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Development Charges in Ontario: Is Growth Paying for Growth?

Adam Found

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OF GLOBAL AFFAIRS & PUBLIC POLICY



UNIVERSITY OF
TORONTO

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The Neptis Foundation is an independent, privately capitalized charitable foundation located in Toronto, Ontario, Canada. Neptis conducts and disseminates nonpartisan research, analysis, and mapping related to the design and function of Canadian urban regions.

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Development Charges in Ontario: Is Growth Paying for Growth?

Adam Found

Abstract

Ontario's *Development Charges Act* (DCA) provides the legal framework within which municipalities recover growth-related capital costs from the new development giving rise to such costs. While the purpose of the DCA is to ensure that growth pays for itself, the way the DCA is designed prevents it from achieving its obvious goal. Because of its overly prescriptive and complex provisions, and because it forces municipalities to charge existing ratepayers for some of the costs of growth, the DCA undermines municipal efficiency, equity, and accountability. One barrier to legislative reform of the DCA is the absence in the literature of a rigorous economic rationale for funding growth-related capital works with development charges. This paper develops such a rationale by comparing development charges to alternative methods of cost recovery for growth-related capital works. A review of the shortcomings of the DCA leads to a recommendation that the DCA be replaced by a new development charges section in the *Municipal Act* and *City of Toronto Act* that would enhance municipal efficiency, equity, and accountability, and ensure growth really does pay its own way.

Keywords: development charges, growth, property taxes, user fees, municipal finance

JEL codes: H21, H54, R11

Development Charges in Ontario: Is Growth Paying for Growth?

I. Introduction

The principles of efficiency, equity, and accountability in government underlie many policy positions, including the prescription that municipal services should be paid for by those who benefit from or otherwise create the need for the services. A growing municipality is expected to recover growth-related operating and capital costs from the new developments that give rise to them, although this recovery occurs in various ways across municipalities in terms of the mix of revenue tools and methods employed.

The primary fiscal challenge with extending a municipal service to new developments concerns the cost of the *initial* capital investment required to expand service capacity or restore existing excess service capacity. It is these capital costs, rather than those related to renewal or replacement of utilized capacity, that are considered “growth-related.”

If growth-related capital costs are not allocated specifically to new residents and businesses, they are pooled with other municipal costs and incorporated into user fees and property taxes paid by all ratepayers. This pooled approach to recovering growth-related capital costs is problematic because growth occurs incrementally over time, whereas growth-related capital works are installed with excess capacity at a single point in time, usually well in advance of growth.

Since growth occurs incrementally and is subject to municipal levies only after it materializes, it generates insufficient user fee and property tax revenue to fund upfront growth-related capital costs. The resulting revenue shortfall is hence shifted to existing ratepayers through higher user fees and property taxes, causing a fiscal distortion I call the “non-concurrence externality,” because its source is the timing inconsistency between growth and growth-related capital works. This burden on existing ratepayers is not only inequitable, but also leads to inefficiently low municipal service levels and other related problems for municipalities and the development industry.

Municipalities can overcome the non-concurrence externality by using development charges (DCs) to recover growth-related capital costs.¹ Used in conjunction with user fees and property taxes, DCs are one-time fees levied by municipalities on new development. The one-time nature of DCs makes them immune to the timing inconsistency between growth and growth-related capital works. Among Ontario’s growing municipalities, the widespread use of DCs suggests a strong preference for them compared with user fees and property taxes

1 A detailed treatment of DCs and similar fees levied by non-municipal entities such as school boards is beyond the scope of this study.

for the recovery of growth-related capital costs . This pattern is consistent with a desire to avoid the non-concurrence externality.

In Ontario, DCs are governed by the *Development Charges Act* (DCA) and its associated regulation (O. Reg. 82/98). But because of various exemptions, discounts, loopholes, omissions, and restrictions, the DCA and its regulation do not, in fact, ensure that growth pays for growth. The DCA instead forces existing ratepayers to subsidize growth, thereby undermining the principles of municipal efficiency, equity, and accountability.

The Province of Ontario can resolve this situation by taking the following actions:

1. Repeal the DCA and replace it with a section on DCs added to the *Municipal Act* and *City of Toronto Act* to consolidate municipal finance legislation and place DCs under the powers and flexibility generally afforded to municipalities by these acts.²
2. Ensure that this new DC section is created through meaningful consultation with municipalities and other stakeholders; provides for municipal accountability, autonomy, and policy flexibility; is permissive rather than prescriptive; and is simple, circumscribed, and reflective of the principle that growth is to pay for itself.

The outcome of these actions would be a municipal sector in a stronger position to manage growth in alignment with the principles of efficiency, equity, and accountability.

2. Economic Rationale for Development Charges

This section explains the economic rationale for DCs as a cost recovery tool, sets DCs within the broader municipal finance context, and demonstrates the important role of DCs as a complement to (rather than a substitute for) user fees and property taxes.

2.1 Local vs. non-local growth-related capital works

In Ontario, responsibility for providing growth-related capital works is shared between developers and municipalities. A distinction is drawn between local and non-local growth-related capital works:

1. **Local growth-related capital works:** These are referred to as “local services” in the DCA; they are capital works that form an integral part of a particular development and are not oversized to serve other developments as well. Local growth-related capital works are provided by developers, and the assets (such as streetlights and 150mm water mains) thereby created are located within or adjacent to the development site they serve. These assets are provided in

² A similar provision could be added to the *Education Act* as school boards are also able to levy DCs.

accordance with the *Planning Act* and are subject to municipal standards as set out in development agreements. Ownership of these assets is transferred to the municipality when the development is complete.

2. **Non-local growth-related capital works:** These are capital works that serve multiple developments; they are provided by the municipality. These assets (such as bridges or water and sewage treatment plants) are usually outside, and sometimes distant from, development sites. To pay for such assets, municipalities take one of the following approaches:
- (a) Levying DCs on development when it occurs, and placing the DC revenue into a special reserve until it is used by the municipality for future growth-related capital works or debt servicing related to past growth-related capital works.
 - (b) Delegating this work to developers through cost-recovery or front-ending agreements, which ensure that municipal standards are met. These agreements compensate developers through (1) payments from the municipality, or (2) DC credits recognized by the municipality, or (3) compulsory payments from other developers whose developments are also served by the capital works, or (4) some combination of these methods.³ This approach allows municipalities to delegate to the development industry the construction of large growth-related capital works that would otherwise not proceed or would not proceed as quickly given municipalities' fiscal capacity and project management constraints.

