

Determinants of housing prices: evidence from Ontario cities, 2001-2011

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Abstract

Purpose – This paper aims to present a panel data econometric model of the main determinants of house prices in the ten largest census metropolitan areas (CMA) in Ontario, Canada, for the years 2001, 2006 and 2011. The impact of immigration on the housing market in Canada is little researched; however, immigration plays an important role into the economy of Canada. According to Statistics Canada, not only is immigration key to Canada's population growth but also without immigration, in the next 20 years, Canada's population growth will be zero. The motivation for this study is the bursting of housing bubbles in some developed countries (e.g. USA). The authors analyze variables that are related to the immigration policy in Canada, accounting also for the impact of the interest rate, income, unemployment, household size and housing supply to analyze housing price determinants. The study investigates the magnitude of the impact of the top three leading categories of immigrants to Canada, namely, Chinese, Indian and Filipino, on the housing prices in Ontario's largest cities. The results show the main factors that explain home prices over time that are interest rate, immigration, unemployment rate, household size and income. Over the 10-year period from 2001 to 2011, immigration grew by 400 per cent in Toronto CMA, the largest receiving area in Ontario, while the nonimmigrant population grew by 14 per cent. For Toronto CMA, immigrants, income, unemployment rate and interest rate explain the CA\$158,875 average home price increase over the 2001-2011 time period. Out of this, the three categories of immigrants' share of total home price increase is 54.57 per cent, with the corresponding interest rate share 58.60 per cent and income share 11.32 per cent of the total price growth. Unemployment rate contributes negatively to the housing price and its share of the total price increase is 24.49 per cent.

Design/methodology/approach – The framework for the empirical analysis applies the hedonic pricing model theory to housing sales prices for the ten largest CMAs in Ontario over the years 2001-2011. Following Akbari and Aydede (2012) and O'Meara (2015), market clearing in the housing market results in the housing price as a function of several housing attributes. The authors selected the housing attributes based on data availability for the Canadian Census years of 2001, 2006 and 2011 and the variables that have been most used in the literature. The model has the average housing prices as the dependent variable, and the independent variables are: immigrants per dwelling (Chinese, Indian, and Filipino), unemployment rate, average employment income, household size, housing supply and the interest rate. To capture the relative scarcity of dwellings, the independent variable immigrants per dwelling was used.

Findings – This study seems to suggest that one cause of high prices in Ontario is large inflows of immigrants together with low mortgage interest rate. The authors focused their attention on Toronto CMA, as it is the main destination of immigrants and comprises the largest cities, including Toronto, Mississauga, Brampton and Oakville. Looking over the 10-year period from 2001 to 2011, the authors can see the factors that impact the home prices in Toronto CMA: immigration, unemployment rate, household size, interest rate and income. Over the period of 10 years from 2001 to 2011, immigrants' group from China, India and the Philippines account for CA\$86,701 increase in the home price (54.57 per cent share of the total increase).

JEL classification – R31, R38, J15, J18,

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Income accounts for CA\$17,986 increase in the home price (11.32 per cent share); interest rate accounts for CA\$93,103 of the average home price increase in Toronto CMA (58.60 per cent share); and unemployment rate accounts for CA\$38,916 decrease in the Toronto average home prices (24.49 per cent share). Household size remain stable over time in Toronto (2.8 average household size) and does not have a contribution to home price change. All these four factors, interest rate, immigrants, unemployment rate and income, together explain CA\$158,875 increase in home prices in Toronto CMA between 2001 and 2011.

Practical implications – The housing market price analysis may be more complex, and there may be factors impacting the housing prices extending beyond immigration, interest rate, income and household size. Finally, the results of this paper can be extended to include the most recent census data for the year 2016 to reflect more accurately the price situation in the housing market for Ontario cities.

Social implications – The fact that currently, in 2017, the young working population cannot afford buying a property in the Toronto CMA area means there is a problem with this market and a corresponding decrease in the quality of life. According to *The Globe and Mail* (July 2017), a new pool in 2017 suggested that two in five Canadians believe housing in this country is not affordable for them. Further, 38 per cent of respondents who consider themselves middle or upper class believe in no affordability of housing. The Trudeau Government promised Canadians a national housing strategy for affordable housing. Designing a national housing strategy may be challenging because it has to account for the differential income ranges across regions. Municipal leaders are asking the government to prioritize repair and construct new affordable housing. Another reason discussed in the media of the unaffordability of housing in Toronto and Vancouver is foreign buyers. The Canadian Government recently implemented a tax measure on what it may seem the housing bubble problem: foreign buyers. Following Vancouver, in April 2017, Ontario Government imposed a 15 per cent tax on foreign buyers who are not Canadian citizens or permanent residents. This tax is levied on houses purchased in the area stretching from Niagara Region and Greater Toronto to Peterborough.

