, Tedds, and McAvoy (2011) have explored some of the technical and administrative issues that would need to be addressed to implement a congestion charge in the Halifax Regional Municipality.

4.2 Property Taxes

Municipalities often use current operating revenues (property taxes, in particular) for assets with a short life expectancy (such as police cars and sometimes fire engines) or recurrent expenditures (such as the maintenance and upgrading of sidewalks, roads, street lighting, and parks). For non-recurrent expenditures (such as expenditures for libraries, museums, and other large fixed assets) or assets with a long life expectancy (such as sewer lines and waterworks), annual operating revenues are inappropriate, however, because current taxpayers fund projects that benefit future users. Using operating revenues to pay for capital expenditures breaks the link between revenues and expenditures over time.

4.3 Land Value Capture

Land value capture as a way to finance major infrastructure projects is currently very popular in the media and in policy circles in Canada and around the world. The idea behind land value capture is to recoup some or all of the unearned increment in private land values arising from two sources – public investment or a change in regulations.

Land Value Capture to Recoup Unearned Increment Arising from Public Investment

With respect to a public investment, the tax is levied on those property owners who benefit (indirectly) from roads, transit, water and sewage systems, and other major infrastructure through increased land values. One way to capture land value increases arising from a public investment is through a special assessment, which is a specific charge or levy added to the existing property tax on residential and/or commercial/industrial properties to pay for additional or improved capital facilities that border on those properties.[25] The charge is based on a specific capital expenditure in a particular year, but the costs may be spread over a number of years (Tassonyi 1997). Examples of capital projects financed in this way include the construction or reconstruction of sidewalks, the initial paving or repaving of streets, and the installation or replacement of water mains or sewers. In each instance, the abutting property is presumed to benefit from the local improvement and is expected to bear at least some of the capital costs. Where special assessments are used, there is a link between those who benefit and those who pay for infrastructure.

Special assessments do not generally contribute large sums of revenue to local budgets, but they are an important way to fund local improvement projects. It is possible to design them so that the costs of the project are allocated according to

25. Special assessments are included under total property taxes dedicated to capital finance in Table 2.

some measure of benefits received. For example, the most common method is front footage, which is appropriate for financing projects where the cost per property increases with the width of the lot. For projects such as neighbourhood parks, whose benefits largely accrue to particular areas or blocks within a community, the best approach to apportioning costs may be zone assessment, under which all properties in the serviced area pay the same share of total costs.[26]

Tax increment financing (TIF) is another way to capture the increase in land value arising from a public investment.[27] Under a TIF, property tax revenue from the designated area is divided into two categories for a specific period of time (long enough to recover all costs of public funds used to redevelop the property, usually between 15 and 30 years). Taxes based on pre-developed assessed property values are retained by the municipality for general use. Taxes on increased assessed values arising from redevelopment (the tax increment) are deposited in a special fund to repay bonds that have been issued to finance public improvements in the redeveloped area. In other words, increases in property tax revenue from the redevelopment of an area are dedicated to financing public improvements in that area.[28]

Although TIFs are widely used in the United States, they are not as common in Canada. In Manitoba, cities are permitted to use TIFs, and the *Municipal Government Act* in Alberta permits municipalities to use a form of TIF known as the "community revitalization levy." This levy allows a municipality to redirect a portion of provincial tax revenues (the provincial education share of property taxes) from a designated revitalization area towards approved municipal expenditures in the specified area. Any increase in provincial education property tax revenues over the benchmark year is provided to the municipality for a 20-year period. The City of Edmonton uses this levy to help fund revitalization in two areas – the Capital City Downtown Plan and the Quarters; the City of Calgary is using the levy to invest in infrastructure improvements in the Rivers District.

26. A sensible approach and one that cities tend to follow is to split the cost of improvements that benefit an abutting property and the public at large by charging the bordering properties, for example, 40 to 60 percent of the total construction costs, with the municipality raising the balance. The challenge, of course, is to match the share assigned to abutting properties with the marginal benefit to those properties (Kitchen and Tassonyi 2012).

27. Unlike special assessments, TIFs capture both the presumed increases in land values arising from a public investment in infrastructure and value changes resulting from regulatory changes.

