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# Forecast of Ontario's Housing Stock 2020-2046

*Working Paper Research*

by

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The views expressed in this article are those of the author and do not necessarily reflect those of OMLTSD. The author is grateful to Vijay Gill for the initiative of this research.

## **1. Introduction**

Ontario's population is projected to increase by almost 40% in the next thirty years (OMF, 2019). Moderate GDP growth, low interest rates, rising population and immigration triggered strong demand for homes in the past decade, as well as the expectations of strong growth into the future. However, there was an unprecedented shift starting from March 2020 due to the Covid-19 pandemic that caused significant interruptions in economic activity everywhere in the world. Ontario has been experiencing the biggest shock in its economic and immigration activities due to the pandemic, which imposed an outlier and uncertainties over the predictive data despite the expectations of the impact to be temporary.

This report will project and analyze Ontario's housing stock by regions and dwelling types towards 2046 (the latest demographic projection available), leveraging:

- Existing data as well as the province's future demographic projections
- Supply-side and demand-side perspectives into the analysis
- Impacts of the Covid-19 and various scenarios of economic and housing development associated with the post-pandemic experience.

## **2. Ontario's Housing Growth and Future Expectations**

According to the literature (Dupuis and Zheng, 2010; Demers, 2005), the key factors determining the housing stock from the demand side are demography, economic growth, interest rates and house prices, while the supply side is contingent on the level of existing housing stock, investment appetite and construction costs. Most of the conclusions, however, indicate that it is the demand side that drives housing stock in Canada (and Ontario), and that its housing supply is rather elastic (DiPasquale, 1999; Green et al., 2005).

When it comes to estimating rough numbers for Ontario's future housing by dwelling types, we can incorporate Ontario's current housing stock (by types of housing), and the rate at which new homes were completed each year, but assuming that key demand factors such as population growth will continue as projected under "normal" or expected economic conditions. Each of these factors will be discussed in more detail later, after providing initial simplified forecast results.

I will expand my estimates to Ontario's Census Metropolitan Areas (CMAs) because dwelling types can vary depending on the regional characteristics; this allows to observe data at micro-level and compare existing (if any) differences in housing markets across CMAs. The dwelling types include: detached (single) units; semi-detached units; row-town units; apartment/condos and others. The following variables were used for initial estimations:

- Current housing stock, measured by occupied private dwellings. The latest reported figures were for 2016 by the Census Profile Research, which is carried out every 5 years.
- New residential dwellings, measured by housing starts. Monthly data is available from Canada Mortgage and Housing Corporation (CMHC). Another indicator of the residential property growth is house completions, but it did not perform/predict as accurately as housing starts data,

when I tested to predict for the past period and compared the results with real-life actual data. Therefore, I took housing starts data as a better proxy to measure housing growth.

I converted housing starts into annual data for 2000-2019, and calculated an average annual (AA) number of housing starts over the period. The AA of housing starts was multiplied with a 1.12 multiplier to account for potential increases due presumably to the conversion of some properties into multi-unit apartments, as suggested by Lascelles (2014). The results for 2046 by CMAs are provided in **Table 1**. The same way, I estimated the future housing stock for Ontario in **Table 2**, shown year by year.

**Table 1.** Forecast of Ontario’s housing stock for 2046 by dwelling type and CMAs.

CMA	Total Dwellings	Detached	Semi-Detached	Row Units	Apartment and other
Ontario	6,576,533	3,674,428	409,861	727,275	1,739,169
Barrie	112,678	81,675	3,477	11,421	14,580
Brantford	66,941	46,140	3,177	6,477	10,941
Greater Sudbury	82,437	52,884	3,937	3,449	21,461
Guelph	83,679	47,258	4,546	12,478	19,221
Hamilton	369,049	212,083	13,497	60,739	81,719
Kingston	93,553	55,227	5,375	6,501	26,010
Kitchener-Camb.-Wat.	292,287	161,196	15,885	35,990	78,712
London	276,536	163,816	8,713	24,398	78,879
Oshawa	209,748	146,456	9,235	23,521	30,252
Ottawa	570,444	261,950	31,619	140,226	135,194
Peterborough	63,051	45,104	951	4,356	12,355
St. Catharine’s-Niagara	212,980	143,559	11,877	19,068	37,556
Thunder Bay	59,507	41,967	2,282	1,570	13,148
Toronto	2,841,292	1,267,919	246,140	326,345	996,688
Windsor	170,905	119,693	9,756	11,373	29,657

