CBI POLICY PAPER

In High Demand:

Addressing the demand factors behind Toronto's housing affordability problem

Josh Gordon[1]

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1. Introduction

Toronto is among several big cities in the developed world struggling with intense housing affordability challenges.[2] In previous years, rising house prices might have been celebrated as a sign of a strong and vibrant economy. As the U.S. housing crash made plain, however, high and rapidly rising house prices are not always something to cheer about.

While housing booms give many homeowners an inflated sense of wealth, and temporarily boost employment and economic growth, they also tend to draw people into dangerous levels of debt. This debt ultimately puts the economy in a precarious place, where a rise in interest rates or some other macroeconomic shock can send the economy into a deep recession. Even short of this worst-case scenario, high housing prices entail generational and class inequities that can threaten the long-tern viability of communities and local economies.

It is important to get the diagnosis right about the causes of high housing prices. Without the right diagnosis, policy aimed at affordability will either be ineffective or counter-productive.

To date, a great deal of attention has been paid to the supply side of the housing affordability issue. Proponents of this supply-side view argue that local governments have not done enough to ease the construction of new housing, and that the Greenbelt and other land-use regulations limit land supply and increase the costs of adding supply through "density targets" and other regulatory measures.[3]

In contrast to this "supply-side" view, others have argued that the main factors behind Toronto's rising house prices are powerful *demand* stimulants: record-low interest rates, leniently enforced mortgage regulations, foreign investment in residential housing, and demographic shifts. In this view, these demand factors have created an environment where housing prices are prone to becoming detached from local incomes, as the housing market is turned into a speculative arena, with all of the dangers this implies for the creation of a housing bubble.

While these views are not so easily separable in practice, they do differ substantially in their policy implications. It is because of these contrasting policy implications that the debate around housing affordability has become so heated.

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[2] "13th Annual Demographia International Housing Affordability Survey: 2017", *Demographia*, available at: http://www.demographia.com/dhi.pdf. "Toronto" in this report is used to refer to the Census Metropolitan Area of Toronto used by

Statistics Canada. It is similar but not identical to the Greater Toronto Area (GTA).
[3] See for example, John Daly, "Why can't I buy a house with a yard?", *The Globe and Mail*, February 2, 2017.

This paper shows that the primary determinants of Toronto's high housing prices are on the demand side, and that the element of foreign investment has been under-appreciated by various public authorities to this point. The case for supply-side reform is overstated and would not address the immediate challenges facing the city. This paper also outlines a demand-oriented policy approach that would help tackle the affordability problem in Toronto.

2. Price trends in Toronto and Canada

If we want to analyze the various factors driving housing price trends in Toronto, it is helpful to get a better sense of how house prices have evolved in other major Canadian cities in recent years compared to Toronto.

This variation across cities and over time provides us with a better understanding to effectively address the causes of rising prices. A good explanation of Toronto's prices will need to account for both "cross-sectional" and temporal variation. In other words, we need to look at whether the alleged causal forces correlate closely with price trends. Far too often a laundry list of potential factors is cited and the "explanation" is left at that. A good account of the situation should instead give us a better sense of the relative weight of each causal force, and allow us to best design policy responses.

Figures 1 and 2 present two illustrations of price levels and trends. Figure 1 shows the evolution of the average house price to average income ratio in some major Canadian cities since 2001. This is a common indicator of affordability, since it relates housing prices to what local incomes can afford. The historical average for this figure is around 3. Usually a city with a ratio above 5 is considered "seriously unaffordable". As Figure 1 shows, Toronto and Vancouver are far above even this mark, whereas other Canadian cities are below that figure.

In practice, a lower interest rate will allow this ratio to grow, as higher mortgages can be serviced when mortgage rates are low. It is mainly for this reason that the trend in the ratios is upward from 2001 onward. Nevertheless, there is clearly a great deal of variation, and low interest rates on their own cannot account for high prices: if that were the case, then price-to-income ratios would be high across the country. They are not. Something unique is happening in Toronto and Vancouver.

Figure 1: Average house price-to-income ratios, select Canadian cities, 2001-2016
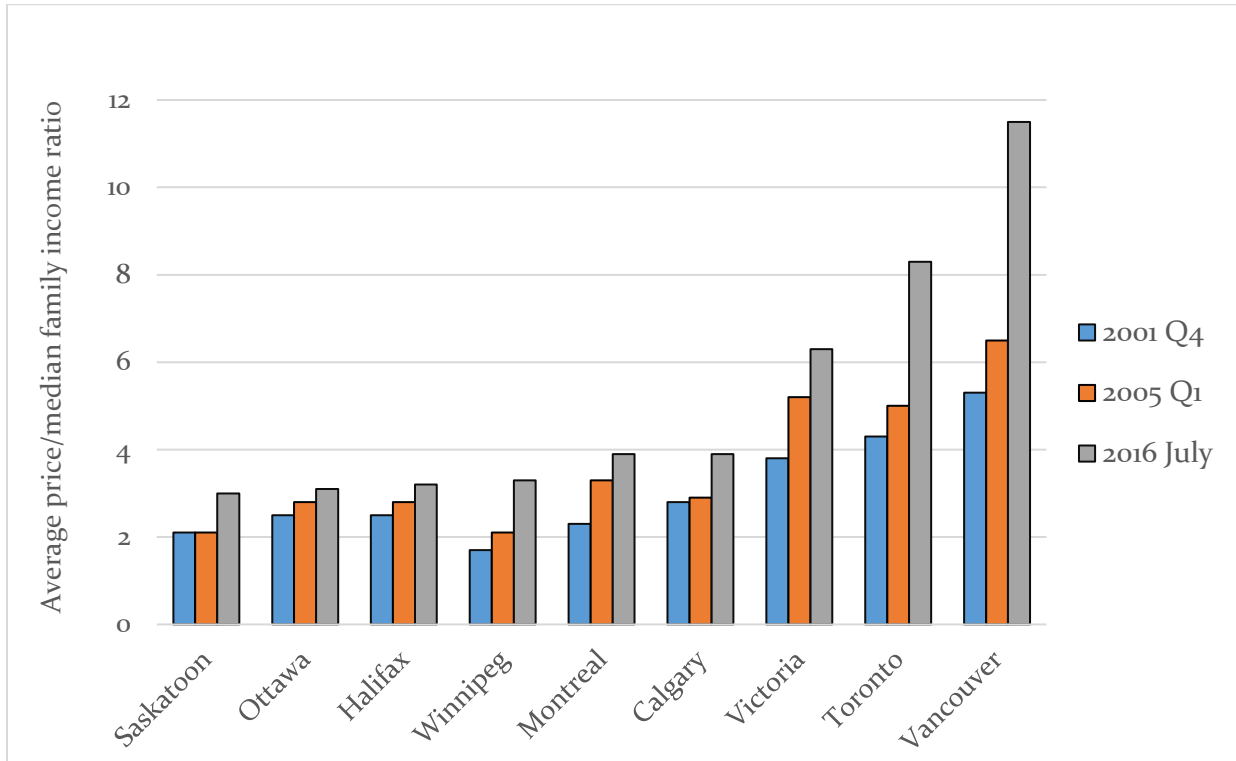

Source: BMO

Figure 2 shows year over year price trends of some of major Canadian markets. What we see is a two-track housing market emerging: from around 2015 on, Toronto and Vancouver surge, whereas the other markets experience declining price growth, or outright price reductions. (Hamilton and Victoria largely track the markets they are close to, as they see spillover effects.) This pattern indicates that something special is happening in these two big markets, which again cannot be simply accounted for by factors that are occurring across the country – such as low interest rates or modest investment in social housing.

There is also a sudden reversal in trend in Vancouver in the latter half of 2016, while Toronto rockets upward. This recent divergence is also telling. As Section 5 explains, it follows the introduction of a 15 per cent tax on foreign buyers in the Vancouver market.

Any explanation of the housing situation in Canada must take this empirical reality seriously. The supply-related arguments at least are potentially able to do so: supply constraints may impinge on some markets, such as Toronto and Vancouver, but not others. Sections 3 and 4 show that while supply constraints have some validity, the causal effect has been overstated.

Figure 2: Year over year trends in Teranet House Price Index, January 2006-January 2017
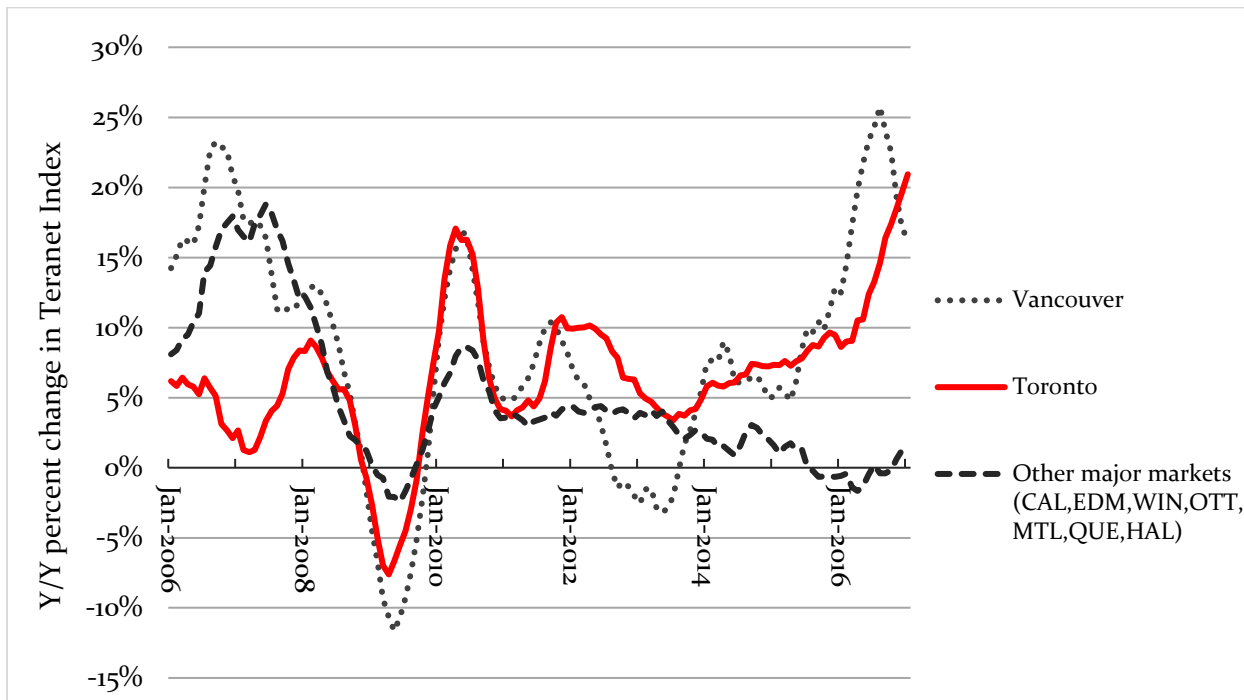
Source: Teranet. Hamilton and Victoria (not shown) largely track the major markets closest to them, Toronto and Vancouver, respectively.

3. Supply constraints and housing prices: What does the literature say?

The basic insight behind the supply-side story is simple. When there is growing demand for a product, an inability to sharply (and cheaply) increase supply will mean that prices rise. In the extreme version, if supply is fixed, or completely "inelastic", then prices will grow rapidly as demand expands. (Think Picasso paintings, for example.) By contrast, if supply can easily expand in reaction to an increase in demand, then the cost of the product will remain steady. (Think about the market

for muffins.) The Appendix illustrates these claims using some basic supply and demand analysis from Economics 101.

In most housing markets, these dynamics mean that house prices will grow slowly but steadily in line with incomes over time: developers will bring sufficient new housing supply onto the market to meet new demand, which moves in mostly predictable ways (e.g., cities' demographic and income trends).

If there is a sudden surge in the demand for housing, however, prices can rise sharply, since new supply is difficult to generate in a short time. An especially big

price increase will happen if adding new housing supply is expensive to do, either because of municipal regulations or because land is costly for developers to purchase and assemble into parcels to construct multi-unit buildings. When this latter situation is the case, an urban housing market is said to be "in-elastically supplied". That is, it takes a larger price increase to generate an extra unit of housing to meet the new demand, given the higher production costs.

The supply side claim, then, is that land use regulations such as Ontario's Greenbelt make the supply of new housing more *inelastic*, thereby raising prices, since they make land scarcer and thus raise the cost of buying it to make new homes.

There is something to this claim. Academic research confirms that "supply elasticity" matters for housing price dynamics, including the presence of geographic or regulatory barriers to urban sprawl. However, its estimated impact is not nearly large enough to generate the price levels Toronto has witnessed and there are important downsides to adopting this approach to lowering house prices.

But before we look at this academic research, it is important to distinguish between the short and long run.

