

Toronto House Price Study

Introduction

The housing prices in Toronto are a source of constant headlines due the rapidly increasing cost and lack of affordability. In the press different theories of the rapid increase in cost have been proposed such as increased immigration, limited supply of homes, lack of construction and investment but these theories have been difficult to demonstrate either due to lack of specific data or explanatory models. A preliminary review of Toronto house prices with publically available data sources are undertaken in this study.

Methodology

The hypothesis taken in this preliminary study is that Toronto house prices are driven mainly by broad macroeconomic trends which include low mortgage rates which make it less costly to buy a house and increased immigration and employment in the city which may put pressure on the available supply of homes.

Other factors examined included: housing construction in Toronto to investigate availability of new home supply, value of the type of residential mortgage lending to evaluate access to funds, wages/compensation for employees in Toronto to examine a measure of wealth.

Different Toronto specific factors likely contribute to the above average price increases exhibited over different housing markets in the country such as types of houses and lots available, distribution of housing in different Toronto neighbourhoods and proximity to different school areas. This type of data was not readily available for analysis.

The preliminary review includes examining the following publicly available datasets for broad trends. The availability of monthly datasets was used as a criterion in selecting datasets such that sufficient data points would be available for analysis.

The Prophet additive regression model (<https://facebook.github.io/prophet/>) was selected for predicting time series. Advantages of Prophet are the ability to include seasonality, multiple regressors, robustness to change points in trend and outliers.

The analysis was conducted over the time period Jan 2013 to June 2020 to predict the reference price of the single family detached home. The training set was chosen to be Jan 2013 to June 2019. The test set was selected from July 2019 to June 2020 to forecast the single family detached reference price over a full season of selling.

A baseline Prophet model with no regressors and a Prophet model with regressors selected from the analysis were prepared and compared over the test period.

The analysis and predictions include a wide range of uncertainties due to the lack of specific Toronto data and the broad scope of the macroeconomic datasets which may provide useful trends but would require more detailed economic analysis to determine applicability.

Data Sources

Housing Prices

Source: Toronto Regional Real Estate Board

<http://trrebb.ca/index.php/market-news/mls-home-price-index/mls-home-price-index-archive>

- Historical monthly price information by reference price and price index by city of Toronto
- Scraped pdf documents from website and converted to csv to extract data

Employment and Immigration

Source: Statistics Canada

[Table 14-10-0082-01 Labour force characteristics by immigrant status, three-month moving average, unadjusted for seasonality \(x 1,000\)](#)

- Monthly series on employment by immigration
- Download filtered by Toronto and ages 25-54 years

Housing under Construction

Source: Statistics Canada

[Table 34-10-0153-01 Canada Mortgage and Housing Corporation, housing under construction in all centres 50,000 and over for Canada, provinces and selected census metropolitan areas](#)

- Monthly series on houses under construction for different CMA
- Download filtered by Toronto CMA

Financial Rates

Source: Statistics Canada

[Table 10-10-0145-01 Financial market statistics, as at Wednesday, Bank of Canada](#)

- Weekly series of financial rates for Canada
- Download filtered by Bank Rate, Prime Rate and 5 yr conventional mortgage rate

Mortgage Lending

Source: Statistics Canada

[Table 10-10-0006-01 Funds advanced, outstanding balances, and interest rates for new and existing lending, Bank of Canada](#)

- Monthly series for residential mortgage lending for Canada (no further regional filtering available)
- Download filtered by total funds advanced for residential mortgage insured and uninsured.

Wages

Source: Statistic Canada

[Table 36-10-0205-01 Wages, salaries and employers' social contributions \(x 1,000\)](#)

- Monthly series for wages and salaries for Ontario (no further regional filtering available)
- Download filtered by Ontario and not adjusted for seasonality