Originality/value – Few studies use Canadian data to explain house prices and analyze the effect of immigration on housing prices. There is not much research on the effect of the immigrants and immigrants' ethnicity (e.g., Chinese, Indian and Filipino immigrants), on the housing prices in Canada cities. This study investigates the impact of the most prevalent immigrant races (e.g., from China, India and the Philippines) on housing prices, using data for Canadian major cities in Ontario within a panel data econometric framework. This paper fills this gap and contributes to the literature, which analyzes the determinants of housing prices based on a panel of cities in the Canadian province of Ontario.

Keywords Housing market analysis, Policy, Economy, Immigrants, Ontario, Regional housing markets

Paper type Research paper

1. Introduction

The housing market has an important role in the economic performance and also impacts the individual well-being (Latif, 2015; Bratt, 2002; Leung, 2004). Purchasing a house is the greatest investment a household may make and the largest single item of consumer's wealth. From 2001 to 2011, the average home price in Ontario increased by 50.9 per cent, from CA\$272,000 to CA\$410,000 (expressed in 2015 Canadian dollars). Given that changes in the housing prices may considerably impact the economy and consumer spending, this paper focuses on the main determinants of the housing prices in Ontario. Failing to explain what drives the house prices may limit the opportunities to maximize a household's wealth and explain the consequences for the economy. Following a rise in the house prices, household equity increases which can boost the consumer spending.

There has been much interest in housing price bubbles, in countries like USA and member countries of the OECD, where the housing growth rates were so high, with observed booms and bursts. When the housing bubble bursts, the economy plunges into recessions with a corresponding decline in consumption and investment (Konstantin *et al.*, 2010; Akbari and Aydede, 2012). The motivation of this study is the bursting of housing bubbles in some developed countries (e.g. USA). We analyze those variables that are related to the

immigration policy in Canada, accounting also for the impact of the interest rate, income, unemployment, household size and housing supply to analyze housing price determinants in a panel data econometric model.

According to the Canadian Real Estate Association (CREA), the housing prices for the largest Ontario cities continued to grow, with a much higher increase recently, year over year.

For the city of Mississauga, located 17 miles from the city of Toronto, the average price of homes sold in April 2017 was CA\$796,555 (\$589,450), up by 21.6 per cent from April 2016. There has been a much higher increase in the home prices for the condo townhouse category that had a median sale price which rose 36.7 per cent from past year levels to CA\$575,000 in the first quarter of 2017.

The single detached homes had a median sale price up 40.1 per cent from a year earlier to a record CA\$1,100,000 in the first quarter of 2017. This was the highest median price on record and the first time the price level had risen above CA\$1m (CREA).

The average price of homes for the city of Toronto in April 2017 was CA\$920,791, up by 24 per cent from past year in April 2016 price of CA\$739,082. In downtown Toronto, the average sale price of a detached home in spring of 2017 was CA\$1.2m.

For the cities of Hamilton and Burlington, located at a distance of 40 miles from Toronto, the average home prices in April 2017 was CA\$611,090, which represents a 24 per cent increase from last year's price in April 2016 of CA\$492,661. For the whole country, on average, over the past year from 2016 to 2017, the average home prices increased 10 per cent. The observed year-over-year increase in home prices for the large cities like Toronto, Mississauga, Hamilton and Burlington is double the national average.

There have been in the media discussions about the possible impact on the housing prices in Canada because of the foreign buyers. There are no data on foreign buyer's home purchases in Canada. Starting August 2016, legislators in British Columbia introduced a 15 per cent tax on foreign buyers of property in the metro area of Vancouver. Prices for detached houses sold in February 2017 within the City of Vancouver dropped by 5 per cent to an average of CA\$2.67m (*The Globe and Mail*, March 2017). Following British Columbia, in 2017, to cool the housing market, in the region of Toronto and surrounding area, legislators imposed a 15 per cent foreign buyers' tax on home prices. This tax applies to all home purchases made by those who are not permanent residents or citizens of Canada as well as foreign corporations.

With all the increase in housing prices in Ontario, it is feared that Canada is on a housing price bubble. No one knows when the housing prices in Ontario will cool down. Many believe that housing prices in Ontario will continue to increase. Does immigration to Canada play a role in increasing the housing prices? What are the main determinants of housing price growth? Each year, Canada admits 225,000 immigrants that cause an estimated 0.66 per cent increase in the housing demand with each 1 per cent rise in immigrant population (Akbari and Aydede, 2012).

The present study empirically investigates the main factors that explain the growth over time of housing prices for the ten largest CMAs in Ontario, for the years 2001, 2006 and 2011 using a panel data framework. The model in this paper follows the econometric specification of later studies in the literature (O'Meara, 2015; Akbari and Aydede, 2012). The average housing prices are explained by interest rate, employment income, unemployment rate, household size, housing supply and immigration.

