A Fiscal Federalism Framework for Financing Infrastructure

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1. Introduction

Canada is alleged to have a serious infrastructure deficit. The precise meaning of this is not easy to specify, but conceptually it suggests that the existing level of infrastructure falls short of some benchmark optimum.[1] This has two dimensions, quality and quantity. The existing stock of infrastructure may be of low quality because it has been allowed to deteriorate and needs to be replaced or upgraded. The quantity of infrastructure may be deficient to the extent that it has not kept pace with the growth of population and of the economy, and with the shift in population from rural to urban areas and among regions. Both dimensions of infrastructure deficit are likely to be true to some extent but we are not certain because there are no recent and reliable data on capital spending by level of government in Canada and how it has changed over the past few years.[2] Given this, it is an open question as to how serious the infrastructure deficit actually is.

The notion of an ideal amount of infrastructure is necessarily vague, and relying on estimates compiled by stakeholders like the Federation of Canadian Municipalities (FCM), provincial associations of municipalities, municipal administrators, or provincial premiers can be problematic given that their purpose is partly to elicit financial support from higher levels of government.[3] There are some objective indicators of shortfalls, such as rates of congestion on the roads,[4] disruptions on the railways, over-crowded classrooms and hospitals, contaminated drinking water and inadequate flood protection. As well, there is some evidence suggesting significant economic benefits from infrastructure spending. For example, a recent Conference Board of Canada report (2013) undertook a detailed examination of the impact of infrastructure

[1] A prior question is: what do we mean by infrastructure? We take an expansive view to include virtually all forms of public capital, including capital used to provide public services, like hospitals, schools, post-secondary institutions, libraries, sidewalks, water purification and sewage disposal facilities; capital provided by the public sector for the use of the private sector, like transportation and communications facilities; and capital used to provide public goods, like environmental control investments, defence equipment, courts and prisons.

[2] Statistics Canada is expected to release data in November 2015 on capital spending by level of government for the period from 2008 to 2012.

[3] A recent request/demand appeared on March 30, 2015. See Bill Curry, "Canadian cities lobby Ottawa for increase in public transit funds", *Globe and Mail*

[4] Benjamin Dachis (2013), *Cars, Congestion and Costs: A New Approach to Evaluating Government Infrastructure Investment*, available at http://www.cdhowe.org/pdf/commentary_385.pdf.

spending on job creation and found that for every $1.0 billion in infrastructure spending, 16,700 jobs were supported for one year. Not only were they in construction, they spilled over into manufacturing, business services, transportation and financial sector employment. The same report estimated that for every $1.0 billion in spending, GDP would be boosted by $1.14 billion, resulting in a multiplier effect of 1.14. Other studies have shown similar effects, with estimated multipliers ranging from 1.14 to a high of 1.78, including Finance Canada's "Seventh Report to Canadians" which estimated a multiplier of 1.6.[5] This suggests that investing in more infrastructure would be socially and economically profitable. But, going from such evidence to precise estimates of the infrastructure deficit is not possible.

For the purpose of this paper, knowing the precise size of the infrastructure deficit is not necessary. The focus instead is on why an infrastructure deficit exists. Why do governments not make sufficient infrastructure spending if it is so beneficial? Given the decentralized nature of infrastructure investment, is there something in the system of intergovernmental fiscal arrangements that leads to underspending on infrastructure? More generally, what would the architecture of federal fiscal arrangements look like if one wanted to ensure adequate infrastructure investment, both new and replacement? This is a tall order, but one that needs airing.

2. Brief Outline of Current Arrangements

We begin by outlining the key features of the federal fiscal arrangements as they affect infrastructure. By this we mean not only the assignment of responsibilities, but also the division of tax room and the structure of grants. The context is informed by the basic principles of fiscal federalism, and all three main levels of government are included. We include issues of deficit financing to the extent that they are relevant for financing infrastructure.

Ultimately the assignment of responsibility for infrastructure relies on the Constitution, or at least must conform to it. There is no direct reference to infrastructure in the Canadian

[5] "Canada's Economic Action Plan: A Seventh Report to Canadians", Finance Canada (2011): http://www.fin.gc.ca/pub/report-rapport/2011-7/pdf/ceap-paec-eng.pdf; and "Leadership for Tough Times: Alternative Federal Budget Fiscal Stimulus Plan", Canadian Centre for Policy Alternatives (2009) http://www.policyalternatives.ca/sites/default/files/uploads/publications/National_Office_Pubs/2009/Leadership_For_Tough_Times_AFB_Fiscal_Stimulus_Plan.pdf

Constitution, but infrastructure spending obviously must be consistent with the functional responsibilities that are set out in sections 91-95. The federal government has legislative responsibility for the postal service, shipping and navigation, ferries, the sea coast and inland fisheries, and public debt and property. Provinces and municipalities within their boundaries are responsible for hospitals, schools, prisons, matters of a local or private nature in the province, and local works other than a) those that connect with works in another province or extending beyond a province, b) shipping with foreign countries, c) works within a province declared by the Parliament of Canada to be of general advantage to Canada or for the advantage of two or more provinces. In practice, municipalities are generally responsible for local infrastructure, like roads, buses, garbage and sewage, water, libraries, recreation facilities. The provinces are responsible for provincial roads, intercity transit, schools and hospitals, and they exercise close oversight over municipal infrastructure spending. The federal government is responsible for interprovincial transport, defence establishments, First Nations' infrastructure, pipelines and telecommunications. All levels of government have their own procurement policies, although provinces are nominally, but ineffectively, constrained by the Agreement on Internal Trade.

An important addition to the Constitution in 1982 was the statement of principles set out in Section 36. Section 36(1) commits the federal government and the provinces jointly to promoting equal opportunities, furthering economic development to reduce disparity in opportunities, and providing essential public services of reasonable quality to all Canadians. Section 36(2) commits the federal government to the principle of making equalization payments to ensure that provincial governments have sufficient revenues to provide reasonably comparable levels of public services at reasonably comparable levels of taxation. The relevance of this for infrastructure will be discussed further below.

As should be apparent, the Constitution leaves considerable discretion in infrastructure spending by the various levels of government. In practice, infrastructure spending is highly decentralized relative to program expenditures more generally. The most comprehensive and recent study on the stock of physical infrastructure indicated that the majority of it is at the local level.[6] In

[6] Francine Roy (2008) *From Roads to Rinks: Government Spending on Infrastructure in Canada, 1961 to 2005*, Statistics Canada, Catalogue no. 11-624-MIE, no. 019. Infrastructure capital in this study is defined as all assets embodied in structures and engineering works. Such capital complements the other factors of

particular, by 2005, over 58 percent of all capital stock in Canada was local, almost 30 percent provincial, and a bit more than 12 percent was federal. From 1961 to 2005, the relative importance of local infrastructure increased dramatically in every region while the federal importance declined everywhere and the provincial share fell everywhere except for Atlantic Canada.

Provincial and federal infrastructure spending is mainly financed from general revenues and borrowing. Municipal infrastructure spending is financed by current revenues, reserves (accumulated from development charges, capital cost charges and so on, and a fraction of annual property taxes that are often collected and deposited in capital accounts), grants, and borrowing. The only long-term borrowing that municipalities are permitted to undertake is for infrastructure or capital projects and this is tightly controlled by provincial legislation. This legislation, with some variation across the country, generally includes one or more of the following: permitting borrowing for provincially approved capital projects; requiring prior approval by provincial authorities; restricting annual debt servicing costs to an upper limit percentage of municipal own-source revenues; restricting the amount of debt to an upper limit percentage of assessed property values; and permitting (or requiring) borrowing from a provincially controlled "municipal fund." In essence, municipalities have little room to manoeuver when it comes to financing infrastructure.[7]

The decentralized structure of infrastructure spending is in the context of a system of federal fiscal arrangements in which vertical fiscal gaps exist, although they are relatively modest by international standards. The federal government collects more general revenues than it needs for its program spending and transfers the excess to the provinces. About 26% of federal program spending consists of transfers to the provinces (and territories). The provinces in turn obtain, on average, about 24% of their revenues from federal transfers, and about 16% of their program spending consists of transfers to municipalities. Total transfers from provinces to municipalities

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production, is long-lived and cannot be easily replaced. Infrastructure does not account for all government capital, which also includes machinery and equipment (such as vehicles and computers).

[7] David Amborski. (2013), "The Context of Municipal Borrowing in Canada." Paper presented at the Institute for Municipal Finance and Governance, March 13, University of Toronto.

are about 80% of transfers that provinces receive from the federal government.[8] Although there is considerable variation across the country, a relatively small percentage of municipal budgets is financed by provincial transfers and most of this is in the form of conditional grants. Behind these averages, however, there is considerable heterogeneity across provinces: some rely more heavily on federal transfers than others.

Despite the significance of intergovernmental transfers, own-source revenues are very important for provincial and municipal governments. In principle, the federal government and the provinces have unrestricted taxing and borrowing powers. In practice, the extent of decentralization of (non-resource) taxing power to the provinces is constrained by several considerations. The level of reliance of the provinces on own-source revenues depends on the division of tax room of major tax bases between the federal and provincial governments. This, in turn, is the outcome of ongoing decisions about tax rates by both levels of government and transfers from the federal government. The evolution of program spending requirements at the federal and provincial levels is also important, particularly the tendency for provincial spending increases to outpace those at the federal level. Although federal and provincial fiscal decisions are interdependent, it is reasonable to view the federal government as taking a leadership role in determining the extent to which provinces must rely on own-source revenues.

