HOUSING MARKET INFORMATION

HOUSING MARKET ASSESSMENT
Canada

Date Released: Second Quarter 2016

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Canada

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Highlights

- This quarterly release of the *Housing Market Assessment* (HMA) provides updated results[1] to evaluate the evidence of problematic housing market conditions at the national level and in 15 Census Metropolitan Areas (CMAs). More detailed reports are available[2] for the CMAs covered in this report.
- The HMA analytical framework considers four factors to assess the evidence of problematic housing market conditions: overheating; acceleration of house prices; overvaluation; and, overbuilding. The appendix of this report contains a detailed description of the framework.
- Overvaluation and overbuilding remain the most prevalent problematic conditions observed across the 15 centres covered by the HMA. Overvaluation is detected in nine centres while overbuilding is detected in seven. CMHC's framework also detects evidence of other problematic conditions such as overheating and acceleration in house prices of varying degrees across CMAs.
- The evidence of overvaluation has increased since the previous assessment in Vancouver, Hamilton, and Saskatoon.
- The analytical framework still detects strong evidence of problematic conditions in four CMAs: Toronto, Calgary, Saskatoon, and Regina. In Toronto this is due to a combination of price acceleration and overvaluation, and, while we do not detect overbuilding, we have some concerns about the high inventory of completed and unsold condominium apartments. In Calgary, Saskatoon, and Regina the strong evidence of problematic conditions is due to the detection of overvaluation and overbuilding.
- Since the previous assessment, the overall level of evidence of problematic conditions detected by our framework has moved from weak to moderate for Vancouver due to the detection of strong evidence of overvaluation. The overall assessment remained the same for other centres.
- Overall, the analytical framework detects moderate evidence of problematic conditions in six CMAs: Vancouver, Montréal, Edmonton, Ottawa, Winnipeg, and Québec.
- Nationally we detect moderate evidence of overvaluation, reflective of a variety of price conditions across the country with some CMAs showing more signs of overvaluation than others.

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[1] Results are based on data as of the end of December 2015 and market intelligence as of the end of March 2016. CMHC continuously monitors market developments and will issue HMA updates on a quarterly basis.

[2] Consult this link for all regional reports.

Overview of the HMA analytical framework

To obtain an accurate picture of the overall state of the housing market, it is important to consider multiple data points and lines of evidence rather than relying on just one measure or indicator.

The Housing Market Assessment (HMA) analytical framework provides a comprehensive and integrated view that relies on a combination of signals from several indicators to assess housing market conditions.

Specifically, the framework considers four main factors that may provide an early indication of potentially problematic housing market conditions: (1) overheating when demand outpaces supply; (2) sustained acceleration in house prices; (3) overvaluation of house prices in comparison to levels that can be supported by housing market fundamentals (listed below); and, (4) overbuilding when the inventory of available housing units is elevated.

For each factor, the framework tests for: (1) the presence or incidence of signals of potentially problematic conditions, but also considers; (2) the intensity of the signals, i.e. how their magnitude compares with their historical average or how consistent they are with known or suspected house price bubbles, such as for Toronto in the late 1980s and early 1990s; and, (3) the persistence of signals over time.

Generally, a situation in which we detect few signals with low intensity or lack of persistence is associated with weak evidence of problematic conditions. Conversely, as the intensity, number, and/or persistence of the signals increases, the likelihood of a factor becoming problematic increases.

The framework takes into account demographic, economic, and financial determinants of the housing market such as population, personal disposable income, and interest rates to detect potentially problematic housing market conditions. The framework also takes into account developments in both resale and residential construction markets.

The framework was developed on the basis of its ability to detect problematic housing market conditions in historical data, such as the house price bubble Toronto experienced in the late 1980s and early 1990s. The ability of the HMA to detect current problematic conditions relies on the assumption that historical relationships between prices and fundamental drivers of housing markets have not changed.

HMA Results

National Overview: Weak evidence of problematic conditions

At the national level, moderate overvaluation is still observed, meaning house prices remain higher than levels consistent with personal disposable income, population growth and other fundamental factors.

The inventory of completed and unsold units remains above its historical average because of the multi-unit segment. Inventory management by builders is required to avoid pushing inventory levels to problematic thresholds.