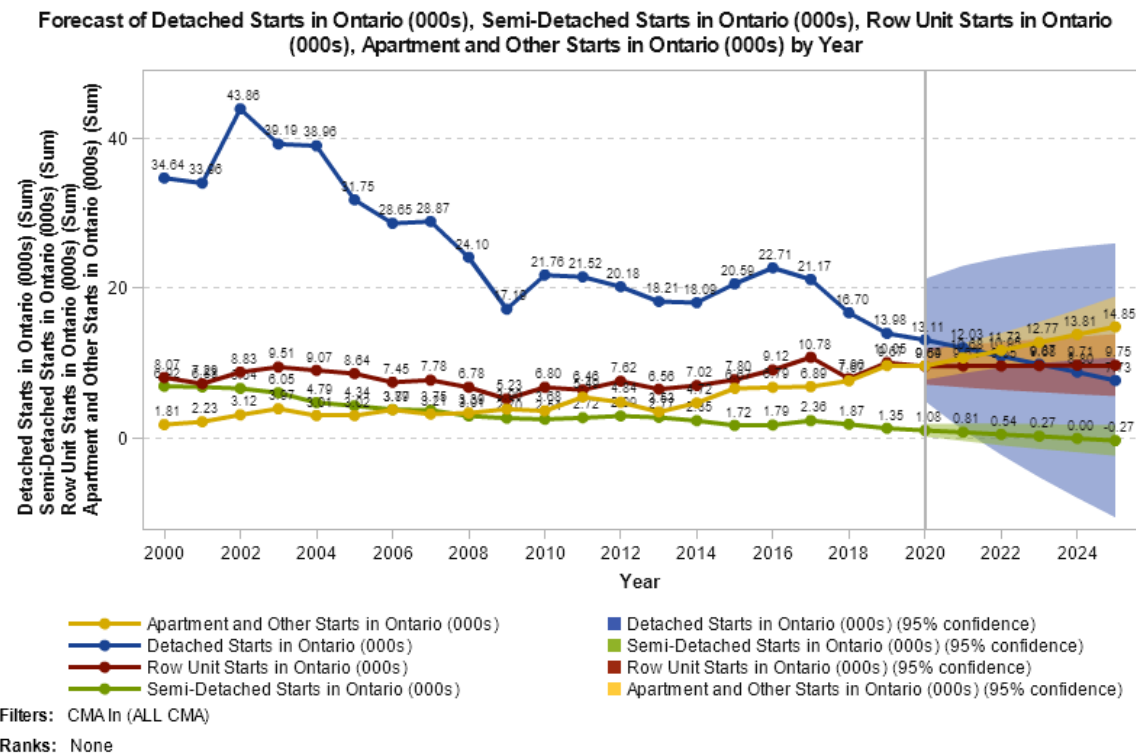
**Table 2.** Forecast of Ontario’s annual housing stock 2016-2046 by dwelling type (based on average growth of new residential dwellings)