The impact of immigration on the housing market in Canada is little researched; however, immigration plays an important role in the economy of Canada. According to Statistics Canada, not only immigration is key to Canada's population growth but also

without immigration, in the next 20 years, Canada's population growth will be zero (Figure A1). The reason is the Canadian aging population, and below 2.1 children per woman replacement rates. This paper explores the impact of immigration as an explanatory variable of Ontario housing prices. Ontario draws immigrants from all over the world. According to Citizenship and Immigration Canada data, the most common countries of birth for permanent residents immigrants in Canada and Ontario in recent years are from the region of Asia and Pacific, specifically India, China and the Philippines, as we can see from Figure A2 and A3. Over the 10-year period from 2001 to 2011, these three categories of immigrants grew by 400 per cent in Ontario (Figure A4); total immigrants excluding the three categories declined by 0.8 per cent (Figure A5), while the nonimmigrant population grew naturally by 12 per cent (Figure A6). Given the above findings, we consider that the three most prevalent immigration ethnicities (Chinese, Indian, and Filipino) may have an impact explaining the long-term housing price growth in Ontario. This paper investigates the magnitude of the impact of the top three leading categories of immigrants to Canada: Chinese, Indian and Filipino on the housing prices in Ontario largest cities in a model of house price determinants.

The results of the model show that the main determinants of the average home price from 2001 to 2011 are immigration (categories from China, India and the Philippines), unemployment rate, income, household size and interest rate. For example, for Toronto CMA, the largest immigrant receiving area in Ontario, the model suggests that out of the CA \$158,875 home price increase over the 2001-2011 period, 58.60 per cent is explained by lower interest rates, 54.57 per cent is explained by an increase in immigration and 11.32 per cent is explained by increase in income. Higher unemployment is associated with a decrease in the average housing prices (24.49 per cent share).

2. Literature review

In the past five years, there has been an ongoing interest in the determinants of factors that influence the real estate markets. Among these are financial stability, inflation and interest rates (Stoykova and Chou, 2013). Fisher and Jaffe (2003) showed that after studying homeownership rates (e.g. the percent of households who own their primary residence) of 106 countries between 1980 and 1999, there is no equation model that can be used for studying the real estate market (Stoykova and Chou, 2013).

The standard hedonic model for the housing market Fotheringham *et al.* (2000) specified the home sale price as a function of housing characteristics: location and housing attribute variables (Bitter *et al.*, 2007). One of the most applied methods of housing price evaluation is the hedonic price modeling (Xiao, 2017). Sirmans *et al.* (2005) described the theory and summary of empirical results of the applied hedonic price models (Cebula, 2009).

Some studies achieved consensus regarding factors that impact home prices, among these are housing financing (income, bank loans), demographic (population growth, urbanization and household size), labor market factors, legislation, taxes and supply-side factors (housing stock and construction costs) (Stoykova and Chou, 2013; Case and Shiller, 2003; Tsatsaronis and Zhu, 2004; Sutton, 2002; De Bruyne and Hove, 2013). The factors that affect housing prices on the supply-side are construction costs, wages of construction workers and material costs (Égert and Mihaljek, 2007). Madsen (2011), Poterba (1984, 1991) stated that in the long run, house prices will be determined by land prices, taxes and construction costs. Most recent studies assessed the impact of culture (e.g. survival vs self-expression) on housing prices (Stoykova and Chou, 2013; Inglehart and Baker, 2005), concluding that culture should be adopted as a long-term housing price determinant.

Konstantin *et al.* (2010) and Girouard *et al.* (2006) conducted surveys of the current literature on the determinants of house prices.

Few studies use Canadian data to explain house prices and analyze the effect of immigration on housing prices. Akbari and Aydede (2012) used 258 census-level units across Canada, with a one-way space fixed effects panel data model, for three census years starting in 1996, 2001 and 2006. Their focus is on the ratio of total immigrants into the total population of each unit of analysis, with an econometric specification controlling for demand-side variables (immigration, mobility, labor market and demography) and housing supply-side variables. Akbari and Aydede's (2012) results show that total immigration does not have a significant impact on the housing prices.

Ley and Tutchener (2001) used descriptive analysis and found a correlation between immigration and housing prices for Toronto (correlation was 0.93) and Vancouver (correlation was 0.96).

Carter (2005) conducted a survey study focusing on the main destination of immigrants in Canada: Toronto, Montreal and Vancouver. Among the factors discussed are labor force outcomes, housing characteristics of immigrants, the influence on housing price, neighborhood and housing circumstances of the poor immigrant.

Dachis *et al.* (2012) analyzed the impact of the Toronto land transfer tax on housing prices and home sales in the Greater Toronto Area (GTA) between 2006 and 2008. Their findings suggest that a 1 per cent increase in the land tax is associated with a decrease in sales volume by 1 per cent and a small increase in house prices of 1.3 per cent.

There is not much research on the effect of the immigrants and immigrants' ethnicity (e.g. Chinese, Indian and Filipino immigrants) on the housing prices in Canadian cities. This study investigates the impact of the most prevalent immigrant races (e.g. from China, India and the Philippines) on housing prices, using data for Canadian major cities in Ontario within a panel data econometric framework. This study is the first to apply panel data model to the ten largest CMAs in Ontario with an application to analyze the impact of immigrants' ethnicities on housing prices. The data set used comprises the years from 2001 to 2011. This paper fills this gap and contributes to the literature, which analyzes the determinants of housing prices based on a panel of cities in the Canadian province of Ontario.