In evaluating the exercise of this leadership role, some important considerations apply. Further decentralization of revenue-raising could jeopardize the harmonization of the tax system, which has been a significant accomplishment of Canadian fiscal arrangements, and has relied in the past on federal dominance in income and value-added tax systems. More decentralization also leads to more horizontal imbalance, which strains the Equalization system, especially given the imbalance in resource revenues. It also reduces the ability of the fiscal system to provide long-term insurance against regional shocks, which arguably is a main long-run role of equalizing federal transfers of all types. Federal-provincial transfers play a role in their own right apart from Equalization, including the use of the spending power or more subtle federal influence to encourage the provinces to design their programs in ways that further the economic and social union.

[8] *Finances of the Nation 2012*, Canadian Tax Foundation, Toronto, 2013, Table A.2

Municipal tax powers are much more restricted and depend on provincial decisions. In practice, Canadian municipalities rely heavily on property taxes, much more so than almost all OECD countries.[9] In Canada, municipalities set the general property tax rate[10] but they are often restricted as to what they can do when it comes to levying differential taxes on different property types. For example, municipalities in Newfoundland and Labrador, except for St. John's, are required to levy a uniform tax rate on all properties. The same is true for Manitoba except for Winnipeg. In other provinces (Prince Edward Island and New Brunswick, for example), they are required to levy differential tax rates on residential and non-residential (commercial/industrial) properties with the differential rate fixed by legislation. For other differential rates, there are often provincial restrictions on the amount by which the commercial/industrial rate may exceed the residential rate. As well, the number of differential rates that are permitted range from a low of two in some provinces - one for residential properties and a second for commercial/industrial properties - to a high of thirty-six in Ontario,[11] where variable rates may be applied to subcategories of commercial and industrial properties, vacant land, parking lots, and so on.[12] In addition, there are property tax relief schemes available for seniors (based on age)[13] and low-income residents (based on income).[14]

While municipalities set their general property tax rate, they are further constrained by the need to run a balanced operating budget and by the lack of other major own source revenues. Local tax revenue is supplemented by user fees, licenses, permits, and other property charges including special assessments, and in some cities, development charges, value capture levies and tax incremental financing. Arguably the potential for some of these to finance infrastructure has not been fully exploited.

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[9] See Appendix A.

[10] Municipalities have no control over assessment (tax base). This is a provincial responsibility.

[11] Ontario Regulation 282/98 under the Assessment Act.

[12] Harry Kitchen and Almos Tassonyi (2012) "Municipal taxes and user fees", in Heather Kerr, Ken McKenzie and Jack Mintz (eds.), *Tax Policy in Canada*, Canadian Tax Foundation, Toronto, ch. 9.

[13] Harry Kitchen (2015), "No Seniors' Specials: Financing Municipal Services in Aging Communities", Institute for Research on Public Policy (IRPP), Montreal, No. 51, February.

[14] Kitchen and Tassonyi, op. cit., 12.

Federal transfers to the provinces take four main forms. First, under the Equalization program, provinces with below-average revenue-raising capacity receive unconditional equalization transfers to bring them close to the average. Revenue capacity is measured using the representative tax system (RTS) method for personal income taxes (PIT), corporate income taxes (CIT), general sales taxes (HST, PST) and property taxes. As well, one-half of aggregated natural resource revenues are equalized up to the national average.

Several properties of Equalization should be noted. There remain significant horizontal imbalances in revenue-raising capacity, despite Equalization, because the provinces with above-average revenue capacity (the 'have' provinces) are not equalized down. At the moment, these are the resource-rich provinces: Alberta, British Columbia, Newfoundland and Labrador and Saskatchewan. Both provincial and municipal property taxes are included in Equalization, which means that national-average revenue capacity includes the main source of municipal own-source revenues. Neither needs nor costs of providing public services are equalized, unlike in Australia where both are, although needs for infrastructure are not explicitly included. Some commentators have argued that either needs or costs or both should be equalized.[15] This was rejected by the Expert Panel on Equalization on the grounds that equalizing expenditure needs would be complicated given that public services can differ widely in quality so comparable levels are difficult to measure.[16] For our purpose, needs for infrastructure are not equalized, although revenues used to finance infrastructure are, and provincial population is a determinant of entitlement.[17] Equalization of revenue capacity to the national average is constrained by the gross domestic product (GDP) cap which limits the growth in total Equalization transfers to the rate of growth in GDP. This cap has been binding in recent years, and entails that actual Equalization is below the national average. Data obtained from Finance Canada data show that have-not

[15] See for example, Thomas J. Courchene, Surplus Recycling and the Canadian Federation, Toronto, Mowat Centre, 2013; Peter Gusen, *Expenditure Need: Equalization's Other Half*, Toronto, Mowat Centre, 2012.

[16] Expert Panel on Equalization and Territorial Formula Financing, *Achieving a National Purpose: Putting Equalization Back on Track, Ottawa*, Department of Finance, 2006.

[17] Equalization for needs and/or costs would not necessarily affect the total Equalization amount significantly. Instead, it would change the way in which the funds are allocated among provinces. To put it differently, the current system of revenue Equalization implicitly treats a dollar worth of spending as yielding a dollar worth of public services. If needs/costs were equalized, that would adjust the revenue Equalization allocations to reflect differences in the relative costs of providing given public services.

provinces are equalized up to 95% of national average. Finally, Equalization is largely formula-driven, so both its absolute size and allocation are determined by the RTS calculations, although this is violated from time to time by federal discretion (e.g., the GDP cap, the Offshore Accords for Newfoundland and Labrador and Nova Scotia).

The second main form of transfers consists of 'social transfers': The Canadian Health Transfer (CHT) and the Canada Social Transfer (CST). These are the remnants of shared-cost programs for medicare, hospitals and social welfare of the 1960s that were instrumental in establishing provincial programs in these areas, and that became the Established Program Financing Transfers once it was deemed that they no longer needed to be shared-cost and as conditional. The CHT and CST are equal per capita transfers that have very general conditions attached. Although nominally allocated to health, social welfare and post-secondary education, in practice they are fungible. It is important to note that these social transfers are implicitly at least partially revenue-equalizing for both have and have-not provinces, since they provide equal per capita transfers funded from federal general revenues. (Since natural resource revenues are not collected federally, that aspect is missing from CHT/CST equalization.) The social grants can be seen largely as transfers that serve to fill the vertical fiscal gap. They ensure that the federal government maintains a minimal share of tax room, and also allow the government to exercise its spending power, as well as its moral suasion, to further national objectives.

Third, and of much less importance financially, there are specific-purpose transfers. These include transfers for projects of joint national-provincial interest, such as national highways, training programs, and so on. Some of these are shared-cost programs to recognize that joint interest. Like Equalization and social transfers, these can be for infrastructure spending, as is obviously the case for the Trans-Canada Highway.

Finally, there are infrastructure transfers which are more recent. In 2014, the federal government put in place the New Build Canada Fund (NBCF) to replace a similar Build Canada Fund that ran from 2007-14. The NBCF runs for 10 years and consists of two components: a $10 billion Provincial-Territorial Infrastructure Component (PTIC) of which $358 million is for program administration, and a $4 billion National Infrastructure Component (NIC) for projects of 'national significance.' As well, there is a $10bn Gas Tax Fund (GTF) allocated among provinces based on population and intended for municipal infrastructure. The 2015 Federal

Budget announced that a new infrastructure fund would start in 2017-18 if the Conservatives are re-elected. This would include $750 million over two years, followed by an annual ongoing fund of $1 billion to help finance public-private partnerships to pay for projects and upgrades with a combination of public and private investment.

PTIC provides funding to support infrastructure projects of national, regional and local significance that contribute to objectives related to economic growth, a clean environment and stronger communities. To support a wide range of infrastructure needs, it is divided into two parts: the first is $9 billion for projects that are nationally and regionally significant, and are predominantly medium and large scale in nature; and the second is $1 billion for projects in communities with fewer than 100,000 residents.

PTIC is an allocation-based program consisting of $250 million that goes to each of the 13 provinces and territories with the remainder disbursed on an equal per capita basis over ten years. To access these funds, provinces must prioritize their infrastructure requests (with an emphasis on eligible costs and timing) for submission to the Federal government. All submissions must satisfy the terms and conditions of the PTIC and are application based. Eligible projects include those of both provincial and municipal governments with municipal requests channeled through provincial submissions. Generally speaking, projects will be federally cost-shared. The maximum federal contribution is 50 per cent for provincially-owned highways and major roads, as well as public transit projects. For municipal projects, the cost sharing is generally 1/3 for each level of government. The maximum federal contribution is 25 per cent for projects with for-profit private sector proponents as well as projects procured as P3s. For projects located in the Northwest Territories, Yukon and Nunavut, the federal government will fund up to 75 per cent of total eligible costs, including P3 projects. For projects with a for-profit private sector proponent, however, the cap would be 25 per cent.

The NIC is a merit-based application-driven program with no pre-determined provincial or territorial allocations. This program funds projects of a national interest. Eligible projects will be limited to those that provide the greatest economic impact under the following seven categories: highways and major roads, public transit, rail infrastructure, local and regional airports, port infrastructure, intelligent transportation systems (ITS), and disaster mitigation infrastructure. Thus, apart from the last category, targeted projects are in the transportation area.

Eligible recipients need not be a municipality or a province or an agency of these, but they could be. They could also be a private sector body, including for-profit organizations and not-for-profit organizations; a Canada Port Authority, International Bridge and/or Tunnel Authority. Generally speaking, projects will be federally cost-shared on a one-third basis unless they are P3 projects, in which case the maximum share is 25 percent.

The maximum federal contribution under NIC is 50 per cent of eligible costs for provincially-owned highways and major roads, as well as public transit projects. The maximum contribution is 25 per cent for projects with for-profit private sector proponents as well as projects procured as P3s. For projects located in the Northwest Territories, Yukon and Nunavut, the federal government will fund up to 75 per cent of total eligible costs, including P3 projects. For projects with a for-profit private sector proponent, however, the maximum would be 25 per cent.