Year	Total Dwellings	Detached	Semi-Detached	Row Units	Apartment and other
2016	5,169,175	2,807,380	289,975	460,425	1,585,595
2017	5,216,087	2,836,282	293,971	469,320	1,590,714
2018	5,262,999	2,865,183	297,967	478,215	1,595,833
2019	5,309,911	2,894,085	301,964	487,110	1,600,952
2020	5,356,823	2,922,986	305,960	496,005	1,606,072
2021	5,403,735	2,951,888	309,956	504,900	1,611,191
2022	5,450,647	2,980,790	313,952	513,795	1,616,310
2023	5,497,558	3,009,691	317,949	522,690	1,621,429
2024	5,544,470	3,038,593	321,945	531,585	1,626,548
2025	5,591,382	3,067,494	325,941	540,480	1,631,667
2026	5,638,294	3,096,396	329,937	549,375	1,636,786
2027	5,685,206	3,125,298	333,933	558,270	1,641,905
2028	5,732,118	3,154,199	337,930	567,165	1,647,025
2029	5,779,030	3,183,101	341,926	576,060	1,652,144
2030	5,825,942	3,212,002	345,922	584,955	1,657,263
2031	5,872,854	3,240,904	349,918	593,850	1,662,382
2032	5,919,766	3,269,806	353,914	602,745	1,667,501
2033	5,966,678	3,298,707	357,911	611,640	1,672,620
2034	6,013,590	3,327,609	361,907	620,535	1,677,739
2035	6,060,502	3,356,510	365,903	629,430	1,682,858
2036	6,107,414	3,385,412	369,899	638,325	1,687,978
2037	6,154,325	3,414,314	373,896	647,220	1,693,097
2038	6,201,237	3,443,215	377,892	656,115	1,698,216
2039	6,248,149	3,472,117	381,888	665,010	1,703,335
2040	6,295,061	3,501,018	385,884	673,905	1,708,454
2041	6,341,973	3,529,920	389,880	682,800	1,713,573
2042	6,388,885	3,558,822	393,877	691,695	1,718,692
2043	6,435,797	3,587,723	397,873	700,590	1,723,811
2044	6,482,709	3,616,625	401,869	709,485	1,728,931
2045	6,529,621	3,645,526	405,865	718,380	1,734,050
2046	6,576,533	3,674,428	409,861	727,275	1,739,169

As shown in **Table 2**, detached homes constituted the largest share of all dwellings in Ontario, followed by semi-detached and apartment/condo units. However, most recent trend reveals that new detached and semi-detached homes have been in decline, while townhouse and apartments/condo type dwellings have been increasing. **Figure 1** depicts this trend over the recent years, and predicts that under normal conditions, new townhouse and apartment/condo types are likely to increase at higher rate relative to the new detached and semi-detached homes into the future.<sup>2</sup>

<sup>2</sup> Predicted trend for dwelling types are made using SAS predictive analytics.

**Figure 1.** 5-year forward forecast of Ontario’s housing starts by dwelling type (x1,000).



### 3. Covid-19 and Shifts in Ontario’s Housing Market

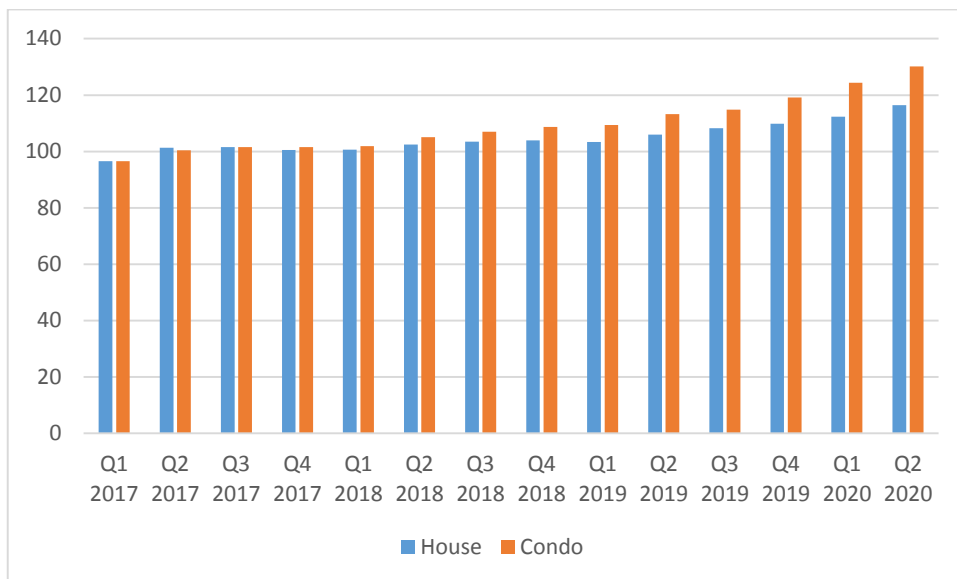
#### 3.1. Shifts in dwelling types

The forecasts by dwelling types must be interpreted with caution, given ongoing residency shifts that are likely to continue into the future (Deng et al., 2020). These include:

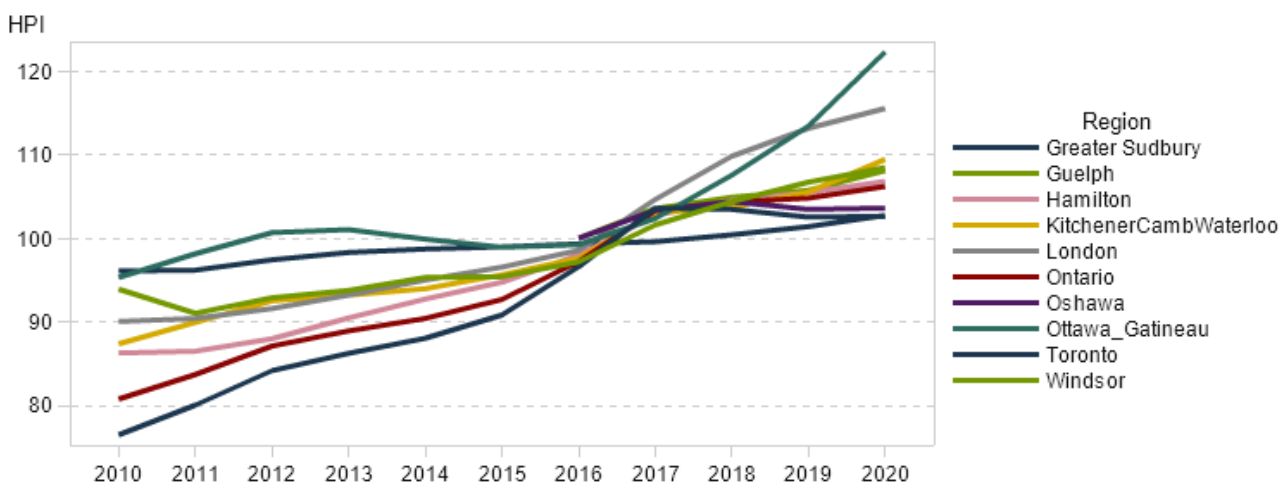
- Preferences over detached houses with bigger space for home office.
- Migration from suburbs to cities, booming construction activities in rural family friendly areas. Persistency of work-from-home situation may increase predicted numbers of detached dwellings and reduce apartment/condo numbers.
- Further decline in new apartment/condo construction can happen due to hardship of construction work over health concerns/regulations, higher costs, and rising condo supply from former Airbnb rentals.

Despite these concerns, recent 2020 data recorded strong demand for all dwelling types and rising house prices (Figure 2 and Figure 3). It is premature to make any conclusions, but general outlook for future housing market is positive, predicting slowdown for the rest of 2020, but surge in prices/demand by mid-2021 (CMHC, RBC, June 2020).

**Figure 2.** House price index for Toronto houses and condos, 2017Q1-2020Q2. (StatCanada, Table: 18-10-0135-01)



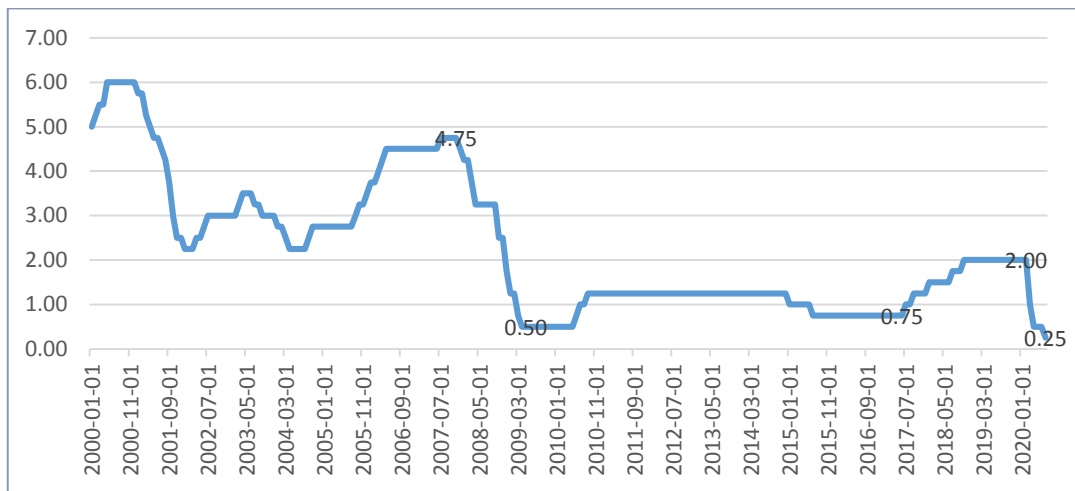
**Figure 3.** House price index trends by CMAs, 2010-2020Q2. (StatCanada, Table: 18-10-0205-01)