28. TIFs in the United States have generated a fair amount of criticism. Although originally intended for "blighted" areas in urban cores where development would not take place "but for" the incentive, the requirement that the area be "blighted" has often been ignored. More recently, TIFs have been used in more affluent neighbourhoods and open spaces (including farmlands) where there is greater potential for property value increases and higher tax revenues (Youngman 2011). The "but-for" test has also been compromised because many developments would have occurred anyway (Youngman 2011). Finally, TIFs target funds to a designated area and this targeting may be at the expense of areas on the periphery of the TIF district or at the expense of overall municipal growth. See Greenbaum and Landers (2014) for a further review of the issues.

Ontario municipalities may use tax increment equivalent grants (TIEGs), but these are not the same as TIFs because they involve a subsidy component.[29] Under this program, municipalities can designate an area or the entire municipality as a community improvement project area. They can then implement a community improvement plan (CIP) with grants and/or loans that can, if the municipality chooses, be calculated on a tax increment basis. Under this scheme, the municipality can offer developers a grant or loan that is based on the higher property tax that is generated from development. In other words, part or all of the annual tax increase arising from the development over a specified period (usually 10 years) is returned to the new business as a grant.[30]

Tax increment financing does link those who benefit from public infrastructure (albeit indirectly through an increase in property values) with those who pay. One of the major questions about TIFs, however, is the extent to which they can be used to pay for major infrastructure projects such as transit lines. Although there are a few examples of TIFs to pay for transit, Haider and Donaldson (2016) suggest that TIFs in North America are generally used for projects in the millions of dollars, not in the billions of dollars. Although they might be used to pay part of the cost of new transit lines, they probably cannot cover the entire cost. TIFs may be useful to pay for transit stations, as they are in Hong Kong, where land value capture at transit stations brings in significant revenues for the mass transit system. Of course, the high density and corresponding high land values in Hong Kong contribute to making this model a success. It is not clear how replicable this model would be in other locations.

Two recent studies in the Greater Toronto Area looked at the potential use of TIFs for major transit investments. One study concluded that if TIFs had been used to finance the Sheppard subway line in 2006, they would not have been able to cover all of the capital costs (Haider and Donaldson 2016). This result is perhaps not all that surprising, given the low ridership on that subway line. Another study of the SmartTrack proposal for the City of Toronto suggested that there would be sufficient commercial development in the city to fund the proposed $2.6 billion investment (Found 2016). It seems that the jury is out on the viability of using TIFs to finance major infrastructure.

Land Value Capture to Recoup Unearned Increment Arising from a Change in Regulations

The sale of building rights, commonly known as density bonusing, is a method of capturing land value resulting from a change in land-use regulations. In Ontario,

29. The Province of Ontario passed TIF legislation in 2006 but never enacted regulations.

30. TIEGs are often used to provide incentives for brownfield developments. Of the 44 Ontario municipalities that have CIPs, 93 percent are using tax increment equivalent grants and 77 percent are using tax assistance measures (Ontario Ministry of Municipal Affairs and Housing 2010). In 2015, $840 million was spent on grants, loans, and tax assistance under this legislation. There are commitments for $33 million in 2016 and total commitments to 2020 and beyond of $356 million (Schedule 79 of the Financial Information Returns). See De Sousa (2015) for more details.

for example, Section 37 of the *Planning Act* allows local governments in the province to secure "facilities, services or matters" (benefits) from developers in return for heights and densities that would otherwise exceed existing zoning bylaw restrictions (Moore 2013). Section 45(9) of the *Planning Act* refers to Committee of Adjustment or Ontario Municipal Board approvals of minor variances with conditions attached that may include community benefits. Similarly, the City of Vancouver exchanges density for benefits through Community Amenity Contributions agreements (CACs). In both cities, the local government negotiates the amount of density and the value of a variety of benefits secured on a case-by-case basis (Moore 2013).

Although there is no consistent reporting of the amount of revenues from Section 37 (and Section 45[9]) of the *Planning Act*, the City of Toronto reported that it secured over $112 million in future cash contributions in 2013 and 2014 (City of Toronto 2015) and almost $52 million in in-kind contributions.[31] Since 1998, the city has secured over $482 million in section 37 and section 45(9) community benefits plus substantial (but unspecified) in-kind, non-cash benefits. Estimates for the City of Vancouver show that approvals for additional density in 2015 secured public benefits of approximately $103 million. Contributions can vary from year to year depending on the number of approvals. In Vancouver, for example, over the period from 2010 to 2014, the total value of public benefits secured was as high as $234 million in 2014 and as low as $27 million in 2010 (City of Vancouver 2016).

