The Economics of Community Amenity Contributions and Real Estate Taxes

A Report to the

BC / Federal Expert Panel on Housing Supply and Affordability

By

Tom Davidoff, Ph.D.
&
Tsur Somerville, Ph.D.

Stada Analytics

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1 Introduction

In this study, we review prior studies of the impact on housing prices and quantities of different types taxes on residential real estate. We consider discretionary development fees and taxes such as Community Amenity Contributions and density bonus pricing; regular unit charges for development, such as development cost levies; property taxes; including vacancy taxes; and transaction taxes, such as property transfer taxes and stamp duties. Generally, the literature on tax impacts grapples with the thorny problem that taxes may be relatively high in markets where demand for homes is large relative to supply; indeed property taxes and development charges commonly fund amenities and infrastructure.

A literature dating back at least as far back as Ricardo (1821) recognizes that taxes on land value based solely on location, that do not change with the amount of structure or infrastructure in place, do not distort investment and hence are simply takings from land owners. Studies of other forms of taxes commonly find some incidence in the form of capitalization of taxes into reduced property values and lower housing quantity produced, with renters bearing some burden in the form of higher rents depending on supply and demand elasticities.

The impact of discretionary charges such as CACs are less well understood. We describe an attempt to identify at least correlations between discretionary charges for density and housing prices and quantities in Greater Vancouver. That attempt proved infeasible due to data problems, but the data problems point to an important shortfall in current density pricing: absence of transparency.

Finally, we lay out alternative paths that municipalities in British Columbia might take in setting prices for density beyond currently allowed limits. Given very high housing prices, the consequences of that choice in terms of revenue raised and in delivering needed new homes may be significant.

2 Review of Literature on price and quantity impacts of different taxes and fees

2.1 Property Tax

There is a very long literature on the impact of regular property taxes on housing prices and development. This literature, dating back at least to Tiebout (1956) is largely focused on the U.S. system, where local property taxes finance all local public goods, and in that way largely operate as a user tax for locally provided goods such as schools, police, and fire

protection. Moreover, present surpluses induced by high tax revenues improve the future fiscal picture (Ross and Yinger (1999)). For this reason, (the "benefit view") it is difficult to assess the causal effect of an increase in property tax burden on housing prices, land values or construction. What is to be held constant when the tax rises? For present purposes, considering different means to fund the same degree of public goods, we wish to understand the effect of a property tax increase uncompensated by improved amenities, infrastructure, or a government's fiscal position. Oates (1969), in an early study of New Jersey communities, finds that holding measured public goods constant, property taxes are associated with lower home values, but that because public goods increase property values, raising property taxes to fund public education does not lower property values.

A "new view" of property tax incidence (Mieskowski (1972)) distinguishes among different types of property tax impacts. The existence of property tax financing affects all of land prices, the volume of residential construction, and housing prices. However, certain types of property must pay higher property taxes without receiving greater benefits, in which case land values and prices are lower for those affected parcels, and certain types of homes may be more expensive. The incidence of that tax falls on landowners to the extent that land is supplied inelastically and may also cause higher housing prices.

While identifying properties that are subject to higher or lower taxes for reasons unrelated to public goods provision is challenging, at least two studies find that housing demand and supply respond favorably to pure fiscal incentives. Lutz (2015) uses quasi-experimental variation in property taxes in the state of New Hampshire to find that in elastically supplied parts of the state (far from Boston), municipalities that received grants from the state designed to reduce property tax burdens saw relative increases in construction. Near Boston, by contrast, where housing is less elastically supplied, prices, rather than quantities adjusted: prices rose where state grants were allocated in high amounts. Singh (2020) finds that real estate developers in New York City were highly responsive to the phase-out of a particular tax benefit available to some rental housing developers. Land owners accelerated development to take advantage of favorable terms that disappeared within two years of a policy announcement.[1]

Billings and Thibodeau (2013) find in a study of homes in Colorado that homes sold

[1]Singh (2020) also finds that the induced development led to *higher* rents in nearby areas, perhaps through gentrification. Mast (2019) and Li (2019), by contrast find reduced rents associated with completion of nearby apartments. British Columbia has recently provided some quasi-experimental variation in property tax changes that are not compensated by changes in public goods provisions. With the Additional School Tax legislation of 2018, B.C. imposed higher taxes on properties within the same communities above $2.5 million in assessed value. We are unaware of studies formally assessing the impact of this change, but anecdotally, it appears that after that tax law change, lower value properties outperformed higher value properties in sales volume and price changes.

in developments where property taxes finance improvements sell for significantly less than homes in subdivisions without such charges, but that the difference in prices is less than the discounted present value of the incremental taxes.

On balance U.S. evidence suggests that property taxes reduce property values. This leads to diminished construction in markets in which supply can easily be added. In less elastically supplied markets, the evidence on the relationship between property taxation and the pace of development is mixed.

2.2 Taxes on vacant homes

Taxes on vacant homes have been rationalized in two ways: first, to encourage property owners to repair or demolish derelict houses; second, and more recently, to address housing demand in areas with challenges to affordability, and with at a minimum a perception that some owners are leaving units without long-term permanent occupants. The latter, vacant housing taxes imposed to address challenges with housing supply, are rarer than taxes on vacant housing because of blight. France has a fairly long history of targeting vacant properties in areas where low income housing is in short supply though the *taxe sur les logements vacants (TLV)*. Segu (2020) compares urbanized regions with the tax to those without that the tax, and she finds that between 1997 and 2001 the tax is responsible for a 13 percent drop in vacancy rates, with the effect concentrated in areas with more long-term vacancy prior to the tax. her work does not identify price or supply effects, but operates from the occupancy of previously vacant units.

While not a tax on vacant properties, restrictions on home purchases by non-residents address the issue of properties owned but not occupied on a full-time basis. Hilber and Schoni (2016) study the effects of the Swiss Second Home Initiative, which restricted ownership of vacation and second homes. They exploit differences in the intensity of the law enforcement across Swiss cantons and find that the restrictions on second home construction do not affect second home prices, but caused the prices of primary residences to decline by 12 percent. Barcelona has recently introduced high charges on owners of vacant homes.