Overheating and acceleration in house prices are not a concern at this time.

Victoria: Weak evidence of problematic conditions

The Victoria housing market is assessed as showing weak overall evidence of problematic conditions. Overheating, price acceleration, overvaluation and overbuilding are not detected in the Victoria market at this time. Although the number of existing home sales grew by double digits while new listings remained stable for all housing types in the region, home price growth was moderate in the fourth quarter of 2015 compared to the same quarter in 2014.

The number of newly completed and unsold homes trended lower in the last quarter, but remains at a level that provides home buyers a wide range of housing types at all price points. In addition, demand for new homes continues to be well-matched by builders as new units under construction are brought to completion.

Vancouver: Moderate evidence of problematic conditions

Vancouver is now assessed as showing strong evidence of overvaluation. Single-detached home prices are now observed to be at levels higher than those consistent with financial, economic and demographic fundamentals. Inventories of new and resale homes have been declining while demand has remained strong. These factors, in combination, are putting sustained upward pressure on prices. While other measures that assess overheating and price acceleration continue to advance, they show weak evidence of problematic conditions. Taking all factors into consideration, the overall assessment for Vancouver indicates moderate evidence of problematic conditions.

Edmonton: Moderate evidence of problematic conditions

We continue to detect moderate evidence of overvaluation in Edmonton as a result of slower growth among economic and demographic fundamentals. New home inventories have been on the rise, while the number of units under construction remains elevated. There is a potential for the market to exhibit signs of overbuilding moving forward as inventory is expected to increase further.

Calgary: Strong evidence of problematic conditions

House prices in Calgary have not been completely supported by economic and demographic fundamentals, leading to a moderate evidence of overvaluation. Low oil prices and weak economic activity have contributed to full-time job and income losses, moderating housing demand. Deteriorating labour market and income conditions also mean fewer people are moving to the region, further moderating demand for housing.

In addition, we detect moderate evidence of overbuilding in Calgary as the vacancy rate rose to an elevated level. Supply in the secondary and purpose-built rental markets has increased while weaker economic activity has reduced rental demand.

Saskatoon: Strong evidence of problematic conditions

Downward revisions to population data for recent quarters contributed to the shift from moderate to strong evidence of overvaluation. Elevated inventories in both new single-detached and row housing units relative to population and a higher rental vacancy rate continued to reflect strong evidence of overbuilding in Saskatoon.

Regina: Strong evidence of problematic conditions

Buyers' market conditions contributed to downward pressures on prices in the fourth quarter. However, moderate evidence of overvaluation reflects slower growth in personal disposable income. The combination of elevated inventory of new housing units, especially condominium apartments, relative to population and a higher rental vacancy rate continue to reflect strong evidence of overbuilding in Regina.

Winnipeg: Moderate evidence of problematic conditions

Evidence of problematic conditions remains moderate for the Winnipeg CMA. Completed and unsold units intended for ownership markets increased in the fourth quarter of 2015, keeping inventory levels above the problematic threshold for overbuilding. While both multi-family and single-detached inventories increased, it is primarily condo apartment units that are lifting levels above the problematic threshold.

Hamilton: Weak evidence of problematic conditions

In the Hamilton CMA, we detect moderate evidence of overvaluation due to strong price growth for single-detached homes. Price growth for single-detached homes has been stronger than warranted by increases in fundamental factors such as population, employment, and income. The sales-to-new-listings ratio also remains above the threshold used to identify evidence of overheating. The sales-to-new listings ratio tends to be high in Hamilton because many buyers come from elsewhere and as such, add to sales but not listings even when they are repeat buyers. This helps explain why housing market conditions in Hamilton have been consistently in favour of sellers, which in turn puts upward pressure on house prices.

Toronto: Strong evidence of problematic conditions

Continued strong price increases in the fourth quarter of 2015 reflects an increased share of higher priced low rise home sales, particularly of single-detached homes. Fewer launches of new single detached projects in recent years meant demand is increasingly absorbed by the high end resale market. As a result, inventories of both new and resale single-detached homes have declined contributing to rapid price growth. The continued rise in house prices has not been matched by growth in personal disposable income and population giving rise to strong evidence of overvaluation.