The DCA requires municipalities to determine the division of growth-related capital works between local and non-local categories. They usually do so through local service policies embedded in the studies that set DC rates. In this paper, I use the term “growth-related capital works” to mean non-local growth-related capital works.

2.2 *Rationale for segregated recovery of growth-related capital costs*

Ontario's municipalities are permitted to recover growth-related capital costs either through pooled or through segregated approaches to cost recovery.

- *Pooled cost recovery*, which combines growth-related and non-growth-related municipal costs, is implemented through general municipal user fees and property taxes.
- *Segregated cost recovery* isolates growth-related capital costs and funds them using DCs or similar charges, or through special user fees or property taxes.

Ontario's growing municipalities have overwhelmingly adopted the segregated approach by way of DCs, and recover non-growth-related costs through user fees and property taxes .

3 This approach is economically equivalent to levying DCs.

Non-concurrence of growth and growth-related capital works

Given the indivisible or “lumpy” nature of major municipal capital assets, municipal service capacity cannot be expanded incrementally to match the gradual progression of growth. Growth-related capital works, such as water treatment plant expansion and road widening, are oversized at the time of creation because of minimum capacity constraints driven by one or more of the following factors:

1. **Engineering considerations:** Municipal capital works subject to physical indivisibilities must occur at a minimum scale if they are to provide any capacity at all. For instance, bridges, road lanes, and traffic lights are all-or-nothing structures; there is no such thing as a bridge of partial span, a road lane of partial width, or an incomplete set of traffic lights. Capital works such as these are therefore typically installed with excess capacity.
2. **Legal considerations:** Some municipal services are heavily regulated by the province whereby capital expansions to them are required to achieve certain minimum capacities. For instance, water and sewage systems must be expanded long before they reach their maximum approved capacity in use and are subject to prescriptive and technical regulations setting out minimum performance and capacity standards.
3. **Cost considerations:** Some municipal capital works are subject to economies of scale and thus installed with excess capacity to minimize long-run costs. For instance, given the prohibitive long-run cost of repeated excavation and replacement of trunk sewers in response to incremental increases in sewage flows, trunk sewers are installed infrequently and thus need considerable excess capacity. Similarly, to prevent undue congestion of municipal services (an implicit cost), capital works are often installed in advance of some or all of the growth giving rise to them, thus creating excess capacity.

Minimum capacity constraints on expansionary municipal capital make it impossible to match growth-related capital works with growth continuously over time. Growth-related capital works are therefore typically oversized as they are constructed upfront to create capacity for multiple years of growth; full utilization of the added capacity might not be reached until well into the lifecycle of these works. This paper uses the term “non-concurrence” to refer to the timing inconsistency between growth and growth-related capital works.

Pooled cost recovery and the non-concurrence externality

If growth-related capital works could be installed incrementally to match the gradual progression of growth, then it would not matter whether a pooled or segregated approach is used to recover growth-related capital costs, all else being equal. Growth-related revenues and costs would match in any given year.

In reality, however, growth-related revenues are inadequate to recover the corresponding costs under pooled cost recovery. Since growth-related capital works create excess capacity upfront while growth generates revenue only after it

materializes, the cost of these works is front-ended, whereas cost recovery from growth is back-ended. This timing mismatch means growth generates insufficient revenue over the growth horizon to recover corresponding growth-related capital costs, and the shortfall is shifted to existing ratepayers in the form of higher user fees and property taxes. This fiscal distortion, the non-concurrence externality, causes the following inefficiencies:

1. **Reduced service levels and growth:** Existing ratepayers respond to inflated user fees and property taxes with demands to reduce municipal services below efficient levels. Reduced municipal services depress property values and discourage growth. Growth is depressed even further as municipalities respond by slowing or halting development approvals.
2. **Diminished fiscal capacity:** The shifting of growth-related capital costs to existing ratepayers imposes secondary inefficiencies on municipalities in the form of diminished fiscal capacity and an increased risk of debt regulation violations, credit downgrading, or even financial insolvency. These effects increase borrowing costs, further diminishing service levels and growth.
3. **Increased service congestion:** If a municipality tries to mitigate the non-concurrence externality by investing in growth-related capital works *after* the associated growth occurs (which is feasible for services other than water and sewage systems), existing and new ratepayers experience increased service congestion. Although such congestion is a non-monetary cost, it is a cost nonetheless, and one largely borne by existing ratepayers.

Alongside these inefficiencies is a sharp inequity between new and existing ratepayers as the latter group is burdened with a considerable portion of the former group's costs.

For example, consider a hypothetical municipality providing water treatment for households. For simplicity, let us assume the municipality has only residential ratepayers, amortizes the replacement cost of water treatment capital through debt financing, and sets uniform user fees per unit of consumption on a full-cost-recovery basis.⁴ Let us further assume current water treatment capital costs of \$100/month/household upon amortization over the capital's expected lifecycle. Under full cost-recovery, this translates into an average capital user fee of \$100/month/household in the absence of growth.

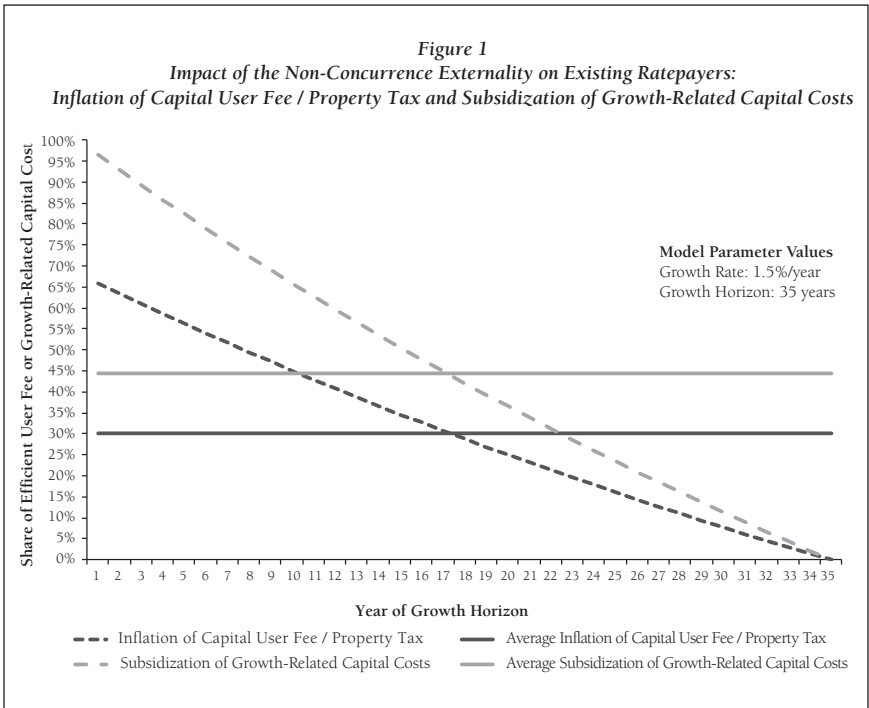
Suppose existing water treatment capacity is fully utilized by existing households. Requirements for expanded water treatment works impose a minimum added capacity that accommodates 35 years' worth of growth at a growth rate of 1.5 percent a year. Further suppose the municipality recovers growth-related capital costs by pooling them with all other costs for water treatment and the expected life of the capital expansion exceeds 35 years. If, hypothetically, all 35 years' worth