The GTF is a per capita grant awarded to provinces who, in turn, allocate the money to municipalities. In British Columbia and Ontario, the province has transferred the allocation chore to the Association of Municipalities. One federal constraint on the use of these funds is that they must be spent on eligible projects, of which there are 17 categories – municipal buildings and emergency medical facilities are specifically excluded as are land costs and soft services. Ninety percent of these funds are spent on water, sewer, wastewater, local roads and public transit, that is, projects of a purely local nature. To ensure that funds meet eligibility requirements, municipalities must submit reports on the project to the provincial authority who in turn forwards them to the Federal government. Very briefly, it is up front funding and back end approval for the Federal government.

With the possible exception of an NIC transfer, the federal government does not deal directly with municipalities, although it does exercise influence over the types of municipal infrastructure projects that can be supported by the GTF (even though the allocation is equal per capita).

In summary, the federal government provides support for provincial and municipal infrastructure spending directly through the NCBF and GTF, and indirectly through Equalization, CHT/CST and specific grants. Moreover, there is no constraint on provinces in using their own-source or unconditional grant revenue to finance infrastructure.

Provincial transfers to municipalities show considerable variation. In addition, funding for municipal infrastructure differs considerably from federal and provincial infrastructure. For municipal infrastructure financed by borrowing, debt service is included as an item in the municipality's operating budget. Thus, municipal infrastructure spending is constrained by a municipality's capacity to borrow, which in turn is affected by its tax capacity, by provincial and federal grants, and also by direct financing of infrastructure by the province. User fees are also an important source of ex post funding for capital projects, especially for water, sewer, solid waste, urban transit and transportation. As well, specific property based charges are used to finance specific infrastructure projects. These include special assessments and local improvement charges, development charges or capital cost contributions, value capture levies and occasionally tax increment financing.[18] Provincial grants to municipalities are also used to finance infrastructure. Some of these have equalization features, such as revenue equalization based on property tax revenues, equal per capita components, and ad hoc needs elements, such as rural-urban, north-south. Provincial grants can also be specific to certain items, such as water, sewer, solid waste, transportation and transit.

3. Fiscal Federalism and Infrastructure: Basic Considerations

What do principles of fiscal federalism tell us about the financing of infrastructure? Our starting point is the principle of subsidiarity, which says that in the absence of compelling arguments to the contrary, the provision of public goods and services should be the responsibility of the lowest level of government. This decentralization default position characterizes bottom-up federations like Canada that have formed from previously separate jurisdictions, and characterizes reasonably well the actual division of responsibilities for infrastructure among the three main levels of government. Given the highly decentralized provision of infrastructure in Canada, what arguments exist for upper-level involvement in lower-level financing and the provision of infrastructure?

Federal role in financing provincial infrastructure

Starting with the federal provincial scenario, there are a number of potential reasons for federal involvement in provincial infrastructure provision. The classic argument is that provincial

[18] Kitchen and Tassonyi, op. cit. 12.

infrastructure spending has spillover effects on neighbouring jurisdictions, and federal grants are a way of dealing with this. However, this argument can cut both ways because spillovers can be positive or negative. Beneficial spillovers occur to the extent that infrastructure projects benefit residents or firms in other provinces. An obvious example is transportation facilities that can be used by all Canadians. Others include abatement expenditures on cross-border pollution, and educational and training institutions whose graduates might reside in other provinces, and health facilities that serve out-of province residents. Some of these spillovers can be addressed by specific shared-cost programs that incorporate conditions like harmonization of service provision and service standard. Some can be addressed by block grants that have broad conditions attached, such as mobility. It is often possible that financing by user fees serves to internalize the benefits to non-residents, as in the case of toll bridges and roads (Confederation Bridge linking Prince Edward Island and New Brunswick, Champlain Bridge in Montreal, Highway 407 through the Greater Toronto Area), post-secondary education institutions (university and college fees), and out-of-province health reimbursements from one province to another.

Infrastructure spending can have negative spillover effects to the extent that they attract persons and businesses from other provinces. This is the analogue of tax competition on the expenditure side. Just like provinces have an incentive to reduce tax rates or offer tax subsidies to attract business, so they have an equal incentive to provide business services and infrastructure to attract business, that is, to 'province-build'. Although the benefits of fiscal competition are sometimes stressed in the classical fiscal federalism inspired by Tiebout[19] and more recently by those who see fiscal competition as a discipline device,[20] fiscal competition also leads to beggar-thy-neighbour policies. These problems can be exacerbated if provinces have highly differing fiscal capacities. For example, one of the consequences of the uneven access of provinces to natural resource revenues is that the resource-rich provinces are able to use their fiscal advantage to pro-

[19] Charles M. Tiebout, "A Pure Theory of Local Expenditures," *Journal of Political Economy*, 64, 1956, 416-24.

[20] Jeremy Edwards and Michael Keen, "Tax Competition and Leviathan," *European Economic Review*, 40, 1996, 113-34

actively build their provinces partly at the expense of others by low taxes and high levels of public services, including infrastructure.[21] The term 'Alberta advantage' captures that.

The point is that one cannot presume that lower levels of government have an incentive to under-provide infrastructure. On the contrary, they have strong incentives to use infrastructure spending as a way to foster local economic development. Indeed, good infrastructure is a prerequisite to making a locality attractive for business, and for retaining business and skilled labour that is already there. If anything, there is a payoff to competing too aggressively against other provinces. There is little that the federal government can do to counter the adverse effects of province-building. However, it can be mitigated by ensuring that all provinces have comparable fiscal capacities to provide needed infrastructure, which is the task of Equalization and to a lesser extent the CHT and CST programs.

There is a broader argument for a federal interest in infrastructure that derives from Section 36(1) of the Constitution and that has recently been emphasized by Dodge, Burn and Dion.[22] As mentioned, that section commits the federal and provincial governments jointly to regional development, equality of opportunity and the provision of reasonable qualities of essential public services. This can be thought of as underpinning the use of social transfers, but it could also be thought of as giving a rationale for regional development policies, including infrastructure. Dodge et al saw this as a vehicle for addressing the disadvantages faced by provinces that were not resource-rich, and as an alternative to equalizing natural resource revenues. The federal government does pursue regional development policies using other instruments. For example, its various regional development agencies, such as ACOA, CED, CanNor, FedDev Ontario, FedNor and WD, provide discretionary finance for businesses willing to invest in targeted regions. As well, it has sometimes used tax-transfer mechanisms such as investment tax credits and preferential Employment Insurance benefits to favor high-unemployment regions

[21] This is discussed in the context of the Dutch Disease in Robin Boadway, Serge Coulombe and Jean-François Tremblay, "The Dutch Disease and the Canadian Economy: Challenges for Policy-Makers," in J. Keith J. Banting, Richard P. Chaykowski, and Stephen Lehrer (eds.), *Thinking Outside the Box: Essays in Honour of Thomas Courchene*, McGill-Queen's Press (2015), forthcoming.

[22] D. Dodge, P. Burn and R. Dion, "Federal-Provincial Fiscal Arrangements: Thinking Outside the Box," *Policy Options* 33, no. 7 (Montreal: Institute for Research on Public Policy, August 2012), 30-33.

It is interesting that the NIC infrastructure grants provided under the NCBF are intended to be for projects of national significance. Be that as it may, it is clear that both Equalization and social transfers, which serve the commitments of Section 36, can be used for infrastructure at the discretion of the provinces. They could be readily revised to address some of the outstanding horizontal imbalance issues, for example, by conditioning the CHT/CST on provincial fiscal capacities, including natural resource revenues. It is not clear why additional federal transfers earmarked for infrastructure are needed, given that the provinces have ample incentive to invest in infrastructure.

It might be argued that there remains a significant vertical imbalance in the federation that constrains the ability of the provinces to finance infrastructure. That is, even though the provinces have access to all the major revenue sources, it is difficult for them individually to raise taxes, especially given their projected expenditure requirements in the near future. Given that and the relatively high levels of debt that they already have, it is also more costly for them than for the federal government. To the extent that this is the case, and that is an open question, the appropriate way to address a vertical imbalance is through the transfer system rather than through infrastructure grants.

Provincial role in financing municipal infrastructure

What is the provincial government's role in municipal infrastructure provision? This situation differs significantly from the federal government. Unlike the provinces, municipal governments have limited access to own-source revenues and debt finance and are, in most cases, subject to oversight by the province on major infrastructure projects. The actual delivery of local infrastructure is executed by municipal governments as the principle of subsidiarity would recommend, but they may not have full discretion over deciding on and financing infrastructure projects if they are partially funded by provincial or federal transfers.

Part of the rationale for provincial-municipal grants for infrastructure is similar to the federal-provincial case. There may be spillovers, both positive and negative, from municipal investments, and the provincial grants, regulations and supervisory oversight serve to ensure that interests of those residing elsewhere are taken into account. In some cases, this might entail specific grants that induce municipalities to undertake projects that serve a broad interest, such as

transit investments, schools, hospitals, conservation areas, water and sewage plants, and so on. This can involve more than simple financing if it is important that the projects be harmonized with those in other municipalities. In some provinces, these spillovers have been internalized, at least in part, by amalgamation of municipal governments.

Much municipal infrastructure benefits mostly residents and businesses in the municipality, and as such there is no systematic incentive to invest too little. On the contrary, as with provinces, municipalities stand to benefit from infrastructure as a means of enticing persons and businesses to locate there. Any shortage of municipal infrastructure investment must be due to other reasons. One is that with the ongoing tendency for urbanization and the fact that migrants from other provinces and immigrants from abroad mostly settle in urban areas, there is a continual need to expand and upgrade infrastructure to accommodate the increased population. This causes a temporary backlog of infrastructure needs that take time to meet.

