

# Interest Rates and Mortgage Borrowing Power in Canada

by Josef Filipowicz, Jason Clemens, and Matthew Lau

## SUMMARY

- One often-overlooked contributing factor to rising home prices in Canada is mortgage interest rates.
- Between 2000 and 2016, the prevailing mortgage interest rate declined from 7.0 percent to 2.7 percent. This decline resulted in a 52.9 percent increase in the mortgage borrowing power (maximum eligible mortgage size) of potential home buyers.
- Based on average family incomes in 2000, falling interest rates resulted in increased mortgage borrowing power in the four main regions over the same period: Vancouver from \$183,751 to \$280,893; Calgary from \$221,214 to \$352,671; Toronto from \$221,214 to \$338,161; and Montreal from \$171,692 to \$262,459.
- Average family incomes also increased from 2000 to 2014. Specifically, average nominal before-tax family income for Canada as a whole increased 53.0 percent over this period with changes in the four metropolitan areas as follows: Vancouver incomes increased by 47.8 percent; Calgary by 76.8 percent; Toronto by 35.2 percent; and Montreal by 45.5 percent.
- Rising average family income coupled with decreasing interest rates resulted in a pronounced increase in the ability of potential home buyers to borrow. Specifically, the increase in nominal mortgage borrowing power for Canada as a whole was 126.1 percent.
- The four metropolitan areas ranged from a high of 161.2 percent in Calgary to a low of 99.7 percent in Toronto with both Vancouver and Montreal recording similar increases of 118.4 percent and 115.0 percent, respectively.

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## Introduction

Rising home prices in Canada have spurred interest in the potential causes and consequences of the increases. Like most goods, housing prices reflect the complex interaction of supply and demand and are driven by the innumerable motivations of buyers and sellers. For many buyers, the purchase of a home is the single largest investment they ever make, and is typically funded through a combination of savings (for a down payment) and borrowing, normally through a mortgage loan. The size of the mortgage for which borrowers can ultimately qualify depends on a number of factors including income, other debts, and the interest rate at which they can borrow.

This research bulletin explores how one of these factors, interest rates, influences mortgage borrowing power (ie., maximum eligible mortgage size), and therefore housing demand in Canada. The rates at which individuals and families can borrow are historically low,<sup>1</sup> meaning that larger loans and/or less expensive interest costs are available to them now more than at any other time in recent decades. Given the powerful effect interest rates have on the amount of borrowing individuals and families can undertake it is particularly surprising how little public attention this aspect of housing prices has received in recent years.

The approach used in this study is neither a definitive nor an overly complex analysis of the interaction between interest rates and mortgage borrowing power. Rather, it is a simple overview aiming to raise awareness on the manner in which lower interest rates increase the amount of borrowing individuals and families can secure. The resulting boost in mortgage

borrowing power likely plays a role in rising home prices observed across much of Canada.

## The link between interest rates, borrowing, and home prices

Before analyzing the link between interest rates and the ability to borrow, it is important to understand the general concept and its effect on home prices. The primary goal of lenders is to have borrowers return their capital plus the interest charged on loans. This is the principle behind the guidelines that lenders use to determine how much money they are willing to lend a borrower based on his or her income and assets.

A decline in interest rates reduces the amount borrowers must dedicate to interest payments, creating more room for them to repay the principal amount they owe. This in turn gives borrowers greater capacity to borrow with the same amount of income.

The increased capacity to borrow means that larger mortgages become available to home buyers, which has an important impact on housing markets. Without any increase in income or repayment requirements, potential home buyers can afford to borrow more money, enabling them to bid up the price of an underlying asset—in this case, housing.<sup>2</sup>

The simple analysis that follows assumes that the supply of housing is not immediately responsive to changes in demand. This is reasonable given the time it takes for home builders to assemble land, acquire permits and approvals, secure necessary resources, and actually build homes. The degree to which housing supply is responsive to changes in housing demand