⁴ The model provided in the Appendix shows the results derived using this example.

of growth occurred at the time of expansion, the average capital user fee would be the same as in the absence of growth (that is, \$100/month/household). In this unrealistic scenario, efficiency and equity are preserved.

But growth is actually occurring at a rate of 1.5 percent a year. As shown in Figure 1, the average capital user fee is now about \$130/month, representing an increase of 30 percent. This increase occurs because households added to the municipality are on average subject to user fees for about half the growth horizon. Under pooled cost recovery, growth pays for about 56 percent of the water treatment expansion, and the remaining 44 percent of the cost must be borne by existing households. Given the recurring nature of capital expansion, the municipality would be expected to stabilize the user fee at the average level required over the long run for full cost recovery – in this case \$130/month/household. Even with user fee stabilization, it is difficult to imagine that ratepayers would tolerate such departures from efficiency and equity.

By comparison, segregated cost recovery insulates existing ratepayers from growth-related capital costs. Segregated cost recovery must, however, take a specific form; otherwise, the non-concurrence externality will be concentrated on new households rather than overcome, as discussed in the next subsection.



2.3 Rationale for development charges as a segregated cost recovery tool

A detailed review of the methodologies underlying the attribution of capital costs between new and existing ratepayers and across development classes (residential, commercial, etc.) is beyond the scope of this paper, as is a detailed examination of the methodologies by which DC rates for different municipal services and service areas are calculated by development class. This is not to dismiss the significance of the detailed structure and operation of DC regimes, but rather to recognize that these facets merit separate examination outside the present study.

Segregated cost recovery based on user fees or property taxes

Unlike pooled cost recovery, segregated cost recovery isolates growth-related capital costs and protects existing ratepayers from the non-concurrence externality. Using the same example, but now assuming segregated cost recovery in the user fee system, the average user fee remains at \$100/month for existing households but increases to more than \$500/month for new households (see the Appendix for calculations).

As user fees and property taxes are paid on an ongoing rather than one-time basis, segregated cost recovery based on these tools results in high levies on new households to ensure full recovery of growth-related capital costs. This concentrated version of the non-concurrence externality produces the following inefficiencies:

- 1. Reduced growth:** Through property markets, the feedback effect of inflated user fees and property taxes levied on new ratepayers depresses developable property values and growth.
- 2. Delayed growth:** The inflation of user fees and property taxes levied on new ratepayers means that early growth subsidizes later growth. This effect introduces distortions into the timing of growth and, by extension, growth-related capital investment. In particular, delays can occur, since growth that takes place later in the growth horizon can free-ride on the over-contributions made by earlier growth. Such a back-ending of growth inflates user fees and property taxes even further, as it diminishes timely revenue generation from growth.

Overcoming the non-concurrence externality requires a segregated cost recovery tool that is not susceptible to the distortions arising from the different timing of segments of growth over the growth horizon.

Segregated cost recovery based on development charges

To be immune to the non-concurrence problem, a segregated cost recovery tool must recover growth-related capital costs irrespective of the timing of growth, and thus be levied on a one-time basis on growth when it occurs. This is the defining property of development charges (DCs).

DCs are levied on development on a one-time basis to recover associated growth-related capital costs. DC payments are qualitatively equivalent to the costs developers routinely incur to provide local capital works. Since property owners need municipal services, the present value of anticipated municipal services and their corresponding costs are incorporated into the price of property. So long as existing and prospective property owners sufficiently value municipal services, the expectation is that municipal costs – whether in the form of local capital works investment, DCs, user fees, or property taxes – will ultimately be paid by property owners. On efficiency and equity grounds, this is the desirable outcome.

In our water treatment example, user-fee-based segregated cost recovery resulted in new households facing an average user fee more than five times that faced by existing households for identical service levels. If DCs are used instead, each new household pays a one-time DC at the time of development and user fees on an ongoing basis thereafter.

To ensure full cost recovery from growth, the water treatment DC would be the cost per household of the capital expansion. To preserve the efficiency of the prevailing service levels extended to new residents, the prevailing user fees would likewise be extended to new households. To prevent overpayment for capital expansion, new households would receive an annual capital user fee rebate based on the average amortized cost per household of the capital expansion.⁵ The rebate would be terminated once the capital expansion is due for replacement.⁶ Since no single household's consumption can appreciably influence the rebated amount, consumption will be as efficient in new households as it is in existing households.⁷

Working through this example demonstrates how the non-concurrence externality is overcome equitably when DCs are levied in conjunction with well-structured user fees and property taxes.

3. Common Misconceptions about Development Charges

DCs have been the subject of numerous misconceptions, often because the non-concurrence externality has been overlooked. This section addresses five common misconceptions about DCs that, in the author's view, are amenable to economic analysis.

3.1 Misconception 1: Development charges are inferior to user fees and property taxes

Arguments advanced by opponents of DCs overwhelmingly rely on the assumption that DCs are inferior to user fees and property taxes for funding growth-related

5 The Ontario Energy Board requires local electricity distribution utilities to provide similar credits to correct overcharging of growth for expansionary capital works.

6 As with other capital works in our water treatment example, future replacement of growth-related capital is debt-financed, pooled with other costs, and entirely incorporated into user fees.

7 Only a small amount of inequity among new households will remain, because of variances in the extent to which actual consumption by a household differs from average consumption.

capital costs (Amborski, 2011; Clayton, 2014; Dachis, 2018; Fathers, 2014). As increased user fees and property taxes are essentially the only viable alternatives to DCs, most if not all policy prescriptions to eliminate DCs rest on the validity of this assumption. The non-concurrence externality, however, renders this assumption, and by extension all prescriptions relying on it, invalid.