A much more compelling constraint on municipalities who identify the need for new or replacement infrastructure is a shortage of discretionary finance, or what they perceive to be a shortage. Municipalities rely almost entirely on property taxes and user fees for own-source revenues, plus whatever transfers they receive from senior governments. Property taxes and user fees are good sources of revenues for financing many local services.[23] In fact, a recent study on Alberta cities argued that the property tax is the only tax needed to finance municipal services. Furthermore, if the education portion of the property tax were eliminated, cities would have more than enough tax room to finance their services now and well into the future.[24] A recent study on the City of Toronto's finances noted that property tax revenues have grown less than inflation from 2000 and that the tax burden per household has fallen over this time.[25] A more recently

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[23] Charles E. McClure Jr. (2001), "The Tax Assignment Problem: Ruminations on How Theory and Practice Depend on History." *National Tax Journal*, Vol. LIV, No. 2, 339-363; Bird and Slack, op. cit. 2; Kitchen and Tassonyi, op. cit. 11; and Harry Kitchen, (2013), "Property Tax: A Situation Analysis and Overview", in *A Primer on Property Tax Administration and Policy*, First Edition, edited by William J. McCluskey, Gary C. Cornia and Lawrence C. Walters, John Wiley & Sons Ltd., 2013, ch. 1.

[24] Mel McMillan and Bev Dahlby (2014), "Do Local Governments Need alternative Sources of Tax Revenue? An Assessment of the Options for Alberta Cities" The School of Policy Studies, SSP Research Paper, University of Calgary.

[25] Enid Slack and André Cote (2014), *Is Toronto Fiscally Healthy? A Check-upon the City's Finances,* IMFG Perspectives No. 7: Toronto: Institute on Municipal Finance and Governance, Munk Centre, University of Toronto.

published study on the Greater Toronto Area[26] concluded that there is room to increase property taxes in most municipalities in the GTA. A quick calculation of effective tax rates (property taxes as a percent of the assessment base) for the ten largest cities in Ontario over the past four years shows a slight decrease in the overall effective tax rate in all but one city.[27] There is no question that the property tax could generate more revenue than it currently does in virtually every city in Canada — politicians could simply raise the tax rate. Furthermore, there is no evidence to suggest that raising the tax rate would lead to serious financial constraints, bankruptcy or revenue loss.

The property tax is not foolproof, however. Not only can one argued that it is relied on too heavily in Canada[28] for financing things like education and social services, it may distort the investment decisions of firms since property taxes are not profit-insensitive. Even in the case of residents, property taxes can discourage property improvement since they do not differentiate between site value and property value.

The real question, it seems to us, is not whether the property tax is adequate or inadequate but whether this is the best tax for funding all municipal services, especially those provided by large cities. Provincial offloading of expenditure responsibilities, additional services for an aging population, and the fact that the majority of infrastructure assets, their construction, maintenance and expansion have become municipal responsibilities have contributed and will continue contributing to an increased burden on the property tax. This is not to minimize the importance of the property tax; rather it is to suggest that big cities ought to have access to a range of taxes[29] so that they can choose the best combination for funding the wide range of services they now provide. An initiative of this sort[30] would be similar to cities and metropolitan areas in many

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[26] Almos Tassonyi, Richard M. Bird, and Enid Slack (2015), *Can GTA Municipalities Raise Property Taxes? An Analysis of Tax Competition and Revenue Hills*, Institute of Municipal Finance and Governance, University of Toronto, No. 20.

[27] Calculated from data in the annual *Municipal Financial Information Returns*, Provincial Ministry of Municipal Affairs and Housing, Toronto, Ontario.

[28] Property taxes as a percent of GDP are higher in Canada than in any other OECD country. Calculated from data in OECD, *Revenue Statistics 1965-2011* (Paris: OECD, 2012), Tables 77, 80, 81, and 83.

[29] For a detailed discussion, see Harry Kitchen, 'Charter City Status' - a solution or a myth for financing city services?" paper presented at a conference at the University of Calgary, June 3, 2015.

[30] New taxes, it must be noted, would require provincial approval and possibly new legislation.

other countries. Additional taxes would give cities more flexibility in responding to local conditions such as changes in the economy, evolving demographics and expenditure needs, changes in the political climate, and other factors. It would make the overall local tax structure more flexible, permitting elected politicians to choose taxes that best fit local conditions and circumstances. This could generate enough revenue to upgrade local infrastructure and provide public services while minimizing fiscal competition.

Given these considerations, arguably the main issue facing municipalities is a perceived vertical fiscal imbalance with respect to upper levels of government. Provinces make transfers to municipalities, but the question is whether they are adequate in size and suitable in structure. Unlike federal-provincial transfers, provincial-municipal transfers are not as systematically equalizing in all provinces. The consequence is that municipalities with the most needs and costs are generally the most financially stretched, and these may well include those with the largest infrastructure needs, such as larger metropolitan areas. To the extent that a vertical fiscal gap exists, it can be traced to a couple of key issues. One has been the tendency for provincial governments to download funding to the property tax for the provision of public services that are more provincial than municipal in nature. These include things like social services and education. While the actual delivery of these services might be better done at the local level, the fact that they are of provincial interest because of their redistributive or social insurance nature suggests that the province should be a significant financial contributor. The other issue is the relationship between a vertical imbalance at the municipal level and that at the federal level. The tendency for the federal government to pass on fiscal deficits to the provincial level has its parallel in the province passing on its deficits to municipalities. There is some evidence that aggregate provincial-municipal transfers are correlated with aggregate federal-provincial transfers. For example, since the early 2000s, the former have been roughly $10bn less than the latter, though with some fluctuation.[31]

Finally, lack of fiscal discretion at the municipal level might detract from the ability of municipalities to respond to infrastructure needs in a timely fashion. This lack of discretion is partly attributed to the oversight exercised by the provinces over municipal capital spending, which is understandable given the potential for soft-budget constraint problems and the potential

[31] See *Finances of the Nation*, Canadian Tax Foundation, Toronto, various years, Table A.2

need to bailout municipalities that have overspent.[32] It could also be attributed to the limited access that municipalities have to local taxes. This situation could be ameliorated if municipalities, especially the larger ones, had access to more flexible own source revenues. Furthermore, both theory[33] and empirical evidence[34] support this: increased local fiscal authority leads to increased local fiscal accountability.

Federal role in financing municipal infrastructure

A final issue is whether the federal government should make direct transfers to municipalities, by-passing the provinces. The argument in favour is that if a vertical imbalance exists for large municipalities and it constrains their ability to finance infrastructure, the federal government is better able to deal with that imbalance than are the provinces, who may themselves be fiscally constrained. Moreover, to the extent that one regards the cities as the engines of growth and innovation, and municipal infrastructure as a necessity for exploiting their potential, large municipal infrastructure investments are of national interest since they spur national growth and their benefits extend well beyond the city involved. A counter-argument is that municipalities are creatures of the provinces and are governed by provincial constitutions. This includes oversight and ultimate responsibility for municipal financial sustainability. Direct dealings between the federal government and municipalities would undermine municipal accountability to the province, and accountability between the municipality and the federal government would be constrained by the distance between them and the absence of day-to-day interaction. As well, direct transfers from the federal government to the municipalities are not necessary to achieve national objectives. Transfers made via the province for infrastructure projects that are deemed to serve national interests can be as effective and more accountable than those that bypass provinces given that provinces are particularly experienced at dealing with municipalities, and

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[32] There is evidence suggesting that local governments subject to hard budget constraints tax and spend more sensibly than those not subject to such constraints. See J. Rodden, G. Eskeland and J. Litvack (2003), *Fiscal Decentralization and the Challenge of Hard Budget Constraints*, Cambridge, Mass.: MIT Press.

[33] B.R. Weingast (2009), "Second generation fiscal federalism: The implications of fiscal incentives", *Journal of Urban Economics*, 65 (3), 279-293.

[34] L. Borge, J. Brueckner and J. Rattso (2013), *Partial Fiscal Decentralization and Public-Sector Heterogeneity: Theory and Evidence from Norway*, http://www.ieb.ub.edu/files/PapersWSFF2013/Borge.pdf

that large municipalities have direct input into provincial political decision-making through proportionately larger influence in provincial legislatures. In any case, relatively few municipal infrastructure projects can be viewed as being of national benefit over and above provincial-local benefit.

A cautionary note

There are two issues that are addressed here. Both deal with municipalities where the bulk of the infrastructure exists. One is a comment on the importance of properly pricing or taxing for the use of municipal services and the impact that this has on the demand for infrastructure. The other is a comment on the growing interest in or direction by senior governments (such as in the 2015 Federal budget) to consider public private partnerships as a vehicle for providing municipal infrastructure.

Pricing/taxing of municipal services

Recent reports and media coverage emphasizing the size of the infrastructure deficit must be treated with caution, especially since none of this discussion has attempted to estimate what the real deficit would be if municipal governments properly priced or taxed for their services. Efficient pricing/taxation exists when user charges or user fee type taxes take into consideration cost differentials attributed to economies of scale, capacity constraints, differential demand in peak and non-peak periods, when second-best circumstances are prevalent and when externalities exist.[35] Ultimately, the objective in setting efficient fees/taxes should be to establish a clear link between services received and the charge or tax for them. When this link is not there and it almost never is, services are underpriced or undertaxed leading to over-consumption and a larger demand for infrastructure than is efficient or necessary. Furthermore, when this excess demand forms part of the request for infrastructure funds from senior levels of government, this is difficult to justify and support. The upshot of this might very well be that infrastructure grants, where they are given, should be conditional on the implementation of efficient pricing and taxation policies at the municipal level.[36]

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[35] Kitchen and Tassonyi, op. cit. 12.

[36] Some of these initiatives would require provincial agreement and assistance.

Public-Private Partnerships

Public-private partnerships (PPPs or P3s) are contractual arrangements between the public sector and a private provider. Unfortunately, they are often viewed by politicians as a way to raise money for cash-strapped governments. Such enthusiasm, however, must be tempered with the reality that P3s are not a source of free money since the private partner must be repaid for any financing it provides.