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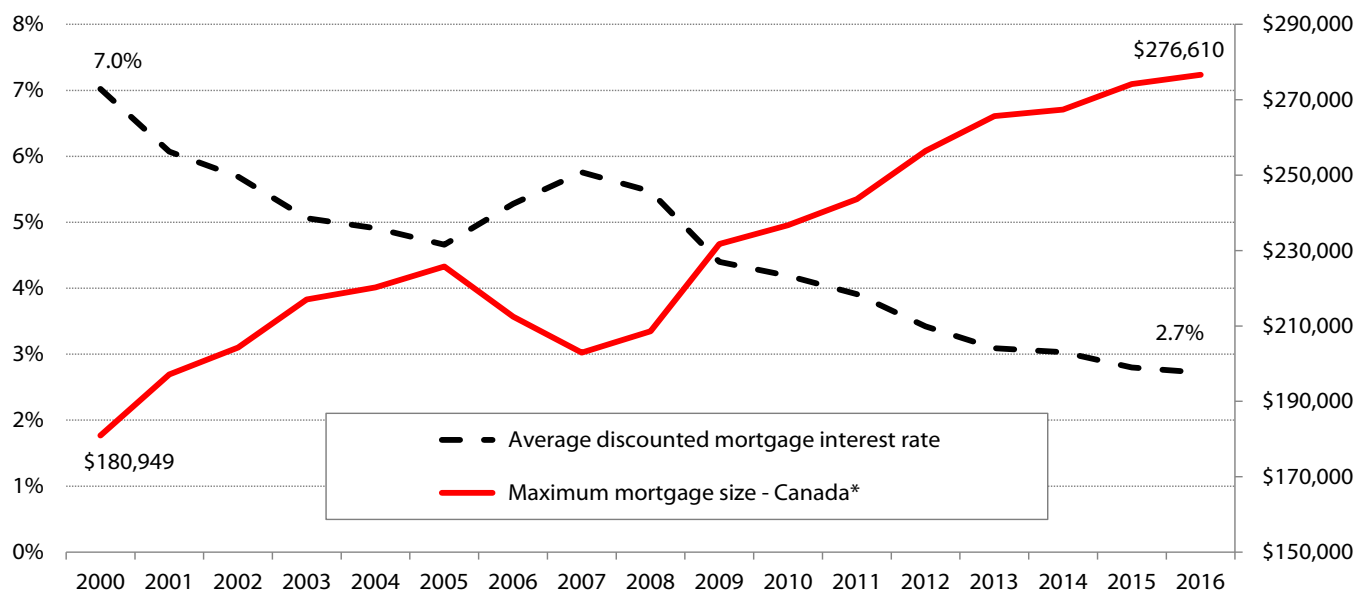
<sup>1</sup> For more on the potential causes of low interest rates, see Walker (2016).

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<sup>2</sup> For more on the way interest rates and liquidity constraints affect consumer behaviour, see Gross and Souleles (2002).

# Interest Rates and Mortgage Borrowing Power in Canada

**Figure 1: Estimated Mortgage Borrowing Power with Average Canadian Family Income, 2000 (at 2000 – 2016 interest rates)**



\* Based on the Canadian average income of \$50,785.

Source: Statistics Canada, 2017a and 2017b; Mortgage Professionals Canada; calculations by authors.

could partially mitigate the bidding up of housing prices.<sup>3</sup>

## The effect of lower interest rates on mortgage borrowing power

To estimate how interest rates influence mortgage borrowing power, we used a standard mortgage qualification calculation at the prevailing market interest rates (see Appendix 1 for details on the data, formula, and assumptions used) for a standard fixed-rate mortgage.<sup>4</sup> The analysis uses the average Canadian family in-

come<sup>5</sup> in 2000 of \$50,785. This calculation estimates the maximum amount of lending available to a family earning the national average income in 2000 at different interest rates.<sup>6</sup>

Figure 1 shows both the prevailing interest rate<sup>7</sup> for each year and the maximum amount of eli-

<sup>5</sup> Average incomes presented in this study are calculated using CANSIM Table 111-0014: *Family Characteristics, by Family Type and Sources of Income, Annual*, by dividing “Amount of income” by “Number in family type.” For Statistics Canada’s definition of Census families, see <http://www12.statcan.gc.ca/census-recensement/2011/ref/dict/fam004-eng.cfm>.