DC opponents generally assert that municipalities use DCs to artificially lower user fees and property taxes and or enhance municipal services for the exclusive benefit of existing ratepayers. In fact, the economic function of DCs is quite the opposite. As demonstrated in the previous section, DCs enable municipalities to recover growth-related capital costs in a way that maintains user fees and property taxes at appropriate levels, preventing the subsidization of new ratepayers by existing ratepayers. Contrary to assertions of DC opponents, DCs therefore help municipalities keep their services at efficient levels.

User fees and property taxes would be higher if growth-related capital costs were pooled with other municipal costs, resulting in inefficiently low service levels and growth. In our water treatment example, pooled cost recovery caused capital-related user fees to increase by about 30 percent for all users and required existing ratepayers to bear about 44 percent of growth-related capital costs. According to calculations by Clayton (2014), if pooled cost recovery replaced DCs, water and sewage user fees in the Regional Municipality of Halton would increase by 10 percent a year instead of 5 percent over the period 2014 to 2023. Halton's water and sewage user fees would be almost 60 percent higher in 2023 as a result. It would be unrealistic to expect Halton ratepayers to accept such an outcome that serves only to subsidize growth and compromise service levels.

Moreover, DCs do not influence consumption decisions at the margin, so they cannot cause new or existing ratepayers to demand inefficient service levels; such demands are influenced by user fee and property tax rates, which are levied at the margin on an ongoing, long-run basis. If municipal service inefficiency is a concern, then a review of service delivery, user fees, and property taxes is in order, after which DCs could be adjusted to reflect revised service levels and funding structures.

3.2 Misconception 2: Development charges erode housing affordability

A widely shared view among DC critics is that DCs erode housing affordability by inflating the prices of new and existing housing (Amborski, 2011; Clayton, 2014; Dachis, 2018; Fathers, 2014). This view is based on the assumption that DCs are an excise tax and nothing else, and that housing affordability is about housing prices and nothing more. This approach has two main flaws.

First, it ignores the fact that the present value of anticipated municipal service benefits (net of corresponding costs) is incorporated into the demand for housing in any given municipality. Second, it equates affordability with house prices, ignoring the rate of housing development and how it is impacted by the value of municipal services. Since housing and municipal service packages are jointly consumed, a better definition of housing affordability would be the degree

to which prospective homebuyers find their preferred bundle of housing and municipal services available and supplied at prices they are willing to pay. This definition recognizes that housing affordability depends on the availability of housing and not just housing prices.

All else being equal, the elimination of DCs would decrease new housing prices and thus increase the rate of housing development. However, all else does not remain equal, for two reasons. First, the non-concurrence externality will arise, meaning user fees and property taxes will increase and municipal service levels will decrease, thereby weakening housing demand and thus reducing the rate of housing development. Second, since any decline in net municipal service benefits adversely impacts existing ratepayers, municipalities will slow or halt housing development approvals, thus further reducing the rate of housing development. The elimination of DCs is therefore almost certain to harm homebuyers in the long run by reducing housing affordability, as measured by housing availability.

3.3 Misconception 3: Development charges are levied to subsidize existing ratepayers

DC opponents assert that municipalities levy DCs in order to subsidize existing ratepayers at the expense of growth (Amborski, 2011; Clayton, 2014; Dachis, 2018; Fathers, 2014). Municipalities do this, they further assert or imply, in the belief that DCs are ultimately paid by profitable developers rather than those who purchase newly developed property. As previously demonstrated, the economic function of DCs is quite the opposite; DCs help prevent the subsidization of growth by existing ratepayers.

The above assertion is, moreover, at odds with Ontario municipalities' stated intentions, as found in official publications and online information. The author's review of DC studies and municipal websites indicates that municipalities clearly understand that DCs are intended to allocate growth-related capital costs, and only those costs, to growth. A similar finding arises from a review of the websites of reputable municipal associations such as the Association of Municipalities of Ontario (AMO) and the Municipal Finance Officers Association of Ontario (MFOA). None of the DC-related materials reviewed suggest that municipalities levy DCs for improper reasons or that they portray DCs as a means of extracting surplus profit from developers or subsidizing existing ratepayers.

These findings align with the consensus among empirical studies: that developers ultimately pass DCs onto the purchasers of newly developed property (Dachis, 2018; Watson and Associates, 2004). Indeed, this is the desirable outcome, as these purchasers ultimately benefit from expansions to municipal services.

3.4 Misconception 4: Electricity distribution utilities fund expansion without development charges

Amborski (2011), Clayton (2014), and Dachis (2018) recommend pooling the cost of municipal water and sewage service expansions with non-growth-related costs,

arguing that other utilities, such as those providing natural gas and electricity, take this approach to funding expansions and other growth-related upgrades to their systems. To support this position, Clayton (2014) studied two Ontario electricity distributors, Toronto Hydro and PowerStream (now Alectra), and noted that they incorporate growth-related capital costs into general user fees. This approach gives rise to the non-concurrence externality and thus to inflated user fees for customers of these utilities.

A broader review reveals that pooled cost recovery is not the norm in Ontario's electricity distribution industry; many electricity distributors charge DC-equivalent fees to pay for expansions and other growth-related upgrades to their systems. For instance, Hydro One, by far the largest electricity distributor in Ontario, requires developers to provide, or engage Hydro One to provide, local capital works and to pay Hydro One for other "system enhancement and expansion costs." Whitby Hydro, London Hydro, and Hydro Ottawa, among many others, use similar system upgrade and expansion fees, known as "capital contributions," which are DCs in all but name (Hydro Ottawa, 2017; London Hydro, 2018; Whitby Hydro, 2017). In fact, the Ontario Energy Board explicitly permits electricity distributors to require capital contributions from developers to pay for expansions and other growth-related system upgrades (Ontario Energy Board, 2018).

Proposing that municipalities recover growth-related capital costs in a manner similar to that used by Ontario electricity distributors would appear to support rather than weaken the case for DCs.

3.5 Misconception 5: Development charges ought to reflect economic benefits generated by growth

Growth brings a multitude of economic benefits unrelated to municipal services but shared between new and existing ratepayers. Clayton (2014) and Amborski (2011) suggest that existing ratepayers ought to share the burden of municipal growth-related costs because they receive economic benefits generated by growth.

This reasoning omits the following essential considerations: (1) growth can cause congestion in municipal services and in the community more generally (for example, increased pollution) and (2) economic benefits (often in the form of agglomeration economies) are generated by the existing community and shared with new developments. These considerations offset the benefits conferred by growth on the existing community, and must be recognized as part of a broader economic understanding of growth.