3. Model

The framework for the empirical analysis applies the hedonic pricing model theory to housing sales prices for the ten largest CMAs in Ontario over the years 2001-2011. There are no clear guidelines in the economic theory on how to select the functional form (Xiao, 2017). The model in this study follows a linear specification, where both the dependent and explanatory variables enter the regression with a linear form. Following Xiao (2017), the hedonic housing price regression model followed takes the following specification functional form:

$$p = \beta_0 + \sum_{k=1}^K \beta_k x_k + \varepsilon \quad (1)$$

where:

p denotes the housing price;
 ε is a vector of random error term; and
 $\beta_k (k = 1, \dots, K)$ is the marginal change of the unit price of the k th characteristic x_k of the good.

Following Akbari and Aydede (2012) and O'Meara (2015), market clearing in the housing market results in the housing price as a function of several housing attributes. We selected

the housing attributes based on data availability for the Canadian Census years of 2001, 2006 and 2011 and the variables that have been most used in the literature.

Therefore, the estimated model is presented in [equation \(2\)](#):

$$\begin{aligned} price = & \beta_1 Immigrants\ per\ Dwelling + \beta_2 Interest\ Rate + \beta_3 Unemployment\ rate \\ & + \beta_4 Income + \beta_5 Household\ size + \beta_6 Houses\ supply \end{aligned} \tag{2}$$

As we can see from [equation \(2\)](#), the model has the average housing prices as the dependent variable, and the independent variables are: immigrants per dwelling (Chinese, Indian and Filipino), unemployment rate, average employment income, household size, housing supply and the interest rate.

To capture the relative scarcity of dwellings, the independent variable, immigrants per dwelling was used.

3.1 Data and descriptive statistics

For this study, the variables ([Table I](#)) and their data sources are as follows: housing starts and new completed houses (Canadian Market and Housing Corporation); average housing prices (2006, 2011; Canadian Market and Housing Corporation); average housing prices (2001; [Sperling and Sander, 2004](#)); private dwellings, household size, income, unemployment rate, immigrants (Statistics Canada); and interest rate (Bank of Canada).

The dollar values of home prices and employment income have been converted to the dollar value of 2015 using the Consumer Price Index (Statistics Canada) to adjust for inflation. Data are available from Census Canada for the years 2001, 2006 and 2011. The units of analysis are the ten major Ontario CMAs: Toronto, Hamilton, St. Catharines-Niagara, Kitchener-Cambridge-Waterloo, London, Ottawa-Ontario part, Guelph, Windsor, Oshawa and Kingston.

The average house growth rate was 40 per cent across all cities for the 10-year period (2001 to 2011), with minimum 21 per cent for London and maximum growth for Hamilton

Table I.
Variable definitions,
descriptive statistics
and pooled data:
years 2001, 2006 and
2011 combined

Variable	Description	Minimum	Maximum	Average	SD
Home price-to-income ratio		2.78	6.88	4.17	0.89
Immigrants per dwelling	Total immigrants from China, India, the Philippines/dwellings (%)	0.48	33.54	6.24	7.50
Interest	Interest rate, 5 year mortgage lending rate	5.39	7.40	6.48	1.02
Urate	Unemployment rate (%)	5.10	10.40	6.83	1.31
Income	Average employment income (2015 \$) (tens of thousand dollars)	5.53	7.48	6.42	0.51
Household size	Household size	2.30	2.80	2.55	0.14
Dwellings	Total number of dwellings	44,215	1,989,705	331,809	512,326
Starts	Housing starts	707	41,017	6,029	11,389
New houses	Newly completed houses	25	1348	250	343
House supply	Houses supply-share of new houses for sale as percent of all houses	0.59	2.51	1.59	0.57

(103 per cent). Windsor had a 15 per cent house price decline over the 10-year period (Table II).

The average home prices grew over years for all cities excluding Windsor. Between the year 2006 and 2001, the maximum price increase was 22 per cent for Hamilton, and the minimum price increase was for the city of St. Catharines-Niagara with 4 per cent increase. Toronto had a 20 per cent price increase for the five-year period, between 2006 and 2011 (Table III and Figure A7).

The home price-to-income ratio is a measure of the housing costs relative to the local ability to pay (Himmelberg *et al.*, 2005). The price-to-income ratio increased for all cities, except for Windsor, where it declined over the period analyzed. The increase in price-to-income ratio has been the most in the cities where the house price growth has been the highest: Toronto, Hamilton, Ottawa–Ontario part and Kitchener–Cambridge–Waterloo. Windsor had an 8 per cent home price decrease over time from 2001 to 2006 and again from 2006 to 2011 (Figure A8 and Table III).

Following Akbari and Aydede (2012), Table IV presents data on housing prices for the ten major cities in Ontario and data on immigrant concentration and home ownership rates. From Table IV, it stands out that Toronto is the main recipient of immigrants (12 per cent of immigrants from China, India and the Philippines), while London and St. Catharines-Niagara are the least recipient of immigrants (1.54 per cent and 1.17 per cent respectively).