<sup>6</sup> This approach follows the preliminary mortgage payment estimates that many lending institutions offer (see Appendix 1), not the specific methods ultimately used in final mortgage agreements.

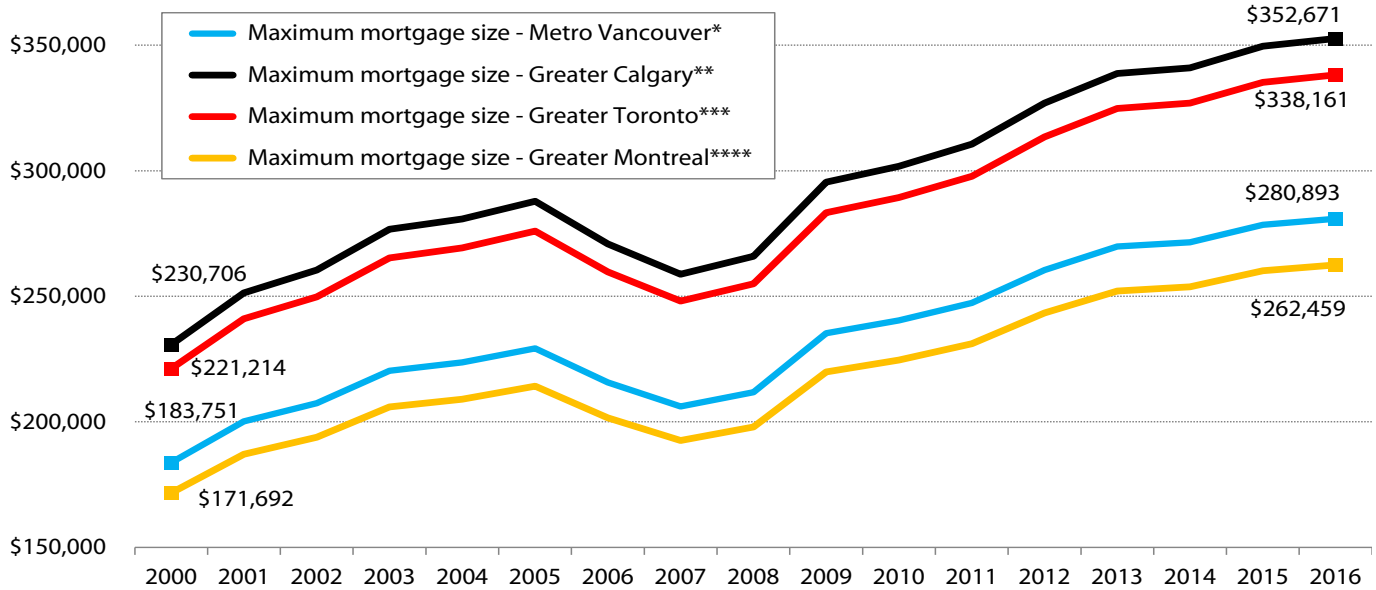
<sup>7</sup> To build our average annual interest rate estimates, we used chartered bank five-year conventional mort-

<sup>3</sup> For an in-depth analysis of housing supply responsiveness in Canada, see Green, Filipowicz, Lafleur, and Herzog (2016).

<sup>4</sup> We assume a monthly payment frequency over a 25-year amortization period (see Appendix 1).

# Interest Rates and Mortgage Borrowing Power in Canada

**Figure 2: Estimated Mortgage Borrowing Power in Major Metropolitan Areas Based on 2000 Average Incomes**



\* Based on the Metro Vancouver average income of \$51,572; \*\* Based on the Greater Calgary average income of \$64,750; \*\*\* Based on the Greater Toronto average income of \$62,086; \*\*\*\* Based on the Greater Montreal average income of \$48,187.

Source: Statistics Canada, 2017a; Mortgage Professionals Canada; Statistics Canada, 2017b; calculations by authors.

gible mortgage a family could secure based on a static income of \$50,785.<sup>8</sup> As the figure illustrates, the prevailing interest rate fell from 7.0

percent in 2000 to 2.7 percent in 2016, a decline of 61.3 percent.