2.3 Fixed development charges

Several studies estimate the empirical relationship between development charges such as development cost levies on land values and construction activity. To the extent that these fees reduce land prices one-for-one, capitalization into the price of new homes built is unlikely, but a high extent of capitalization may reduce construction volumes, affecting the overall market price level. Not surprisingly given incidence would depend on how profitable current

residential development is relative to alternative use or option value, the evidence is mixed. As with property taxes, Yinger (1998) emphasizes the importance and difficulty of *ceteris paribus* analysis.

Mayer and Somerville (2000) find an insignificantly negative effect of impact fees on the volume of new construction, reckoning that impact fees are fixed and certain, and hence less of a concern on average than lengthy and uncertain delays in the subdivision approval and permitting processes.

Ihlanfeldt and Shaughnessy (2004) find almost 100% incidence of impact fees on (reduced) buildable land values in Florida, but find that both new and existing homes rise in price considerably more than by 100% of the impact fees. They reason that the fees replace other property charges and pay for amenities, thereby raising the value of homes. By contrast, in surveys, Burge (2014) and Been (2005) summarize findings in Toronto, and Texas with little or no incidence of fees on land values, but significantly increase housing prices.

Building on Gyourko (1991), the "new view" espoused by Yinger (1998) argues that that impact fees may buy benefits and reduce property taxes for both incumbent and new residents, and so the expected impact of these fees on land values is ambiguous. This analysis emphasizes the importance of holding all else equal while exactions vary, a difficult task.

Murray (2018) adds a further complication to empirical analysis: consistent with strategic behavior announced increases in development charges accelerate development into periods before the charges come into effect. Both the level and growth of fees are both relevant to the timing of development.

2.4 Property Transfer Taxes

The motivating interest in property transfer taxes is primarily on how they affect transaction volumes. This is motivated by the theoretical prediction that taxes on the purchase or sale of real estate will cause households to remain in units longer than they might otherwise. The largest part of the research in this area use UK data, where the stamp duty was first imposed on documents for the transfer of land title in the beginning of the 19th century. Using a fairly long period of analysis, from 2004 to 2012 in the UK, Best and Kleven (2018) find that a 1% tax reduced transactions by 20% in the short-run, and that even over a longer period half of the result on volume remains. Taking advantage of a relaxation in the stamp tax during the Great Recession for lower priced properties, Besley, Meads, and Surico (2014) find that eliminating the 1% stamp tax for these properties yielded an 8% increase in transactions for lower priced houses that received the holiday. However, this reflected sales that would have occurred later, as transaction volumes for treated class of properties fell after the stamp tax

holiday ended. Hilber and Lyytikäinen (2017) investigate the implications for behaviour of this type of tax by determining whether changes to stamp taxes have a larger effect on house sales or labour mobility. They find that the effect of lower transactions and longer holding periods is associated with housing transactions for households not moving labour markets, i.e. those remaining in the same area, suggesting that the effects are on housing market liquidity, but not labour mobility.

Like the UK, Australia has had stamp taxes for a long time. But unlike the UK, state level differences in tax rates allows more space for identification. Davidoff and Leigh (2013) exploit the variation by transaction price, over time, and across states in Australian stamp taxes. They test the effects of stamp duty changes on transaction volumes. Their results, like Besley, Meads, and Surico (2014), are at the lower end of the effects in the literature. Their results are equivalent to a 1 percentage point increase in the stamp tax yielding an 8% decline in sales volume.

Research on buyer taxes in the Netherlands also show evidence that they lengthen tenure. Ommeren and Leuvensteijn (2005) use Dutch panel data on households to observe the length of tenure of households, as opposed to other work that studies the volume of transactions. Rather than use variation in stamp tax rates they use a competing risks hazard model on duration until transition to a new house to infer the effect from the effect of current house value on the move decision, where a stamp lowers the value of the selling house, but not the house being purchased. They extract effects of the magnitude such that a 1 percent stamp tax reduces transaction by 8 percent.

In contrast to country level taxes, Dachis, Duranton, and Turner (2012) study a city-specific tax that allows for a different identification strategy. They estimate the effect of the City of Toronto's implementation in 2008 of a 1.1% tax on real estate transfer by comparing sales volumes and prices on house on either side of the City's boundary with neighbouring jurisdiction that did not have a tax. They find the tax is approximately capitalized into lower prices and was associated with a 15% decline in transactions, but these only occurred for units close to the border for whom units without the tax might be an appropriate substitute. The unique and narrow circumstance of their subject may explain why they find almost twice the effect on transactions than results from other research

When stamp tax rates vary by house value levels, as in BC, they create breaks at the transition points. This was source of identification for Besley, Meads, and Surico (2014) with the 2008 tax holiday in the UK for lower valued properties. Kopczuk and Munroe (2015) exploit differences in the property transfer tax rate for higher and lower priced properties in the New York metropolitan area using the differences in these rates between New York and New Jersey. They find real effects, first in pricing where more properties are transacted

slightly below $ 1M than above, a "bunching effect. They also find that there are fewer transactions above the $ 1M threshold than below, even accounting for bunching, consistent with fewer transactions, and longer property hold periods because of the tax.

Two papers study the effects of transfer taxes in the markets that also imposed foreign buyer taxes. Fu, Qian, and Yueng (2015) evaluate the effect of increasing the stamp tax specifically on purchases likely to be made by speculators. In their case, it is the Singapore government's decision in 2006 to rescind the deferral of a purchaser's stamp tax on a pre-sale contract until after completion. They found a large reduction of 75% pre-sales contracts after the tax, when compared to sales for existing units, but no clear effect on price levels, though price volatility did rise 18 percent. Tam (n.d.) finds that in Hong Kong, where different tax rates based on holding periods, as opposed to property values, also both result in bunching, more transactions immediately after a holding period threshold is passed, and an aggregate reduction in transactions because of holding periods.

2.5 Foreign Buyers Taxes

There are no published academic papers that assess the effects of differential property transfer or stamp taxes on foreign buyers of residential real estate, of the type introduced in British Columbia in 2016. One reason for this is the challenge in finding an appropriate control group with the available data. One attempt to circumvent this is by West and Botsch (2020) who proxy for jurisdiction demand by foreign buyers with the percentage of Chinese born household reference persons in the 2016 census in that jurisdiction. They find that house prices fell more after the introduction of the FBT in jurisdictions with a higher percentage of household reference persons born in China than those with a lower percentage. But this is an imperfect test and confounded by the geographic variation in housing locations by ethnicity: more households with immigrants from China are in locations lose to the core where pre-policy house prices were higher. An example of the identification challenges is Xie et al. (2017). They study the effect of Singapore's introduction of the stamp tax on foreign buyers, but this comes along with a group of other macro-prudential policies that also affect housing markets, making the identification of the effect of the tax on foreign buyers of real estate hard to identify.