Ontario average of home prices for its ten major CMAs is \$311,692. Looking at population per dwelling data, we can see that it is easier to find a home in Ottawa–Ontario part, Kingston and St. Catharines-Niagara than in the rest of the cities in Ontario. Toronto and Oshawa have the highest population per dwelling, while Ottawa-Ontario part, Kingston and St. Catharines-Niagara have the lowest ones. Table IV seems to suggest that there is a relationship between house prices and immigrant concentration for the cities in Ontario. The next section studies this relationship with an econometric model.

4. Results and discussion

This paper presents a panel data regression model (Baltagi, 2001) of the determinants of the housing prices in Ontario cities. Hausman (1978) test cannot be rejected, suggesting that both fixed and random effects coefficients are consistent. The ten cities chosen for the analysis can be seen as a sample of all cities in Ontario, and therefore, the random effects model is more appropriate.

We can see from Table V that all the estimated coefficients are statistically significant, with exception of the houses supply coefficient which is close to zero and statistically insignificant.

Cities	Growth rates 2001 to 2011
Toronto	51
Hamilton	103
St Catharines-Niagara	25
Kitchener-Cambridge-Waterloo	43
London	21
Ottawa-Ontario part	62
Guelph	31
Windsor	–16
Oshawa	40
Kingston	37

Table II.
Average house
growth rates

Table III.
House price
dynamics

Cities	House price (2015 dollars)			Price/income ratio		% House price growth		% Price-to-income ratio growth	
	2001	2006	2011	2001	2006	2001 to 2006	2006 to 2011	2001 to 2006	2006 to 2011
Toronto	325,572	408,912	492,412	4.80	5.69	25.60	20.42	18.57	20.81
Hamilton	173,830	288,655	352,134	2.78	4.39	66.06	21.99	58.22	18.34
St Catharines-Niagara	188,259	225,897	235,531	3.40	3.99	19.99	4.26	17.30	4.38
Kitchener-Cambridge-Waterloo	223,362	276,283	319,932	3.74	4.36	23.69	15.80	16.58	13.89
London	203,980	221,081	246,792	3.50	3.67	8.38	11.63	4.97	8.72
Ottawa-Ontario part	224,734	298,782	364,058	3.21	4.10	32.95	21.85	27.82	18.73
Guelph	246,193	285,083	322,149	4.04	4.46	15.80	13.00	10.32	7.16
Windsor	207,966	190,449	175,285	3.16	2.85	-8.42	-7.96	-9.78	-0.09
Oshawa	236,618	299,804	332,021	3.72	4.50	26.70	10.75	20.90	7.33
Kingston	202,515	246,188	276,607	3.51	4.06	21.57	12.36	15.74	11.79

Cities	Average price of houses	Percentage of immigrants in total population			Three categories	Population per owned dwelling	Determinants of housing prices
		China	India	Phillipines			
Toronto	492,412	4.07	4.87	3.14	12.09	2.77	549 Table IV. Housing market and immigrant concentration in the ten major Ontario cities, 2011
Hamilton	352,134	0.72	1.21	0.90	2.83	2.51	
St Catharines-Niagara	235,531	0.40	0.26	0.51	1.17	2.39	
Kitchener-Cambridge-Waterloo	319,932	1.17	1.42	0.39	2.98	2.59	
London	246,792	0.65	0.59	0.31	1.54	2.40	
Ottawa-Ontario part	364,058	1.79	1.01	0.82	3.62	2.46	
Guelph	322,149	0.91	1.39	1.09	3.40	2.55	
Windsor	175,285	1.05	1.11	0.83	2.99	2.49	
Oshawa	332,021	0.38	0.58	0.72	1.68	2.71	
Kingston	276,607	0.57	0.38	0.32	1.27	2.33	
Total		11.71	12.82	9.04	33.56	25.20	
Average	311,692	1.17	1.28	0.90	3.36	2.52	

Variable	Coefficient estimate (standard errors)	Table V. Pooled estimates of average home price, two-way space and time random effects model dependent variable: price $N = 10, T = 3$
Intercept	—	
Immigrants (China + India + Philippines)/Dwelling	0.339 (0.108)***	
Interest rate	−4.632 (1.153)***	
Unemployment rate	−1.441 (0.778)*	
Income	4.748 (1.564)***	
Household size	13.262 (7.112)*	
Houses supply	0.254 (1.659)	
R^2	0.979	
Notes: Significance is indicated with ***, ** and *for the 1, 5 and 10% levels, respectively		

The magnitude of the coefficient of immigrants is 0.339 and statistically significant (at 1 per cent level), suggesting that each additional 1 per cent increase in immigrants per dwelling is associated with CA\$3,390 increase in the average home prices. For Toronto, from 2001 to 2011, the increase in the immigrants per dwelling was 25.6 per cent, which corresponds to CA\$86,701 increase in average home prices.