In the short run, a sudden surge in demand will increase prices in a housing market even if it is "elastically" supplied, given that new housing supply can't be

generated at the snap of fingers. This is why even elastically supplied markets such as Phoenix and Orlando experienced a sharp run-up in prices during the American housing boom from 2000 to 2006. In the case of Phoenix, for instance, prices rose a stunning 109 per cent during this period. Since this boom was largely premised on low interest rates and problematic lending practices (e.g., subprime lending), the market almost completely "unwound" itself when rates rose and the faulty lending models were exposed to macroeconomic stress. *Therefore, rising prices, and even sustained price increases, can't necessarily be attributed to supply side issues such as municipal regulations and land constraints.*

Nevertheless, in both types of markets, elastic and inelastic, high prices driven by a demand surge will eventually induce extra housing supply. Once this new supply comes onto the market, and speculative dynamics subside, then prices will fall back towards their longer-term equilibrium (illustrated in the Appendix). It is this longer-term price level that we are concerned with here.

This longer-term equilibrium price level is determined by both demand and supply factors. On the demand side, the main relevant factors will be: broad demographic trends, the city's desirability (or its "amenities"), income growth, interest rates, and patterns of foreign or

outside investment. We will return to these shortly.

On the supply side, as noted, the relevant factors will be geographic and regulatory constraints on housing construction which may increase the price of production.

So what does the academic evidence suggest about the relative importance of supply related factors?

Most of the research that has looked at the impact of supply related factors has looked at the American housing market. This is because it is the market with the most comprehensive data, and so it has been easiest to evaluate contending theories. The American experience is also a useful starting point for discussions of the Canadian market, given broad similarities in our housing policy frameworks.[4]

In the American literature, research on supply-side dynamics has taken two main, inter-related forms. One strand has tried to evaluate the impact of objective *geographic constraints* such as mountains and water on housing prices. This work is most closely associated with Albert Saiz (2010). Saiz, in one well-cited paper, looked at the share of "developable land" within a 50km radius of a major city's central business district. Areas covered by water, wetlands and by steep slopes were deemed "undevelopable". The Appendix shows how

major American housing markets vary on this dimension.

Another strand has tried to establish reliable estimates of *regulatory constraints*, such as the Wharton Regulation Index (WRI; Gyourko et al., 2008). This measure was based on a survey of city planning directors, asking about eleven different features of the regulatory environment: local political pressure and engagement, the bodies in charge of re-zoning approvals, the stringency of density or "open space" requirements, average processing time for approvals, and so on.

Together, they have been used to estimate "supply elasticities" for different American cities. They have also been used independently in regression analysis to estimate their impact on prices.

Most of this work does find that supply elasticities, or proxies for them, have an impact on housing prices. In one influential article, Glaeser, Gyourko and Saiz (2008) found that cities with geographic constraints, or less developable land, saw average price gains that were more than twice as large as unconstrained markets during the housing booms in the 1980s and the late-1990s to early-2000s. In one estimation, a change of one standard deviation in developable land

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[4] Many of the weaknesses that plague supply-sided analyses in the U.S. recur in studies of other countries (e.g., Hilber and Vermeulen, 2012),

making the American literature illuminating in this respect as well.

would create a price difference of around 13 per cent in a boom (for the 1980s). Saiz (2010) also arrived at similar conclusions, finding that factors such as geographic constraints and regulations had significant effects on prices.

There are several issues with these analyses. First, *measures of supply inelasticity will be positively correlated with important demand-side factors*.[5] In other words, urban markets with factors that are associated with supply inelasticity (e.g., mountains and water, strict zoning rules) are also likely to be highly desirable places to live, and thus have stronger demand pressures.[6] This matters because when we estimate the impact of supply inelasticity on housing prices in statistical regressions, this underlying correlation will exaggerate the apparent impact of supply factors, unless we can carefully control for demand-related factors.

The intuition behind this point is straightforward. For example, nearby mountains and water can make a city a pleasant place to live, as Vancouverites will attest. But they also mean that Vancouver is highly limited in its ability to expand its urban footprint. An analysis that simply took these geographic features as supply

constraints and ignored their demand-stimulating impact (or the "amenity" they provided), would miss an important part of the story. In short, what is driving prices: amenities or geography? We would need very precise models to disentangle the effects.

Substantial literature documents the political economy of zoning regulations. This literature finds that strict regulations are most likely to emerge in large, fast-growing cities. Residents in these cities have the most incentive to regulate the impact of urban growth (e.g., think traffic, neighborhood transformation, etc.), and such incentives will be especially strong in locations with geographic constraints, where residents cannot as easily "flee" the nuisances of growth through urban sprawl. Sightlines to natural beauty, such as mountains or water, can also be at risk and may be regulated to lower this risk. For this reason, geographic and regulatory constraints are correlated as well.

The very process of rising prices offers an important stimulus to local political efforts to restrict growth in ways that protect or enhance property values. Homeowners, for example, come to recognize the equity benefits that can be generated through

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[5] For an excellent paper on this topic, see Davidoff (2015). Much of what follows is drawn from that paper and papers referenced within it (e.g., Saiz, 2010).
[6] This is entailed by the theory put forward by Saiz (2010) in relation to geographic constraints:

because people are free to move from one city to another, the main things that would make them accept higher housing prices at the margin is some compensation in terms of amenities or income (or both).

strict zoning, and mobilize to press their case. In small, slow-growing, or declining markets prices do not rise sufficiently to engender the same kinds of regulatory pressures.

In one neat formulation, then, "zoning follows the market". Or, again to use the jargon of economics, regulatory constraints are largely "endogenous". To be fair, many scholars arguing the supply-side view recognize these issues. The question is whether they are appropriately dealt with empirically, in the design of regression analyses and so on.

This brings us to the second issue with the supply-oriented studies: *they often adopt a highly inexact or "clumsy" approach to controlling for demand factors* and this will tend to exaggerate the effect of supply dynamics. Take the influential paper by Saiz (2010) as an example. In his regression analyses, Saiz tries to capture demand forces with variables that measure a city's population growth, its change in industrial employment, its immigration rates and its average January hours of sun. He also controls for region (Northeast, Midwest, South, and West).

There are good reasons for the inclusion of each of these variables, especially population growth, as confirmed in the literature that Saiz draws upon. But we can also see how each of these variables is a blunt instrument for what it is trying to capture. For example, change in industrial

employment is trying to measure economic trends, but it will only do so very crudely: moves toward service sector employment will be treated the same regardless of whether they are high-end or low-end service jobs. Average hours of sun in January are also plausible as a rough measure of desirable weather, but again it will only be a weak approximation.

In Saiz's model, certain important demand-side variables are also excluded: credit conditions/ mortgage regulation, income growth, crime rates, outside investment, rate of tourist visits (to proxy "amenities"), and so on. Again, researchers must work with what they have, and so this clumsy approach is often difficult to avoid. To be clear, this is not a question of nefarious scholarship. Nevertheless, there is insufficient appreciation for what the blunt estimation of demand forces will mean.

This is illustrated in two recent papers by Thomas Davidoff (2013; 2015). Davidoff (2015) shows how *adding a few demand variables to a regression can dramatically diminish the explanatory power of the supply-oriented variables*, such as regulations (the WRI measure) or land constraints (Saiz's measure). In most of these regressions, Davidoff selects demand variables that are arguably more precise than Saiz's: the share of the city's population with a college degree in 1980, a measure of employment growth in nationally leading industries (the so-called

"Bartik" index), immigration levels, and dummy variables for two distinct geographic areas (the main West Coast cities and the so-called "Sand States" in the U.S. South). Depending on the regression model in question, the estimates of supply elasticity generated by Saiz *lose around half or more of their explanatory power* once the demand variables and/or geographic controls are included.[7] In some models, supply elasticity does not even reach statistical significance.[8]

These results are consistent with Davidoff (2013). This paper shows that once state-level factors like credit conditions were controlled for, measures of supply constraints had very little effect on the magnitude of the house price cycle during the 2000s. In other words, the dominant explanation for price volatility lay on the demand side, including such things as loose credit conditions.

In sum, because demand is highly correlated with estimates of supply inelasticity, and it is difficult to capture demand dynamics in precise ways, studies that have found a major role for supply constraints have likely exaggerated their impact.

There is a third reason to be wary of relying too strongly on the supply argument in the case of the Greater

Toronto Area (GTA): based on the American experience, *low supply elasticity cannot account for more than a moderate fraction of the recent price increases in Toronto, even if we accept elasticity figures estimated using "clumsy" or problematic demand variables.*

To illustrate this point, Figures 3 and 4 plot housing prices in the twenty-four largest American markets in 2015 against the estimates of supply elasticity found in Saiz (2010). Figure 3 reports simply the average housing price, while Figure 4 looks at another, more standardized measure of prices: the average house price-to-income ratio (which will correct for the influence of currencies and incomes).

Recall that the estimates of supply elasticity include the effects of *both* geographic and regulatory constraints. The larger the number on the horizontal axis, the more elastic is supply. Given this theory, we should expect a negative correlation, which we do in fact see. More elastic markets should have lower housing costs. The point however is that the predicted relationship (i.e., the dotted line) between the two variables suggests a price level that is well below where Toronto sits now, which is a price-to-income ratio of over 8 (or an average house price of ~$770,000 CAN - or ~$610,000 USD in 2015 Q2)[9], *even if Toronto had one of the*

[7] See Davidoff, 2015, Table 4.
[8] See Davidoff, 2015, Table 6.

[9] "Home price up 22 per cent in January compared to last year: Toronto Real Estate Board", *Toronto Star*, February 3, 2017.

least elastically supplied markets in North America.

If we look at Toronto's geographic constraints, however, the city is not one of the most constrained, as shown in the Appendix. Moreover, developers in Toronto acknowledge that while the city's regulatory environment is not ideal, it is also not among the most challenging when compared to developers' experience in other cities.[10] A more middling elasticity of near 1, such as in Seattle, would predict a price-to-income ratio of 5, or a house price of ~$350,000 USD – or ~$440,000 CAN (in 2015 Q2). Again, well below where Toronto now sits.

Figure 3: Estimated housing supply elasticity and average house prices in the 24 largest American housing markets, 2015 (Second Quarter)
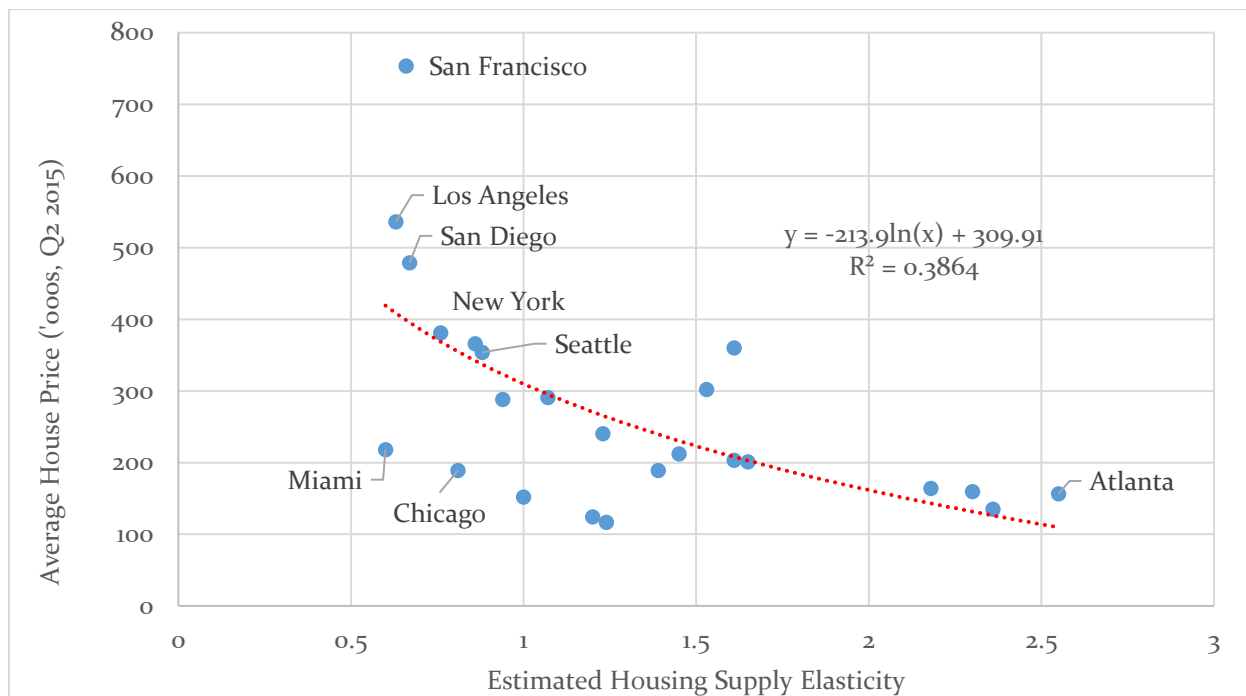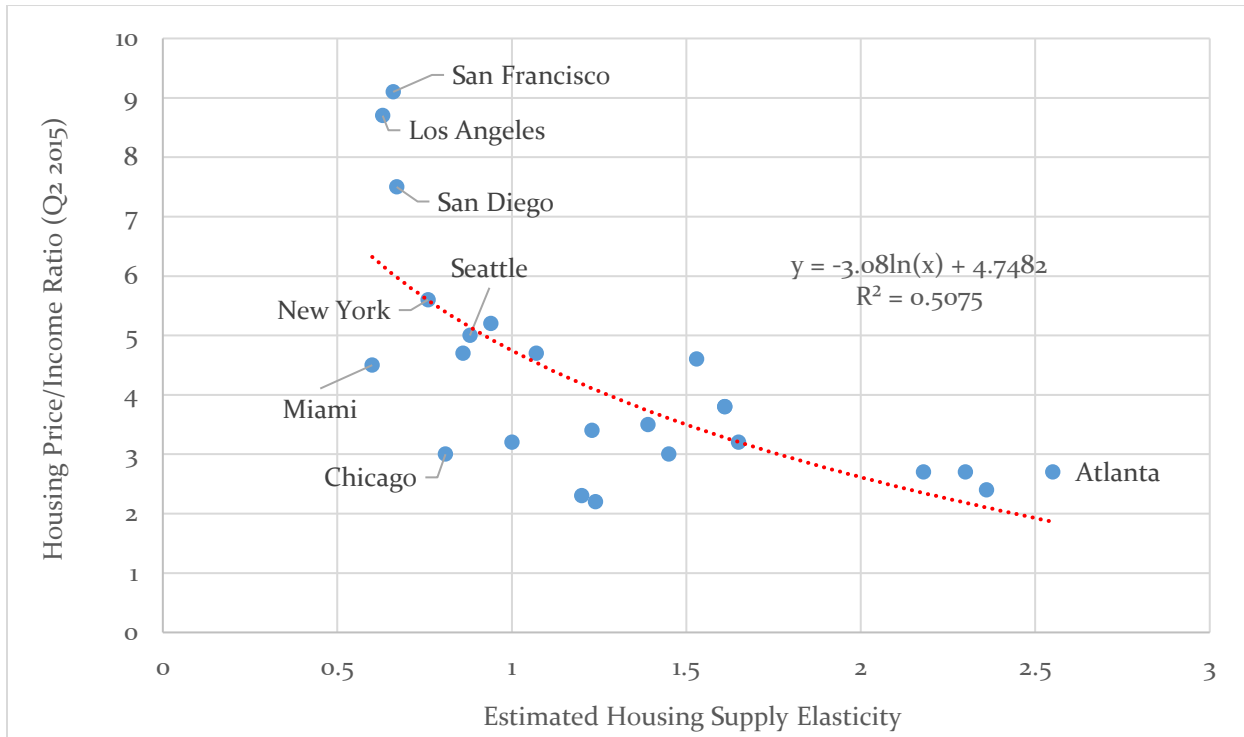