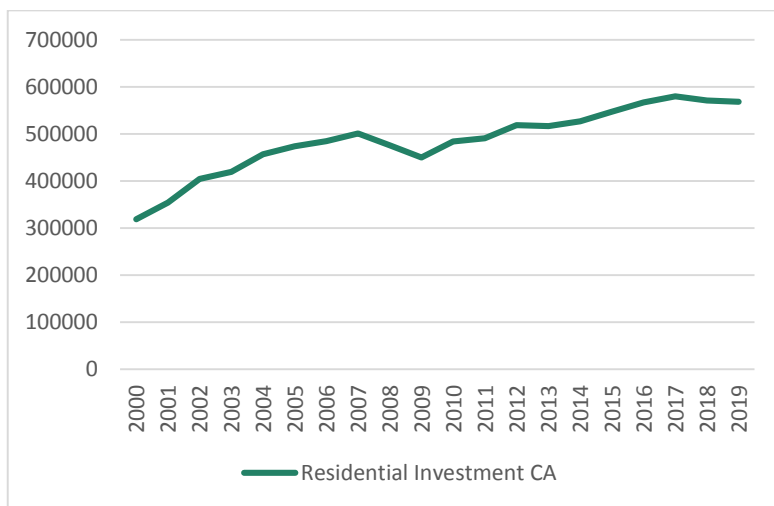
### 3.2. Interest rates and housing stock.

As a result of the Central Bank’s response to the pandemic, Canada is experiencing a record of lowest interest rates (**Figure 4**). Housing is simultaneously a consumption good and an investment asset, and regarded as the best investment option for many households when the interest rate is low. **Figure 5** shows that Canadian real residential investment has been increasing with average annual growth rate of 1%, except some periods of recession (2008) or when major housing policies were adopted (e.g. stress test in 2017). It provides support for our predictions of continuous growth in housing stock, although there might be potential slowdowns due to the pandemic or other shocks over the next thirty years.

**Figure 4.** Bank of Canada overnight interest rates (Source: FRED).



**Figure 5.** Real residential investment (x1,000,000) in Canada (StatCanada, Table: 36-10-0108-01).



### 3.3. Population growth and immigration

Demographics is the most important determinant of future housing. Ontario population is projected to increase from around 14.6 million in 2019 to almost 20 million by 2046 (OMF, 2019) that will trigger physical need for additional housing units. Analysis of the population projections (StatCanada, Table: 17-10-0057-01) reveals that Ontario population will increase by average annual rate of 1% over the next thirty years.

In deciding long-term housing projection, the case of Ontario is unique because 82% of its population growth comes from the immigration. Recent pandemic border closures created temporary stops in the flow of immigrants, and therefore, uncertainties over the short-run increase in the population. There were no announcements about the changes in immigration projections, and it is expected that population will grow according to the current plan. Besides, there can be unpredictable demographic factors, such as the surge in predicted population due to asylum seeking. For example, number of asylum claimants dramatically increased from around 24,000 in 2016 to 55,000 in 2018 that put additional pressure on housing demand along with increased immigration during these years. Some



prediction reports had suggested in 2014 that Ontario had been oversupplying housing stock, however, immigration expansion policies of 2016 proved the opposite (RBC, 2014). Even in the latest results of 2019 population, we can see a difference between projected population (14.5 million) and actual population (14.6 million).