The number of completed and unsold units has remained stable at high (and above average) levels. The widening price differential between low rise and high rise units resulted in seller's market conditions in the condo resale market in 2015. This combined with a low average vacancy rate in the rental market suggest that unsold inventory could be steadily absorbed. Apartment units under construction moved higher during the fourth quarter indicating that builders will need to continue to monitor inventories.

Ottawa: Moderate evidence of problematic conditions

We continue to detect moderate evidence of overbuilding in Ottawa's housing market. The number of completed and unsold condo apartment units per 10,000 population has been steadily rising throughout 2015, and rose once more in the fourth quarter, pointing to moderate evidence of overbuilding. The increase in unsold units has been accompanied by rising vacancy rates in primary and secondary rental markets pointing to softer demand conditions. While the number of condo units under construction declined in the fourth quarter, inventory management is still needed until the high number of completed and unsold units is absorbed by the market. Conditions in the market continue to point to weak evidence of overvaluation due to modest price growth despite soft income performance.

Montréal: Moderate evidence of problematic conditions

Moderate evidence of overvaluation is detected by our framework. Price growth on the resale market remains moderate but relatively stronger than the growth expected based on fundamental factors such as slower growth in the population of first time home buyers (aged 25 to 34) and relatively modest growth in personal disposable income. The number of condominium units completed and unsold has stabilized but remains elevated. Inventory management is necessary to make sure that the currently elevated number of condominium units under construction does not remain unsold upon completion.

Québec: Moderate evidence of problematic conditions

The strong evidence of overvaluation detected by our framework remains the main concern. It reflects slower growth in first time home buyers' demand. Also, since 2000, price growth has been relatively stronger than growth in household disposable income. Moreover, there remain some concerns with respect to high inventories of condominiums in the new and resale markets.

Moncton: Weak evidence of problematic conditions

The October 2015 vacancy rate remained elevated at 7.4 per cent, providing moderate evidence of overbuilding in the Moncton CMA. The sales-to-new listings ratio remained low in the fourth quarter and average prices fell slightly. Moreover, at this time, there is weak evidence of problematic conditions regarding overheating, price acceleration, or overvaluation in the housing market.

Halifax: Weak evidence of problematic conditions

While the volume of real estate transactions in the resale market remained stable in 2015, price growth in certain areas of the city rose sharply which could raise concerns of overvaluation if strong price growth persists. However, according to our framework, the Halifax CMA shows weak evidence of overheating, price acceleration, and overbuilding at this point.

St. John's: Weak evidence of problematic conditions

House price growth continues to weaken. We detect moderate evidence of overbuilding due to relatively high inventory of completed and unsold units. However, the inventory showed a small decline over the two previous quarters. The October vacancy rate was stable at 4.7 per cent and rental demand continues to be supported by retirees exiting homeownership. Weaker overall housing market activity is attributed to weaker economic growth and the effect of depressed oil prices.

Table 1

Comparisons between the January 2016 and April 2016 reports

Note 1: Colour codes indicate the level of evidence of problematic conditions. The HMA reflects a comprehensive framework that not only tests for the presence or incidence of signals of potentially problematic conditions, but also considers the intensity of signals (that is, how far the indicator is from its historical average) and the persistence of signals over time. Generally, low intensity and persistence are associated with a lower potential of upcoming problematic conditions. As the number of persistent signals increases, the evidence of a problematic condition developing increases.

Note 2: Results at the CMA level are not segmented by housing type or neighbourhood. They represent an assessment of the entire CMA. However, specific CMA reports provide further detailed analysis of these markets.

Note 3: The colour scale extends to red only for those factors that have multiple indicators signaling significant incidence, intensity and persistence of potentially problematic conditions. As a result, only overvaluation and overbuilding can receive a red rating, since they are assessed using more than one indicator.

Note 4: To ensure the framework is as current as possible, on a regular basis, we undertake a model selection process whereby our house price models for overvaluation are tested for statistical significance at the national and CMA level. The result of this process may change the number of indicators of a problematic condition from the previous assessment.