Source: Saiz (2010); *Economist*. Most recent figures available were used. Dotted line is a logarithmic function.

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[10] Interview with developer representative (2017). No academic studies to my knowledge have tried to replicate a WRI-type measure in the Canadian context.

Figure 4: House price-to-income ratios and estimated housing supply elasticity in the 24 largest American housing markets, 2015 (Second Quarter)

Source: Saiz (2010); Economist. Most recent figures available were used. Dotted line is a logarithmic function.

These figures need to be treated with caution. For one thing, the slope of the predicted relationship is strongly driven by the three west coast cities of Los Angeles., San Diego, and San Francisco. Los Angeles and San Francisco have received a large amount of foreign investment in recent years, especially from China (and San Diego indirectly through its effects on the L.A. market). Consequently, these cities may be skewing the results. By either removing them from the equation, or estimating the bivariate relationship in 2000, before the wave of foreign investment (and the subprime boom), the

"predicted" price level is *much lower* even for the least elastically supplied markets: between a price-to-income ratio of 4 or 5. (The Appendix shows these results.) And since we know that these supply elasticity estimates are biased, due to problematic controls for demand, *the bivariate relationship will already be greatly overstating the impact of supply dynamics on prices*.

The conclusion is that supply-related dynamics simply cannot come close to generating the kinds of prices Toronto is currently experiencing under normal

demand conditions. The Appendix also shows that this conclusion holds when it comes to geographic constraints, which are arguably most pertinent to the Greenbelt debate. Instead of supply issues there must be extremely strong demand pressures at work in the GTA. Section 5 shows the case for this view. Before that, however, Section 4 looks at the specifics of the Toronto supply experience.

4. Toronto's supply experience: Indications of stress?

The review of the academic literature in Section 3 is far removed from the usual debates around supply and demand in the media. In this realm, a much more prosaic type of supply and demand analysis dominates: are enough houses being built? The present section tackles this question to unpack some of the typical claims made by supply-side analyses. It also shows how the issue of the Greenbelt has been misunderstood in the debate, looking at recent patterns of urban expansion in Toronto.
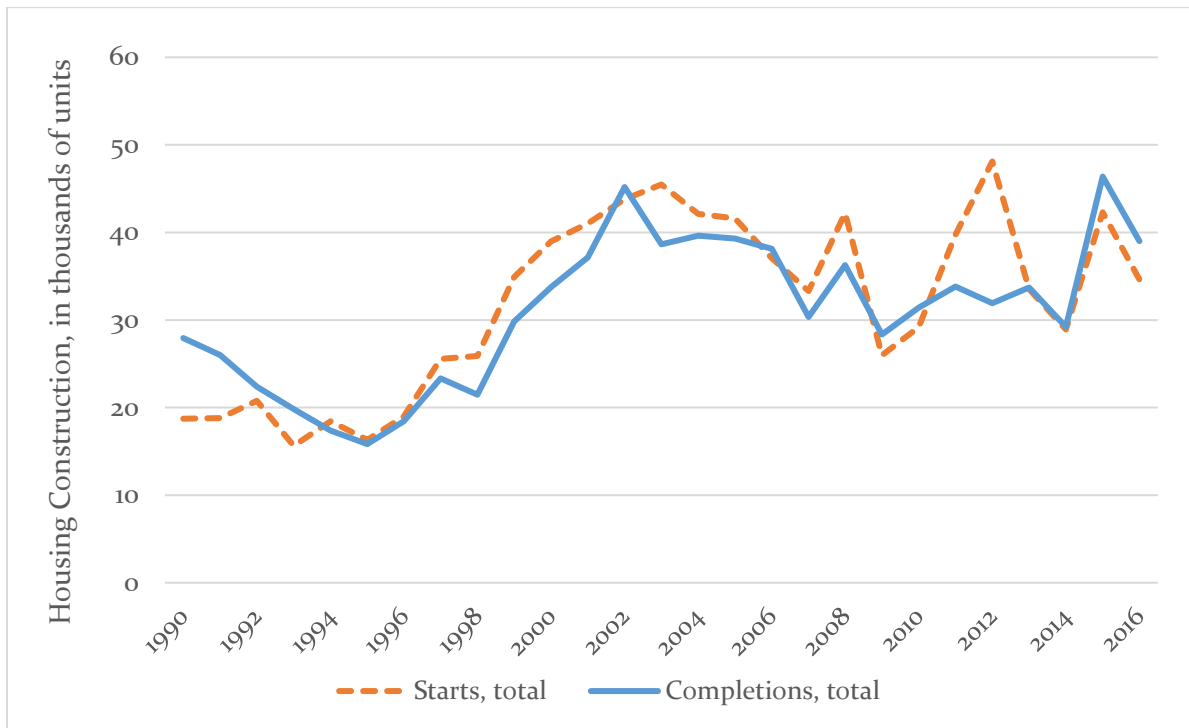
To start, let us examine the data on housing construction in the Toronto area. How much is being built, and is it keeping up with demographic growth? Also, what is being built? Figures 5-8 shed some light on these questions.

Figure 5: Single-detached completions in Toronto (CMA), 1971-2015
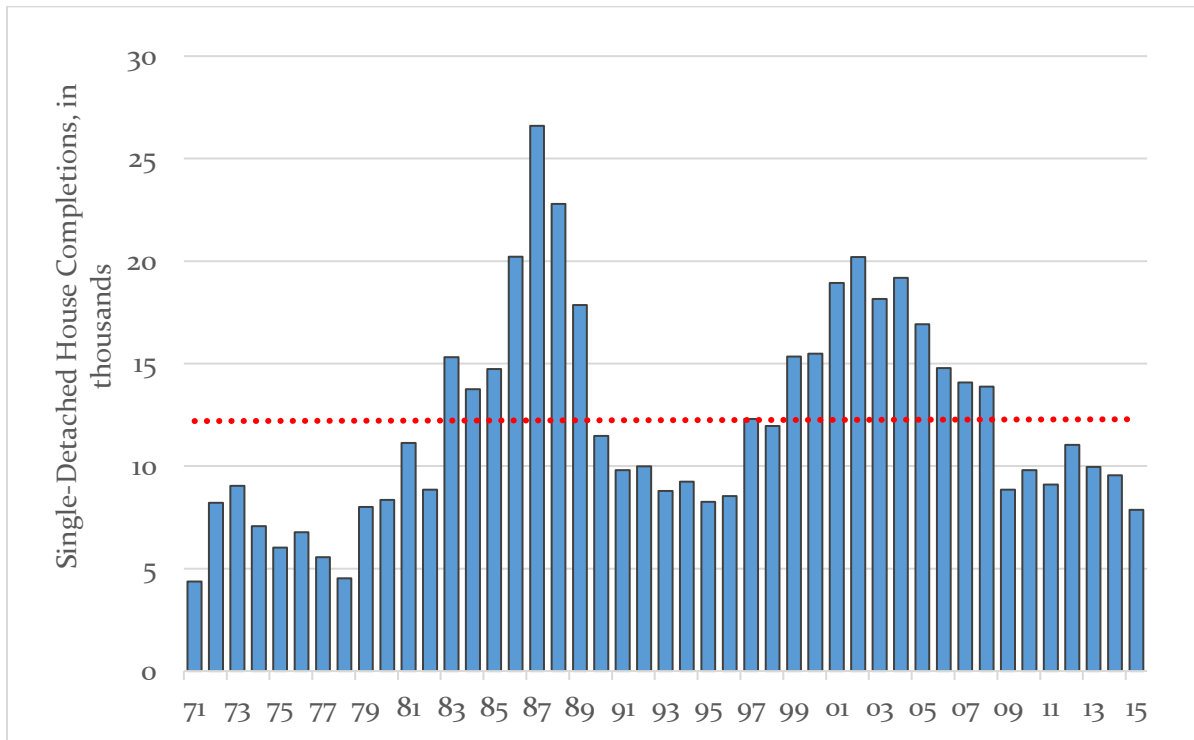
Source: CMHC; BMO.

Figure 6: Housing construction in Toronto (CMA), 1990-2016

Source: CMHC.

Two conclusions emerge from Figures 5 and 6. First, the construction of single-detached houses has fallen in recent years, at least relative to its highs in the mid-2000s and late-1980s. The rate of construction has only been modestly below the long-term average, however. From 2010-2015, an average of ~9,500 single-detached houses were built per year, compared to the long-term average of ~12,000 for the 1971-2015 period. (If we include the 1960s the long-term average is ~11,000). Second, if we include all types of housing, such as townhouses and especially condos, the rate of construction is well above historical rates. In fact, completions in 2015 were at a record level.

Ultimately, this broader category of housing is more relevant. As cities grow, it is common that construction increasingly shifts to denser or high-rise construction, as people are willing to trade "yards for location" to avoid long commutes.

While construction activity is high, has it kept up with population growth? Perhaps higher construction rates merely reflect stronger population growth. Figures 7 and 8 address this: housing construction has more than kept up with population growth in recent years.

Figure 7 shows a measure of construction relative to population growth: the rate of population growth per housing unit completion. *The lower the number, the*

more construction relative to population growth is occurring. It is normal that the ratio is not 1:1, since the average number of people living in a unit of housing is well over one. In recent years, construction has been strong relative to population growth.

Figure 7: Population growth relative to housing completions, Toronto (CMA), 1991-2015
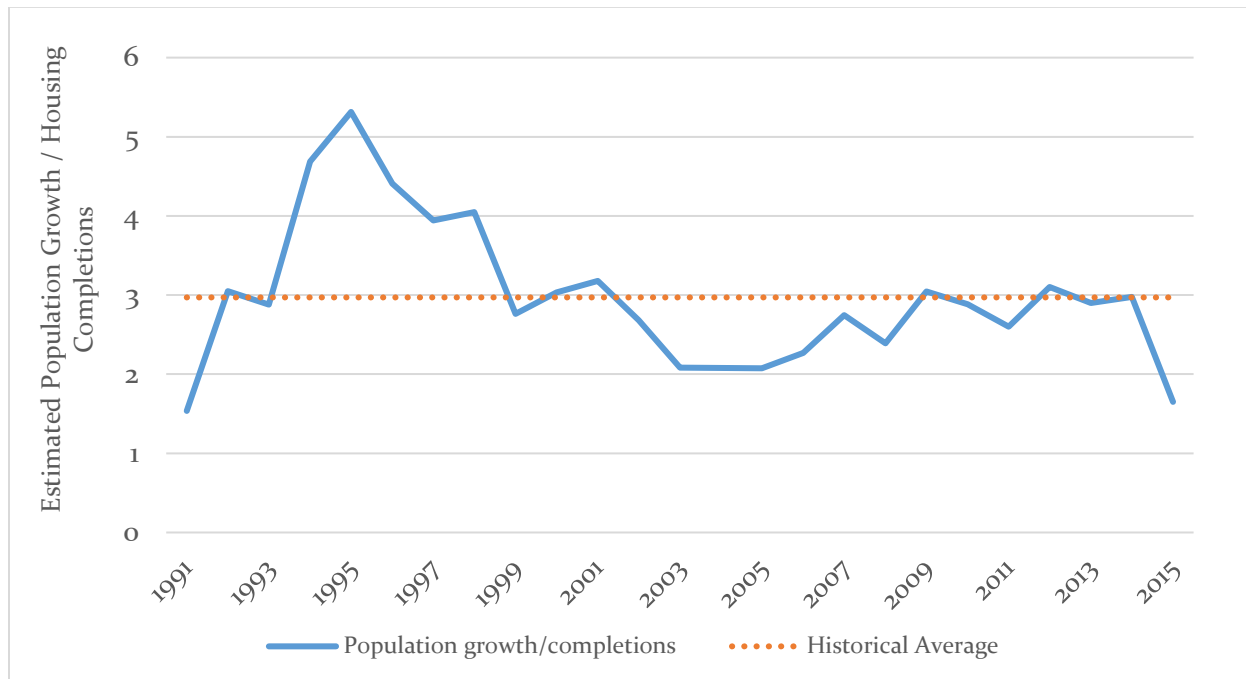

Source: CMHC. A lower number means *more* construction relative to population growth.