When interest rates fall, the same individual or family with the same income (\$50,785) can borrow more money. Specifically, the maximum amount this family could borrow increased from \$180,949 based on prevailing rates in 2000, to \$276,610 at 2016 rates, an increase of 52.9 percent. It is important to remember that the resulting estimates represent maximum mortgage loan eligibility, not home prices.

Figure 2 moves beyond the hypothetical national analysis and specifically examines Canada's four largest metropolitan areas: Vancouver (British

gauge rates, obtained from Statistics Canada. As these are official posted rates, they do not reflect typical rates at which Canadians can ultimately borrow for home loans. As such, we obtained the average spread between posted rates and real rates from annual surveys published by Mortgage Professionals Canada (formerly the Canadian Association of Accredited Mortgage Professionals) between 2005 and 2016. For 2000 to 2004, we applied the 2005 spread retroactively. Though less accurate, this approach is conservative, as spreads between posted interest rates and real interest rates grew considerably over that period (Allen, Clark, and Houde, 2011).

<sup>8</sup> Average incomes are not necessarily representative of the typical home buyer. Home owners repre-

sent just over two-thirds of Canadian households in 2011 (National Household Survey, 2011).

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# Interest Rates and Mortgage Borrowing Power in Canada

**Table 1: Growth in Family Income by Major Metropolitan Centre (2000 - 2014)**

Vancouver	47.8% (17.8% in real terms)
Calgary	76.8% (25.4% in real terms)
Toronto	35.2% (1.6% in real terms)
Montreal	45.5% (13.0% in real terms)
Canada	53.0% (18.5% in real terms)

Source: Statistics Canada, 2017b and 2017c.

Columbia), Calgary (Alberta), Toronto (Ontario), and Montreal (Quebec). The analysis from figure 1 is replicated for figure 2; the difference is that average incomes are regional.

In 2000, the average gross family income<sup>9</sup> in Vancouver, Calgary, Toronto, and Montreal could have supported borrowing of up to \$183,751, \$230,706, \$221,214, and \$171,692, respectively, given the prevailing interest rate for mortgages that year (7.0 percent). The variation in the mortgage amounts is driven entirely by the differences in average family income between the four cities in 2000: \$51,572 in Vancouver, \$64,750 in Calgary, \$62,086 in Toronto, and \$48,187 in Montreal.

If the income levels are kept constant, but interest rates are allowed to drop from 7.0 percent, where they were in 2000, to 2.7 percent, where they were in 2016, potential home buyers see a marked increase in their ability to borrow. Specifically, the same level of average income in Vancouver, for instance (\$51,572), could support borrowing of up to \$280,893 in 2016, an

<sup>9</sup> Gross debt service (GDS) ratios are calculated based on gross income (See Appendix 1). As such, this analysis does not account for after-tax income.

increase of almost 53 percent. The three other metropolitan areas see the same proportionate increases: Calgary rises to \$352,671, Toronto to \$338,161, and Montreal increases to \$262,459.