### 3.4. GDP, unemployment and post-pandemic stimulation packages

Demand for housing is significantly conditional on economic development, which I will evaluate in terms of real GDP growth. Some months after the pandemic hit, economic outlooks are generally optimistic for Ontario. The Conference Board of Canada (CBC) forecasts that the deepest part of the recession is over expecting economic rebound of 6.7% in 2021 and 4.8% in 2022. Ontario government predicts the real GDP growth to be 1.5% in 2021 and 1.9% in 2022 (OMF, 2020).

Full recovery from the pandemic may stretch up to 2022, but expansionary policies are possibly to be in force until the threat of the pandemic fades away. However, specialized policy changes are the hardest to forecast - be it in terms of credit rules, immigration policies or housing supply action plans. Although a span of our sample is limited and omits the structural breaks caused by the pandemic (or by any other forces in the future), the trends of new residential construction and population are much likely to grow steadily in the long-run, the relationship of which we will do in more depth in the next chapter.

## 4. Estimating Regression Model for Ontario's Future Housing Numbers

In this part, I'll look further into demand-side determinants of the housing stock, particularly demographics. The regression model is applied to find the magnitude of this relationship, controlling for the effects of other macroeconomic variables. After finding a coefficient (assuming a significant relationship), I can simulate the ratio into projected demographics to plan the future housing stock. The model is:

$$HS_t = \Delta POP_t + \Delta GDP_t + IR_t + HPI_t + DR \quad (1)$$

where HS-housing starts (or change in housing stock);  $\Delta POP$ -historical population growth;  $\Delta GDP$ -real GDP growth; IR-interest rates; HPI-housing price index; and DR-is a dummy control to account for home deterioration rate. Data is panel capturing 15 different CMAs in Ontario, and the period is annual between 2001-2019 (285 observations). The variables were tested for stationarity and no unit root problems were detected. The model was estimated using random effects as advised for panel regional data:

$$HS_t = \mathbf{0.366}POP_t + 54.17\Delta GDP_t - 124.6IR_t - 27.76HPI_t$$

$$t\text{-stat:} \quad [20.75]^{***} \quad [0.731] \quad [-1.147] \quad [-2.552]^{**}$$

*R-squared: 0.64*

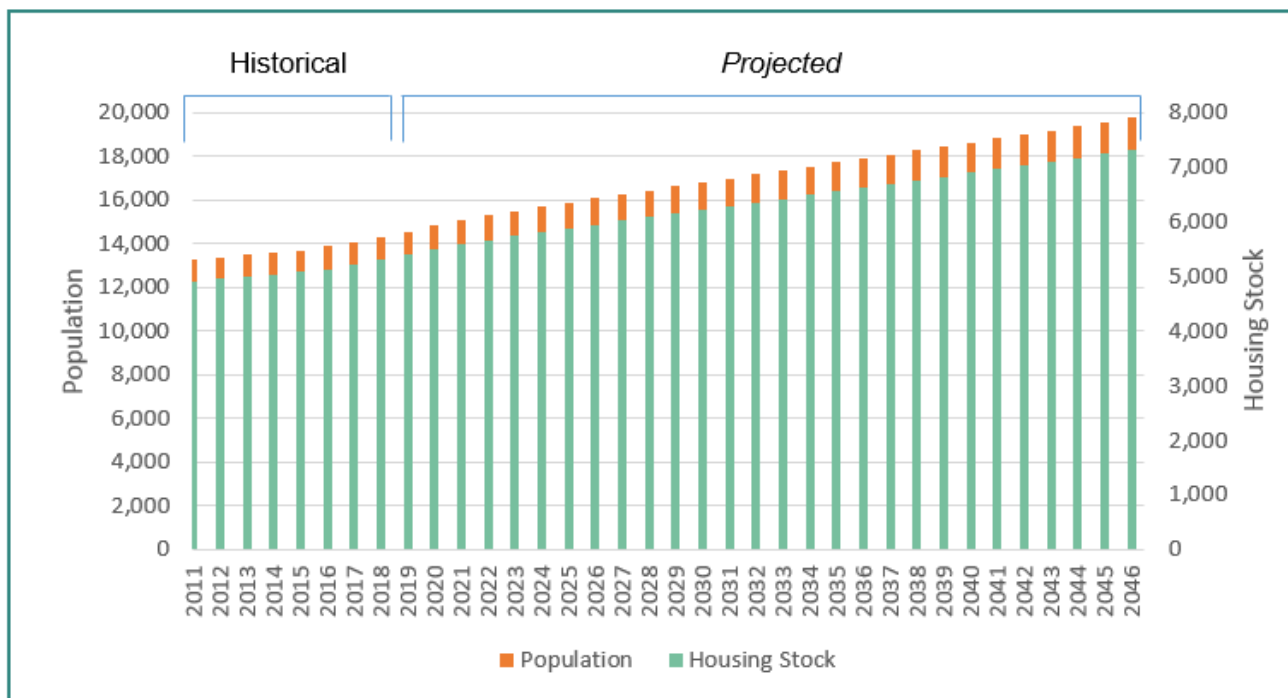
\*\*\*, \*\* and \* indicates rejection of the null hypothesis at the 1%, 5% and 10% significance level, respectively.