Interest rate is negatively correlated with the average house price. Each additional 1 per cent increase in the interest rate is associated with CA\$46,320 decrease in the average home prices. Interest rate was 5.39 per cent in 2011, down from its 7.4 per cent value in 2001, which contributed CA\$93,103 price increase for Toronto over the 10-year period.

Other results show that unemployment rate is negatively correlated with the average home price. Each 1 per cent increase in unemployment rate is associated with CA\$14,413 decrease in the average home price. The coefficient of income shows that each additional \$10,000 increase in income is associated with CA\$47,475 increase in price.

We focused attention on Toronto CMA, as it is the main destination of immigrants and comprises the largest cities, including Toronto, Mississauga, Brampton and Oakville. Looking over the 10-year period from 2001 to 2011, we can see the factors that impact the

home prices in Toronto CMA: immigration, unemployment rate, household size, interest rate and income.

We can see from [Figure A9](#) that over the 10 years, from 2001 to 2011, immigrant group from China, India and the Philippines account for CA\$86,701 increase in the home price (54.57 per cent share of the total increase). Income accounts for CA\$17,986 increase in the home price (11.32 per cent share); interest rate accounts for CA\$93,103 of the average home price increase in Toronto CMA (58.60 per cent share); and unemployment rate accounts for CA\$38,916 decrease in the Toronto average home prices (24.49 per cent share).

Household size remain stable over time in Toronto (2.8 average household size) and does not have a contribution to home price change.

All these four factors, interest rate, immigrants, unemployment rate and income together explain CA\$158,875 increase in home prices in Toronto CMA between 2001 and 2011.

5. Conclusions and discussion

This paper presents a panel data econometric model of the main determinants of house prices in the ten largest CMAs in Ontario for the years 2001, 2006 and 2011. The results show the main factors that explain home prices over time are immigration, interest rate, income, household size and unemployment rate. With regard to immigration, the largest categories of immigrants considered are from China, India and the Philippines. Over 10-year period from 2001 to 2011, these three categories of immigrants grew by 400 per cent in Toronto CMA, the largest receiving area in Ontario, while the nonimmigrant population grew by 14 per cent. This study found evidence that immigrants contribute significantly to housing prices in Ontario.

For Toronto CMA, immigrants, income, unemployment rate and interest rate explain the CA\$158,875 average home price increase over 2001-2011 period. Out of this, the three categories of immigrants' share of total home price increase is 54.57 per cent, with the corresponding interest rate share 58.60 per cent and the income share 11.32 per cent of the total price growth. Unemployment share of the total absolute price increase is -24.49 per cent.

This study seems to suggest that one cause of high prices in Ontario is the large inflow of immigrants together with low mortgage interest rate. The fact that currently, in 2017, the young working population cannot afford buying a property in Toronto CMA area means there is a problem with this market and a corresponding decrease in quality of life.

According to *The Globe and Mail* (July 2017), a new poll in 2017 suggest that two in five Canadians believe housing in this country is not affordable for them. Thirty-eight per cent of respondents who consider themselves middle or upper class believe in no affordability of housing. The Trudeau Government promised Canadians a national housing strategy for affordable housing. To design a national housing strategy may be challenging, because it has to account for the differential income ranges across regions. Municipal leaders are asking the government to prioritize repair and construct new affordable housing.

Another reason discussed in the media of the unaffordability of housing in Toronto and Vancouver is foreign buyers. Canadian Government recently implemented a tax measure on what may seem the housing bubble problem: foreign buyers. Following Vancouver, in April 2017, Ontario Government imposed a 15 per cent tax on foreign buyers who are not Canadian citizens or permanent residents. This tax is levied on houses purchased in the area stretching from Niagara Region and Greater Toronto to Peterborough. Since then, it has been observed that the price of all types of homes sold in Toronto area was 19 per cent down to CA\$746,218 in July 2017 from the market peak in April 2017, when house sales averaged

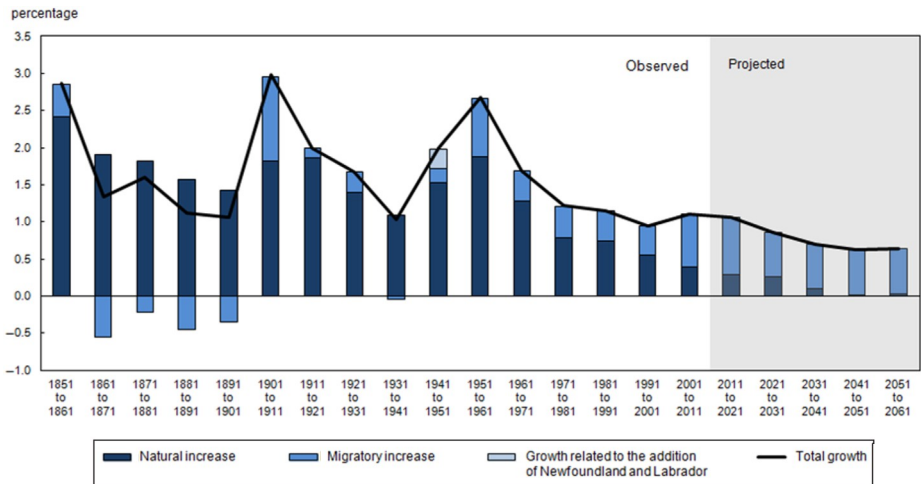
CA\$920,791 (*The Globe and Mail*, August 2017). Data are currently not available on the foreign buyers, but it would help to identify any relationship between foreign purchases of homes in Ontario and the corresponding price increase.