## How rising incomes amplify the effect of lower interest rates

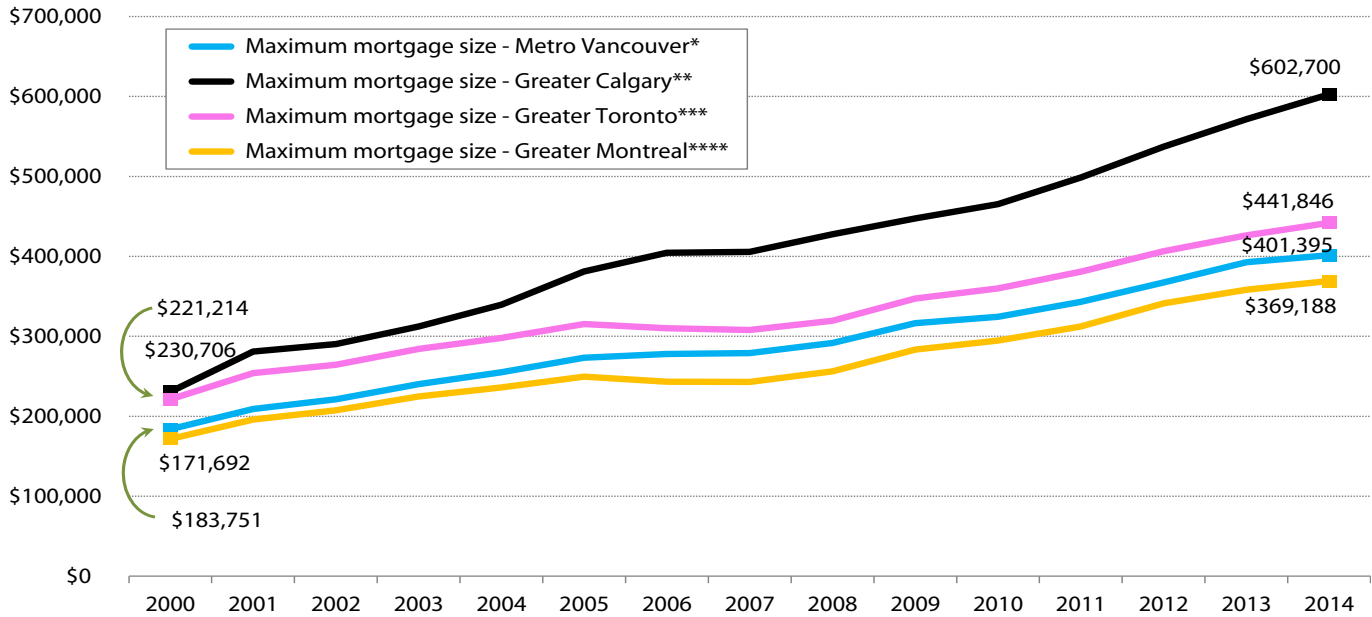
The previous section examined the effect of interest rates on mortgage borrowing power when income remained constant. This section adjusts average incomes to reflect the fact that between 2000 and 2014, the latest year of available data, average family incomes in the key metropolitan areas examined increased. Indeed, average total incomes for Canadian families as a whole grew by 53 percent in nominal terms between 2000 and 2014 (18.5 percent in real terms).

Table 1 shows the growth in average family incomes in the four metropolitan areas analyzed between 2000 and 2014. Figure 3 depicts the growth in the maximum mortgage borrowing power by major metropolitan region between 2000 and 2014 based on both the change in average family income and the falling interest rate (from 7.0 percent to 3.0 percent).

Once the calculations allow for rising incomes, it is clear that the maximum mortgage borrowing power increases beyond the 52.9 percent observed when only the decline in interest rates was accounted for. Calgary experienced the largest increase in mortgage borrowing power between 2000 and 2014 (rising 161.2 percent). The Greater Toronto Area experienced the smallest increase in mortgage borrowing power (though still showed a marked increase of 99.7 percent). Mortgage borrowing power increased by 118.4 percent in Vancouver and by only slightly less in Montreal (115.0 percent). Across Canada, mortgage borrow-

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**Figure 3: Estimated Mortgage Borrowing Power in Major Metropolitan Areas, Including Income Growth (2000-2014)**



Source: Statistics Canada, 2017a; Mortgage Professionals Canada; Statistics Canada, 2017b; calculations by authors.

ing power rose by 126.1 percent. Put differently, the growth in average family income coupled with the decline in prevailing interest rates for mortgages increased Canadians' ability to borrow for mortgages by 126.1 percent, more than doubling the nominal amount they could borrow in 2000.

## Conclusion

Historically low interest rates present a number of opportunities for potential home buyers. If they can borrow at lower interest rates, a smaller portion of their mortgage payments is dedicated to interest and a larger portion to principal loan repayment. These savings qualify buyers for larger loans, or they can be channeled to other household priorities. However, increased borrowing power also affects home prices.

The decline in mortgage interest rates between 2000 and 2016 was estimated to result in a 52.9

percent increase in mortgage borrowing power. This effect is amplified when increases in family incomes are taken into account. Specifically, the increase in average family incomes coupled with the noted decline in interest rates resulted in a marked increase in mortgage borrowing power across all four metropolitan areas analyzed: Vancouver (118.4%), Calgary (161.2%), Toronto (99.7%) and Montreal (115.0%). For Canada as a whole, the combination of the increase in average family incomes plus the decline in interest rates resulted in an increase in mortgage borrowing power of 126.1 percent.