As municipalities cannot determine the exact net economic benefits of growth, any prescribed shift of growth-related costs onto existing ratepayers in recognition of such benefits would be arbitrary. Such complex economic calculations must be left to property markets, in which locational economic benefits are capitalized into land values. Since property markets adjust to account for existing and anticipated locational economic benefits, there is no need for municipalities to intervene by allocating an arbitrary share of growth-related costs to existing ratepayers. As their

function is strictly the recovery of municipal growth-related capital costs, DCs indeed should be formulated without regard to the economic benefits generated by growth.

4. Assessing Ontario's Development Charges Act

Although DCs are useful for allocating growth-related capital costs appropriately and overcoming the non-concurrence externality, in practice they are effective only insofar as they accurately reflect and recover such costs. In this section, I assess Ontario's DCA (and its regulation O. Reg. 82/98) by how well it facilitates the incorporation of growth-related capital costs into DCs. Based on this assessment, I propose legislative reform for DCs.

4.1 Cost recovery deficiencies of the Development Charges Act

MFOA and AMO recognize the cost-recovery deficiencies of the DCA and have lobbied the Province of Ontario for much-needed DC reform (AMO, 2018; MFOA, 2013). According to MFOA (2013), three particular provisions in the DCA result in DCs recovering only about 80 percent of growth-related capital costs.⁸ This figure actually understates the overall cost-recovery deficiency because it does not reflect other DCA provisions, such as exempted growth, that further erode the recoverability of growth-related capital costs. The remainder of this subsection identifies notable exemptions, discounts, loopholes, omissions, and other restrictions in the DCA that compromise the recovery of growth-related capital costs from new developments.

Exempted growth

The DCA exempts certain developments from DCs, such as the following types of residential development: enlargement of an existing dwelling unit⁹; creation of up to two additional dwelling units within an existing single-detached dwelling; creation of up to one additional dwelling unit within an existing residential building; and (pending proclamation by the Lieutenant Governor) creation of a second dwelling unit within a new residential building. An exemption for certain enlargements of existing industrial facilities is also granted.¹⁰ Finally, the DCA exempts developments on land owed or used by municipalities or school boards.

8 The three provisions referred to by MFOA are (1) ineligible services, (2) 10 percent final deduction, and (3) truncated service levels, each of which is discussed in this section.

9 Within a given class of residential dwelling units, if municipal service usage is not expected to increase with increased dwelling unit size, there is no need to levy DCs on dwelling unit enlargements.

10 If the gross floor area of the enlargement is less than or equal to 50 percent of the original facility, the enlargement is exempt from DCs; otherwise, the DC that would otherwise apply to the enlargement is reduced by $\frac{1}{2}A_0/(A_1 - A_0)$ percent, where A_0 and A_1 are the original and enlarged gross floor areas, respectively.

Municipalities could, in theory, offset exemption-related shortfalls in DC revenue by simply excluding the exempted growth from the growth forecast, thereby raising DC rates. The DCA, however, prohibits municipalities from taking this course, forcing municipalities to instead make up for the shortfalls by increasing user fees and property taxes paid by existing ratepayers.

Ineligible services and capital works

The DCA designates certain municipal services and capital works as ineligible for DC funding: cultural and entertainment facilities such as museums, theatres, and art galleries; tourism facilities, including convention centres; land for parks¹¹ and woodlots; hospitals; landfills and waste incinerators; headquarters for general administration (such as city halls); computer equipment; and any rolling stock with an expected useful life of less than seven years.

Deductions from growth-related capital costs in recognition of grants and other contributions

Before a municipality can incorporate the cost of a capital work into the DC calculation, the DCA requires that the cost be reduced by the amount of any grant, subsidy, or other contribution made to or anticipated by the municipality for that capital work. The only exception occurs if the contributor explicitly indicates, at the time the contribution is made, how the contribution is to be shared between existing and new development, in which case the growth-related and non-growth-related portions of the capital cost are reduced by the amounts of the contribution respectively designated for these portions.

In the author's experience, contributors to capital works seldom specify how their contributions are to be shared between existing and new development. Since contributions are generated exclusively by existing development, they ought to be designated for existing development by default on equity grounds, unless the contributor explicitly intends otherwise.

Truncated planning horizons

For many municipal services, the planning horizon used to forecast growth and growth-related capital needs is limited to 10 years under the DCA, with the following exceptions: water, sewage, stormwater, roads, electrical power, policing, and fire protection. The 10-year limit applies to so-called "soft" services (such as libraries and parks) which are generally not necessarily required in advance of growth. Municipalities tend to allow such services to become somewhat congested before expanding them.

Truncation of the planning horizon results in the exclusion from the DC formulation of capital works required for growth over the allowable 10-year

¹¹ In accordance with the *Planning Act*, land for parks or cash-in-lieu can be acquired from developers as a condition of development.

period, but expected to be constructed after that period. Only when the capital work in question is captured by the allowable planning horizon can it be included in the DC formulation. By this time, a portion of the growth the capital work is intended to serve may have become existing development, reducing the amount by which the cost of the capital work can be recovered by DCs.

Truncated and ill-defined service levels

Taking growth as given, anticipated municipal service levels are the key drivers of growth-related costs. Yet when municipalities set DC rates, the DCA requires them to assume the same service levels as those provided on average over the 10-year period preceding the DC formulation, unless legislation requires future service levels to exceed the historic average. A recent amendment to the DCA lifts this restriction for transit service only, allowing planned service levels to be used in that case. Otherwise, the growth-related capital costs incorporated into DCs must exclude any increases to service levels compared with those provided on average over the previous decade.

This restriction is especially problematic when growth triggers the need to commission a new municipal service, such as a new arena, airport, water or sewage system, or solid waste collection service. With the historic service level being nil by definition for such a service, existing ratepayers are forced to pay for the entire initial capital cost of the service, even though growth has triggered and will proportionately benefit from the service. A much more reasonable approach would be to permit DC formulation to be based on planned rather than historic service levels. The fact that the province recently amended the DCA to permit this for transit DCs is effectively an admission of the problem caused by the historic service level approach to DC formulation.

Furthermore, the DCA defines service level simply as the replacement cost of the asset portfolio supporting the municipal service in question. This narrow definition is based on service inputs rather than output, and ignores trade-offs between capital and operating costs, the multidimensional nature of municipal service outputs, and the potential for economies or diseconomies of scale in service production. By restricting the measurement of service levels to asset replacement cost, the DCA prevents municipalities from ensuring that DCs accurately reflect service levels as understood by existing and prospective ratepayers and as set by municipalities.