Policy makers and practitioners generally acknowledge that P3s can generate significant efficiencies, better cost controls, stronger operational knowledge, and greater operational flexibility when used to deliver projects that have passed a rigorous and thorough value for money assessment (VfM). A VfM compares the net present value (NPV) of the P3 option with the NPV of a comparable project delivered through conventional procurement methods. While not a straightforward or easy task, the VfM is intended to capture all quantitative and qualitative factors affecting both costs and benefits.[37] A critical issue in this calculation is the way in which risks are assigned to the public and private operators.

At least two survey papers have examined the success of a number of P3s in Canada. One included ten case studies of P3s across Canada. It concluded that "Canadian governments have sometimes found it difficult to effectively reduce either their total costs (that is, the sum of production and transaction costs) or their budgetary risk exposure (by transferring revenue risk) through the use of P3s".[38] This led the authors to conclude that P3s are not socially desirable for all public infrastructure projects, but may work well under certain circumstances; for example, where governments have not attempted to transfer revenue risk (uncertainty over future revenue streams) to the private sector; where projects have required specialized knowledge that the public sector lacks; and where governments have been able to transfer construction risks (cost overruns and construction delays, for example) at something close to a fixed price.[39]

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[37] Partnerships Canada is a federal agency that assists federal infrastructure authorities in traversing the tricky P3 terrain including the calculation of VfM assessments. Infrastructure Ontario performs the same role for potential P3s at the provincial and municipal level.

[38] Aidan R. Vining and Anthony E. Boardman (2008), "Public-Private Partnerships in Canada: Theory and evidence", *Canadian Public Administration* 51(1), p. 11.

[39] Ibid.

A second and more recent study conducted a VfM assessment for 28 provincially approved P3 projects in Ontario from 2007 to 2010.[40] This study noted that the base cost of P3s was, on average, 16% higher than conventional tendered contracts. The higher cost was attributed to higher interest rates paid by private borrowers and a premium for taking on greater project risks arising from potential cost overruns, construction delays and so on. Transaction costs for lawyers and consultants added another 3% to private-sector costs.

Conventional government procurement practices also face a number of risks. As with P3s, these include cost overruns, construction delays, design flaws, and fluctuating revenues. To account for these risks and to attempt to establish a level playing field for comparative purposes, a risk premium that averaged 49% of base costs was added to the more conventional alternatives. It was this risk premium that drove the VfM in favour of a P3 for each of the 28 projects. A major concern here is that there is no empirical evidence to support such a large risk premium. The authors emphasized this concern and it has also been highlighted by Ontario's Auditor General.[41] Hence, no one really knows whether Ontario's taxpayers have been and are getting the best value for their money under P3's.

Canadian experience with P3s is relatively limited by international standards. Based on existing experience, municipal infrastructure projects that may be suitable for a P3 include roads and public transit, water and wastewater treatment systems, solid waste disposal as long as they can pass a rigorous and carefully constructed VfM assessment. A P3 may be most appropriate when outputs can be clearly defined, where risks are correctly assigned to each party, where proper incentives can be introduced for encouraging private partners to get better value and if there is clear communication and accountability between the private and public partners.[42] Where P3 contracts are properly structured and based on performance measures, they can lead to improved local governance including increased accountability, transparency, and value for money.

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[40] Matti Siemiatycki and Naeem Farooqi (2012), "Value for Money and Risk in Public-Private Partnerships", *Journal of the American Planning Association* 78(3), 286-299.

[41] Barrie McKenna (2012), "The hidden price of public-private partnerships", *The Globe and Mail,* October 15, p. B-1.

[42] Carlos Ugate, Gabriel Gutierrez and Nick Phillips (2012), *A Roadmap to Funding Infrastructure Development*, Discussion Paper 2102-09, at www.internationaltransportforum.org/jtre/DiscussionPapers/jtrepapers.html

Because P3s are monopolistic in nature, there is a role for government in monitoring their behaviour. Governments should set the terms and conditions for service delivery, funding and quality of service, and establish performance standards or measures. Government could even provide the pricing structure to be used for services provided by the infrastructure (volumetric pricing for water and sewers, tolls and other charges for roads and public transit, user fees for solid waste disposal) or set up a price regulation or monitoring system.

Letting a private partner operate a P3 can raise transactions costs because of the need to monitor service quality. However, it has the potential advantage that user fees or prices are more politically acceptable because the public expects private-sector services to be priced.[43] These prices should be regulated in such a way that they do not prevent flexible or innovative pricing structures.

4. Issues with the Current Arrangements for Financing Infrastructure

The discussion in the previous section suggests some key issues that should be considered in crafting a system of intergovernmental fiscal relations that takes into account infrastructure needs and financing. An over-arching issue concerns the adequacy of the current system for addressing ongoing and future infrastructure needs. As we have mentioned, the federal government already provides virtually unconditional and fungible Equalization and social transfers to provinces that can be used both for their own infrastructure spending and for supporting municipal infrastructure spending. In addition, some specific federal grants are designated for infrastructure projects of national interest (Trans-Canada Highway). As mentioned earlier, there is also the NBCF, GTF, and the gas tax fund that earmark federal transfers to infrastructure, much of it purely local in nature. Given all of these, are there arguments for a permanent and substantial infrastructure grant to the provinces and municipalities?

Some might argue that Equalization and CHT/CST are only based on revenue capacity and do not take account of infrastructure spending or other needs. However, national average revenue-raising capacity, which determines the aggregate size of Equalization, reflects national average spending of all kinds financed by the revenues. Thus, it implicitly includes provincial tax

[43] Vining and Boardman, op. cit. 38.

revenues devoted to financing infrastructure. If one took needs and/or costs into account in calculating Equalization, this would not affect the total Equalization amount, though it would affect its allocation among provinces. It is true that debt financing is not included in Equalization, and debt may be used to finance infrastructure. However, debt is just postponed taxes, which eventually enters Equalization. Similarly, CHT/CST transfers are unconditional and are meant to support both current and capital spending on health, social assistance and post-secondary education. The upshot is that a case for an additional infrastructure grant cannot be based on the idea that infrastructure spending is not taken into account in Equalization/CHT/CST.

There may still be an issue of whether total transfers to the provinces are adequate, given their share of tax room relative to their spending obligations. The concept of vertical fiscal imbalance is necessarily an ambiguous one, given in principle that both provincial and federal levels of government have full discretion in setting their own tax rates. At the same time, the greater the tax room occupied by one level of government, the more difficult it might be for the other to raise tax rates given that they are tapping into a common pool of potential revenues. Vertical imbalances evolve over time, and can reflect both longer-term factors like the relative growth rates of provincial versus federal expenditures and short run factors like precipitous reductions in federal-provincial transfers in response to fiscal shocks. In either case, a temporary vertical imbalance may be created that can be addressed by either increased provincial tax effort or increased transfers.

In current circumstances, the provinces are fiscally constrained because of the rate of growth in spending on health, education and social services which is reflected in higher growth rates in debt-GDP when compared with the federal government. At the same time, the federal government has reduced tax rates, leaving more tax room for the provinces. The provinces could increase tax rates and deal with any vertical imbalance they face. The economic question is whether it is desirable to shift tax room to the provinces as opposed to increasing federal transfers as a way to address an imbalance. Opinions differ on that. On the one hand, requiring provinces and municipalities to meet incremental expenditure needs by increasing own-source revenue entails an element of political accountability that might be missing if transfers were used. On the other hand, further decentralization of tax room exacerbates horizontal imbalance,

and makes it more difficult for the federal government to meet its Equalization commitment. It also runs the risk of threatening the sustainability of tax harmonization. Another sometimes overlooked consequence of decentralized revenue-raising is that it reduces the ability of the federation to insure against regional shocks. As is readily apparent nowadays, this distinguishes a federation from an economic union such as the EU. These arguments might suggest some balance of own responsibility and transfers to meet vertical imbalance problems. For our purposes, the fact that provincial governments and their municipalities are fiscally constrained may make it particularly difficult to meet infrastructure needs if they are crowded out by growing expenditures on health and other public services. That does not necessarily mean that an infrastructure-specific grant is called for as opposed to remedying any vertical imbalance by a mix of federal transfers and own source revenues.

The existence of horizontal imbalance also results in particular strains on infrastructure spending for the have-not provinces. Because the Equalization system only applies to them and includes only half of resource revenues, the provinces with above-average fiscal capacity have a significant fiscal advantage over the have-not provinces. This constrains the ability of the latter to meet infrastructure spending by increasing own-source revenues. It would be difficult to address this issue directly since the Equalization system cannot be turned into a net system. However, the GDP cap, which applies selectively to the have-not provinces, could be eliminated, and the CHT/CST system could be more equalizing by making transfers contingent on fiscal capacity rather than being equal per capita.[44]

There remains an argument that some infrastructure investments delivered by the provinces serve a 'national purpose', and even if they are most efficiently provided by the provinces they should be supported by federal grants. The grants would encourage such projects to be undertaken, and would ensure that they are designed to take national benefits into account. Determining what is in the national interest is not an easy or obvious matter. The national interest might be due to spillover benefits to other provinces or municipalities. Examples such as transportation projects, communications, environmental protection and education institutions come to mind. Even if projects are in the national interest, it may be efficient for them to be provided by the provinces,

[44] This has been proposed by Thomas J. Courchene (2010), "Intergovernmental Transfers and Canadian Values: Retrospect and Prospect," *Policy Options* 31, no. 5 (Montreal: Institute for Research on Public Policy, May), 32-40.

since they are closer to the ground and better able to know local needs, to solicit contracts, and to monitor the investment. In such cases, the provinces undertaking the investment can be the main beneficiary, so whether the project should be shared-cost is an issue. Shared-cost financing is a way to encourage accountability.