Housing prices reflect the interaction of supply and demand, and the significant increase in mortgage borrowing power attributable to lower interest rates plays a role in this interaction. As such, the extent to which increased mortgage borrowing power influences home prices deserves closer consideration by Canadians and their policy makers.

# Interest Rates and Mortgage Borrowing Power in Canada

## Appendix 1: Mortgage Calculation

To produce the estimates in this study, we used the Canada Mortgage and Housing Corporation's monthly mortgage payment calculation (CMHC, 2017a) with the following formula and assumptions:

### Formula

$$\text{Monthly payment} \times \frac{(1 + \text{monthly interest rate})^{\text{number of payments} - 1}}{\text{monthly interest rate} \times (1 + \text{monthly interest rate})^{\text{number of payments}}}$$

### Assumptions

- » Monthly payment frequency
- » 25-year amortization period
- » Fixed interest rate throughout duration of loan\*

### Maximum monthly payment estimates

Maximum monthly payments were calculated using the gross debt service (GDS) ratio, a commonly used tool in mortgage lending. Lenders use this ratio as an initial threshold whereby the amount of debt a potential borrower desires is compared to their income to ensure that the repayment schedule is sustainable. This approach, formulated below, adds the monthly payments required by the mortgage loan (principal plus interest), plus property taxes and heating.\*\* In order to qualify for a mortgage, an applicant's GDS ratio must typically be 35 percent\*\*\* or lower (CMHC, 2017b), which means that a borrower's home-related and mortgage servicing costs\*\*\*\* cannot exceed 35 percent of their total annual income. It is a method that lenders use to ensure borrowers only accumulate debt within reasonable and serviceable constraints.

### GDS calculation

$$\frac{\text{Principal} + \text{Interest} + \text{Taxes} + \text{Heat}}{\text{Gross Annual Income}}$$

For the purposes of this study, monthly payments on property taxes and heating were estimated at 5 percent of gross monthly income.+ This approach does not account for variation across municipalities, regions, and housing types.\*\*

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\* Holding the interest rate fixed throughout the duration of the loan is a conservative approach, as rates are often revised down at the end of each mortgage term.

\*\* Where applicable, 50 percent of monthly condominium fees are also included.

\*\*\* Some lenders use a GDS ratio of 32 percent.

\*\*\*\* Lenders also use the total debt service (TDS) ratio to incorporate other household expenses.

+ Green, Jackson, Herzog and Palacios (2016) estimate that energy spending represents 2.6 percent of total household spending across Canada in 2013, and Chawla and Wannell (2003) estimate that property taxes represented 1.8 percent of income for Canadian families earning \$100,000 and above.

\*\* Without property-specific information on non-mortgage housing costs, different authors use different assumptions to produce broad comparisons. Masson (2013) assumes annual non-mortgage housing costs are equal to 5 percent of the mortgage amount.