Ineligibility of existing excess capacity

The DCA requires municipalities to reduce growth-related capital cost estimates entering DC calculations by an amount commensurate with existing excess capacity that is not “committed” excess capacity and is available to service growth. As per O. Reg. 82/98, existing excess capacity is considered “committed” only if the council of the municipality expressed a clear intention, before or upon creation of the excess capacity, that the costs of the excess capacity would be recovered by

DCs or similar charges. While at first this restriction might seem innocuous, it is in fact highly problematic for municipalities.

For example, consider a sewage treatment plant constructed in the 1980s, for which 50 percent of the capacity was excess capacity reserved for growth. Suppose the plant's construction was entirely grant-funded, as was largely the case during 1974-1992 for water and sewage system capital works in Ontario (Kitchen, 2017). As the project was entirely grant-funded, it was not included in the municipality's DC calculations, even if it had had DCs at that time. As the DCA was enacted in 1997, the municipality would not have designated the excess capacity as "committed" in accordance with the provisions of O. Reg. 82/98.

Suppose that current utilization of the plant is at 90 percent of its capacity and a provincial mandate requires the plant to be replaced and expanded. Although the cost of the expansion can be recovered through DCs, the cost of replacing the 10 percent of capacity that is existing excess capacity would be ineligible for inclusion in DCs and thus paid for by existing users, even though the associated benefits will flow to new development only.

Excess capacity arises in existing municipal assets when previously utilized or committed capacity becomes available for growth or increased growth, respectively. This could occur for any number of reasons. For example, excess capacity in a water system arises when demand by existing ratepayers is reduced by water conservation measures, or in a sewage system when stormwater inflow and infiltration into sanitary sewers is reduced (for example, by relining pipes). Similarly, excess capacity in roads is created when transit enhancements mitigate increases in traffic volumes.¹²

At the time of an asset's installation, municipalities cannot be expected to predict if, when, or to what extent the asset might develop excess capacity during its long life, given constantly evolving technologies and municipal service demands. As municipalities cannot know in advance what excess capacity might arise long into the future, the "committed" excess capacity designation standard imposed by O. Reg. 82/98 is effectively unattainable. No matter how excess capacity arises in existing municipal assets, therefore, the cost of its restoration is invariably picked up by existing ratepayers because of the excess capacity restrictions in the DCA.

The DCA thus forces existing ratepayers to subsidize growth by providing existing excess capacity often without charge, which is inequitable. This problem,

12 Existing excess capacity is particularly notable for roads, especially two-lane arterial and collector roads. As roads must have a minimum of two lanes to provide any level of capacity safely, they usually have excess capacity when constructed. Today, most roads, some initially built more than 150 years ago, remain two-lane simply because they retain some excess capacity. Given the extensive network of two-lane roads built before 1997, the DCA makes a vast amount of excess capacity in roads ineligible for inclusion in DCs. Similarly, the DCA also designates as DC-ineligible the restoration of existing excess capacity in municipal assets (such as bridges and trails) for which excess capacity tends to persist through multiple asset lifecycles (as marked by renewals and replacements).

moreover, frustrates municipalities' efforts to comply with provincial mandates for greater intensification of development because such intensification (for example, infill development) is often enabled by existing excess capacity in municipal assets, such as roads, situated in built-up areas.

Final deduction from growth-related capital costs for certain services

Regarding municipal services subject to the 10-year planning horizon restriction, once the foregoing reductions in growth-related capital costs have been taken into account, the DCA arbitrarily requires a further 10 percent deduction from these costs prior to the calculation of DCs. According to the Ontario Ministry of Municipal Affairs and Housing, this 10 percent deduction is based on a recognition that growth-related capital works benefit both new and existing ratepayers (Ontario, 2013). This rationale, however, is unconvincing since the DCA *already* requires capital costs entering DC calculations to be reduced by the amount attributable to existing ratepayers.

Inflexibility in updating development charges for changing capital costs

Municipalities operate in a constantly changing environment. Whether precipitated by legislative reform, market adjustments, or shifting ratepayer preferences, changes in anticipated capital costs are an ever-present reality for municipalities. Effective management of these changes requires flexibility and responsiveness.

With its excessively prescriptive approach and unnecessary complexity, the DCA stymies attempts by municipalities to remain flexible and responsive. The problems include the protracted and pedantic process required for updating DC rates and the restriction of DC rate indexation to a single Statistics Canada price index, regardless of whether it accurately reflects capital cost inflation. A limited ability to update DCs as responsively as they can update user fees and property taxes unnecessarily shackles municipalities with financial and service level inflexibilities.

4.2 Legislative reform for development charges

Among developers, municipalities, and academics, the only broad consensus about DCs in Ontario is the need for legislative reform. The DCA's numerous cost-recovery deficiencies, its excessively prescriptive nature, and its unnecessary complexity strongly suggest the appropriate policy prescription is repeal. What should be instituted to fill the gap?

It is noteworthy that with the exception of DCs, all other major municipal capital funding tools – user fees, property taxes, capital charges, and local improvement levies – are governed by the *Municipal Act* and the *City of Toronto Act*. The scope of these acts should be increased to include DCs upon repeal of the DCA. The *Municipal Act* and *City of Toronto Act* could be amended with an added section pertaining to DCs, thus providing for greater consolidation of municipal finance legislation. This reform would also allow municipalities the same flexibility

in relation to DCs as that offered by the *Municipal Act* and *City of Toronto Act* in relation to other funding tools.

Design of a new DC section for the *Municipal Act* and *City of Toronto Act* would benefit tremendously from meaningful consultation with municipalities and other stakeholders. While such a design is beyond the scope of this paper, it should reflect the principles of efficiency, equity, and accountability, and allow greater flexibility in the formulation of DCs as other sections of the *Municipal Act* and *City of Toronto Act* do for user fees and property taxes. It should also be simple and based on the principle that growth should pay for itself. A sensible starting point would be the elimination of the many provisions in the DCA that erode the effectiveness of DCs. Only once the “growth-pays-for-growth” prescription is fully respected in municipal finance legislation can DCs reach their full potential as an effective tool for recovering growth-related capital costs.