Foreign buyers taxes are motivated by work that finds that capital inflows are equated with higher house prices. Unless foreign source demand for local real estate is perfectly inelastic, any tax on foreign buyers will reduce housing demand and lower prices. Using macroeconomic data and estimating approaches, Sá, Towbin, and T. (2015) and Sa and Wiedlak (2015) find that aggregate country level capital flows, not specifically real estate

investment, are associated with higher house prices both in OECD countries and separately for the regions of the US. Two papers using the "home bias effect" approach to identify capital inflows - where increased risk in country A leads to an inflow of capital to areas of country B with residents with links through immigration and ethnicity to country A - with higher house prices. The seminal paper using this approach in housing to study how capital flight raises London house prices is Badarinza and Ramadorai (2018) while Ari, Puy, and Shi (2020) use the same approach and find similar effect between estimated capital inflow and house price appreciation in the US. Finally, Sa (2015) looks at purchases of UK residential real estate by foreign registered corporations, finding that a 1 percent increase in the volume of their purchases in a region raises local house price by 2.1 percent. In a related work Pavlov and Somerville (2018) find that wealth inflows, in their case with immigrants, have a larger effect on house prices than immigrants without wealth.

One paper that attempts to model the explicit effect of foreign purchases of real estate that are then left vacant is Favilukis and Van Nieuwerburgh (2017), a theoretical paper with a simulation model calibrated to New York and Vancouver. They find that when capital flows into a market and purchases high value properties in an urban core, then renters and prospective homebuyers are hurt, as the capital inflow and subsequent vacant units result in renters paying higher rents and being forced to live further from the urban core than they might otherwise. In their model these negative effects can outweigh the benefits to existing land owners from higher house prices, so that they get aggregate welfare losses from foreign capital inflows when these units are then left vacant.

If the definition of foreign is generalized to non-local, then Suher (2016) work on differential property taxation, as opposed to a buyer or stamp tax, is instructive. Suher finds that the removal of the 20 percent abatement on property taxes for non-resident owners only in 2013 resulted in a 1.8 percentage point decline in the share of properties that were not the owner's principal residence. This effect was higher, for higher value properties. He estimates an elasticity on the probability of ownership relative to the tax amount of -0.6, so that a ten percent increase in the property tax charged would result in a 6 percent decline in "foreign". or more accurately non-resident, ownership.

In a recent working paper, Gorback and Keys (2020) find that foreign buyer taxes imposed *outside* the U.S. led to relatively high increases in prices in neighbourhoods where Chinese buyers are relatively numerous *within* the U.S., suggesting that foreign buyers play important roles in price growth within certain U.S. neighbourhoods.

2.6 Community Amenity Contribution

2.6.1 Theoretical Effect of Community Amenity Contributions

Community Amenity Contributions (CACs) may be described as a tax on the profits that arise from allowing a property owner to add more density to that property. These are conceptually similar to density bonusing, whereby cities define a base zoning that may be attained while paying only normal development costs to the city, and an extra density that may be purchased through the provision of amenities or affordable housing.[2]

Coriolis Consulting Group (2014) argue that CACs almost logically cannot deter development, because they capture only part of the value of rezoning. In that way, it is true that combining upzoning with a CAC should not deter development, as long as a base density can be developed without the CAC. However, it is also true that land that would profitably be redeveloped with upzoning and no CAC might not be profitably redeveloped with upzoning and a large CAC. Since the same site is almost never observed with the same base zoning and the same degree of upzoning, but different CAC charges, it is difficult to compare the apples-to-apples extent of CACs on redevelopment. We describe an exercise that aimed to do that in section 3. Both Gyourko (1991) and Fischel (1990) support the Coriolis Consulting Group (2014) approach, observing that stricter regulations may be policy substitutes for development fees. That is, absent charges, communities might not offer upzoning, so it is not a simple matter to compare the extent of development with and without CACs, holding all else constant.

Mayer and Somerville (2000) find that costs have a small and insignificant adverse effect on the volume of construction, even holding other regulations constant. By contrast, the time and uncertainty involved in obtaining regulatory approvals are found to have a significantly negative impact on the pace of construction in U.S. metropolitan areas. Based on consideration of the industry, they reason that certain costs are a small disincentive to build relative to uncertainty about the outcome and timing of regulatory decisions.

Theory suggests that Community Amenity Contributions (CACs) levied as a percentage of the change in land value resulting from rezoning will reduce the supply of new housing and raise house prices relative to conditions if they were not imposed. This result does not occur because developer/builders pass on these costs directly as higher prices to consumers. Rather, the higher expected development costs that result from having to pay CACs leads them to offer lower prices to landowners. A standard model of landowner behaviour yields the outcome where there are fewer sales by existing landowners to developers. With lower quantities of land as an input into the production of new housing, less development occurs

[2]Coriolis Consulting Group (2014).

and the supply of new housing to the market is lower than it would be otherwise. The lower supply with no changes to demand results in higher house prices.

Any effect of CAC depends on constrained housing markets. Since the principal of CACs is to capture some part of the increase in land value from rezoning, it must be the case that government land use regulation constrains the market, so that relaxing them increases the value of a land parcel by allowing a higher and better use than was possible prior to the change. Without zoning restricting uses and densities there is no change in land value, no land lift, to pay for the CACs.

2.6.2 Developer Reaction to CACs

The theoretical treatment of CACs and housing markets rests on the assumption of a competitive market for new housing. Developers compete for land to use for developments, and they compete in the output market, so that they are "price takers" in both output and input markets. For the former, there must be sufficient numbers of developers bidding on land to use for development that land prices reflect competitive developer profits given costs, demand, and risk. For the latter, buyers must perceive that they have choice among developments and that existing units for sale are a viable alternative.