The housing market price analysis may be more complex, and there may be factors impacting the housing prices extending beyond immigration, interest rate, income and household size. Finally, the results of this paper can be extended to include the most recent census data for the year 2016 to reflect more accurately the price situation in the housing market for Ontario cities.

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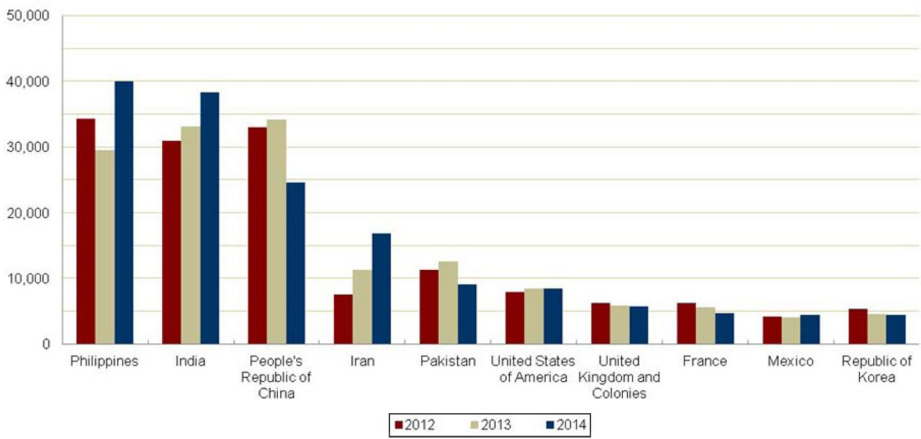
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Source: Citizenship and Immigration Canada

Figure A1.
Canada permanent
residents by source of
country



Source: Citizenship and Immigration Canada

Figure A2.
Canada – permanent
residents by province
or territory and
source area, 2014

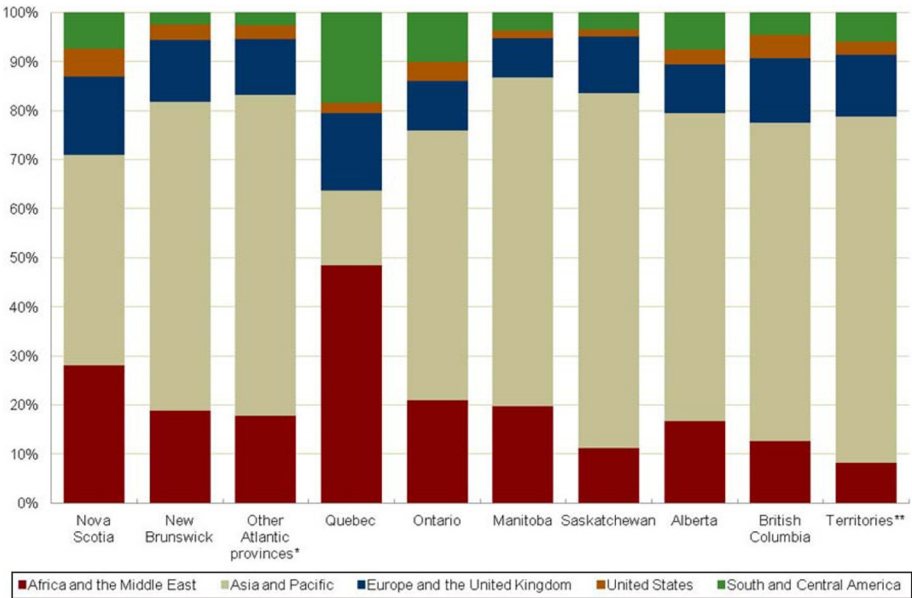
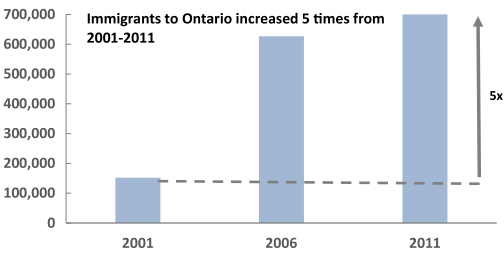


Figure A3.
Population growth
rate, actual and
projected for Canada

*Newfoundland and Labrador and Prince Edward Island
**Yukon, Northwest Territories, and Nunavut