According to Moore (2013), there are at least three justifications for density bonusing: to cover the cost of infrastructure necessary to support the increased density, to share the windfall profit when local governments grant developers higher densities, or to compensate local residents negatively affected by the increased density (e.g., shadows or increased congestion created by the new development). Regardless of the justification, the value of the uplift generated by the additional density has to be determined and the resulting benefits negotiated. Calculating the uplift can be complicated and difficult for the public to understand – transparency has become a serious issue with these mechanisms.

4.4 Development Charges and Contributions

A development charge (known as development cost charges in B.C. and off-site levies in Alberta) is a one-time levy on developers to finance the off-site, growth-related capital costs associated with new development or, sometimes, redevelopment. Charges are levied for works constructed by the municipality, and the funds collected have to be used to pay for the infrastructure made necessary by the development. Development charges are appropriate to finance infrastructure in areas experiencing new growth; they are not used to pay for the maintenance and replacement of existing services.

31. "Secured" means that there is an agreement that the applicant will provide the funds at a future date, generally at the time of application for a building permit.

The rationale for charging developers for growth-related capital costs is that "growth should pay for itself" and not be a burden on existing taxpayers (Slack 2002). "Growth-related" costs have traditionally included "hard" costs for roads and water and sewage systems, and, in some jurisdictions, also include "soft" costs for services such as libraries, recreation centres, and schools.

An economically efficient development charge should cover the full cost of the infrastructure and vary by the type of property (residential, commercial, or industrial), the density of the development (single versus multi-unit buildings), and the distance from existing services (Kitchen and Tassonyi 2012). Marginal-cost pricing, or a reasonable approximation, is better at linking revenues and expenditures for specific developments than average cost pricing, which charges every unit the same amount regardless of the type of unit, location, or density.

Most Canadian municipalities, however, do not use marginal-cost pricing but rather impose the same charge regardless of whether a property is located close to existing facilities or farther away. Developments close to existing infrastructure pay the same charge as developments far away, even though the costs are higher for the more distant developments. Although uniform charges are easier to calculate than variable charges, uniform charges also mean that municipalities levy the same charge on residential dwellings in low-density neighbourhoods as on those in high-density neighbourhoods, even though the marginal cost per property of infrastructure projects in low-density areas is higher (Blais 2010). The consequence of uniform pricing can be urban sprawl (Slack 2002). Although it may be difficult to calculate the growth-related infrastructure costs for each individual property, it would be possible to calculate costs by neighbourhood as a way to discourage inefficient development patterns (Kitchen and Tassonyi 2012; Slack 2002).

4.5 Intergovernmental Transfers

As noted earlier, the federal government has responded to the calls for funding infrastructure with a wide array of programs and transfers, starting in 2002 and continuing into the present (see Table 3). The largest contributions are for major infrastructure and strategic infrastructure; the gas tax fund transfer is by far the largest transfer and is ongoing.[32] Provincial governments also provide (conditional) transfers to municipalities to pay for infrastructure. In some cases, federal programs require contributions from both the provinces and municipalities.

Grants from senior levels of government (federal or provincial) for capital infrastructure can be justified on economic grounds if the projects for which funds are provided generate spillovers or if they are projects in which the donor government has a specific interest or need. For these purposes, conditional grants

32. The federal gas tax transfer was originally a tax-sharing scheme calculated on the basis of 1.5 cents per litre in 2005 and increasing to 5 cents per litre by 2009–10. In 2013, it was converted to an annual fund of $2 billion indexed at 2 percent per year.