The standard approach by both economists and the real estate industry to determine land values is a land residual approach. The price of housing in the market (i.e. output prices) is given and land acquisition offers by developers are made taking prices as fixed. From total expected revenues, developers subtract all expected non-land costs and their target profits to yield a land residual, which is the maximum amount they can pay for the land and given cost and expected prices still hit their profit targets. In competition the profit targets will reflect standards given expected time for development, uncertainty, and financing, where this competitive level of developer profit is usually expressed as a percentage of total costs.

The introduction of CACs is treated as an increase in non-land development costs, as part of the per-construction permitting costs. An individual developer cannot pass this cost on given the competitive market for housing, so the increased costs results in a lower offer price to the landowner for their land. Figure 1 shows the effect of the introduction on CACs on the price competitive developers would offer for land with and without CACs. From the top, starting with potential revenue, this is allocated to developer profits (first box) and total non-land construction costs (second box). The difference between these two and the land value in its current use is the land lift, or the increased value from relaxing the zoning constraint for this parcel. In the absence of CACs this would go entirely to the landowner. With CACs this is split between the regulating jurisdiction (the diagonally marked CAC box) and increase in land value provided tot he land owner, the shaded box.

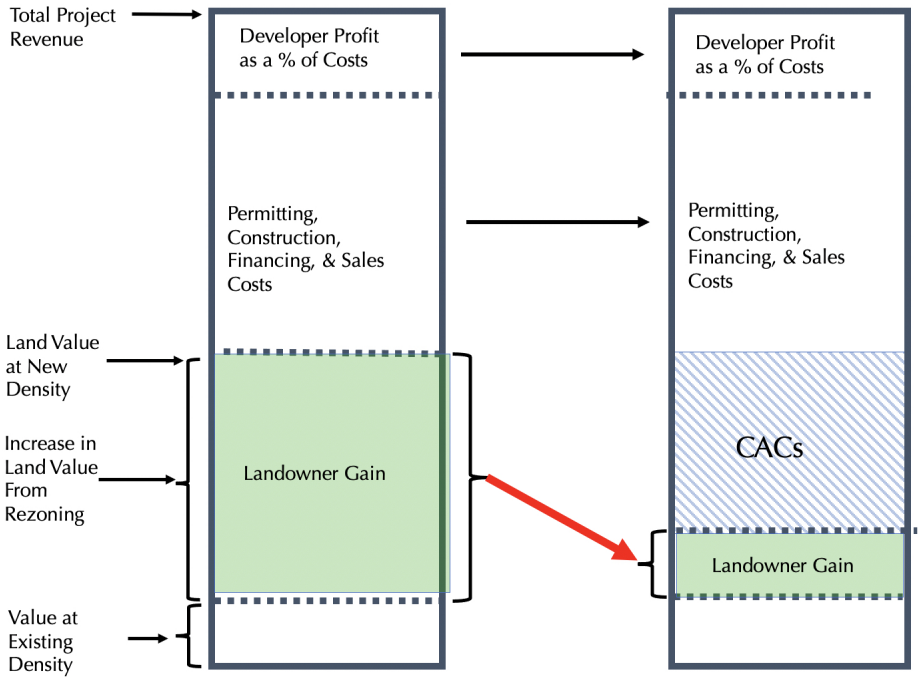

Figure 1: CACs and Developer Offer Prices for Land

Figure 1 also incorporates a number several additional assumptions. First, that the amount of CACs for a given parcel are known in advance so that they do not increase cost uncertainty for the developer. Second, that CACs do not add additional time to the development process. Violation of these assumptions would affect the level of competitive expected profits by adding risk and time to the development process. In addition, the public investments financed by the CACs are assumed to not add to the value of the property. They are presumed to be more general community benefits than a provision of public infrastructure or amenities that directly improves the attractiveness of the specific development. If the CACs were spent on amenities that created a perceived benefit for buyers, this would increase the expected revenues to the development. If this change occurred prior to land acquisition this would increase the price paid to land owners for land (the shaded box), and if it occurred afterwards it would increase developer profits.

The effects of the lower bids for land on the land market are shown below in Figure 2. The lower developer land bids from the CACs result in a shift inwards, down, and to the left in developer demand curve for land. Given a standard upward sloping supply curve by land owners, this results in lower land prices and a lower quantity of land sold to developers. Land prices cannot fall below their value in their current use as no landowner would sell their land to a developer for a lower price than they could receive from another party willing

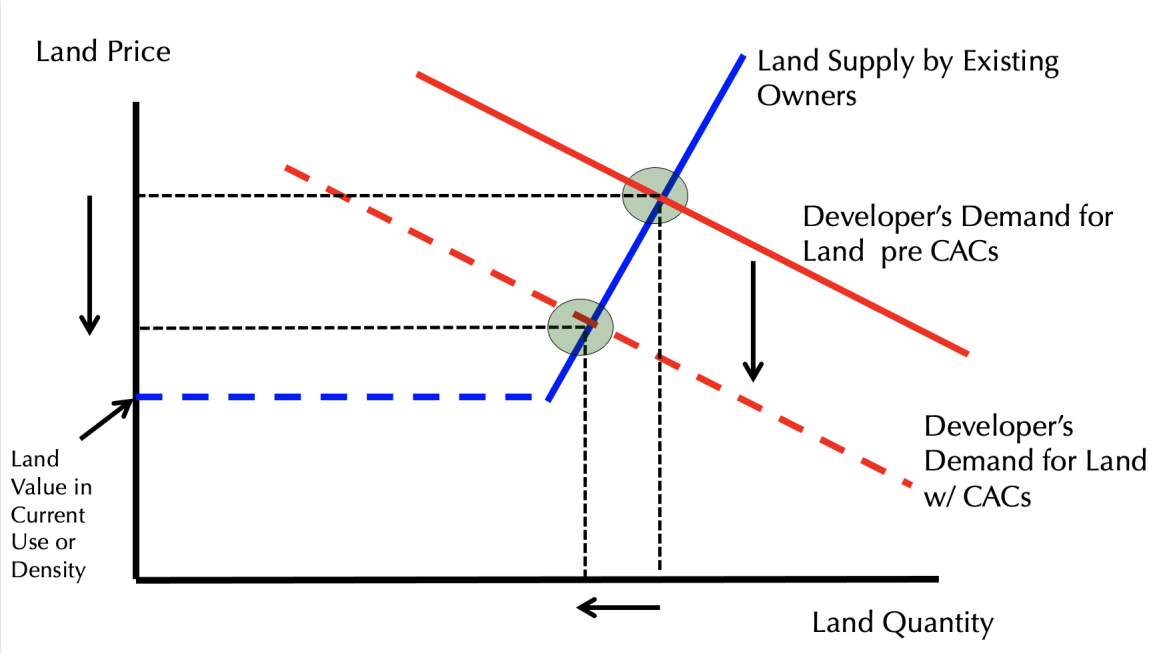

Figure 2: CACs and the Land Market

to keep the land in its current use.