Another argument for federal support or encouragement is that there might be a systematic tendency for lower level governments to under-provide infrastructure because of fiscal competition or short-sightedness. We have suggested that this is an over-stated concern. While tax competition puts downward pressure on tax rates on mobile tax bases, the opposite is the case for infrastructure. To the extent that infrastructure attracts businesses from other jurisdictions, there is a negative spillover: a given jurisdiction does not take account of the adverse effect on other jurisdictions of businesses re-locating (i.e., the loss of tax revenue). Resource-rich provinces provide a good example of that. Alberta explicitly tries to attract businesses not just with low tax rates but also with public infrastructure. Thus, there is no argument based on fiscal competition for infrastructure to be under-provided by provinces and municipalities.

The national interest may be interpreted in a broader sense. Infrastructure investment might be seen as contributing to regional development in fulfilment of the joint commitment of Section 36(1). In this case, the allocation of projects would somehow reflect regional development objectives and need. Some have argued[45] that federal infrastructure spending should be considered as a pro-active alternative to Equalization to encourage have-not regions to grow and be less dependent on transfers. More generally, this has been seen as a partial antidote to the inefficient interregional allocations of resources induced by natural resource shocks (Dutch disease) and to province-building by resource-rich provinces who have an incentive to use resource revenues to attract business by investing in local infrastructure and keeping taxes low.

The provincial premiers argue that there should be a permanent federal infrastructure grant that provides financing to the provinces to meet predicted infrastructure needs. The communiqué of

[45] See for example David Dodge (2012), "Strengthening the Canadian Economic Union in a Period of Fluctuating Resource Prices," Presentation to the Public Policy Forum 25th Anniversary Lecture Series, Carleton University, Ottawa, October 10.

their January 30, 2015 Winter Meeting states:[46] "Investments in public infrastructure support economic growth and create jobs. Premiers called on the federal government to join them by providing additional funding beyond the Building Canada Plan, to support investment in provincial and territorial infrastructure funding priorities which will advance our economic competitiveness now and well into the future. Premiers agreed that federal infrastructure programs must follow a "base-plus per capita" formula that will allow more strategic investments by all jurisdictions. Premiers also discussed the importance of trade infrastructure and called for increased federal investment in gateways to support greater international trade in key markets." There is little justification for such a federal initiative apart from the idea that infrastructure supports economic growth, which could be viewed as a "national purpose". The issue is whether there needs to be an infrastructure-specific grant over and above the all-purpose grants that already exist. Provincial governments already receive unconditional transfers that can be used for capital spending as they see fit, and they also have access to the same revenue sources as the federal government. An infrastructure grant could simply crowd out provincial infrastructure spending that would otherwise occur, or that would occur if the provinces had sufficient revenue from own sources and general transfers. We have suggested that there might be a vertical imbalance in the sense that federal transfers are too small given the share of revenues (i.e., income tax) they currently claim, evidenced by the fact that provincial debt/GDP is rising while that of the federal government is falling. Moreover, because provincial program spending is rising more rapidly than the feds because of health care especially, infrastructure is being crowded out along with other programs. While this may be a valid assessment, it does not follow that the response is to make larger infrastructure grants. One could either increase general transfers or adjust the tax room, or some combination of the two as appropriate.

Different issues arise with municipal infrastructure. As mentioned above, problems of vertical imbalance raise unique problems for financing municipal capital projects, especially given the constraints that they face on borrowing and their limited access to broad tax bases. Increasing own revenues to meet spending deficiencies is more difficult for municipalities since they rely heavily on property taxes which are already at relatively high rates by international standards and

[46] See Council of the Federation website: http://www.canadaspremiers.ca/phocadownload/newsroom-2015/communique-jan_30_2015.pdf

must get provincial approval for new revenue sources. Moreover, as a proportion of their spending, infrastructure is much more important for municipalities than provinces, and arguably municipal infrastructure has significant spillover benefits that might warrant provincial conditional grants. Municipalities also face significant horizontal imbalances within provinces because of inadequate equalization systems.

If there is need for more infrastructure investment at the municipal level, what is the best way to fund it? Given that infrastructure spending benefits future generations and that municipalities have borrowing capacity, borrowing makes considerable economic sense. Currently, every province has an organized authority or agency that is responsible for assisting most, if not all, municipalities in issuing long-term debentures that are subsequently sold by investment dealers. In the western provinces, Winnipeg, Regina, Saskatoon, Edmonton, Calgary and Vancouver issue debt in their own name rather than through a provincial agency. Province-wide agencies[47] issue debt for the remaining municipalities in the western provinces as they do in Quebec and the eastern provinces. In Ontario, Infrastructure Ontario has been set up as a crown corporation with a mandate to manage large infrastructure projects. It operates like an infrastructure bank. It offers short-term and long-term loans for eligible public sector infrastructure projects at affordable rates. It provides access to capital market financing without fees or commissions. The length of the loan may be structured to match the life of the asset, hence there is no need to refinance over the life of the loan. Loans may be available for any depreciable asset and have been used a wide range of projects including the construction of roads, bridges, and facilities to the acquisition of assets, such as vehicles and equipment. Finally, Infrastructure Ontario offers technical expertise and assistance for municipalities about to engage in infrastructure investment. For borrowing that may not go through Infrastructure Ontario, regional governments borrow on behalf of their lower-tier municipalities as a matter of process but the obligation to service the debt remains with the lower tiers. Lower tiers in counties and the counties themselves may borrow on their own behalf. Finally single tier municipalities may borrow on their own.

[47] In some provinces, these are agencies set up by the provincial government. In British Columbia, the Municipal Finance Authority is a cooperative that is owned and operated by all member municipalities and governed by a board appointed by the Regional Districts. It is not an agency of the province.

Restrictions on whether municipalities must borrow through province-wide bodies varies. In some provinces, every municipality must borrow through the province wide agency (Nova Scotia and New Brunswick, for example). In other provinces, larger cities as noted above are not required nor do they borrow through the province wide organization.

The advantages of a province-wide body are immense. Municipalities borrow from or apply for funds from the province-wide authority, which in turn totals up all the requests for local funds and issues long-term debentures against the authority itself. In some provinces, these debentures are guaranteed by the province. When the proceeds are received from the sale of these debentures, the funds are dispersed to the requesting municipalities usually under a loan agreement with the borrowing municipality. The system is relatively immune to soft-budget constraint problems. For example, there has not been a default in municipal borrowing for at least 50 years.

Recently, however, it has been suggested that the federal government could undertake this borrowing[48] because it faces lower interest rates than those paid by the existing municipal/ provincial bodies. If this is true, it may be appropriate as long as the federal government could act as an arms-length banker in dealing with the municipal sector. In other words, the federal government would borrow funds to finance municipal infrastructure and the municipal sector would repay this debt just as they would repay loans made by private investors. However, it might be hard to imagine how this could occur without the federal government exercising approval and oversight over the municipal projects it finances, much like the provinces now exercise control. It is not at all clear that it would be conducive to accountability to have the federal government influencing municipal infrastructure investments.

Three other sources of finance for municipal infrastructure can be contemplated. Additional tax sources could be made available to municipalities, at least large ones.[49] For example, they could piggyback onto the provincial personal income tax or onto a provincial tax base that is more narrowly defined such as the provincial gas tax with revenues dedicated to roads and transit.

[48] Bill Curry (2015), "Debt: Governments across the country brace for looming crunch, political dilemmas" *Globe and Mail*, B-1, May 13.
[49] Kitchen, op. cit. 29.

While this would create more fiscal capacity for some municipalities, it would also result in some fiscal imbalance between large and small cities. In principle, this could be addressed by provincial-municipal equalization, though this would not be straightforward.

A second source of revenue would be to expand and improve user fees. Current practice in setting user fees frequently deviates from that which is fair, efficient and accountable. The tendency is to set fees to generate revenue rather than to allocate resources to their most efficient use. Failure to introduce efficiency considerations (price equals marginal cost) into the pricing structure or to entertain in any serious fashion, suggestions for expanding the role for user fees has been defended on grounds that they are regressive. This claim, however, is about as relevant as the claim that milk prices and movie tickets are regressive. This is not to imply that income distribution issues are unimportant. Clearly, they are very important but they should be handled through income distribution programs that target the poor rather than changing or distorting prices where the rich frequently benefit more than the poor.

Failure to price properly has created a good deal of unplanned and implicit income redistribution, much of which would be unacceptable if it were made explicit. As an example, the tendency to charge a fixed price for water, regardless of quantity consumed, on the premise that fixed income earners (poor and seniors) could not afford to pay, provides an implicit subsidy for higher income households with larger lawns to water and more cars to wash. Similar outcomes emerge from the practice of offering discounted transit fares based strictly on age.

Failure to set prices efficiently has led to a demand for services and subsequently, a demand for physical infrastructure that is not allocatively efficient or optimal.[50] All too often, inefficiently set user fees have led to overinvestment and larger facilities than would be justified if more efficient pricing practices were adopted. For financing municipal services, user fees should be adopted wherever possible. They make considerable economic sense for all water and sewer systems, solid waste collection and disposal, public transit and transportation and much of public recreation and libraries. Raising revenues in this way would enhance municipal accountability.

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[50] Harry Kitchen (2006), "A State of disrepair: How to Fix the Financing of Municipal Infrastructure in Canada", *Commentary* C.D. Howe Institute, available at http://www.cdhowe.org/pdf/commentary_241.pdf

Finally, there is the option of a federal infrastructure grant that would go directly to municipalities.[51] Presumably, the federal spending power would allow this, even though municipalities are responsible to provinces. The administrative and accountability issues associated with the federal government dealing with municipalities would be immense (unless the transfers were unconditional). The federal government is not as well placed as the provinces for determining municipal needs. To the extent that there is a municipal infrastructure deficit (which is unclear), and to the extent that the provinces are fiscally constrained, there may be a vertical imbalance among the three levels of government (slightly more complicated than above). The vertical imbalance is essentially between the federal government and the provincial-municipal levels combined, and could be addressed as above rather than the feds earmarking transfers to infrastructure. The provinces are better placed to finance municipal infrastructure than is the federal government.