The results indicate that there is a strong significant relationship between the housing and population growth, as well as the home price index, but the latter has lower significance level. The demography coefficient is 0.366, indicating that per unit (or thousand as our data is in thousands) increase in population triggers 0.366 unit (or a thousand) increase in housing stock. This means a **ratio of around 2.7**. We can estimate number of future dwellings by applying this ratio to the projected population for Ontario, conditional that house prices remain stable (significant factor in the model) and no major shocks to economy. **Table 3** shows projected housing stock for 2019-2046, based on the **population projections by Ontario Ministry of Finance**. **Figure 6** displays the graphical representation of the historical/projected Ontario population and total dwelling numbers for 2011-2046.

**Table 3.** Projected population growth (by OMF) and estimated future housing needs for Ontario, 2019-2046 (x1,000).

Year	Population	Housing Stock
2019	14,574	5,398
2020	14,831	5,493
2021	15,073	5,583
2022	15,300	5,667
2023	15,509	5,744
2024	15,706	5,817
2025	15,888	5,885
2026	16,070	5,952
2027	16,252	6,019
2028	16,435	6,087
2029	16,618	6,155
2030	16,800	6,222
2031	16,983	6,290
2032	17,165	6,357
2033	17,348	6,425
2034	17,530	6,493
2035	17,713	6,560
2036	17,896	6,628
2037	18,079	6,696
2038	18,263	6,764
2039	18,447	6,832
2040	18,633	6,901
2041	18,818	6,970
2042	19,005	7,039
2043	19,192	7,108
2044	19,381	7,178
2045	19,570	7,248
2046	19,759	7,318

**Figure 6.** Population and housing stock for Ontario, 2011-2046 (x1,000).



Our estimated forecasts using the regression analysis (**Table 3**) largely validate our previously estimated projections using average growth of housing starts (**Table 2**), although with minor differences. Simulation through regression model projects the need for around **7.3** million homes in 2046, compared to **6.6** million homes by the previous method for the same year. Note that housing projections may vary, depending on the projection scenario, as well as differences in the sources of data. For instance, M1 medium-growth scenario for Ontario population from the **Statistics Canada projects 18,265,200 people in 2043, while OMF plans for 19,192,388 people for the same year.** Table 2 projections are based on the housing starts data by CMAs and taken from Statistics Canada, while Table 4 is based on demography data from OMF and estimations accounts for simultaneous effects of other important economic variables. These may account for slight variations in the projections, although, estimated figures do not deviate much from each other.

All in all, we projected Ontario housing stock for the next thirty years using both supply-side and demand-side impacts, and the results show between 6.6 million and 7.3 million residential dwellings for 2046. According to the current population/home ratio and projected demographic growth, the province will need approximately 7.3 million homes by 2046, while the present supply-side and new residential construction trends forecast that the housing capacity could be around 6.6 million homes by 2046 if to continue at current pace.

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