Conclusions

This paper offers a simple yet compelling economic rationale for DCs. At the centre of this rationale is what I call the “non-concurrence externality,” a fiscal distortion arising from the pooling of growth-related and other municipal costs, since growth and growth-related capital works do not coincide over time. This distortion causes inflated user fees and property taxes, which in turn place downward pressure on municipal service levels and cause the subsidization of growth by existing ratepayers. DCs enable municipalities to overcome the non-concurrence externality. Effective use of DCs in conjunction with user fees and property taxes ensures that growth pays for growth-related capital works in the most efficient and equitable manner reasonably achievable.

A critical assessment of the DCA identified several cost recovery deficiencies. Based on this assessment, the paper recommends that the DCA be repealed in favour of a well-designed DC section in the *Municipal Act* and *City of Toronto Act*. This legislative change would consolidate municipal finance legislation and extend to DCs the flexibility municipalities possess in relation to user fees and property taxes. It would also restore municipalities’ autonomy over the recovery of growth-related capital costs and enhance their accountability more generally.

For more than 20 years, the DCA has forced Ontario’s municipalities to subsidize growth to the detriment of existing ratepayers and even the development industry. Both municipalities and the development industry are stronger when growth-related capital costs are recovered by DCs set within well-structured municipal funding regimes. For the good of existing and prospective ratepayers, the full potential of DCs must be realized to ensure growth pays its own way.

6. Works cited

- Amborski, D. (2011). *Alternatives to Development Charges for Growth-Related Capital Costs*. Residential and Civil Construction Alliance of Ontario.
- AMO. (2018). *Development Charge Reform: Growth Must Pay for Growth*. Retrieved October 26, 2018, from: <https://www.amo.on.ca/AMO-Content/Backgrounders/2018/DevelopmentChargeReform>
- Clayton, F. (2014). *New Direction for Funding Growth-Related Water and Wastewater Infrastructure in the Greater Toronto Area and Hamilton*. Toronto: Centre of Urban Research and Land Development, Ryerson University.
- Dachis, B. (2018). *Hosing Homebuyers: Why Cities Should Not Pay for Water and Wastewater Infrastructure with Development Charges*. Toronto: C.D. Howe Institute.
- Fathers, F. (2014). *Residential Development Charges Lead to a Hidden Tax for City Residents*. Vancouver: Fraser Institute.
- Hydro One. (2018). *Connecting Your Subdivision*. Retrieved October 26, 2018, from <https://www.hydroone.com/business-services/builders-and-contractors/subdivisions>
- Kitchen, H. (2017). *Paying for Water in Ontario's Cities: Past, Present and Future*. Toronto: Institute on Municipal Finance and Governance, University of Toronto.
- Hydro Ottawa. (2017). *Conditions of Service*. Retrieved October 26, 2018, from <http://static.hydroottawa.com/documents/corporate/policies/HOL-COS-V6-EN-FINAL-04-01-2017.pdf>
- London Hydro. (2018). *Conditions of Service*. Retrieved October 26, 2018, from <https://www.londonhydro.com/site/binaries/content/assets/lhcontent/pdfs/conditionsofserviceaugust2018.pdf>
- MFOA. (2013). *Frozen in Time: Development Charges Legislation Underfunding Infrastructure 16 Years and Counting*. Toronto: Municipal Finance Officers Association of Ontario.
- Ontario. (2013). *Development Charges in Ontario: Consultation Document*. Toronto: Ministry of Municipal Affairs and Housing.
- Ontario Energy Board. (2018). *Distribution System Code*. Retrieved October 26, 2018, from https://www.oeb.ca/oeb/_Documents/Regulatory/Distribution_System_Code.pdf
- Watson and Associates. (2004). *City of Ottawa 2004 Development Charges Background Study*. Mississauga.
- Whitby Hydro. (2017). *Conditions of Service*. Retrieved October 26, 2018, from <http://www.whitbyhydro.on.ca/site/binaries/content/assets/lhcontent/pdfs/my-home/conditions-of-service-rev-35-final.pdf>

Appendix: A Simple Model of the Non-Concurrence Externality

Consider a growing municipality providing a particular service under the following simplifying assumptions:

1. **Homogeneity:** Ratepayers consist exclusively of identical households.
2. **Growth integration:** Growth occurs at a constant rate each year and is integrated into the municipality by the extension of prevailing service levels through capital expansion.
3. **Cost minimization:** The municipality provides the municipal service at minimum long-run cost.
4. **Constant returns to scale in operations:** Operation of the municipal service is subject to constant returns to scale.
5. **Indivisible capital:** Capital for the municipal service is subject to indivisibilities such that the cost-minimizing, and thus minimum, capital expansion provides initial excess capacity and thus accommodates multiple years of growth.
6. **Zero service congestion:** To accommodate growth without service congestion, the municipality undertakes capital expansion at the beginning of the growth horizon.
7. **Zero residual excess capacity:** Expansionary capital exhibits no excess capacity at the end of its expected life; that is, initial excess capacity is fully utilized by growth prior to its replacement.
8. **Amortization:** Based on replacement value, capital costs are amortized (that is, converted into annual capital costs) over the corresponding expected capital lifecycle.
9. **Pooled cost recovery:** Through a uniform user fee system, the municipality pools and recovers all service costs on an annual basis.¹³
10. **Denomination of costs:** All costs are in real dollars and, for greater tractability, future costs are not discounted to present value.
11. **Static environment:** Demand-supply interactions among the municipality, existing households, and new development as well as feedback into service levels are suppressed for the purpose of identifying the impact of the non-concurrence externality.

Based on these assumptions, the model's exogenous variables are defined as follows:

1. $H_0 > 0$ is the initial number of households in the municipality.¹⁴
2. $g \geq 0$ is the annual rate of household growth.

13 The model's key insights are invariant to whether costs are recovered through user fees or property taxes.

14 This variable is included for modelling completeness only as the model's key results are independent of it.

3. $m \in \{1, 2, \dots\}$ is the growth horizon corresponding to the minimum capital expansion.
4. $r \in \{1, 2, \dots\}$ is the capital lifecycle (that is, the replacement horizon).
5. $a > 0$ is the annual operating cost per household of the service.
6. $c > 0$ is the amortized capital cost per household of the service.

Let $H(t)$ denote the number of households within the municipality in year t where $t \in \{1, 2, \dots\}$ is a discrete time index in years. Given the annual growth rate g , the municipality's population in year t is $H(t) = H_0(1 + g)^t$. The municipality is set to grow from an initial H_0 households to $H(m) = H_0(1 + g)^m$ households over the growth horizon m .