Figure 8 backs up this point by simply looking at Toronto's population in census years relative to the total number of dwelling units in those same years. The ratio is consistently falling, suggesting that construction is keeping up with demographic demand. There is little indication of "not building enough". That said, a falling ratio is consistent with an expansion in the share of housing that is made up of denser, high-rise units, which will house fewer people on average.

Figure 8: Population to total dwelling units ratio, Toronto (CMA), 1996-2016
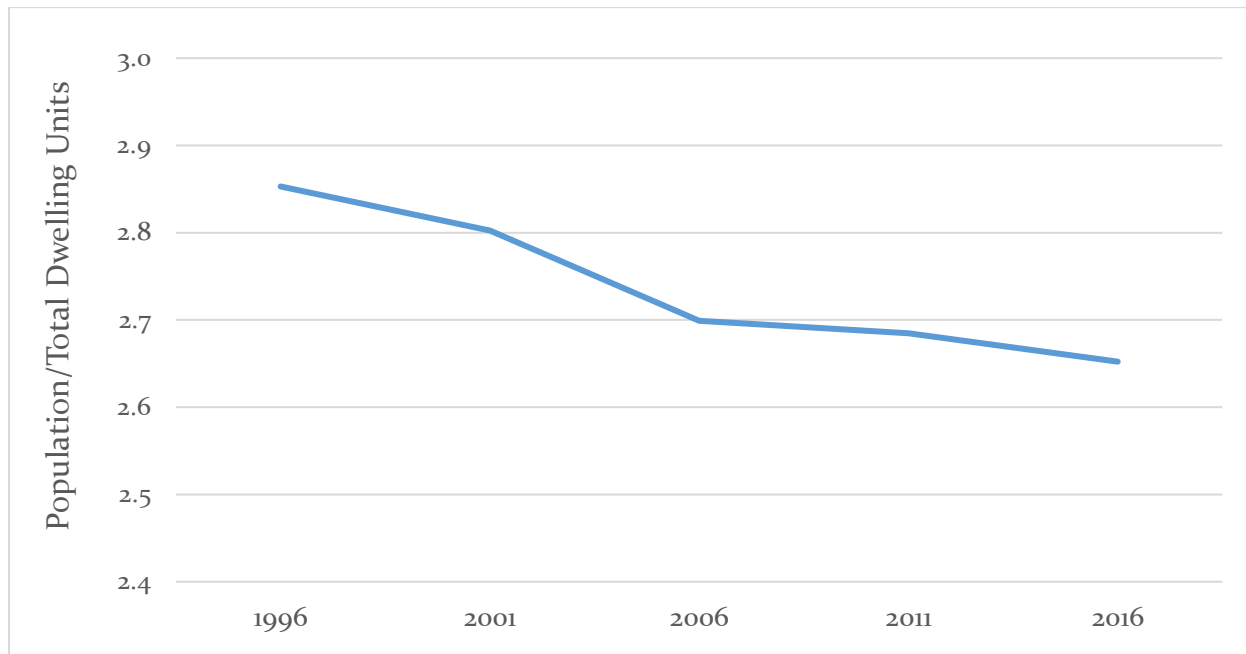
Source: Canadian census, various years.

This data shows that housing construction is keeping up with population demographics, thereby suggesting that shortfalls in supply are due to demand factors not captured in population growth, such as foreign investment and multiple-property ownership by both domestic and foreign investors. In sum, there is no compelling evidence that insufficient housing is being built relative to demographic needs. There has been a slowdown in the construction of single-detached housing, but this has been more than compensated for by higher construction of apartments or condos.

Those in favor of sprawl-oriented solutions to the housing crisis often seize upon the modest slowdown in construction of single-detached homes. This, they claim, is the major reason for surging prices of these types of homes and the hot market in general.

To make this case, an evolving series of arguments have been made in the media. First, with respect to a land supply issue, due to the Greenbelt and restrictive land use policies, and more recently to a lack of "serviced land".

While the provincial *Growth Plan* influences where and how the region grows (for example, by encouraging more intensification), claims that we are "bumping up" against the Greenbelt, restricting construction of detached

houses, has been shown to be false.[11] In fact, there is a considerable land area that has been designated for "greenfield expansion" that has yet to be built on, the designated greenfield area (DGA).[12] Additionally, there remains around 59,000 hectares of the so-called "Whitebelt" area, which is currently a buffer between the existing urban settlement area and the Greenbelt (the areas shaded white within the Greenbelt in Figure 9).

Perhaps even more illuminating, urban growth in Toronto has dramatically slowed, despite ample greenfield land available for development.[13] From 1991-2001, Toronto's urban footprint expanded 26 per cent. From 2001-2011, by contrast, it only expanded 10 percent. Yet from 2011-2016, it has only expanded around 4 percent; however, only 20 percent of the 56,000 hectare DGA was developed from 2006-2016, leaving over 45,000 hectares to be developed.

More recently, a low supply of serviced land – that is furnished with the requisite infrastructure to support housing (e.g., water, sewage, etc.) – has been cited as the main impediment to the construction of detached houses in greenfield areas. Municipalities in the GTA are required to maintain a three-year supply of serviced land, but they do not keep consistent records of this. However, it remains unclear as to why land is not being adequately serviced, and there is limited data to determine to what extent serviced land is the issue.[14]

There have also been claims of "speculative land hoarding", whereby those who own land resist development with the expectation that the price of land will continue to increase in value. The other dynamic is that cities naturally tend to sprawl slower as they expand, as the distance to central areas increases and there are stronger incentives for denser development. This is the conclusion of another important Neptis Foundation report, *Growing Cities* (2010).

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[11] For that plan, see:
https://placestogrow.ca/index.php.
[12] Latest research on land supply by the Neptis Foundation shows 126,000 ha. of unbuilt land supply in the Toronto region:
http://www.neptis.org/publications/update-total-land-supply-even-more-land-available-homes-and-jobs-greater-golden.
[13] See "No shortage of land for homes in Greater Toronto and Hamilton area", *Neptis Foundation*, October 2016. Available at:
http://www.neptis.org/publications/no-shortage-land-homes-greater-toronto-and-hamilton-area.
The estimate below for the 2011-2016 period is

from work underway at the Neptis Foundation (personal communication).
[14] For contrasting views, see Neptis Foundation, 2016, "Brampton open data provides a template for the understanding of serviced land" (available at:
http://www.neptis.org/publications/brampton-open-data-provides-template-understanding-question-serviced-land); and Frank Clayton, 2015. "Why is there a shortage of new ground-related housing in the GTA", Policy Commentary No. 4 (available at:
http://www.ryerson.ca/content/dam/cur/images/CUR_PC%234_Shortage_New_Ground-Related_Housing_June1%2C%202015.pdf).

Figure 9: The Greenbelt and the Greater Toronto Area
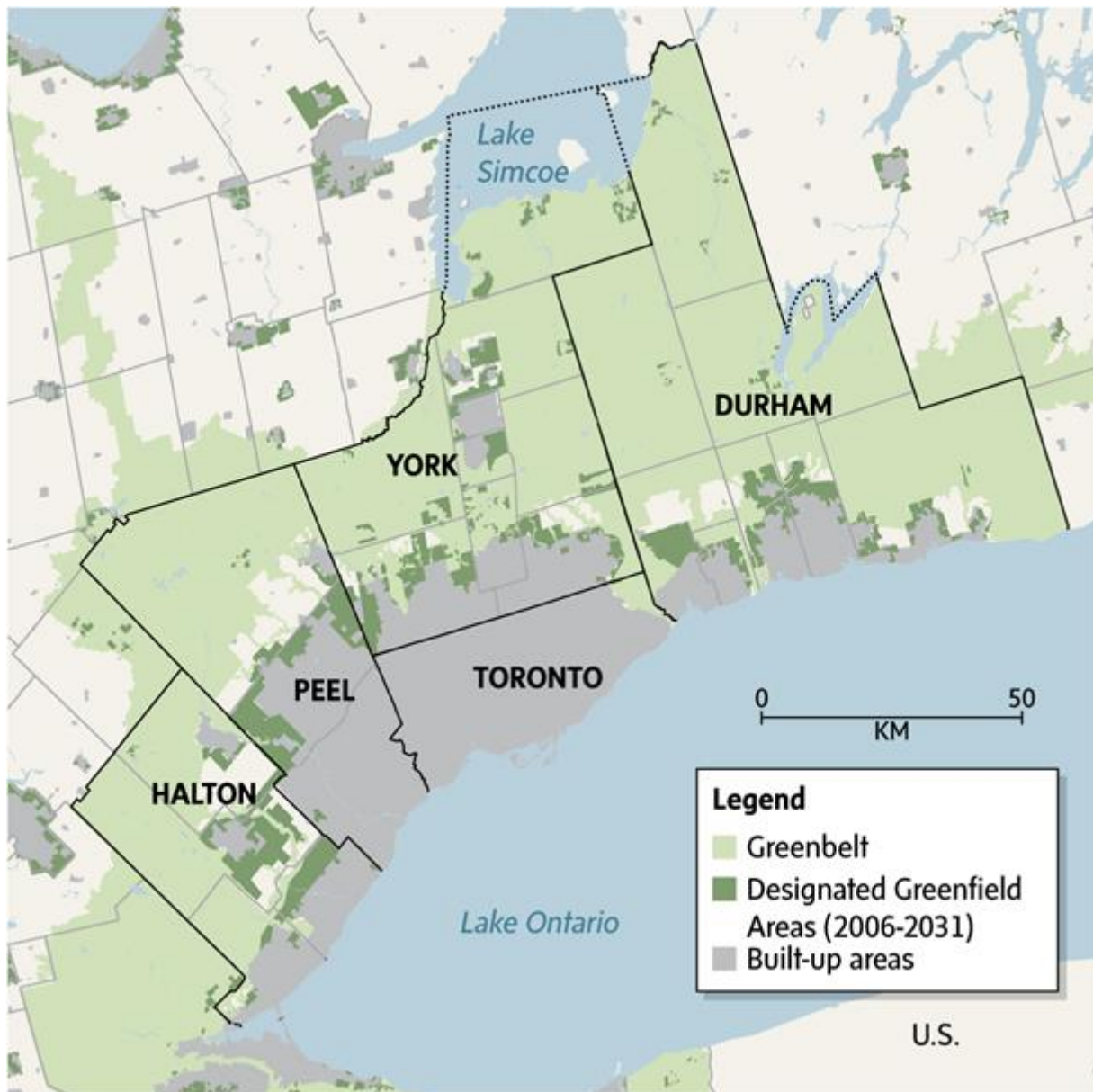
Source: Neptis; Globe and Mail.

5. Potent demand pressures and the new global real estate reality

If supply-side factors can only account for a modest share of Toronto's high and rising prices (see Appendix), that leaves powerful demand-side pressures as the main culprit behind the recent run-up in housing prices. While this paper does not intend to exhaustively examine the relative impact of all demand factors, a few broad conclusions can be sketched.

First, the pattern of sharply rising prices has not been driven by income growth, which might characterize a booming, productive underlying economy. In fact, Toronto's income growth since 2001 has been lacklustre, trailing almost all the other major Canadian markets (Figure 10); nor are average Toronto incomes particularly high at present relative to other Canadian cities.[15] Similarly, the unemployment rate was worse than

average among the same cross-section of cities from 2010 to 2015.[16]

Population growth has been strong, and there is little doubt that this has put pressure on prices. Population growth has slowed in the past five years, though, as prices have surged. This indicates that population growth does not account well for the pattern in prices over time that we see in Figure 2.