In addition to any aggregate infrastructure deficit that may exist at the municipal level, there may be systematic shortages in some jurisdictions relative to others. Needs for infrastructure may differ across jurisdictions. In principle, this could be addressed by a needs-based component in equalization. In some countries, needs equalization is often applied at the municipal level, even if it is not at the provincial level. Examples include Switzerland, Germany, South Africa, and the Scandinavian countries. Need equalization can be very complicated, as in Australia where needs are estimated by complicated and opaque statistical techniques. However, simpler and more transparent methods can be used, as the Swiss case illustrates. A simple and transparent method for designing a municipal equalization system is outlined in Appendix B.

5. Implications for Intergovernmental Fiscal Arrangements

There are a number of general points that come out of the above discussion. One is that, all three levels of government have ample incentives to invest in needed infrastructure, and maintain existing infrastructure, and have the constitutional right to provide infrastructure within their own boundaries. Indeed, if anything, fiscal competition arguments would suggest that sub-national governments have an incentive to over-invest in order to attract businesses and skilled persons to their jurisdictions. The exception to this occurs when provincial or municipal

[51] The GTF is earmarked for municipal infrastructure, but goes through the provinces.

infrastructure projects provide spillover benefits for residents in other locations, or when the infrastructure contributes to national objectives, such as those laid out in Section 36(1) of the Constitution.

Another relevant point is that most provincial infrastructure needs can be financed out of own source revenues, borrowing and unconditional transfers (Equalization, CHT/CST). The formula for Equalization grants to the provinces takes both provincial and municipal revenue capacity into account, and makes no distinction between revenues that are used to finance current expenditure and those used for capital spending. Moreover, both Equalization and social transfers are fully fungible, and are intended to be used for current and capital spending. Similarly, most municipal infrastructure projects can be financed by own source revenues, borrowing and provincial transfers.

To the extent that there is a provincial and/or municipal infrastructure deficit, this reflects a vertical imbalance; that is, given the spending responsibilities of all levels of government, intergovernmental transfers are insufficient given the way in which tax room is divided between the levels of government. A deficiency in infrastructure indicates tight fiscal constraints and sub-national debt levels rather than a choice to forego infrastructure spending in favour of other types of spending. A vertical fiscal imbalance can best be addressed by some combination of unconditional transfers from the federal government to the provinces, and from the provinces to municipalities, and by making more revenue room available to lower levels of governments. This seems to be particularly relevant for municipal infrastructure financing, which is partially constrained by a shortage of own-source revenues.

In the case of federal-provincial transfers, it is hard to specify with any precision the ideal level of transfers. However, a couple of points can be made. One is that the Equalization system is compromised by not equalizing provinces with above-average fiscal capacity, and by the fact that the federal government does not have access to natural resource revenues, which constitute the main source of horizontal imbalance. While it is difficult to deal with these problems adequately, a couple of measures could mitigate their impact. First, the GDP cap could be eliminated. It serves simply to reduce the amount of Equalization available to have-not provinces. Second, although the CHT/CST system is generally equalizing, it too does not equalize provincial natural resource revenue capacities, given that the source of financing is

federal general revenues. This could be addressed by conditioning social transfers on provincial revenue-capacities.

A second point about federal transfers is that vertical imbalance grows over time because provincial spending responsibilities are growing relative to those of the federal government, while social transfers are becoming untied from provincial spending needs. One way to forestall a growing imbalance, without putting undo pressure on the provinces to increase their share of tax room, is to tie the growth of social transfers to the average rate of growth of health, welfare and post-secondary education expenditures at provincial and municipal levels of government. This could be done in a way that does not impose strong incentives for the provinces to increase their spending.

A perceived provincial-municipal vertical imbalance is more difficult to address because the extent to which the municipalities can increase own-tax revenues is constrained by their reliance on the property tax. If the federal-provincial vertical imbalance were dealt with, that would in turn affect provincial-municipal imbalance since provincial-municipal transfers are likely related to the financial constraints faced by the provinces. At the same time, additional sources of revenues for municipal governments, especially large cities or metropolitan areas, should be permitted. This includes an improved and expanded range of user fees and earmarked user-fee-type taxes for things like roads, especially in the context of financing infrastructure investment. It could also include municipal piggy-backing on provincial income taxes, at least for larger cities.

Problems of infrastructure finance could be especially apparent for municipal jurisdictions with the most need and least revenue capacity. They will be particularly reluctant to find more own-source financing for infrastructure, given that it will put them at a disadvantage relative to other communities. This calls for expanding and fixing provincial-municipal equalization systems, possibly by taking more of a needs-based approach than in the federal-provincial Equalization system.

Finally, there may well be cases where there is a national interest in provincial or municipal infrastructure investments. This might be the case where such projects contribute to improving either efficiency in the internal economic union, such as national transportation projects or projects that improve investment in human capital or innovation, or equity in the social union,

such as by improving equality of opportunity or regional development. Identifying infrastructure projects that are of national importance is not an easy matter, and would have to be done on a project-by-project basis. These projects are better supported by project-specific grants, possibly of a cost-sharing nature, than by a broad, dedicated infrastructure grant.

6. Concluding Remarks

There is wide ranging agreement that both the quantity and quality of infrastructure plays a critical role in economic activity. Similarly, there is general agreement that an infrastructure deficit exists in Canada, although there is some question as to its size and how it has been estimated. For the purposes of this paper, however, knowing the size of the deficit is not relevant. What is relevant is who should be responsible for providing this infrastructure, how should it be financed, and what influence should one level of government exert on another? These questions, along with others, have been addressed within the fiscal federalism framework as it applies to infrastructure. The following points come out of this discussion.

First, the principle of subsidiarity supports a high degree of decentralized responsibility for the provision of infrastructure to provinces and municipalities. Second, contrary to what might be supposed, local infrastructure financing and provision is not constrained by serious fiscal competition problems. On the contrary, local and provincial governments have every reason to use infrastructure investment as a way of attracting economic activity, so they should not be reluctant to engage in it. Third, the federal government already provides largely unconditional transfers (Equalization, CHT/CST) to the provinces that can be used for financing infrastructure. Arguments in defense of federal infrastructure transfers to municipalities are limited to instances where there is a clear national benefit from the infrastructure that is not being taken into consideration by the provinces. The current federal infrastructure grants to municipalities do not fit into this category.

Similar comments apply to provincial transfers to municipalities, although these tend to be more conditional and perhaps less equalizing. Finally, to the extent that lower levels of government have difficulties financing infrastructure, these might be attributed to a basic fiscal imbalance in the tax-transfer system. This can be addressed by increasing transfers, which may reduce accountability, or by making available more tax room to provincial or municipal governments.

Provincial governments have significant revenue-raising ability, and further shifts of tax room from the federal government could exacerbate the large horizontal imbalances that already exist and also could jeopardize tax harmonization. However, there seems to be room for expanding and improving user fees at the municipal level and giving large cities and metropolitan areas access to additional taxes provided that provincial-municipal equalization systems deal with any imbalances created across all municipalities within a province.

Appendix A: International Comparison of Municipal Taxes

This Appendix reviews the types of taxes that are available to local governments in a number of OECD (Organization for Economic Cooperation and Development) countries and shows their relative importance. It comments on the extent to local government in these countries have fiscal autonomy and discretion in determining the tax base and tax rates. Finally, it provides some more detailed information on local tax systems in selected countries.

Patterns of Taxation

Table A-1 illustrates the relative importance of a range of local taxes in OECD countries in 2010. The following may be noted from the information in the table:

- Income taxation (corporate, personal and payroll) accounts for more than 50% of local tax revenues in eleven countries (column 2). In Germany, Switzerland, Denmark, Estonia, Finland, Iceland, Luxembourg, Norway, Slovenia and Sweden, it accounts for more than 70% of local tax revenue. In Australia, Canada, Chile, Czech Republic, France, Greece, Hungary, Ireland, Israel, Netherlands, New Zealand, Slovak Republic and the United Kingdom, by comparison, local governments do not have direct access to income tax revenue.
- Local sales taxes (in various forms but referring generally to taxes on goods and services that are sold) generate between 20% and 100% of total local tax revenue in eleven countries (column 3). At the other extreme, local sales taxes are non-existent or almost non-existent (generating less than 5% of all local tax revenues) in fourteen countries.
- Property taxes (column 4) account for almost 90% or more of all local tax revenue in seven countries (Australia, Canada, Mexico, Ireland, Israel, New Zealand, and the United Kingdom). By contrast, local governments in twelve countries get around 15% or less of their tax revenue from the property tax.
- Local governments in Italy and the Slovak Republic get more than 20% of all tax revenue from other local taxes (column 5), mainly on businesses.
- Column 6 provides information on the relative importance of local taxes by calculating local taxes as a percent of gross domestic product (a measure of the level of national income generated in each country). In federal countries (with federal, state/provincial, and local governments), local government taxes varied from 0.2% of GDP in Mexico to 4.6% in Switzerland with the unweighted average being 2.6%. For unitary countries (central and local governments only), local government's tax share of GDP ranges from 0.3% in Greece to 17.3% in Sweden with the unweighted average being 4.7%.
- Column 7 shows the relative importance of local taxes in the entire tax system in each country. When local taxes are calculated as a percent of all taxes (central government, state government, local government and social security funds), they range widely in relative importance. For example, in federal countries, local taxes range from slightly more than 1% of all taxes in Mexico to slightly more than 16% in Switzerland (the highest) with the unweighted average being 7.9%. For unitary