The “zero service congestion” assumption means that capital expansion occurs at $t = 1$. As per the “zero residual excess capacity” assumption, the model is symmetric across growth cohorts and hence can be restricted to the first growth cohort without loss of generality. The relevant modelling horizon is therefore $t \in \{1, 2, \dots, m\}$, this being the growth horizon.

Based on the “homogeneity,” “growth-integration,” “cost minimization,” “indivisible capital,” “constant returns to scale in operations,” and “amortization” assumptions, the total cost of the municipal service is $C(t) = aH(t) + cH(m)$ in year t . According to the “pooled cost recovery” assumption, the user fee in year t is the cost per household:

$$u(t) = \frac{C(t)}{H(t)}$$

$$u(t) = \frac{aH(t) + cH(m)}{H(t)}$$

$$u(t) = a + c \frac{H_0(1 + g)^m}{H_0(1 + g)^t}$$

$$u(t) = a + c(1 + g)^{m-t}$$

Letting $i(t) = (1 + g)^{m-t} - 1$, the user fee can be rewritten as:

$$u(t) = a + c[1 + i(t)]$$

Since $t \leq m$ and the efficient user fee is $a + c$, then $i(t)$ is the percentage by which the capital component of the user fee is inflated. That is, in the presence of growth (when $g > 0$), non-concurrence between growth and capital expansion (when $m > 1$) implies $i(t) > 0$. Conversely, the efficient user fee prevails, meaning $i(t) = 0$, only if there is no growth ($g = 0$) or if growth concurs with capital expansion ($m = 1$). Over the growth horizon, the average of $i(t)$ as a function of g and m is:

$$\begin{aligned}\bar{i}(g, m) &= \frac{1}{m} \sum_{t=1}^m i(t) \\ \bar{i}(g, m) &= \frac{1}{m} \sum_{t=1}^m [(1+g)^{m-t} - 1] \\ \bar{i}(g, m) &= \frac{1}{m} \left[\frac{(1+g)^m - 1}{g} - m \right] \\ \bar{i}(g, m) &= \frac{(1+g)^m - 1}{gm} - 1\end{aligned}$$

Aside from capital user fee inflation, another insightful indicator of the non-concurrence externality is the degree to which growth is subsidized by existing households through the inflated user fee. Let $s(t)$ denote the share of capital expansion costs borne by existing households in year t . Since the subsidy to growth is funded by excess revenue generated by existing households paying the inflated capital user fee, $s(t)$ is expressed as:

$$\begin{aligned}s(t) &= \frac{c \frac{H(m)}{H(t)} H_0 - cH_0}{c[H(m) - H_0]} \\ s(t) &= \frac{(1+g)^{m-t} - 1}{(1+g)^m - 1} \\ s(t) &= \frac{i(t)}{(1+g)^m - 1}\end{aligned}$$

As with $i(t)$, it is straightforward to verify that $s(t) > 0$ in the presence of growth and non-concurrence. Over the growth horizon, the average of $s(t)$ as a function of g and m is:

$$\begin{aligned}\bar{s}(g, m) &= \frac{1}{m} \sum_{t=1}^m \frac{i(t)}{(1+g)^m - 1} \\ \bar{s}(g, m) &= \frac{\bar{i}(g, m)}{(1+g)^m - 1}\end{aligned}$$

Within the confines of the user fee system, the municipality could prevent adverse impacts on existing households by segregating growth-related capital costs and allocating them strictly to growth. This action would restore the user fee for existing households to the efficient level; that is, $u_e(t) = a + c$, where $u_e(t)$ is the user fee paid by existing households. Letting $u_n(t)$ be the user fee paid by new households, this segregated approach further results in:

$$u_n(t) = \frac{a[H(t) - H_0] + c[H(m) - H_0]}{H(t) - H_0}$$

$$u_n(t) = a + c \frac{H(m) - H_0}{H(t) - H_0}$$

$$u_n(t) = a + c \frac{(1+g)^m - 1}{(1+g)^t - 1}$$

Letting $i_n(t) = \frac{(1+g)^m - 1}{(1+g)^t - 1} - 1$ be the capital user fee inflator under these circumstances, the user fee for new households can be rewritten as:

$$u_n(t) = a + c[1 + i_n(t)]$$

It is straightforward to verify that $i_n(t) > i(t)$ in the presence of growth and non-concurrence, meaning that the capital user fee for new households is even higher under segregated cost recovery than it is under pooled cost recovery when the former is implemented with user fees. This result is unsurprising, considering that the revenue shortfall caused by non-concurrence is now concentrated over new and thus fewer households than it is under pooled cost recovery. Over the growth horizon, the average of $i_n(t)$ as a function of g and m is:

$$\bar{i}_n(g, m) = \frac{1}{m} \sum_{t=1}^m i_n(t)$$

$$\bar{i}_n(g, m) = \frac{1}{m} \sum_{t=1}^m \left[\frac{(1+g)^m - 1}{(1+g)^t - 1} - 1 \right]$$

$$\bar{i}_n(g, m) = \frac{1}{m} \sum_{t=1}^m \left[\frac{(1+g)^{m-t} - (1+g)^{-t}}{1 - (1+g)^{-t}} - 1 \right]$$

$$\bar{i}_n(g, m) = \frac{1}{m} \sum_{t=1}^m \left[\frac{i(t)}{1 - (1+g)^{-t}} \right] > \bar{i}(g, m)$$

To illustrate an application of the above model, suppose the municipality grows at 1.5 percent per year and that the relevant growth horizon is 35 years (perhaps for a water treatment plant expansion), meaning that $g = 0.015$ and $m = 35$.¹⁵ This model implies that, on average over the growth horizon, pooled cost recovery inflates the capital user fee by $\bar{i}(0.015, 35) \cong 30$ percent, and forces existing households to subsidize $\bar{s}(0.015, 35) \cong 44$ percent of growth-related capital costs. If the municipality instead adopted segregated cost recovery within the user fee system, the average user fee for new households would then be inflated by about $\bar{i}_n(0.015, 35) \cong 412$ percent; that is, it would be 5.12 times the efficient level.

15 These are the values used to generate Figure 1 in the main text.

If the municipality instead implemented segregated cost recovery with DCs, the user fee would be universal and efficient (equal to $a + c$ per year for each household) and each new household would pay a DC of cr at time of development where $r \geq m$ is the replacement horizon for the capital expansion according to the “zero residual excess capacity” assumption. To prevent overpayment by new residents for the capital expansion without undermining service level efficiency, the municipality provides each new household an annual capital user fee rebate equal to c ; the rebate is terminated upon replacement of the capital expansion.

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