Table 3: Infrastructure Canada Contribution and Transfer Programs, 2002–2016

Program	Description	Approved ($millions)
Public Transit Infrastructure Fund	Up to 50% of eligible costs allocated on the basis of ridership	1,417
Canada Strategic Infrastructure Fund (closed)	Up to 50% for projects of regional and national significance	362
New Building Canada Fund – National and Regional Projects	Base amount plus per capita allocation for medium and large-scale projects	1,565
New Building Canada Fund – National Infrastructure Component	Federal cost matching up to 50% for projects of national significance	1,110
Building Canada Fund – Major Infrastructure Component	Large infrastructure projects of national or regional significance	6,031
New Building Canada Fund – Small Communities Fund	Generally costs shared one-third by each level of government; for smaller communities	713
Green Infrastructure Fund	Federal cost matching up to 50% for environmental infrastructure	628
Building Canada Fund – Communities Component	Funding for small communities on a one-third basis for three levels of government	1,024
Building Canada Fund – Large Urban Communities Component (Québec only)	Infrastructure projects in large communities in Québec	194
Building Canada Fund – Research and Planning Component (Québec only)	Funding for research and planning	3
Tuktoyaktuk to Inuvik Highway (NWT only)	Construction of road	200
Canada Strategic Infrastructure Fund	Federal cost matching up to 50%	4,622
Municipal Rural Infrastructure Fund	Funding for small-scale infrastructure projects on a one-third basis for three levels of government	981
Border Infrastructure Fund	Federal cost matching up to 50% for Canada–U.S. border crossings	591
Infrastructure Stimulus Fund (closed)	Up to 50% federal cost matching for short-term stimulus	3,612
Building Canada Fund – Top Up to Communities Component (closed)	Short-term economic stimulus funding	463
G8 Legacy Fund (closed)	Funding to support hosting of G8 Summit	45
Building Canada Fund – National Infrastructure Knowledge Component (closed)	Merit-based application program for projects of national significance	0
Total contribution programs		**23,545**
Gas Tax Fund (statutory payment with ongoing commitments)	$2 billion annually indexed at 2% per year	18,770
Provincial-Territorial Base Fund	Up to 50% for provinces (75% for territories) to address core infrastructure priorities; used to build or renew infrastructure in most Building Canada Fund eligible priorities	2,301
Public Transit Fund (closed)	Funding allocated on a per capita basis	400
Total transfer programs		**21,471**

Source: Infrastructure Canada website (http://www.infrastructure.gc.ca/prog/table-tableau-eng.php) and Dahlby and Jackson (2015)

are appropriate with the funding rate set to match the proportion of benefits deemed to be in the form of spillovers, or the rate could be set to match the proportionate interest of the donor government. Dahlby and Jackson (2015) make a case for federal transfers in the national interest for productivity-enhancing infrastructure that generates nation-wide benefits (as opposed to infrastructure that improves the quality of life).[33] Even if it does not generate spillover benefits to individuals in other communities, federal funding can be justified because the increase in federal tax revenues from the productivity improvement benefits citizens across the country through reduced tax rates or increased expenditures.[34]

Although the distinction between productivity-enhancing infrastructure and quality-of-life infrastructure appears, at first, to be intuitively appealing as a way to justify federal funding, it is difficult to apply it in practice. For example, clean water is considered to be quality-of-life infrastructure but is it not also essential for productivity? Moreover, since there is little or no information on the benefits of productivity-enhancing infrastructure, we have no idea what share of benefits generated are assumed to be collective rather than strictly local or, by extension, how much should be funded by the federal government. To design a transfer on this basis, it is necessary to estimate the relative share of the total benefits that are enjoyed across the country, but most transfer programs appear to assume (without much evidence) that this share is very large because we see that the federal matching rate tends to range between a third to a half of the cost of the infrastructure. In the case of a road, for example, there may be a national benefit, but it is likely to be much less than 50 percent of the cost of the road.

If grants fund more than the collective benefits, they can create problems (Slack 2010, 2015). In particular, grants can distort local decision-making by lowering the price of some services, and often require municipalities to spend the funds they receive according to the guidelines of senior governments and not according to their own interests.[35] They often require matching funds on the part

33. Infrastructure that improves quality of life is said to include, for example, parks and recreational facilities, and water and sewage treatment facilities. Infrastructure that is productivity enhancing includes roads, bridges, transit, and educational facilities (Dahlby and Jackson 2015).

34. Dahlby and Jackson (2015) provide two other justifications for federal infrastructure transfers – when fiscal stimulus is needed during an economic recession, such measures are more effectively instituted at the federal level and spending on public infrastructure is a useful fiscal instrument. Furthermore, federal infrastructure investment is justified where it fulfils international trade or environmental agreements.