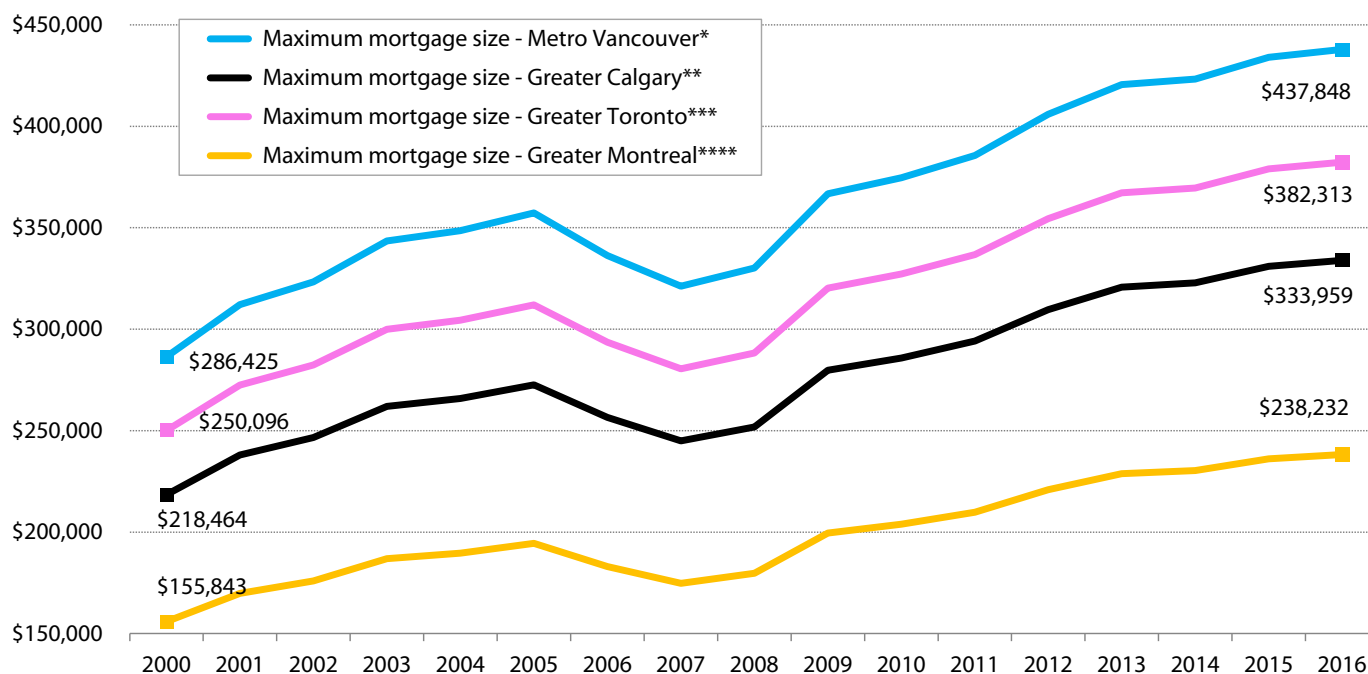
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## Appendix 2: Increases in mortgage borrowing power

Figure A2.1 gives some additional context. It shows increases in mortgage borrowing power based on average monthly mortgage payments in four metropolitan areas in 2016. The Canada Mortgage and Housing Corporation (CMHC) provided these averages.

This figure clearly indicates the difference in mortgage borrowing behavior across the various regions. For example, Metro Vancouverites make the largest monthly payments of the four regions, even though they earn less than Torontonians and Calgarians, on average.

**Figure A2.1: Estimated Mortgage Borrowing Power in Major Metropolitan Areas, by Average Monthly Mortgage Payment in 2016**



\* Based on the Metro Vancouver average of \$2,010 monthly; \*\* Based on the Greater Calgary average of \$1,533 monthly; \*\*\*Based on the Greater Toronto average of \$1,755 monthly; \*\*\*\*Based on the Greater Montreal average of \$1,093 monthly.

Source: Statistics Canada, 2017a; Mortgage Professionals Canada; CMHC, 2017c; calculations by authors.



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**Josef Filipowicz** is a Senior Policy Analyst in the Centre for Municipal Studies at the Fraser Institute. He holds an M.A. in Political Science from Wilfrid Laurier University, and a Bachelor of Urban and Regional Planning from Ryerson University. His work with the Fraser Institute includes the *New Homes and Red Tape* series focusing on the regulatory landscape surrounding home-building in Canada's municipalities, as well as analysis of the impact land-use regulation has on the housing supply in Canada's largest cities.



**Jason Clemens** is the Executive Vice President of the Fraser Institute. He has an Honors Bachelors Degree of Commerce and a Master's Degree in Business Administration from the University of Windsor as well as a Post Baccalaureate Degree in Economics from Simon Fraser University. He has published over 70 major studies on a wide range of topics, including taxation and entrepreneurship. He has published over 300 shorter articles in US, Canadian, and international newspapers.



**Matthew Lau** was a research intern with the Fraser Institute in 2016. He holds a Bachelor of Commerce with a specialization in finance and economics from the University of Toronto.

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