Table A-1: Relative Importance of Local Taxes in Selected OECD Countries, 2010

Countries (1)	Tax sources as a % of total local tax revenues: Income[1] (2)	Sales[2] (3)	Property[3] (4)	Other[4] (5)	Local taxes as a % of GDP (6)	Local Taxes as a % of all taxes[5] (7)
	%	%	%	%	%	%
Federal:						
Australia	0.0	0.0	100.0	0.0	1.0	3.5
Austria	61.4	9.9	15.4	13.3	1.5	3.3
Belgium	36.7	9.9	53.2	0.3	2.3	5.1
Canada	0.0	2.0	97.9	0.1	3.4	10.2
Germany	78.1	5.9	15.8	0.1	3.0	7.9
Mexico	0.3	1.7	89.0	9.0	0.2	1.2
Switzerland	84.3	1.3	14.4	0.0	4.6	15.6
United States	5.2	21.3	73.4	0.0	4.2	16.1
Unweigthed average	33.2	6.5	57.4	2.9	2.6	7.9
Unitary:						
Chile	0.0	59.7	40.3	0.0	1.4	6.2
Czech Republic	0.0	48.5	51.5	0.0	0.4	1.3
Denmark	89.0	0.1	10.8	0.1	13.3	26.7
Estonia	89.6	2.5	7.9	0.0	4.7	13.4
Finland	93.6	0.0	6.3	0.1	10.8	24.4
France	0.0	25.3	64.5	10.2	4.8	10.8
Greece	0.0	21.3	78.6	0.0	0.3	1.1
Hungary	0.0	80.0	19.8	0.2	2.5	6.4
Iceland	77.4	2.0	20.6	0.0	9.2	25.5
Ireland	0.0	0.0	100.0	0.0	0.8	3.2
Israel	0.0	4.8	95.2	0.0	2.6	7.5
Italy	25.0	26.6	10.9	37.5	6.7	15.4
Japan	48.6	19.4	30.9	1.1	7.3	25.9
Korea	15.4	26.7	45.2	12.7	4.7	16.7
Luxembourg	92.2	1.4	6.0	0.4	1.7	4.4
Netherlands	0.0	50.0	47.6	2.3	1.4	3.8
New Zealand	0.0	8.6	91.3	0.0	2.4	7.2
Norway	88.5	1.4	10.1	0.0	6.2	13.6
Poland	58.2	8.3	29.6	3.9	4.4	12.7
Portugal	34.6	26.4	34.2	4.8	1.8	5.7
Slovak Republic	0.0	24.7	50.8	24.5	0.8	2.9
Slovenia	78.4	6.4	15.1	0.0	4.0	10.9
Sweden	97.4	0.0	2.6	0.0	17.3	35.4
Turkey	24.5	49.8	14.7	10.9	2.8	9.5
United Kingdom	0.0	0.0	100.0	0.0	1.8	5.1
Unweighted ave.	36.5	19.8	39.4	4.3	4.7	11.8

[1] Includes individual, corporate and payroll tax.
[2] Includes general consumption taxes, value added taxes, specific taxes on goods and services (fuel taxes, hotel and motel occupancy) and taxes on use on goods or on permission to use goods or perform activities.
[3] Taxes on property including recurring taxes on net wealth.
[4] Includes a miscellaneous collection of local taxes.
[5] Total includes central government, state government, local government and social security funds.

Source: OECD, *Revenue Statistics 1965-2011* (Paris: OECD, 2012), Tables 77, 80, 81, and 83.

- countries, the range extends from a low of 1% in Greece and the Czech Republic to a high of slightly more than 35% in Sweden with the unweighted average being 11.8%.

The following observations can be made about taxation in OECD countries:

- Local governments in countries (federal and unitary) where local taxes are a relatively small percentage of total taxes generally have fewer expenditure responsibilities.
- The relative importance of local taxes in a country's overall tax system is generally less in federal countries than in unitary countries – in federal countries, state or provincial or regional governments collect some taxes which are in the domain of local government in unitary countries.
- Local property taxes play a more important revenue role (more than 57% of all taxes on average) in federal countries than in unitary countries (39% of all local taxes, on average).
- Local income taxes, on average, are considerably less important in federal countries (33% of all local tax revenues) vis-à-vis unitary countries (more than 36% of all local tax revenues).
- Local sales taxes are relatively less important on average in federal countries (6.5% of all local tax revenues) than they are in unitary countries (almost 20%). This difference reflects that the state/provincial/canton/regional level of government collects considerable sales tax revenue in federal systems; whereas, this source of revenue is more likely to be available to local governments in unitary countries.
- At the local government level, there is heavy reliance on income taxes in the Nordic countries whereas heavy reliance is placed on property taxes in countries that, in the past, were part of the British Commonwealth or significantly influenced by the British government.
- With a few exceptions, where local taxes are a comparatively high percentage of total tax revenue and GDP, local governments tend to rely more heavily on local income taxes.
- Local governments in some countries only have access to one tax (property or income) whereas local governments in other countries have access to two or three local taxes.
- Where local taxes account for more than 10% of all tax revenue, there is no common pattern. Local governments in some of these countries have access to a wide range of taxes and others have access to only one local tax.

No definitive conclusions can be drawn about patterns of local taxation across countries nor can anything be concluded about the appropriateness of one tax over another tax. Local government access to a specific tax or taxes is dependent on a number of things including the local government's capacity to administer the tax; the types of expenditures that local government must fund; the willingness of a senior level of government to assign taxes to local government; constitutional and legislative requirements; and other factors.

Appendix B: A Simple and Transparent Approach to Expenditure Needs Equalization[52]

The purpose of needs equalization is to enable local levels of government to provide approximately comparable levels of public services per unit of own revenue. A suitable equalization system should have the following features:

1) Be formula driven,
2) Be relatively simple and transparent,
3) Be based on readily measurable factors that are beyond the control of local governments,
4) Be immune to strategic behavior,
5) Be legislated for a fixed period, say, five years, and be subject to renewal

Expenditure needs equalization is complicated because, unlike revenue which has a monetary value, expenditures provide heterogeneous public services whose quality is difficult to compare across local governments. The analogue to the Representative Tax System (RTS) used for revenue equalization would be a Representative Expenditure System (RES), which would require calculating a set of representative expenditures across localities. This would be difficult. There is an approach that is very simple and understandable, and that relies mainly on readily available data. It approximates the RES approach in spirit, but is much easier to apply. Like the RES, it relies on what local governments actually do, but at the same time is based on factors over which individuals local government have no control.

The method works as follows. Suppose there are a variety of types of local governments varying by size and urbanization. The set of local governments can be classified by type (e.g., small urban, medium urban, large urban, rural, etc.) and expenditure needs equalization applied to each type. Consider one of those types. The basis for calculating needs for this type of locality is the total amount of local government expenditures for this, say, *G*. This amount *G* consists of different categories, such as education, social welfare, health, roads, and so on, such that $G = \sum_j G_j$ where G_j is the aggregate spending in category j.

Suppose that for a subset of spending categories needs indicators can be specified that roughly reflect the need for spending in the relevant category. For education, it could be the number of school age children; for health, the number of persons aged below 5 and above 65; for welfare, the size of the disabled and welfare dependent population; for roads, the number of km. of roads; and so on. Let the aggregate size of the need indicators for expenditure category *j* be $N_j = \sum_i N_j^i$, where N_j^i is the need indicator for locality *i*.

The calculation of needs for expenditure category *j* for each locality mimics the RES approach by first calculating an aggregate expenditure needs index as $E_j = G_j/N_j$. This is analogous to a cost per unit of needs index nation-wide for this class of locality. The expenditure need entitlement for expenditure category *j* for locality *i* is given by:

$$E_j^i = N_j^i E_j \qquad (1)$$

This calculation is done for each expenditure category for which needs indicators are defined. For categories for which needs indices are not defined, denoted by G_k, equalization needs are defined on an equal per capita basis. This is equivalent to specifying the needs indicator for these

[52] This Appendix is based on work done with Anwar Shah.

categories to be the population of the locality, P^i. Needs equalization for spending category *k* is then simply:

$$E_k^i = P^i \frac{G_k}{P} \qquad (2)$$

where *P* is aggregate population in all localities of this type. The aggregate expenditure needs equalization entitlement of locality *i* is then the sum of needs for all expenditure categories of types *j* and type *k* in (1) and (2):

$$E^i = \sum_j E_j^i + \sum_k E_k^i$$

The same calculation applies to all localities. Note that the sum of expenditure needs aggregated across all regions is actual total expenditures *G*.

Finally, the total equalization entitlement for region *i* is found by subtracting total expenditure needs E^i minus total revenue capacity (calculated by RTS). This can be thought of as a gap-filling calculation.

Equalization calculated in this way has some notable features.

1) Assuming the RTS is calculated for all revenue sources, the combination of revenue and needs equalization equalizes 100 percent of the differences among localities. In principle, total entitlements for high-income localities could be negative. However, if the vertical gap is large enough (i.e., expenditure needs are high enough relative to revenue-raising), full equalization can be achieved without requiring any negative equalization.
2) The absolute size of the equalization program as well as the entitlements of all localities is endogenous to the system.
3) The effective marginal equalization tax is 100 percent in the sense that increases in a locality's tax base reduces entitlements fully if the locality uses the national average tax rate, and changes in a locality's need index gives rise to offsetting changes in entitlements. As long as localities have limited ability to influence their need indices or their tax bases, this should not be a big problem. To the extent that incentives are a problem, it is more pronounced on the revenue than on the expenditures equalization side. In principle, this could be addressed by equalizing revenue capacity less than fully.
4) The choice of types of localities and the need indices are to some extent arbitrary and could be adjusted as time goes by.
5) Expenditure needs are equalized but costs are not. Whether costs should be equalized is a matter of dispute. Some have argued that costs are relevant where wage rates differ across localities. This could be addressed by adjusting entitlements by relative wage indices, although if a public sector wage index is used that could provide an incentive to increase wage rates.