35. For a time, the federal government required that all projects over $100 million go through a screening process for suitability for public–private partnerships administered by P3 Canada (a federal agency). The tying of grant financing to the use of public–private partnerships, which is no longer in effect, was controversial (Conger and Tassonyi 2016). This paper does not discuss the P3s to finance infrastructure; see Siemiatycki (2017).

of the recipient municipality, and some municipalities do not have the capacity to match funds.[36] Funding from senior governments can lead to inefficient local revenue decisions. In particular, there may be little incentive to use proper pricing policies for services where grants cover a large proportion of capital costs. For this reason, infrastructure grants, where they are given, should require local government to implement efficient pricing and taxation policies (Boadway and Kitchen 2014). Historically, transfers have also removed the incentive to set up carefully thought-out asset management and asset cost-recovery programs, but this is changing in many parts of the country.[37]

Transfers reduce accountability. When the level of government making spending decisions (cities, for example) is not the same as the level of government that raises the revenues to pay for them (a senior level of government), accountability is blurred. There is also little incentive to be efficient when someone else is responsible for funding. In terms of linking expenditures and revenues, federal grants can be justified only if the benefits from the resulting expenditures are at least partially enjoyed by Canadians across the country (a point discussed earlier). Finally, grants are rarely a stable and predictable source of revenues. If capital grants are unexpectedly reduced, local governments have to borrow or increase taxes or delay infrastructure investment.

4.6 Borrowing

For infrastructure projects that benefit future residents, fairness, efficiency, and accountability are enhanced if the projects are financed by borrowing. Annual interest charges and repayment of the borrowed funds should be paid from local tax revenues (for capital assets that benefit the municipality in general but for which specific beneficiaries cannot be identified) and user fees (for capital assets that benefit specific users) imposed on future beneficiaries (Kitchen and Tassonyi 2012). Examples of capital expenditures for which borrowing is appropriate include fire and police infrastructure, recreational facilities, libraries, roads and streets, public transit, solid waste facilities, and water and sewer systems (these do

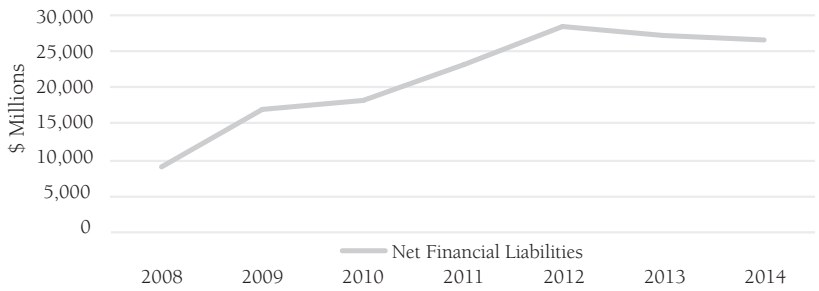
36. Of course, intermunicipal (and interpersonal) distributive adjustments should be part of a benefit-based financing system (Bird and Slack 2014). A provincial–municipal equalization transfer system, for example, would presumably address insufficient fiscal capacity (or higher expenditure needs) for some local governments. In Canada, provincial–municipal equalization transfers can be found in seven provinces.

37. The publication of detailed asset management plans has become part of the requirements that municipalities must meet to obtain provincial conditional capital transfers in some provinces. Asset management considers how to finance a facility's costs over the entire life-cycle of maintenance, rehabilitation, and replacement (Elgie et al. 2016). Asset management planning includes accounting for costs and depreciation, financing of acquisitions, and maintaining a state of good repair. See Ontario Ministry of Infrastructure (2016); Watson and Associates (2016).

not include growth-related capital infrastructure, which, as was suggested above, should be financed from development charges).[38]

Figure 2 shows the extent of municipal borrowing in Canada from 2008 to 2014.[39] Net financial liabilities (financial liabilities minus financial assets) show a steady increase for most of the period but then a decline starting after 2012.

Figure 2: Net Financial Liabilities, Municipalities, Canada, 2008–2014



Source: Statistics Canada, CANSIM Table 385-0037.

Municipalities in Canada are restricted in terms of how much they can borrow by provincial/territorial governments. Table 4 summarizes the rules in each province/territory. In most provinces, a formula-based approach is used; in others, restrictions are based on an approval process. Notwithstanding provincial restrictions on borrowing, Tassonyi and Conger (2015) suggest that Canadian municipalities have considerable unrealized borrowing capacity. Using data for 2013, Table 5 estimates aggregate municipal borrowing capacity for municipalities in three provinces – Alberta, British Columbia, and Ontario – based on provincial guidelines. Column 3 shows that the percentage share of net debt charges in net revenue is well below provincial guidelines in each province and is much lower for Ontario municipalities, on average, than for municipalities in British Columbia or those municipalities in Alberta that have more generous borrowing limits.