2.6.3 Effect on New Housing Market

In the new housing market, the lower quantity of land supplied to developers results in higher prices and a lower total quantity of new housing. As shown in Figure 3 the lower quantity of land supplied to developers, an input for new housing causes a shift inwards, up, and to the left in the developer supply curve for new housing. The new equilibrium is for higher prices and lower quantity, but the mechanism is not developers passing along higher CAC costs to buyers directly, but instead offering lower prices to land owners, resulting in less land available for development, which reduces the supply of new housing and raises its price.

The magnitude of the effects shown above in Figure 2 and Figure 3 depend on the reaction of landowners to the lower land offers from developers. Explicitly this is measured as the elasticity of land supply. If land supply is relatively elastic, so landowners are sensitive to small changes in price, then the outcome would be as shown below in Figure 4, where the inward shift in developers' offers, the, demand curve for land, yields very large changes in the quantity of land supplied. By extension, this large decrease in the quantity of land supplied will yield a comparatively large inward shift in the supply curve for new housing, resulting in a larger decrease in new supply and higher prices for new housing. In contrast, when land supply is inelastic, so land owners are willing to sell at any price above the current use

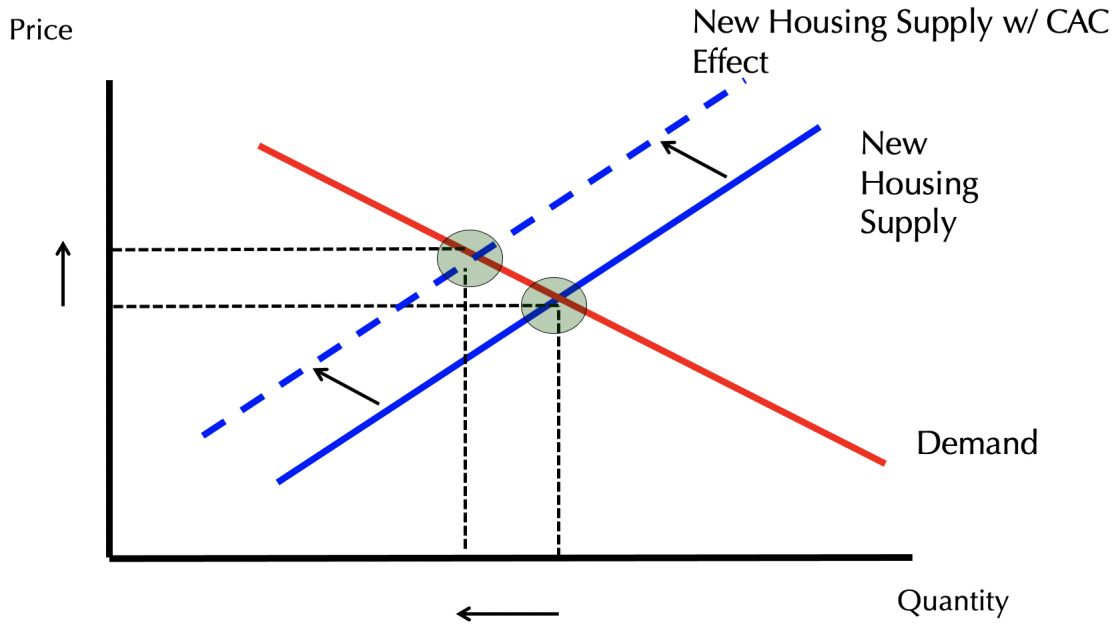

Figure 3: Market for New Housing

value, then the effect on the new housing market is very attenuated. As in Figure 5 with inelastic land supply, the inward shift dramatically lowers land prices, but has little effect on quantities. The effect on the output market for new housing is small as well, as the size of the inward shift in the new housing supply curve is small because there has been little change in the quantity of land supplied to developers.

Determining the elasticity is measuring owners willingness to sell for prices above their value in the current use. For a given offer from a developer that exceeds the market value of the land in its current (pre-redeveloped) use, the will depend on both the private benefit the owner gains from the land in its current use and the owners prediction of future offers for the property. A developer who seeks to assemble a minimum of three contiguous single family lots for a townhouse development needs to make offers that all three will accept, that allow them at a minimum after transaction taxes, realtor fees, and moving and search costs to acquire the same type of housing asset and be compensated for the inconvenience of searching for a new unit and moving. And they must also believe that this is a better offer than they will get if they wait some number of years for another land assembly proposal. This would appear to be premium of at least 25% above the current use value.