Figure 10: Change in Individual Median Employment Income, 2000-2013, Major CMAs, Unadjusted for Inflation
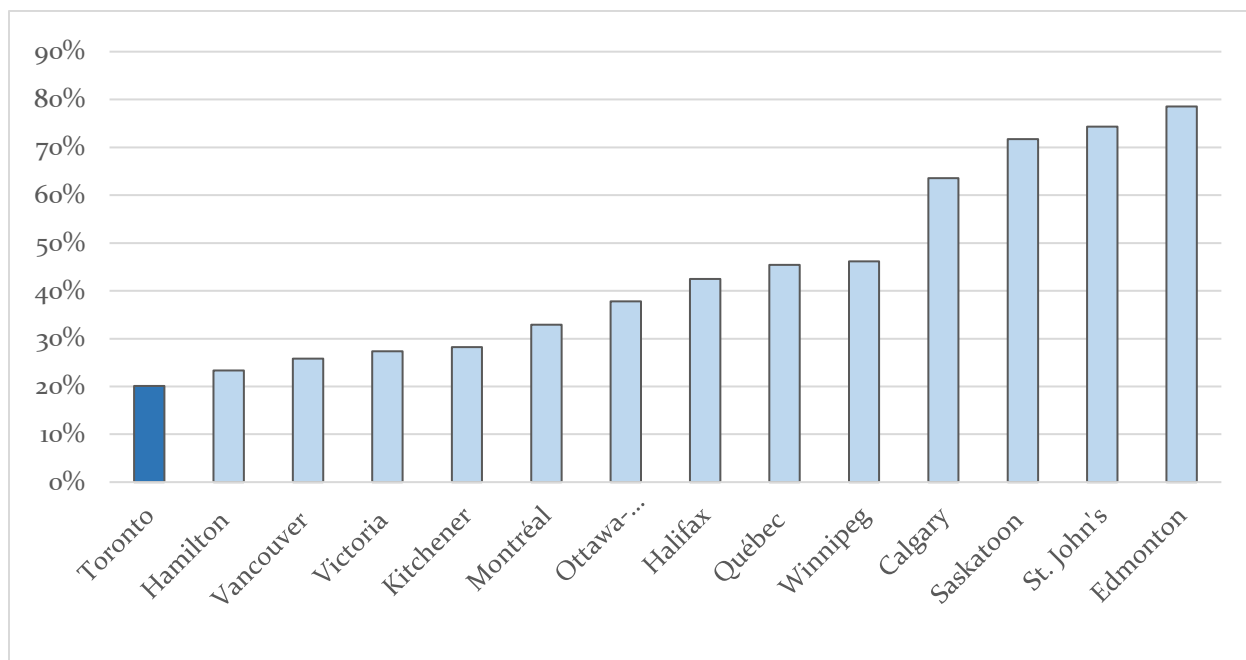
Source: CANSIM. Other measures of average incomes, including family incomes, show the same pattern.

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[15] There are a variety of measures for average income, depending on whether one measures average or median income, family or individual income, or whether one includes government transfers. But in almost every one Toronto places either low to middling among the largest Canadian CMAs. See for example: http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/famil107a-eng.htm.

[16] Cansim data, Table 109-5334 and 109-5337.

Second, low interest rates have clearly played an important role. When mortgage rates are low, homebuyers can afford larger mortgages and multiple property investment is facilitated. This is behind the broad increase in house price-to-income ratios shown in Figure 1. However, what Figure 1 also shows is that most Canadian cities have only seen a modest rise in their price-to-income ratios. Since they have all experienced low and declining mortgage rates, Toronto's extremely high prices cannot be explained with reference to this factor alone. Furthermore, as Figure 2 shows, prices have surged in Toronto only from late 2015 onwards, well after interest rates dropped to very low levels following the deep recession around 2008.

Research suggests that interest rates on their own only play a moderate role in house price dynamics. One careful analysis by Glaeser, Gottlieb and Gyourko (2013), suggests that the decline in interest rates over the course of the American housing boom from 1996 to 2006 only accounted for around one-fifth of the rise in prices.

What historically low interest rates do seem to be doing, however, is helping to foster the emergence of speculative bubbles in specific markets. When interest rates are as low as they are, rents can often come close to meeting mortgage costs. For those wanting to speculate, this allows the purchasing of multiple homes that are used as investments. It is this speculative activity that is so powerful in generating bubbles. In addition, very low interest rates can create the desire for "safe assets"

that yield more than government bonds. Thus, demand for "safe assets" is added to traditional investment or speculative demand.

Underlying these dynamics are price expectations. Speculative activity in housing markets is based upon the expectation of rising prices. Something has created these expectations in Toronto (and Vancouver, though that may have changed, as discussed below). In other Canadian cities, such expectations are far less prevalent. Understanding the emergence of such expectations will therefore go some distance to explaining the price dynamics in Toronto, which are now very clearly in a bubble pattern, as Figure 2 shows.

Why might Toronto and Vancouver have been prone to such expectations?

This brings us to the third major point about demand forces in Toronto. As I have argued at greater length elsewhere (Gordon, 2016), a fundamental feature of the dynamics in these two cities has been a large and continuous flow of foreign capital into the housing market. This occurred not just in the form of high immigration rates. Several Canadian cities have seen high rates of immigration, including Montreal. What distinguishes Toronto and Vancouver is the phenomenon of wealth-based migration, which was actively encouraged by Canadian governments since the late 1980s.

One of the primary conduits of foreign capital into the Canadian housing market was the Immigrant Investor Program (IIP)

established in 1986. David Ley (2017), a professor of Geography at the University of British Columbia, has written extensively about this program. The IIP allowed wealthy aspiring migrants to front the Canadian government a five-year interest-free loan in return for permanent resident status and a path to citizenship. (Prior to 2010, $400,000; afterwards, $800,000.) These loans were returned after that five-year period, and the program placed very few conditions on those who thereby gained citizenship.

Rather than engage in entrepreneurial activity, as the program officially intended, most of the migrants who used the program conducted very little business in Canada. After ten years, the average annual amount of taxes paid was around $1,400, compared to $7,500 for the average Canadian. Yet those who arrived through the program bought expensive housing, as documented in the case of Vancouver by Moos and Skaburskis (2001), using census data. What this means is that housing was being purchased using foreign income and wealth, while little (compensating) economic activity took place locally which might improve incomes: this generated the so-called "de-coupling" of the housing market from the local labor market.

Inevitably, this phenomenon tends to generate high price-to-income ratios, at least if such activity is substantial. In the case of Vancouver, there is little doubt that it was substantial: Ley estimates that around 200,000 people arrived through

this and other wealth-based migration programs, or roughly 8 per cent of the region's current population. Around two-thirds of those who arrived in Canada through the IIP settled in B.C. (read Vancouver), while almost 30 per cent landed in Ontario (read Toronto). Using Ley's estimate for Vancouver, this suggests that almost 100,000 people arrived in the Toronto region through this program.

Given Toronto's greater size, and the fact that around half the number of people arrived in this manner, it is no surprise that the impact on the Toronto housing market has been much less potent than in Vancouver. Still, it likely had some effect, as Figure 1 suggests. Vancouver is by far the most extreme Canadian city in terms of its price-to-income ratio, but Toronto is second by some margin, and this matches up to the role of wealth migration in the housing market.

The IIP was canceled in 2014 because the Canadian government realized that the program was not working as intended. After the cancellation of the IIP, Canadian governments, including the Canada Mortgage and Housing Corporation (CMHC), failed to gather good data on foreign ownership in the housing market. As a result, we must piece together what has occurred in other ways.

In this respect, the main thing to note is that around $1 trillion USD left China in

2015, and nearly that much in 2016.[17] This money has flooded into property markets around the developed world, given that such real estate is seen as a "safe asset".[18] In Australia and the U.S., where they keep better track of foreign buying, the years from 2013 to 2015-16 saw roughly a trebling in purchases from China. The cities most affected by this, such as Sydney, Melbourne, San Francisco, and L.A., have seen their prices surge in that period, as in Toronto and Vancouver. We also know from surveys of wealthy Chinese citizens that these are the preferred destinations for purchases. In a 2014 survey, Vancouver ranked third globally as a preferred target for real estate purchases, while Toronto ranked sixth.[19] (L.A. and San Francisco were first and second, respectively, showing why their outlier status in Figures 3 and 4 is revealing.)

We also have the data gathered in Vancouver by the B.C. government, which found that almost 15 per cent of the market was foreign buyers prior to the introduction of the foreign buyer tax in August 2016. In a five-week period in June and July of last year, roughly $1 billion was spent on Vancouver real estate by foreign buyers (90 per cent of which was from China). Annualized, that is around $10 billion. And it is important to note that this was a conservative estimate, since it captures only the purchases by those with a foreign passport. If, instead, the data captured the use of foreign capital, which is more relevant, the estimate of foreign buying could possibly be double that figure or more. In short, a large amount of foreign money has been entering select Canadian real estate markets, especially in recent years, with potent knock-on effects.

This wave of money from abroad is certainly not the only factor affecting prices in recent years in Toronto and Vancouver. Nor is it necessarily the main factor, though the case for that view is stronger in Vancouver. The point, instead, is that the long continuous wave of foreign capital, in combination with the recent spike in foreign buying, has created *powerful expectational dynamics*.[20] In the context of historically rising prices and expectations that foreign capital will continue to arrive in large volumes, many *domestic* buyers, both speculative and otherwise, have sought to jump into the market, even at very high prices. This has meant that rising foreign demand has been

[17] See for example, "Chinese start to lose confidence in their economy", *New York Times*, February 13, 2016; "Chinese capital flight is back", Matthew Klein, *Financial Times* (Alphaville), January 18, 2017; and Orville Schell, "Crackdown in China: Worse and Worse", *The New York Review of Books*, April 21, 2016.
[18] See for example, "Canada's real estate boom: a Chinese perspective", *Toronto Star*, December 23,

2016; "China sends bubbles to North America", Bloomberg, June 15, 2016.
[19] See the Hurun Report, available at http://up.hurun.net/Hufiles/201504/201504271627 43845.pdf.
[20] This influx of foreign capital also allowed (and pressured) older homeowners to better assist their children in making downpayments, by drawing on their equity. This is the so-called "Bank of Mom and Dad" effect.

placed on top of, and fostered *domestic* speculative demand and first-time buyers' panicked demand (so-called FOMO, or "fear of missing out", demand). In combination, this has created scorching demand conditions that disconnect prices from local fundamentals.

Incidentally, this also refutes common refrains that the issue is a "supply problem" because we have so few active listings. When sales rise due to high demand, and some hold off listing because they believe prices will continue to escalate, it is natural that active listings will fall. As we have seen, housing construction has kept up with

demographic demand. What such refrains are mainly pointing to are potent demand pressures, not supply issues.

Figure 11 illustrates this point by charting annual sales as well as new and active listings in Toronto.[21] It shows a spike in sales in 2015 and 2016 especially (solid line; right-hand side axis). Meanwhile, new listings over the whole period have remained roughly constant (dotted line; left-hand side axis). What strong sales have done is draw down "inventory", or active listings (dash line; left-hand side axis). Again, this pattern reflects a surge in *demand*.

Figure 11: Real estate sales and listings, Toronto, 2004-2016
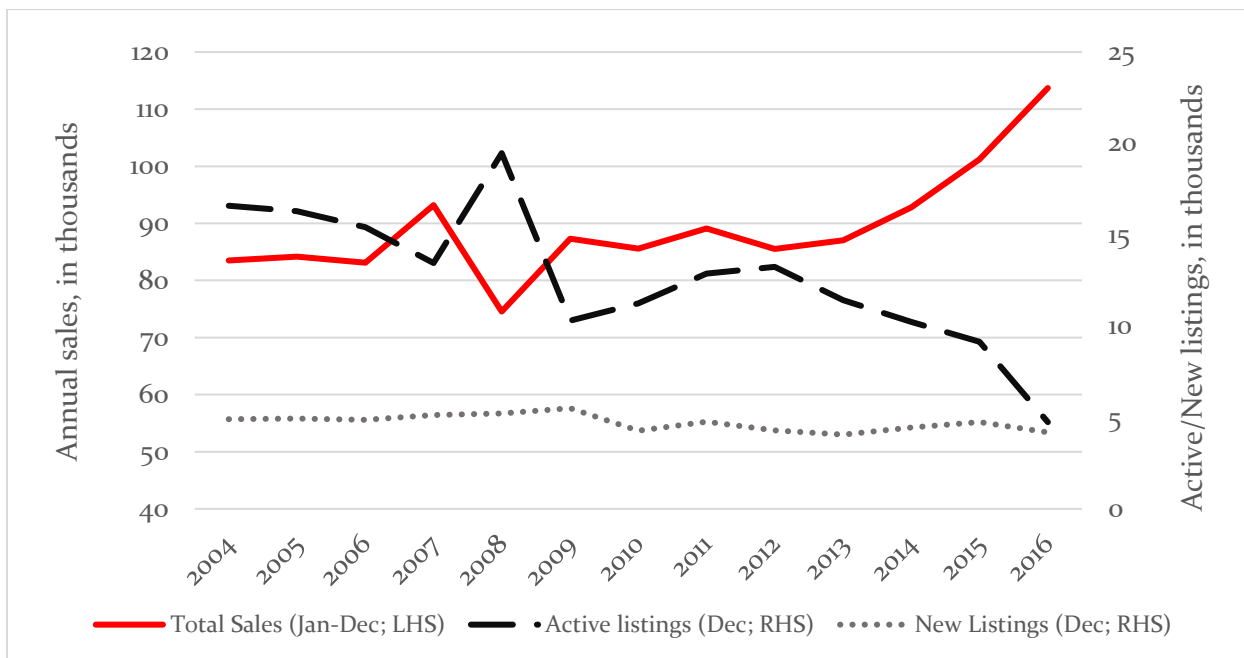
Source: TREB. December is simply a representative month to illustrate trends over time.