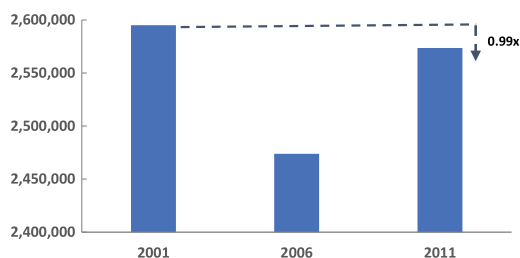
Source: Statistics Canada, available at www.statcan.gc.ca/pub/11-630-x/11-630-x2014001-eng.html

Figure A4.
Immigration in
Ontario from China,
India and the
Philippines

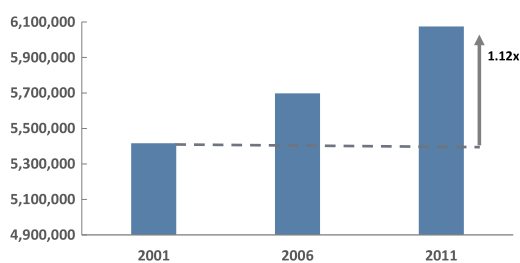


Source: Authors' calculations

Figure A5.
Immigration in
Ontario excluding
China, India and the
Philippines



Source: Authors' calculations



Source: Authors' calculations

Figure A6.
Nonimmigrants in
Ontario

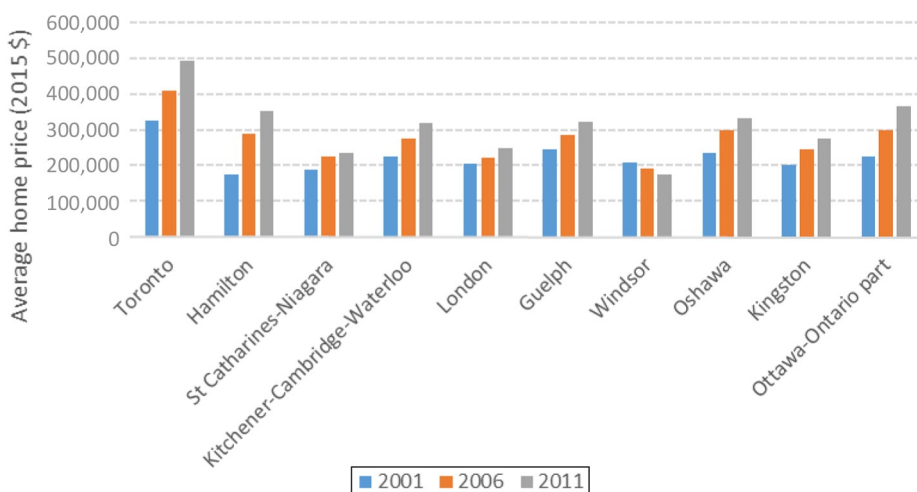


Figure A7.
Average home prices
for Ontario CMAAs
over time

Source: Author's calculations

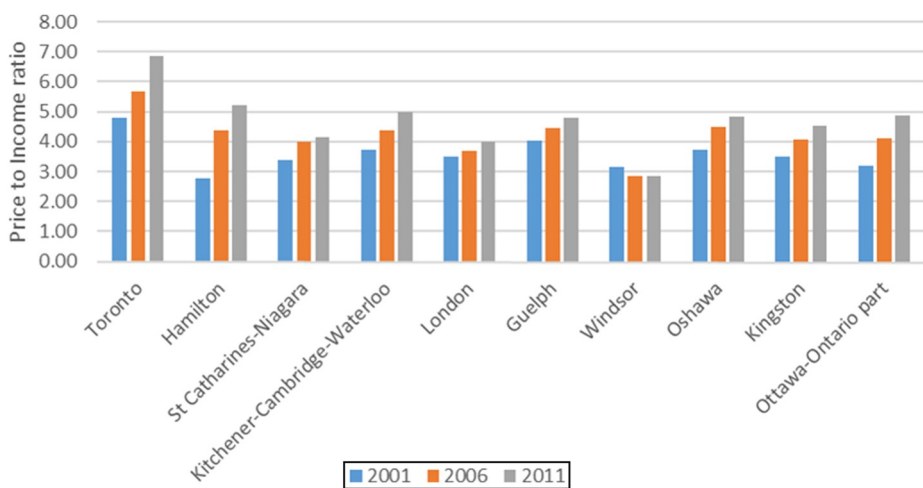


Figure A8.
Price-to-income ratio
for Ontario CMAAs
over time

Source: Authors' calculations

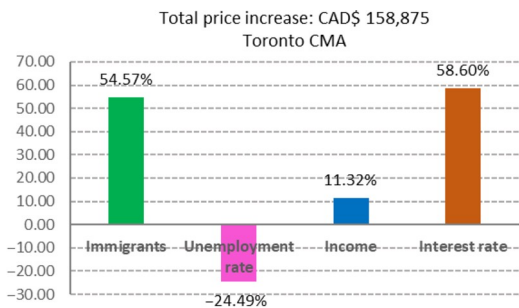


Figure A9.
Determinants of
average home price
increase in Toronto
CMA from 2001 to
2011

Source: Author's calculations

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