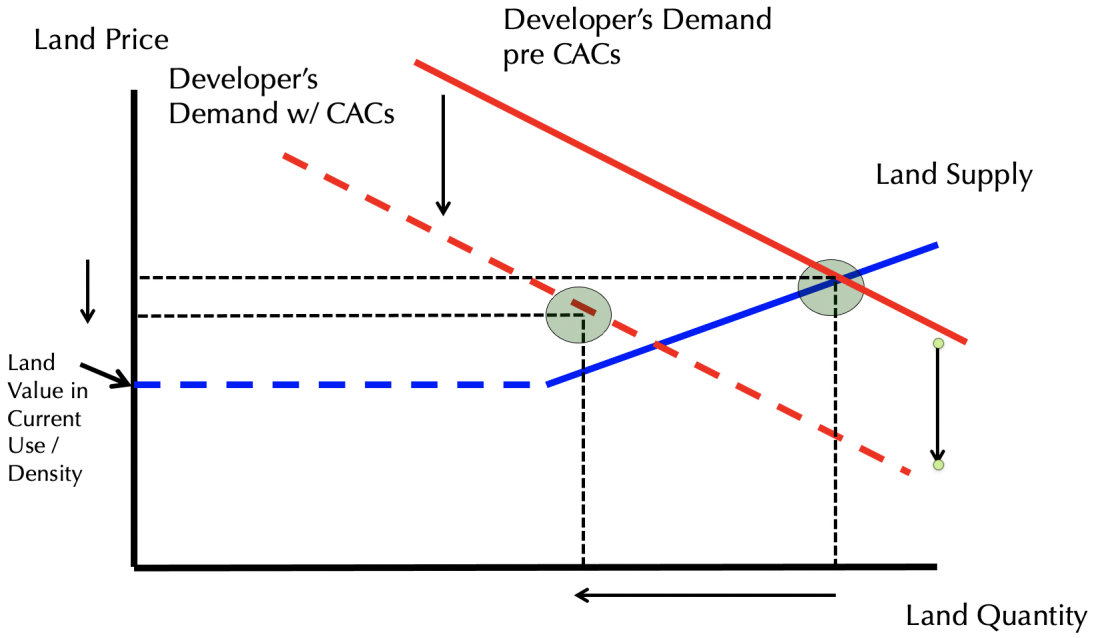

Figure 4: Elastic Land Supply

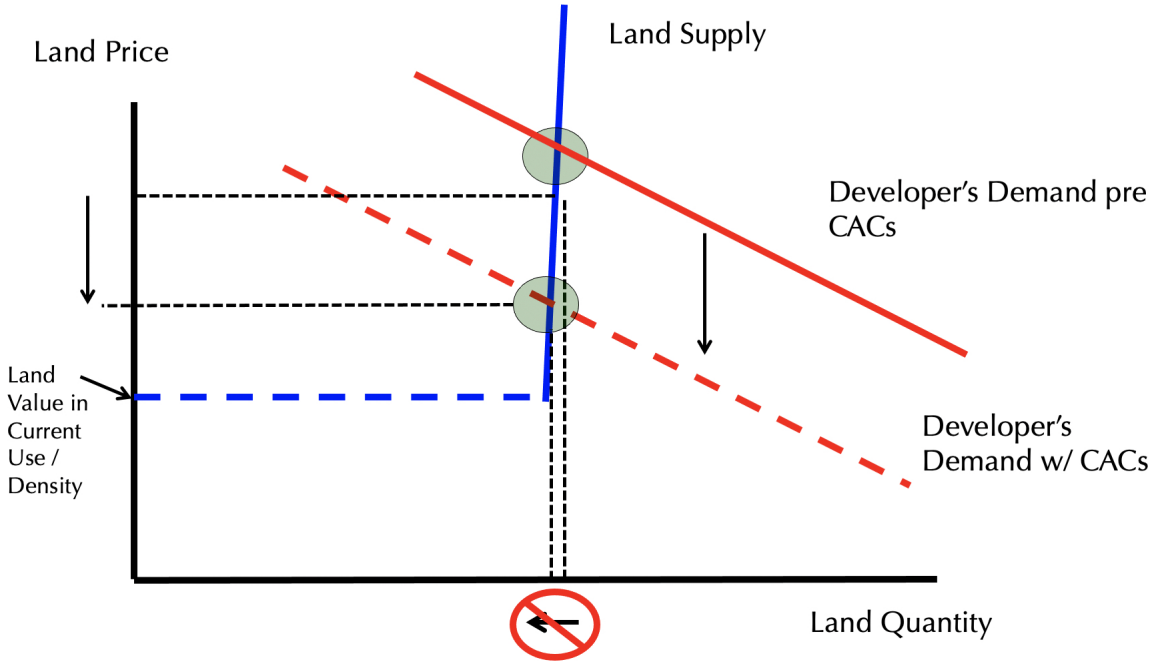

Figure 5: Inelastic Land Supply

2.6.4 CACs and Uncertainty

The treatment of CACs used above assumes they are both known and their imposition does not lengthen the development permitting and construction time. Introducing uncertainty into both will affect land bids. Expected developer profit, as captured in developer pro-formas reflect expected costs, revenues, time to develop, and uncertainty in all three. Increasing uncertainty in any of these will increased the developer's minimum expected profit needed to justify doing the development. So, even if the expected CAC charges prior to making an offer for land are unchanged, increased uncertainty to their levels, and to how long the determination of the CACs will take will, in a competitive investment market, increase the expected or minimum hurdle returns for real estate development. Figure 6 shows how this uncertainty can result in an inability to acquire the land for development. The right side introduces greater uncertainty in the CAC process, which by raising risk, increases benchmark profitability rates. This increases the size of the profit rectangle demanded by competitive developers.[3] Neither the expected non-land development costs nor the expected amount of CACs change, as it is uncertainty and thus required profits that changes. This compresses the shaded section which was the return to land owners above the value in their current use. If this diminution is sufficiently large, it is possible to make the redevelopment an inferior option to the current use for land acquisition, and thus shut off development completely. To prevent this, the calculation of the CAC amount must incorporate the effect of CAC level and timing uncertainty on equilibrium development profits.

[3]Specifically the return on equity in real estate development must rise relative to other investments to compensate for the increased risk in the risk-return space of an asset market equilibrium.