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[21] See also: http://www.trebhome.com/market_news/housing _charts/archive/charts_february_17.htm.

It is worrisome that this pattern has begun to intensify the dynamics of expectation. In the first two months of 2017, new listings dropped despite rapidly rising prices, likely because even more sellers now expect prices to climb higher. This has sent the sales-to-new listing ratio soaring, which is a good proximate indicator for future house price increases.[22]

In a housing bubble, then, not even a substantial amount of new supply can meet speculative demand. This is why prices rose so substantially and for so long in Phoenix and Las Vegas, despite elastic supply. The appropriate strategy in this respect is to curtail or discourage speculative demand, and the main way governments can do that is by shifting expectations. This understanding of the issue informs Section 6, which looks at possible measures to cool the housing market.

6. Potential Policies

If the primary drivers of high and rising prices in Toronto lie on the demand side, policy is best targeted directly at that. Not only will relying on a supply-oriented strategy not effectively tame prices, as discussed above, but there is also the danger of over-building in the medium-term.

In the context of strong demand pressures, over-building might seem like an impossibility to the reader. But if demand pressures suddenly shift, due to changes in rising interest rates or global economic instability, then over-supply can be revealed, and it can worsen the price correction that follows. This is what occurred in some elastically-supplied American markets during their booms and busts in the 2000s when builders responded to high prices by building frenetically, only to see bubbles burst in dramatic fashion. This is less likely in the Canadian case, due to substantial and continuous immigration into big cities (where diaspora communities act as powerful magnets). But it is still a concern that should be acknowledged; in Toronto's housing bubble in the late 1980s, this appears to have occurred in the condo market.[23]

In any event, many of the supply-oriented solutions being proposed would be difficult to reverse, such as allowing sprawl in the Greenbelt. The built environment is not something that can be reversed in any simple way. Consequently, locking Toronto into a pattern of greater sprawl would be problematic moving forward. Considering the challenge of climate change, where cities will need to become denser to limit emissions from transportation, this is not a step that should be taken as a first resort

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[22] See the third chart in the link in the footnote above.

[23] See David Macdonald, "Canada's Housing Bubble: An Accident Waiting to Happen", *Canadian Centre for Policy Alternatives*, August 2010.

in the struggle to create affordable housing.

What options exist in terms of curtailing demand, then?

Certain steps, though undeniably potent, would be too blunt. Raising interest rates falls into this category. The reasons are complicated and many, but the essential point is that such a move would have a broad contractionary effect on the Canadian economy at a time when it is not operating at full capacity. In addition, as Figure 1 shows, the affordability crises are concentrated in Toronto and Vancouver; there is no reason to deflate other Canadian markets when their prices are stagnant or growing slowly (Figure 2), and there are other more targeted policies available.

The same critique could be applied to a further tightening of mortgage rules. This has been done several times since they were initially loosened in 2006-08 under then Prime Minister Stephen Harper. Arguably the most potent changes occurred in 2012, when the federal government reduced the maximum amortization period from 30 to 25 years, further restricted the amount that homeowners could borrow when refinancing, and ended government-provided mortgage insurance on properties over $1 million.

As Figure 2 shows, these changes appear to have affected many Canadian markets, as price growth subsequently fell to low levels. Toronto, and Vancouver after a

pause, are clearly the exceptions, and this points again to the role of foreign and local investors in these two markets. For these wealthy buyers, stricter mortgage rules do not constitute a significant hurdle.

If they are driving the market, as it appears, it should be no surprise that the latest mortgage restrictions, the so-called "stress tests", did not have a major impact on the Toronto market. Introduced in fall 2016, the "stress tests" were intended to discourage first-time buyers from taking on mortgages they could not repay in the event of interest rate increases. These were a welcome move, but since first-time buyers only represent a limited segment of the market, the cooling measures failed to sufficiently dampen demand. They also did not shift expectations.

The policies outlined below attempt to achieve both of those critical objectives: reducing demand significantly and shifting expectations. They are not mutually exclusive.

Foreign Buyer Tax

The first is simply a foreign buyer tax like that implemented in Vancouver. This 15 per cent tax is applied to any residential transaction where the buyers are not Canadian citizens or permanent residents.

Such a stiff tax has acted as a deterrent for many foreign buyers, as Figure 12 shows.[24]

Apart from sharply lower foreign buying since the tax, what has happened in the Vancouver market? Very briefly, the market has gone cold in the detached and townhouse segment.[25] Sales volumes for detached houses are down 54 per cent overall from a year earlier, while sales of attached units are down 40 per cent. In the areas most exposed to foreign buying, the figures are even bigger: sales of detached homes in Richmond and West Vancouver are down around 65 per cent. Sales have also slowed considerably for apartments/condos: down roughly 25 per cent. In the meantime, prices have started to fall sharply at the high end, and price growth has stalled in the attached and condo market. In some high-end areas, benchmark prices have fallen from 5 to 10 per cent (though the benchmark may understate changes in the market; some realtors report prices falling around 20 per cent).

Figure 12: Foreign buyers in the Vancouver market, June 2016 – November 2016
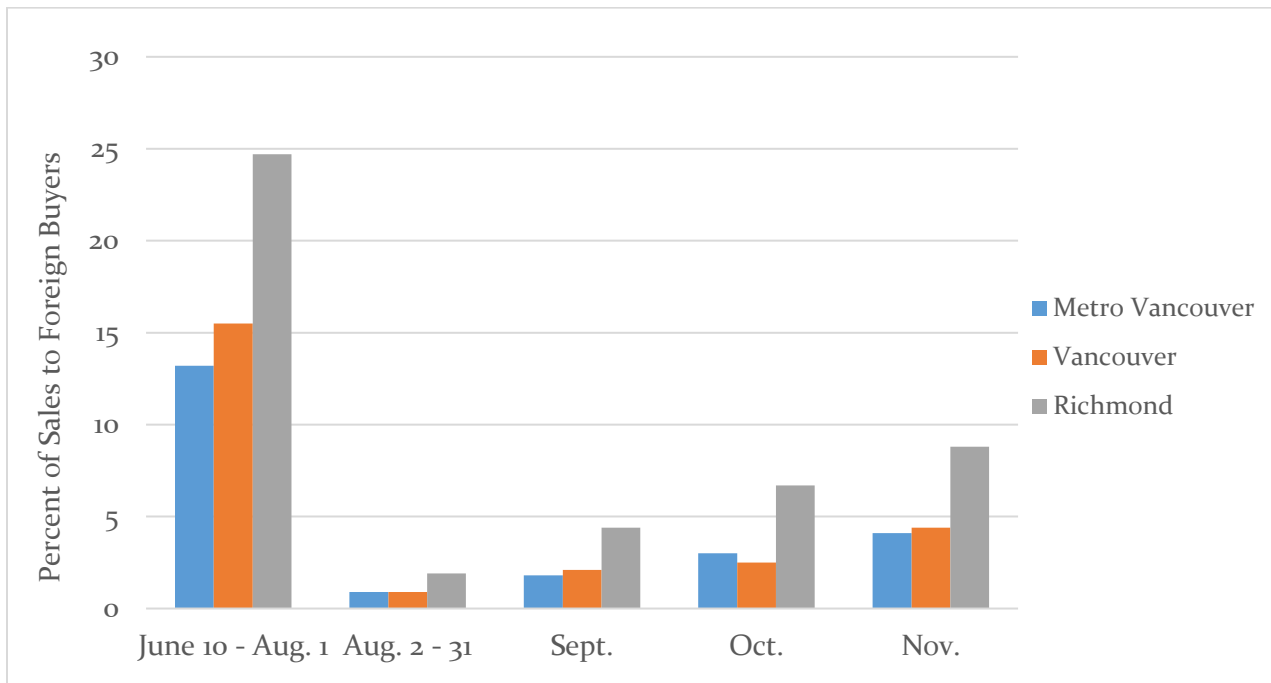
Source: B.C. Government; The Globe and Mail.

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[24] They seem to be returning in slightly larger numbers in recent months, but this is in part because of moves by the B.C. government to prop up the housing market (loans to first-time homebuyers) and to weaken the tax (exempting those with a work permit).

[25] For below, see Real Estate Board of Greater Vancouver, "Monthly Statistical Report-January 2017", available at: http://www.rebgv.org/sites/default/files/2017-01-January-Stats-Package.pdf.

What this indicates is that foreign buyers were having powerful knock-on effects as postulated above. They did not constitute a big enough part of the market to account for such a sharp slowdown in sales volume on their own. What has happened is that their desertion calmed FOMO demand and scared off speculative demand.[26] Also telling is that alternative markets for foreign capital from China (i.e., Seattle and Toronto) have seen their markets heat up in the meantime.[27] The evidence could not be much clearer, and for a market as hot as Toronto's, such a cooling would be helpful.

Yet although this cooling of the Vancouver market is a welcome change from its previous temperature, the market remains highly unaffordable. It is possible that if the foreign-buyer tax were kept in place, the dynamics at the high end of the market would gradually ripple out to the rest of the market, causing prices to fall broadly. This is certainly plausible, since this is how price escalation occurred: prices surged at the high end then rippled outwards. Nevertheless, there is a good chance that affordability cannot be achieved based on a

foreign buyer tax alone. This is where a second policy option might be considered.

Progressive property surtax

The rationale for the following proposal is spelled out in greater detail elsewhere, but it can be sketched briefly here.[28] The policy idea was initially developed by Rhys Kesselman, a professor at the School of Public Policy at Simon Fraser University.

The basic idea is to have a progressive property surtax that can be offset by income taxes paid. It would be levied *annually* on properties above a certain threshold in value (say $800,000), and only apply to the value of the property above that threshold. Seniors who had paid into the Canada Pension Plan at a high rate for 5-10 years would be exempt from the tax. The rate could start at 1 per cent for the first $1 million above the threshold (to $1.8 million, say) and rise to 2 or 3 per cent thereafter. So a house worth $2 million might have an annual surtax of $14,000.

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[26] It should be noted that this represents the diminishment of "foreign passport buying", not the disappearance of foreign capital. There is still a fair bit of the latter money entering the Vancouver market.

[27] See for example, "B.C. foreign buyers tax really did yank down Vancouver home prices: BMO", *Global News* (National Online), January 23, 2017; "For Chinese home buyers, Seattle is the new Vancouver", *Wall Street Journal*, February 7, 2017; and "Chinese home buyers turn their attention

away from Vancouver", *The Globe and Mail*, March 7, 2017.

[28] See "Vancouver's Housing Affordability Crisis: Causes, Consequences and Solutions", Centre for Public Policy Research, May 2, 2016, pp. 34-36. Available at: http://www.sfu.ca/mpp/centre_for_public_policy_research/cppr.html. Another similar proposal has been put forward by over 40 economists at UBC and SFU. The main proponent of this approach is Tom Davidoff. A description of it can be found at: http://www.housingaffordability.org/.

The surtax is designed to hit those who own expensive property based on foreign income or wealth, and/or those who have aggressively evaded taxes. Recent immigrants who arrived in Toronto with wealth but who participated in the local economy and paid taxes would be effectively exempt from the surtax. The surtax would make no distinction based on nationality or anything along those lines. Instead, the premise would be that ownership is encouraged for anyone earning income in Canadian labor markets, while ownership based on foreign wealth or illicit income is discouraged (or forced to pay a penalty). A salutary side-effect would likely be to discourage the holding of many properties as investments, at least at the higher end of the market.

This proposal has several strengths: it would be very hard to evade; it would tax "previously arrived" foreign ownership (it would be retroactive); it would discourage future foreign ownership by those who had no interest in participating in the local labor market; it would harm very few people for whom we might feel sympathy (for the vast majority it would miss them entirely, in terms of the effective exemption structure); and it could generate major revenues in the short-term. Most importantly, the tax would alter expectations. Torontonians would come to recognize that subsequent demand for housing would be primarily local, not foreign, and thus that prices were likely to

fall. In combination with a foreign-buyer tax, this could reduce demand and reverse expectations in a powerful way.

It should be noted that these are not radical ideas. In fact, representatives of the big five banks have expressed support for introducing a foreign-buyer tax in Toronto: BMO, CIBC and RBC. These banks realize the dangers posed to themselves and the broader economy by sizzling real estate markets and they want those risks addressed. A foreign-buyer tax is also supported by around 77 per cent of Torontonians, as indicated in a recent Angus Reid poll.[29]

Other policies could be considered, such as a speculation tax, but they likely would not be as potent. Such a tax could be applied at a declining rate if a property was bought and sold in a short period. For example, if a property was held for less than a year, the tax rate could be 10 percent on a resale, and it would fall progressively in 6 month increments down to zero after 3 years. This would discourage speculation, but it would not likely alter expectations. For this reason it would need to be supplemented by other measures, like those outlined above.