38. Monies in development charge reserve funds can be used to fund the growth-related portion of the debt service for projects that have been debenture financed. Large projects often serve both existing and growth communities.

39. Because Statistics Canada moved from the Financial Management System (FMS) to Government Finance Statistics (GFS) in 2008, comparable data are not provided before that year. The increase in net financial liabilities from 2008 onward may reflect the post-2008 recession and federal stimulus transfers that required municipalities to match federal (and provincial) funds for infrastructure.

Table 4: Municipal Debt Limits and Restrictions by Province/Territory	
Province	**Borrowing restrictions**
Newfoundland and Labrador	Ministerial approval
Nova Scotia	Debt service ratio limit of 30 percent of own-source revenues. Ministerial approval for lease agreements or commitments in excess of $100,000; $500,000 for Halifax Regional Municipality
New Brunswick	Annual borrowing in excess of 2 percent of the assessed value of the real property of the municipality
Québec	Ministerial approval
Ontario (excluding the City of Toronto)	Debt service limit of 25 percent of own-source revenue adjusted by debt service payments to other governments; City of Toronto sets own policy
Manitoba	Total debt, maximum 7 percent of municipal assessment, annual debt service not to exceed 20 percent of annual revenue – guideline set by Manitoba Municipal Board
Saskatchewan	Established by Saskatchewan Municipal Board upon application
Alberta	Cities of Edmonton, Calgary, Medicine Hat, and R.M. of Wood Buffalo: debt limit of two times total revenue excluding capital transfers; debt service limit of 35 percent of revenue; debt limit of 1.5 times total revenue excluding capital transfers; debt service limit of 25 percent of revenue
British Columbia	City of Vancouver: aggregate debt not to exceed 20 percent of assessed value based on average assessment of previous two years; own policy limit of 10 percent of operating expenditures. Debt service limit of 25 percent of consolidated reoccurring own-source revenues and municipalities "whose economies are not well-diversified may face a lower limit," administered by the Municipal Finance Authority of British Columbia
Yukon	Three percent of the current assessed value of all property
Northwest Territories	Debt service not to exceed 25 percent of own-purpose revenues
Nunavut	Ministerial regulation (federal)

Source: Based on Tassonyi and Conger (2015)

Column 5 provides an estimate of the unused borrowing capacity in each province, calculated as the difference between how much municipalities are permitted to borrow (the regulated percentage of net revenues allowable for debt service) and how much they actually borrow (measured by their actual net debt charges).

Table 5: Municipal Borrowing Capacity in Alberta, British Columbia and Ontario

	Net debt charges ($millions) (1)	Net revenues ($millions) (2)	Net debt charges/ net revenue (%) (3) = (1/2)	Maximum permissible debt service – 30%/25% of net revenues ($millions) (4)	Aggregate municipal borrowing capacity ($millions) (5) = (4)–(1)
Alberta – higher limit	1,189	7,026	16.9	2,108	918
Alberta – municipalities	201	4,927	4.1	1,357	1,156
Alberta – total	1,391	11,952	11.6	3,465	2,074
British Columbia	1,216	7,086	17.2	1,772	1,216
Ontario	1,983	30,969	6.4	7,742	5,760

Source: Based on Tassonyi and Conger (2015). Authors' calculations are based on provincial sources of municipal statistics using provincial definitions of appropriate debt charges and revenue.

Overall, the table suggests there is capacity to increase levels of municipal borrowing in all three provinces.[40]

Efforts have been made in different provinces to encourage municipal borrowing by lowering the cost through pooling municipal debt. Municipal finance authorities have been established in most provinces (such as the Municipal Finance Authority of British Columbia, the Municipal Capital Borrowing Board in New Brunswick, the Nova Scotia Municipal Finance Corporation, and the Newfoundland and Labrador Municipal Financing Corporation).[41] In Ontario, Infrastructure Ontario, a crown corporation with a mandate to manage large infrastructure projects, operates like an infrastructure bank. It offers short-term and long-term loans for eligible public-sector infrastructure projects at affordable rates and provides access to capital market financing without fees or commissions.