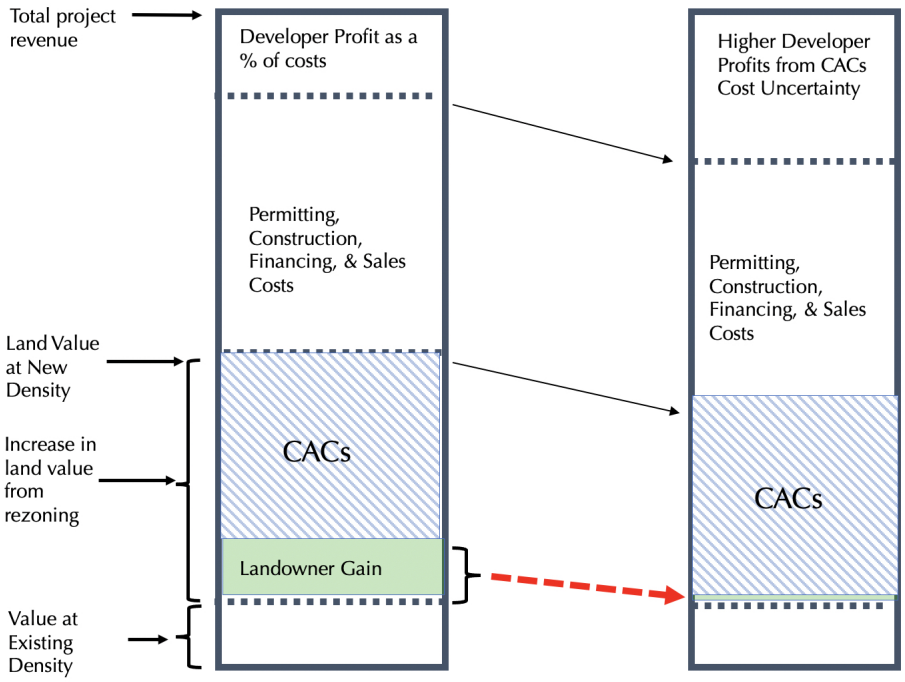

Figure 6: Elastic Land Supply

3 Challenges to Empirical CAC Estimation

To our knowledge there has not been an analysis of how variation in the extent of CACs affect the price or quantity of housing in different jurisdictions or in the same jurisdiction over time, beyond the analysis of Coriolis described above.[4]

As part of this project, we sought to study the relationship between CAC levels and development intensity across jurisdictions and time among municipalities in Greater Vancouver. Ideally we wished to create data that might be tabulated as follows:

Pursuant to the discussion above, even with such data, it would be challenging to establish a causal link between CAC levels and construction activity. Jurisdictions in which developers are more eager to build and hence have more to gain from upzoning will presumably demand higher CACs or density bonusing fees than other jurisdictions. Indeed, an average CAC charge per square foot presumably reflects a fraction of developers' profit per square foot. Still, we hoped to find some random variation linked to changes in Council priorities or the starting date at which different communities started pursuing CACs.

[4]There are studies concerning the level of voluntary developer contributions in London, e.g. McAllister, Shepherd, and Wyatt (2018).

Table 1: Data that would be helpful in determining the CAC-development intensity relationship

Jurisdiction	Date	Average CAC charge per additional square foot	Apartment completions
A	2005	$50	1,000
A	2007	$55	1,000
...	...	...	...
A	2019	$80	3,000
B	2005	$25	400
...	...	...	...
B	2019	$90	2,000
...	...	...	...

3.1 Data availability

To assemble data, we enlisted an MBA student with an interest in real estate development and an advanced undergraduate with a background in computer science and commerce (currently employed by Microsoft). We triaged in an effort to assemble the best data feasible, ranking jurisdictions by size and ease of data acquisition. As a general matter, staff in different communities directed us to publicly available files. There is currently no regional clearinghouse with data on development cost pricing at different locations at different points in time, and jurisdictions do not offer such resources, either.

3.1.1 Vancouver

We were able to obtain a panel of CAC charges for the City of Vancouver. There is not easily available data on hypothetical CAC charges for projects that were not approved. However, for projects that went before council, dating back to 2011, there are 200 projects that were readily found based on archiving by the City of Vancouver. Each project put before council includes a variety of standard data, such as base zoning, additional density requested, and total development charges under base zoning and the requested upzoning. This allows us to calculate the incremental charges per square foot of space beyond the baseline. We find that the incremental cost per square foot rises over time. We suspect that rental projects are over-represented in the data relative to all approvals, so we may not have the universe in the approximately 200 projects identified. This data was not trivial to obtain, but with some work and expenditures, we were able to assemble sufficient data to create a table something like the ideal Table 1 above for the City of Vancouver.

3.1.2 Coquitlam

For the City of Coquitlam, we were able to obtain data on 50 projects that went before council. We were able to observe CAC charges, but other project details were more challenging to tabular, as the data is not tabulated consistently in publicly searchable files. Thus we could not obtain an average charge per time period.

3.1.3 Other jurisdictions

Searching municipal archives in other jurisdictions produced almost no useful data. Some data was found for Richmond, but not in a way that made tabulation of key variables feasible. Development charge archives for the important jurisdictions of Burnaby, Surrey, for example were not readily searchable.

3.2 Upzoning charges: discussion

While we hoped to estimate a statistical relationship between CAC and other charges for additional density, our efforts did provide an important bit of information. A very high degree of sophistication and attention would be required to know the historical patterns of development charges for density beyond base zoning in Greater Vancouver municipalities. Thus even with information on current policy, forecasting future charges, presumably an important part of investment planning, appears extremely difficult. This lack of information likely poses a barrier to entry to developers unfamiliar with local processes and uncertainty over an important cost even for experienced local developers.

4 Options for density pricing in British Columbia

Below we present the strengths and weaknesses of three different approaches to using a payment from a developer related to the density of a proposed development as a mechanism to finance municipal capital projects, where the need for the projects is a result of the proposed increase in density and increased population and economic activity that results from the proposed development. In identifying different approaches we purposefully abstract away from the existing legal framework in BC that governs the existing form of Community Amenity Contributions. Our objective is not to guide policy within current laws and regulations, but to offer insight that allows for revisiting existing rules and structures to allow for the best policy to achieve the best for current and future residents, ensure the provision of municipal infrastructure and amenities necessitated by growth, and work towards improved housing

affordability. We address three types of approaches: i) fixed density charges, ii) negotiated or tailored density charges, and iii) the auction of density.

4.1 CACs and Density Bonusing as Dutch Auction

As recognized by Elmendorf and Shanske (2020) in the context of auctions, and earlier by Gyourko (2009) and Fischel (2001), the Province must recognize a free-rider problem among jurisdictions. Affordable housing may be in the public interest regionally, but individual municipalities have strong political and fiscal incentives to prefer less affordable and more sprawling forms of housing. Encouraging municipalities to profit from allowing additional density may induce more supply through the channel of municipal political self-interest than is lost through this relatively non-distortive profit tax.

Because marginally profitable projects may be chased away by development charges, it would be attractive to design a system of density pricing such that provinces and municipalities can monitor whether targets for housing production are being met in areas deemed suitable for additional density.

If municipalities wish to ensure the sale of a particular quantity of density beyond what is currently permitted over some time period, while also attaining a high price for the released density, they essentially face an auctioning problem. In recent years, governments have turned to auctions to sell a variety of public assets, such as natural resources, electricity and wireless spectrum. Latent residential density is among the most valuable resources controlled by B.C. municipalities.