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[29] See http://angusreid.org/foreign-buyers-tax-toronto/.

7. Conclusion: The need for action

The chorus of voices for policy action is growing by the day in Toronto. Concerns about rising rents and housing prices are emerging from citizen groups and the media, and the big banks are becoming increasingly insistent on the need for action.

As housing bubbles are allowed to expand, many are hurt or drawn into unsustainable financial situations. This is particularly the case for young Torontonians. When housing bubbles unwind, there is major collateral damage and people are hurt through little or no fault of their own. And the historical record is that they do unwind, essentially without fail. As Mian and Sufi (2014; p. 9) put it: *"Economic disasters are almost always preceded by a large increase in household debt.* In fact, the correlation is so robust that it is as close to an empirical law as it gets in macroeconomics."*

Housing bubbles entail mass expansions of private debt, as Figure 13 shows, and dangerous levels of private household debt are concentrated around Toronto and Vancouver, the cities with the highest housing prices in Canada.[30]

Figure 13: Private debt to disposable income ratio, 2000-2014, Select Countries
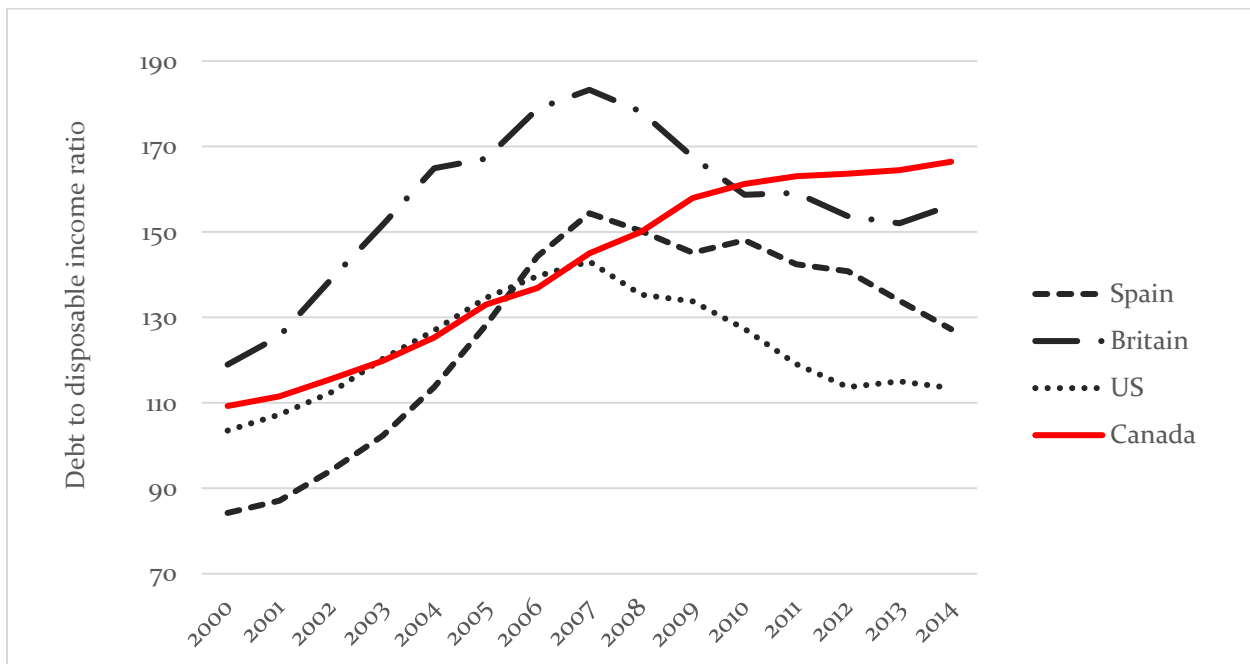
Source: OECD.

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[30] See for example, Alan Walks, 2013, "Mapping the Urban Debtscape: The Geography of Household Debt in Canadian Cities", *Urban Geography* 34(2): 153-187; and Craig Alexander and Paul Jacobsen, 2015, "Mortgaged to the hilt: Risks from the distribution of household debt", *C.D. Howe Institute*, Commentary No. 441.

Counting on "this time being different" is not a prudent strategy. Letting the housing boom grow will only worsen the "debt deleveraging" that accompanies a price correction. This happens when many households try to pay down debt at the same time, thereby reducing their consumption and causing economic activity to fall. A rise in interest rates or some other macroeconomic shock can generate this dynamic, and many analysts expect this in the next few years. Figure 13 shows this process at work following 2007-08 in some major economies, coinciding, as we know, with painful recessions in these places. It is better to tame this boom now, then, before the situation gets worse.

This paper has argued that the primary forces driving Toronto's high housing prices are on the demand side. Policy action should therefore be directed to this front, especially to targeted policies that will have immediate effects on buyer expectations in Toronto. The capacity to enact such policies lies mostly with the provincial government, and the policies suggested above are technically feasible and broadly popular. The policy tools of the federal government are often too blunt, by contrast, while municipal governments do not usually have the ability to tame demand and their responses on the supply side are likely to be uncoordinated and bedeviled by local opposition.

Supply constraints have been shown to play some role in rising housing prices in the scholarly literature. However, their impact is overstated and efforts to weaken them frequently entail important tradeoffs. Especially in the context of powerful expectational dynamics, they are unlikely to have much effect in the short-term.

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9. Appendix

This appendix illustrates some of the economic arguments made in Section 3. It also adds a couple of figures to put Toronto's geographic constraints in context, and illustrates what the relationships found in Figures 3 and 4 look like when outliers are removed, or when we look at the relationships in 2000 (arguably prior to a significant influence of foreign capital). For those that do not have a background in economics it will be difficult to follow, but I attempt to keep things straightforward.

Figure A depicts some short-run supply and demand curves in a hypothetical housing market. For the sake of simplicity, housing units are treated as alike. The short-run supply curve (S_0) is vertical because new housing cannot be conjured at a snap of the fingers; it takes a year or two to plan and build. So, in the short-run supply is taken to be fixed, or *completely inelastic*. In this situation, if demand increases from D_0 to D_1, due to rising incomes or in-migration, for example, then the price will increase from P* (or point A) to P_2 (or point B).

Figure A: (Short-run) Supply and Demand in a Hypothetical Housing Market
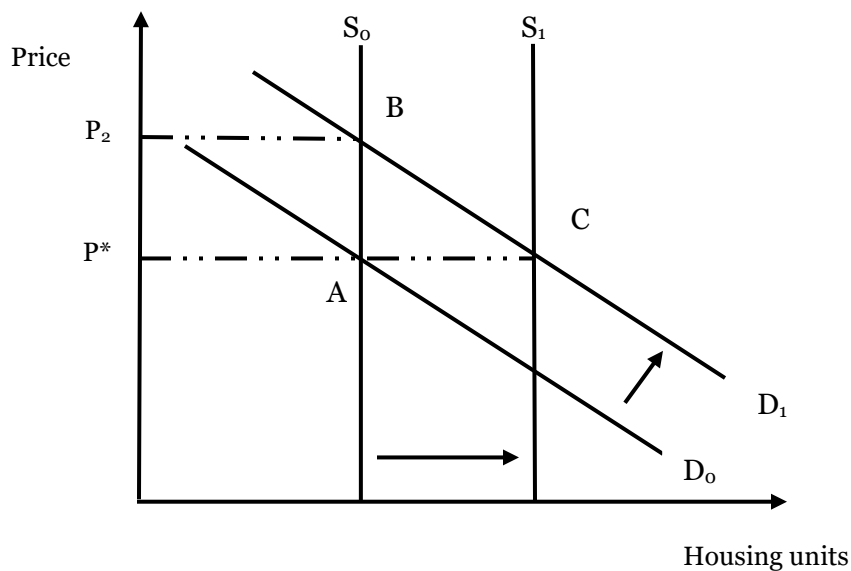
In practice, though, developers will be able to anticipate the rough amount of increased demand coming from such sources and, so long as supply is easy to add, we can think of the supply curve gradually shifting out over time to meet the new demand (from S_0 to S_1, and to point C). This will dampen price pressures and keep them close to the original costs of production (e.g., the costs of labor, building materials, and outlying urban land). Such is the

situation in most small communities, where outlying land is easy to purchase and develop. In these communities, prices will only fluctuate significantly if there is a sudden shift in demand (e.g., either a bunch of new people move to town, or people move away due to economic decline). Once supply has a chance to adjust, then prices will gravitate towards the earlier prices, which are set roughly by building costs. (The situation is slightly different with population decline, because unlike other markets where supply will fall, houses aren't "un-built"; this leads to very low housing prices in areas of economic and demographic decline such as Detroit.)

The logic behind the typical supply side arguments in the media is that Toronto is not building enough new units relative to new population – the supply curve has not shifted out far enough to moderate prices (somewhere between S_0 and S_1, in other words). As Section 4 showed, there is no strong evidence for this. There are fewer single detached houses being produced, and this should drive up their relative price, but construction of overall housing units has kept up with demographic demand. Moreover, in big, growing cities it is common for people to trade "yards for location" and thus denser, high-rise development will meet much of the new demand for housing. This should dampen the price pressures on single-family detached houses.

Nevertheless, if land is limited due to geographic or land-use regulations, then the prices of single-detached houses will tend to rise over time in such cities, for the simple reason that the price of land will increase: there are more people bidding for the same amount of land. The increasing price of land will push up the costs of adding new supply for developers. In short, it will make the supply of housing more inelastic. Again, this is the basic insight of the supply side case against the Greenbelt. Geographic constraints, though, are not the only things that add to the costs of housing production. Municipal regulations might also make it difficult to expand housing supply, by adding various administrative costs to projects (e.g., making developers go through lengthy and uncertain rezoning processes to turn prime land into denser development).

In cities with these supply constraints, then, the *long-run* supply curve will be more inelastic than in those without them. Figure B shows two hypothetical markets that match up to these situations: a "constrained" or inelastic market (S_C), and an "unconstrained" or elastic market (S_U). As the reader can see, the same outward shift of the demand curve produces different price and quantity outcomes. Figure B depicts a shift in broad demand conditions between 1970 (D_{70}) and 2017 (D_{2017}).

Figure B: Long-run housing supply and demand in constrained and unconstrained markets
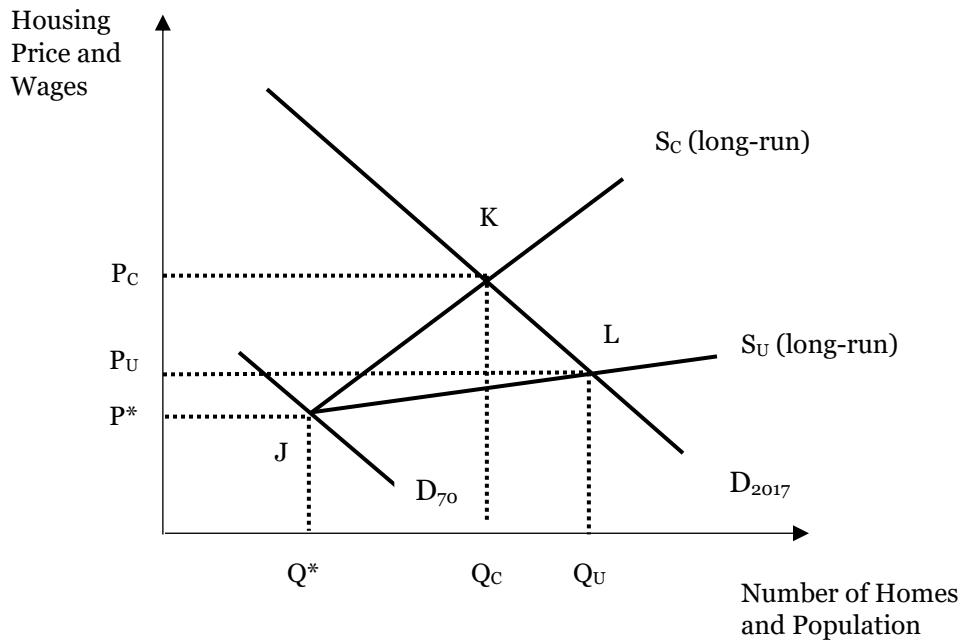
A few things should be noted here. First, given the same broad demand pressures (e.g., immigration and income growth), the cities with elastic supply should see greater increases in housing units (or population) relative to those with inelastic supply: Q_U vs. Q_C. That is, at least, if supply elasticity is uncorrelated with demand factors; but this is unlikely, as argued in Section 3. Indeed, in the American experience, inelastic markets have grown more in recent years than elastic ones, confirming that supply elasticity is correlated with demand factors (see Davidoff, 2015).

Second, inelastic markets should usually have higher wages than elastic ones. This is because workers need to be compensated for their higher housing costs, otherwise they will move away. "Amenities", such as natural beauty, may also provide some form of compensation, but again in the American experience higher wages are found in more inelastic markets *as well as* greater amenities (which can be proxied by tourist visits). It is interesting that in the Canadian experience, this has not matched up with the empirical record. Toronto and Vancouver, with the highest housing prices, have some of the lowest incomes among major cities. This suggests that these housing markets have become "de-coupled" from the local labor market, as substantial foreign ownership might entail.