APPENDIX

Methodology

This appendix provides a technical discussion of the framework used in the Housing Market Assessment (HMA). The goal of the HMA is to provide prompt, accurate, and reliable assessments of Canadian housing markets to the public with the objective of identifying problematic conditions.

The HMA builds on published economic and financial research taking into account the characteristics of Canadian housing markets, uses different econometric methods and data from various sources, and validates the models with past periods where housing imbalances were observed such as Toronto in the late 1980s and Calgary prior to the global financial crisis of 2007-2008.

1. HMA Overview

To obtain an accurate picture of the overall state of the housing market, it is of central importance to consider multiple data points and lines of evidence rather than relying on just one measure or indicator. The HMA undertakes this task by constructing a comprehensive, multidimensional, and integrated framework to assess housing market conditions.

To capture imbalances or problematic conditions in housing markets, the HMA framework assesses four factors: (1) overheating when demand outpaces supply; (2) sustained acceleration in house prices; (3) overvaluation of house prices in comparison to levels that can be supported by housing market fundamentals; and, (4) overbuilding when the inventory of available housing units is elevated.

As Table 2 shows, several indicators are considered, when possible, in assessing these factors. For instance, overvaluation—measured by the deviation of housing prices from their level consistent with economic, financial and demographic fundamentals—is assessed using four econometric models each of which is using three different price series (see Section 2 for details).

How does the HMA detect significant imbalances or problematic market conditions?

The HMA first uses several indicators to test for the presence of signals of potentially problematic conditions against some predefined thresholds. Once such signals are detected, the HMA measures their intensity, i.e. to what extent the indicators deviate from their historical average, or how their magnitude compares to what was observed during known or suspected past house price bubble episodes, such as in Toronto in the late 80s-early1990s or in Calgary prior to the global financial crisis of 2007-2008.

The HMA then considers the persistence of imbalances over time. In other words, the framework acknowledges that housing markets can temporarily diverge from their fundamentals and that does not necessarily signal problematic conditions if the divergence is mild and short-lived. In some cases the divergence could be caused by temporary factors in markets.

Table 2 : Housing Market Assessment factors and underlying indicators

Factors	Indicators
Overheating	Multiple Listing Service® (MLS®)[1] and the Québec Federation of Real Estate Boards by the Centris® system[2] sales-to-new listings ratio[3]
Acceleration in house prices[4]	MLS® average price Centris® average price
Overvaluation	MLS® average price Centris® average price Statistics Canada's New Housing Price Index (NHPI) Teranet-National Bank House Price Index™
Overbuilding	Rental vacancy rate[5] Inventory of completed and unsold ownership and condominium housing units per 10,000 population[6]

[1] Multiple Listing Service® (MLS®) is a registered trademark owned by the Canadian Real Estate Association.

[2] QFREB by the Centris® system

[3] Taking the Canadian MLS® market as a whole, a sales-to-new-listings ratio below 40 per cent has historically accompanied prices that are rising at a rate that is less than overall inflation, a situation known as a buyers' market. A sales-to-new-listings ratio above 55 per cent is associated with a sellers' market. In a sellers' market, home prices generally rise more rapidly than overall inflation. When the sales-to-new-listings ratio is between these thresholds, the market is said to be balanced.

[4] The integration of the Teranet-National Bank House Price Index™ and New Housing Price Index (NHPI) as indicators for acceleration remains preliminary at this point, so only the MLS average price measure is currently used to assess acceleration in house prices.

[5] This refers to the Fall Rental Market Survey average national apartment vacancy rate on the primary purpose-built rental market in structures of 3 units or more.

[6] The level of inventories discussed here is for urban centres with a population of 50,000 and over. The inventory of housing units is defined as a snapshot of the level of completed and unsold (or unabsorbed) units at a specific time. A unit is defined as "absorbed" when an agreement is made to buy the dwelling.

APPENDIX (CONTINUED)

How are the results presented?

The HMA uses a colour scale to characterize our assessment of each of the four factors. Green signifies weak evidence of problematic conditions, meaning that the imbalance is either absent or too short-lived to suggest problematic conditions. Yellow signals moderate evidence of problematic conditions and is applied to cases where only one of the indicators shows signs of intensity and persistence of imbalances. The colour scale extends to red only for the factors for which indicators are signalling incidence, intensity and persistence of potentially problematic conditions. As a result, only overvaluation and overbuilding can receive a red rating because they are assessed with more than one indicator.