Density bonusing with an eye to attaining quantity targets may be thought of as a Dutch (declining price) auction. At the start of a time period, a municipality might set a price per square foot above base zoning of, say $X within a defined region (e.g. the Broadway Corridor in Vancouver or Metrotown in Burnaby). As under current practice, projects eligible for density bonusing would have to fit within some density and design parameters. If, after some defined time period has elapsed the municipality finds that there have not been enough units applied for at that price, the density bonus price would be adjusted down below $X per square foot. If instead the municipality appears likely to have more development than desired, the price per square foot could be raised above $X.

This practice would not represent a wide divergence from current practice, in which B.C. municipalities charge high prices for discretionary zoning and in which there is at least nominal quantity targeting. Vancouver has moved in the direction of fixed prices for density within corridors over project-by-project negotiation. However, explicitly recognizing the goal of attaining a quantity target through pricing would offer both transparency in pricing and

a framework and data for clearly recognizing the tradeoff between prices and quantities.

Recognizing the purpose of selling density to attain development targets while financing municipal needs (including housing affordability support) might induce communities to make their development process more transparent. That is, auction revenue would flow more freely if design guidelines were sufficiently clear that predevelopment time and expenditures required to determine eligibility to purchase density bonuses were limited.

4.1.1 Zoning auctions: implementation considerations

In-kind contributions: Basic welfare economics suggests that cash attained from density bonusing can be used to purchase social housing or to provide cash transfers for households in need, without a need to use new housing projects as the site for affordable housing. However, some municipalities have a preference for requiring in-kind contributions in lieu of cash. If an auctioning approach is to be used in this case, it may be challenging to define a price per new square foot. Perhaps a fraction of bonused square feet dedicated to rents below a fixed number might be used in that case. Pricing multiple dimensions of in-kind contributions would be challenging.

Distaste for explicitly selling zoning: U.S. courts typically ask for a "rational nexus" between charges and community needs induced by particular projects, whereas revenue from the sale of zoning might easily exceed negative externalities brought to communities from additional density. Politically, citizens might object to municipalities selling the right to add density. Both of these are legitimate concerns, but are violated by current practice, which adds the further negative factor of opaque pricing and unclear criteria for accepting projects.

Strategic delay by a small number of powerful developers: A development community aware of a municipal quantity target might collude to wait to pay for approvals until late in a cycle, when failure to hit targets has led to reduced density bonus pricing. One might imagine professional groups hosting sessions where developers discuss at what price per square foot purchasing density becomes "feasible." This concern could be met in two ways. First, a transparent process for attaining approval to build should foster more competition, as expertise in negotiating approval pricing would be a smaller factor in project success. Second, municipalities could target prices rather than quantities, and commit to fixing prices for a prolonged period to avoid gaming. The second approach would have the cost of requiring cities to think carefully about the price-quantity tradeoff.

4.2 Bespoke Charges

Current CACs are a variant of bespoke, tailored, or negotiated CACs. The level of CACs, how much and in what form a developer might provide in-kind, and what they will cover are all unknown o varying degrees in advance of a developer's contract with a landowner. This approach maximizes uncertainty, which increases the risk that developers will not be able to bid enough to acquire sites. However, since the expected land lift and need for infrastructure and local amenities varies with the interaction, of proposed density, tailoring should allow for a better match of the charge to the need generated by the development and to the change in land value from the change in zoning. An assessment of this approach in practice in our minds is that benefits of a better pricing of density that site specific CACs can provide has been offset by the uncertainty and time delays that exist in the practice.

4.3 Fixed Charges

One reason we see for the emergence and growth of CACs is that development cost levies or charges (DCCs or DCLs) are only available to finance a subset of capital projects that local governments see as necessitated by new development. CACs offer a mechanism for local governments to use their monopoly power to grant development rights in their areas of jurisdiction in exchange for payments for capital projects. While technically voluntary, and not a charge on density, the ubiquity of their application makes them effectively a charge. Formalizing this by essentially broadening DCC/DCLs to cover all municipal capital projects would create a framework that would introduce transparency to the process. Developers would know in advance of a land bid what their total charges and fees would be, minimizing uncertainty and eliminating the delays from the calculation and negotiation in the current CAC approach. This marginal cost of density approach comes with the very real drawback that it is determined by the costs of density rather than the benefits of increases in land value from the greater allowed density. As a result, local governments would most likely not raise as much revenue and it might bias development to occurring in less affordable areas where the gap between the marginal benefit to the developer and land owners of increased density and the marginal cost, as reflected in the fee structure, was greatest.

5 Authors' Qualifications

5.1 Dr. Thomas Davidoff, Ph.D.

Thomas Davidoff holds the Stanley Hamilton Professorship in Real Estate Finance at the University of British Columbia (UBC), is director of the UBC's Centre for Urban Economics and Real Estate, and is an associate professor in UBC's Strategy and Business Economics Division. Davidoff is also currently an associate editor of *The Journal of Housing Economics* and *The Journal of Risk and Insurance*. His research interests include housing, real estate economics, and retirement finance. Davidoff received his B.A. in social studies from Harvard College, his M.A. in public affairs and urban and regional planning from Princeton University, and his Ph.D. in economics and urban studies and planning from the Massachusetts Institute of Technology. Davidoff has publications on housing, aging, and insurance markets in leading economics and finance journals, such as *The American Economic Review*, *The Review of Financial Studies*, and *The Journal of Urban Economics*.

5.2 Dr. Tsur Somerville, Ph.D.

Craig Tsuriel (Tsur) Somerville, Ph.D. is a principal at Stada Analytics, an urban and real estate economics consulting firm. He is an Associate Professor in the Strategy and Business Economics Division of the Sauder School of Business, UBC, where he has been since 1993. He holds the Real Estate Foundation of BC Professorship and is a Senior Fellow at the UBC Centre for Urban Economics and Real Estate, where he served as Director from 2002-2016. His academic research focuses on the economics of housing markets and real estate development and academic and general interest research has addressed a broad set of topics in real estate development, housing policy, supply, markets, affordability, and finance, as well as land use regulation. He holds a BA in Economics and East Asian Studies from the Hebrew University in Jerusalem and an A.M. and Ph.D. in Economics from Harvard University. He has published in the leading journal in real estate and urban economics and served on the editorial boards of *The Journal of Urban Economics* and *Real Estate Economics*.

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