Lastly, the main debate is not whether supply elasticity affects prices. It clearly does. The question is how big an effect supply elasticity has on prices, as embodied in geographic constraints and regulations. In other words, what is the difference between P_C and P_U?

Figures 3 and 4 have already provided one crude estimate of this. As Section 3 argued, though, these bivariate relationships need to be treated with a great deal of caution, since they likely overstate the effect of supply constraints. Controlling for demand factors would likely cut the strength of the predicted relationship in half or more, based on Davidoff (2015).

To provide a partial (illustrative) corrective for these issues, Figures C and D depict the relationship between housing prices and supply elasticity in two situations where the influence of outside or foreign investment might be "bracketed". Figure C describes the bivariate relationship when the West Coast cities that are likely most affected by outside capital are removed from the equation. Given the amount of outside money that has flowed into San Francisco and L.A. (with spillover effects into nearby San Diego), there are good grounds to consider them exceptional. Figure D, meanwhile, shows the bivariate relationship of housing prices and estimated supply elasticity in 2000, prior to a major influx of foreign capital, record low interest rates, and the subprime lending dynamics of the mid-2000s boom.

Regardless of whether we use price to income ratios or simply average house prices, the magnitude of the predicted price increase (due to inelastic supply) weakens considerably. In Figure C, the predicted price to income ratio for the most inelastic markets is around 4.5, rather than around 6 when the major Californian cities are included (i.e., Figure 4). If we look at average house prices instead (not shown), the predicted average house price in the most inelastic markets is about $300,000 USD when these cities are excluded, compared to $400,000 USD when they are included. In other words, the predicted price level in inelastic markets drops by around 25 percent when we crudely "bracket" the influence of foreign money. As Figure D shows, the same rough change in predicted price occurs when we examine the relationship in 2000.

Clearly Toronto's housing prices sit far above what even the most supply inelastic market dynamics would suggest: a price to income ratio of over 8 (perhaps even higher at the time of writing) and an average house price of $770,000 CAN – or $610,000 USD (using the exchange rate in 2015 Q2).

Figure C: Estimated housing supply elasticity and average house price-to-income ratios, largest U.S. markets minus L.A., San Francisco, San Diego, 2015 (Second Quarter)
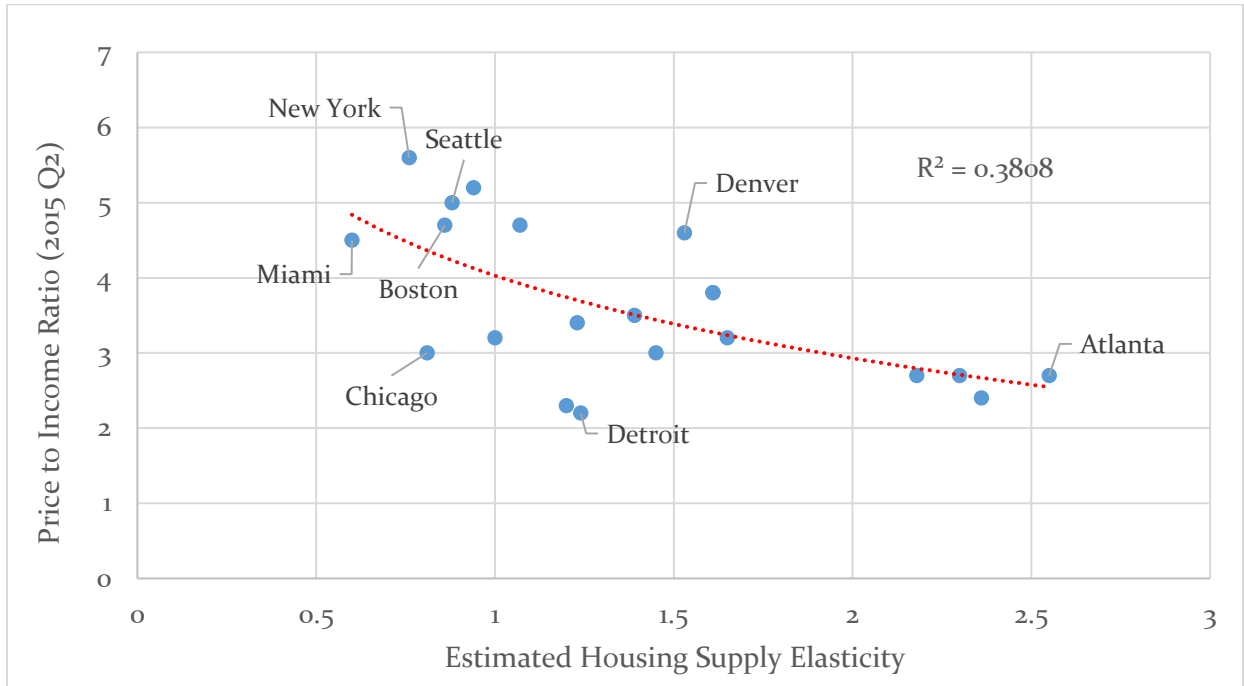
Source: Saiz (2010); Economist. Dotted line is a logarithmic function.

Figure D: Estimated housing supply elasticity and average house price-to-income ratios, 24 largest U.S. markets, 2000 (Second Quarter)
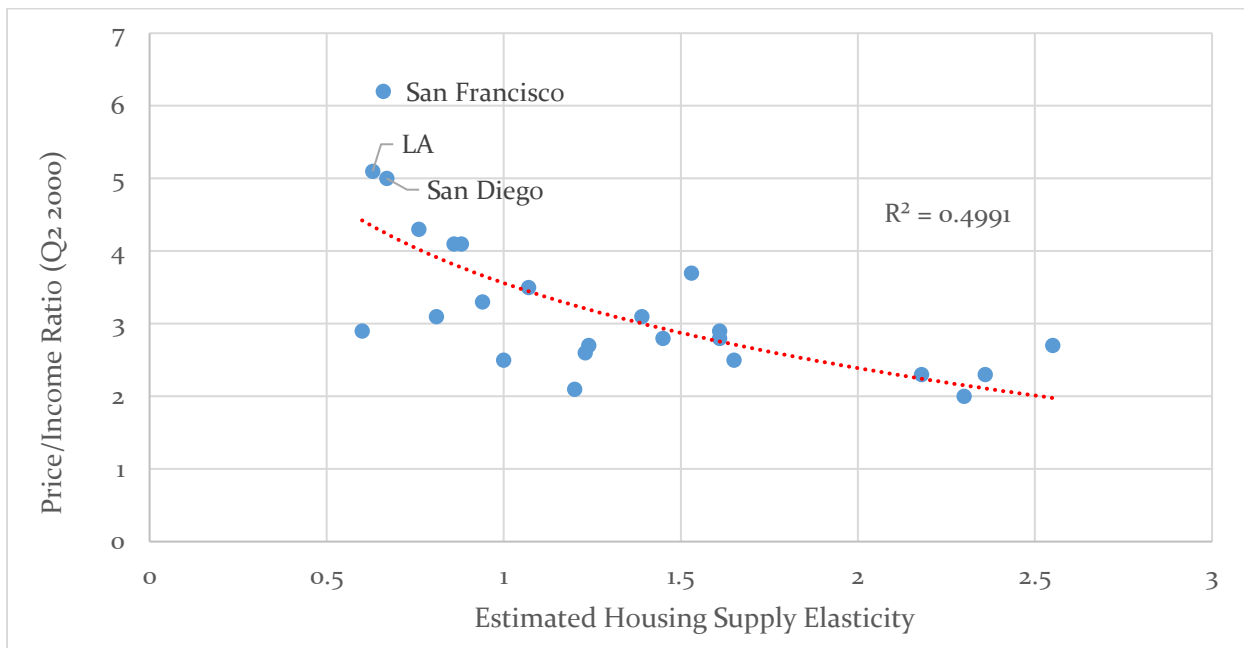

Source: Saiz (2010); Economist. Dotted line is a logarithmic function.

Figure E adopts a different approach to get some insight into the role of geographic constraints on development. Arguably, the debate about the Greenbelt is more closely related to this issue. Figure E shows the relationship between house prices and the share of "undevelopable land" within a 50 km radius of a city's central business district. "Undevelopable land" includes territory covered by water and steep slopes (e.g., mountains). Saiz (2010) presents these figures for all major American markets.

Examining Figure 9, somewhere around 50 per cent of land around Toronto would be "undevelopable", due mainly to Lake Ontario. Figure 9 also shows that the Greenbelt does not seriously impinge on this figure, since most of it lies outside of the 50 km radius. Once again, using a very crude estimation of its role, Figure E shows that such a figure for "undevelopable land" could not generate the kinds of prices in Toronto. The "predicted price" in this view is around $350,000 USD, well below where Toronto sits.

To be sure, this estimation is highly problematic for a range of reasons. Most importantly, as Section 3 noted, "undevelopable land" frequently entails amenities along with constraints – thus demand factors will be correlated with geographic constraints. Consequently, the relationship in Figure E will be overstating the role of geographic constraints on prices.

Figure E: "Undevelopable land" and average house prices, 24 largest American markets, 2015 (Second Quarter)
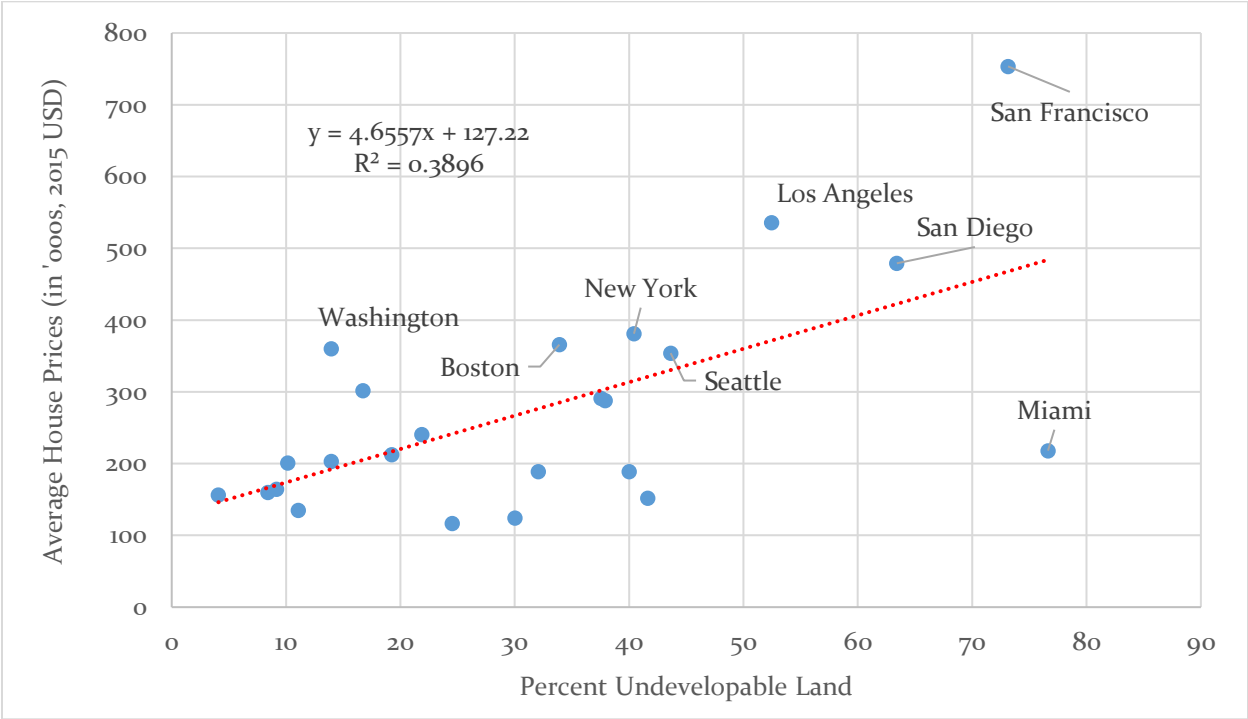
Source: Saiz (2010); Economist.

The point of going through these various crude estimations is not to arrive at a definitive gauge of the effect of supply elasticity on average house prices. A proper estimation of this relationship would involve a much more elaborate regression analysis, with better controls for demand-side variables. Davidoff (2015) makes some attempt at this in the American context. What the simple bivariate relationships above *do* illustrate, though, is that even with some of the most generous assumptions, supply-side variables such as geographic and regulatory constraints cannot come close to accounting for Toronto's high house prices. And there are good reasons for doubting these generous assumptions, as Section 3 explained. Consequently, the degree of influence they have on housing prices is likely to be modest.

In sum, the best available evidence from the US suggests that arguments about supply-side factors have been overstated by many in the Toronto debate. Lacking good Canadian data on supply constraints, both geographic and regulatory, we must rely on the existing American evidence. It provides reason for caution in adopting a supply-oriented response to the emerging housing affordability crisis in Toronto, especially given the tradeoffs involved in such action.