How is the HMA framework validated?

The framework was tested against CMHC's mortgage insurance claims rate. The results show that the detection of more than one HMA factor is more problematic for insurance claims than the detection of just one factor. Therefore, the individual factors are jointly analysed to provide an overall assessment of the state of a given housing market, which is rated on our three-coloured scale (green, yellow, and red). See text box 1 for the colour scale for the overall assessment.

2. Housing Market Assessment Factors

As shown in table 2, the HMA framework considers four factors to assess housing market conditions: overheating, acceleration in house prices, overvaluation, and overbuilding. This section provides a detailed description of each of the four factors used in the HMA, including the indicators used to assess each factor and the criteria used to identify whether an imbalance is problematic.

For each indicator our decision rule considers intensity and persistence jointly to decide if a factor is problematic. This approach reduces the risk of misleading assessments that only rely on minor deviations or "blips" in the data. Typically, a threshold for an indicator identifies the lower bound for the zone of problematic levels and this zone reflects levels of intensity that were rarely observed over the historical period. The persistence of problematic conditions is assessed by taking into account not only the most recent observation, but also the recent trend.

OVERHEATING

There is overheating when housing demand is significantly and persistently outpacing supply. The sales-to-new listings ratio (i.e. the number of existing homes sales divided by the number of new listings entering the market) is used as an indicator to assess possible overheating in the existing home market. When demand is strong relative to supply, house prices typically grow at a faster rate. Until the rebalancing of demand and supply occurs, sustained overheating conditions for the resale market may lead to upward pressures on housing prices for existing and new homes. However, as supply and demand begin to balance out, indicators of overheating would begin to soften and house prices would gradually moderate.

Intensity

The framework compares the sales-to-new listings ratio to problematic thresholds to detect evidence of overheating. Since each CMA market has its own characteristics, estimated thresholds for overheating vary across CMAs. These thresholds are determined by CMHC's local market analysts. Typically, taking the Canadian MLS® market as a whole, a sales-to-new-listings ratio above 55 per cent is associated with a sellers' market while an overheating market corresponds to the upper range of a sellers' market, with a ratio exceeding 70 per cent.

Text box 1: Colour scale for the overall assessment

The four HMA factors are assessed jointly to provide an overall assessment of a given housing market.

An overall assessment of strong evidence of problematic conditions (i.e. red) reflects a situation where more than one factor of price acceleration, overvaluation or overbuilding exhibits moderate or strong evidence of imbalance. For example, while both Toronto and Calgary are currently assessed as showing strong evidence of problematic conditions, in Toronto it is due to the detection of price acceleration and overvaluation, while Calgary shows evidence of overvaluation and overbuilding. As these imbalances are resolved, the overall assessment will be moved from strong to moderate to maintain an ongoing monitoring after the detection of problematic conditions.

An overall assessment of moderate evidence of problematic conditions (i.e. yellow) can reflect a variety of cases. The first case is when only one of the factors of overbuilding or overvaluation are assessed as showing strong evidence, as in Vancouver. Another case is when only one factor is detected with moderate evidence and we have concerns about another factor that has not technically crossed the threshold for moderate evidence. Edmonton is an example of this case, wherein moderate evidence of overvaluation is detected and we have concerns for overbuilding, even though overbuilding is not yet formally detected.

Finally, an overall assessment of weak evidence of problematic conditions (i.e. green) applies to all other situations. For example, it can reflect a situation where only one factor shows moderate evidence of problematic conditions.

APPENDIX (CONTINUED)

Persistence

We evaluate overheating by assessing if the sales-to-new listings ratio exceeds the levels that are seldom seen in historical data. These levels indicate unusual and potentially problematic conditions and thereby are defined as thresholds. We detect overheating in a given market if the sales-to-new listings ratio exceeds its threshold for at least two quarters over a period of four consecutive quarters, in the three years preceding the assessment.[7] This prevents relying on signals that are temporary in nature.