Municipal financing authorities are able to gain greater access to national and international capital markets and to benefit from higher credit ratings. The credit

40. While limits differ by province, a systematic examination of the rationale for these limits other than being rooted in history and any potential discernible impact on borrowing levels, does not exist. See Hanniman (2015) for a recent re-examination of municipal credit conditions and Bird and Tassonyi (2001) for a review of the history of these rules.

41. In some provinces, such as Nova Scotia and New Brunswick, all municipalities have to borrow through the provincial authority. In other provinces, larger cities are not required to borrow through the provincial authority. For example, the cities of Winnipeg, Regina, Saskatoon, Edmonton, Calgary, and Vancouver issue their own debt rather than using the provincial agencies.

risk of all local governments combined is almost always less than that for each individual local government. Pooling local government debt reduces borrowing costs both by reducing the cost of capital and by lowering the administration costs to issue debt. A municipal finance authority substitutes one contract with an underwriter for separate contracts between each borrower and debt issuer. It should be able to economize on transaction costs because it issues debentures more frequently than most individual municipal borrowers and it operates in a volatile capital market that is subject to a large amount of uncertainty. It can exercise a greater degree of flexibility over issue terms and costs to municipal clients. The federal government has also introduced legislation to establish a Canada Infrastructure Bank with the intent to pass on its lower borrowing rates to municipalities but also to take advantage of the capital and expertise of the private sector to plan, fund, and deliver infrastructure (for details, see Canada 2017; Siemiatycki 2016).

4.7 Reserves and Reserve Funds

Financing capital projects with reserves (funds that are set aside in a separate fund for capital spending) is essentially the reverse of financing through borrowing. In place of borrowing to finance capital expenditures and repaying this debt in the future, reserves or reserve funds reverse that timetable.[42] Another way of thinking about the use of reserves in contrast to using debt is to think in terms of the contrast between a debit card that reduces savings and a credit card that creates indebtedness (liabilities). A portion of current revenue is set aside annually in a special account and allowed to accumulate until it is eventually withdrawn and used to finance or partially finance a specific capital project or projects. These reserves, while they are accumulating, are deposited in interest-earning accounts. Capital reserves are created for future acquisitions. Most cities have moved towards greater reliance on reserves for replacing assets such as buildings, facilities, vehicles, and equipment, as is evident from the share of these funds in total sources of capital finance (see Table 2). Nevertheless, the use of reserves breaks the link between expenditures and revenues over time, depending on the method of calculation.

5. Final Comments

Municipalities across Canada have welcomed recent announcements by the federal government that it will increase its investment in municipal infrastructure. This funding is surely needed to maintain existing infrastructure in a state of good repair as well as to invest in new infrastructure. Although some federal funding can be justified on the grounds of externalities and national interest, there are pitfalls in municipalities relying too heavily on these transfers. They are rarely stable and predictable – the next government may have different ideas about

42. Reserves (budgetary appropriations) stem from an annual decision, whereas reserve funds are formally created by bylaw and work as savings accounts.

federal transfers for municipal infrastructure, for example. Transfers do not encourage municipalities to be efficient or price services correctly, and they reduce accountability. Those making decisions about how to spend the money are not the same as those making decisions about how to raise it.

A more Wicksellian approach to paying for municipal infrastructure would require better use of user fees. Although the application of user fees by municipalities has increased, especially for water and wastewater, as we look across the country we see very few cases of municipalities pricing roads and bridges, and, where user fees are levied, municipalities generally do not use zone pricing or peak-time pricing that would reflect marginal cost. Parking is rarely priced correctly. Yet advances in technology have made it much easier for cities to impose road tolls, transit fares, and parking charges. In Singapore, for example, in-vehicle units affixed to car windshields allow drivers on toll roads to be charged according to location and time of day. In San Francisco, new technology permits the use of marginal-cost pricing for parking: the city uses smart meters that allow it to charge variable rates, record parking use and duration through sensors, and transmit the data to a central collection system.

The underlying problem with adopting a more Wicksellian approach to infrastructure funding is that political leaders do not want to tell users that they should pay for what they receive or that redistribution through setting the wrong prices for local public services is a bad idea. Moreover, when governments establish an inefficient pricing scheme, it is very difficult to change it. Going back to the example of lower transit fares for seniors, it would be difficult to remove that subsidy because the losers (seniors) will protest and the winners (everyone else) are unlikely to notice any gains. Nevertheless, if local governments are to adopt better user fees, someone has to persuade people that it is a good idea.

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