ACCELERATION IN HOUSE PRICES

Expectations of future house price growth can attract investors who want to benefit primarily from short-term capital appreciation, which can then lead to further acceleration in house prices. It has been found that speculative activity, fad-based behaviour or excessive leveraging can cause house prices to accelerate, encouraging additional speculative activity, fad-based behaviour or excessive leveraging, thus propelling prices further upward in a spiral of increasing price growth.

Under balanced market conditions, house prices are expected to increase over time, in line with household's cost of living (often measured by the Consumer Price Index — the CPI). There is house price acceleration when growth in housing prices starts increasing, and keeps increasing for several quarters. Basically, acceleration involves the level of house prices increasing beyond household's cost of living and this discrepancy rises over time.

Acceleration in house prices over an extended period can eventually cause house prices to depart from levels warranted by the underlying demographic, economic and financial drivers of housing activity, thus eventually also leading to overvaluation.

To assess acceleration in real house prices,[8] the framework uses a statistical test developed to identify periods of accelerating asset prices.[9]

Intensity

The HMA formally deems there is acceleration in house prices if their growth rate exceeds an estimated threshold based on a statistical test that detects explosive behaviour of a time series.[10]

Persistence

Acceleration in house prices is detected for test statistics reaching levels above their critical value (or threshold) hence we interpret it as a signal of unsustainable acceleration in prices.

OVERVALUATION

In the short term, house prices will generally tend to fluctuate around levels consistent with the fundamental drivers of housing activity, like income and population growth, and actual and expected financing costs, with alternating periods of slight and non-problematic overvaluation while remaining reflective, overall, of evolving market conditions instead of potentially problematic developments.

However, sustained overheating and acceleration in house prices can lead to overvaluation in the housing market. Speculative behaviour would push prices above those consistent with economic and demographic fundamental drivers. Overvaluation can also occur when observed prices adjust slowly to deteriorating housing market conditions. Overvaluation is detected when house prices remain significantly above levels warranted by fundamental drivers of housing markets.

The framework uses a combination of several house price measures and models to estimate house price levels warranted by fundamental drivers. Their deviation with observed prices provide the estimated degree of over- or undervaluation.

The HMA uses three different price measures: MLS® average resale price (or the Centris® average price by QFREB), the New Housing Price Index (NHPI) from Statistics Canada, and the Teranet-National Bank House Price Index™). The HMA also uses four different models:[11] a classic demand driven model, an urban growth model, a borrowing capacity model, and a hybrid model. These four models jointly cover a wide range of economic, demographic, and financial drivers of housing activity and prices. See text box 2 for a description of the four models.

For each price measure used to assess overvaluation, the four econometric models are used to estimate the level of house prices that would be consistent with the fundamental drivers of the housing market. When observed price levels diverge significantly and persistently from their fundamental levels estimated by these models, overvaluation is usually detected. The use of three different price measures and four models improves the reliability of our results.

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[7] The lengths of time periods that are used to evaluate the persistence of signals are based on our analysis of CMHC's mortgage insurance claims rate. Specifically, we tested the variables underlying our factors (for example, the sales-to-new listings ratio), and the factors using historical data on the claims rate to see if the variables underlying our factors and/or the factors were statistically significant determinants of changes in the claims rate. This analysis showed that combinations of factors were most significant.

[8] Real house price refers to observed (or nominal) house prices adjusted for CPI inflation.

[9] See Phillips, Wu and Yu (2008) "Explosive Behaviour in the 1990s NASDAQ: When Did Exuberance Escalate Asset Values?" for further details on the methodology.

[10] Formally, to detect sustained acceleration in house prices, we use the augmented Dickey-Fuller (ADF) test. The null hypothesis is for a unit root against the alternative of an explosive root (the right-tail). The ADF test rolls over a 3-year period, it moves through time one quarter at a time.

[11] Econometric models of house prices are estimated using cointegration techniques such as Engle-Granger and augmented ordinary least squares.

APPENDIX (CONTINUED)

Combining these four models and up to three price series (depending on the housing markets), generates several potential estimates[12] of price levels supported by fundamental factors – and corresponding estimates of over- or undervaluation. The gap between observed and estimated (fundamental) house prices is an indication of the degree of over- or undervaluation.

Intensity

The intensity of a house price gap —the magnitude of the difference between observed and fundamental house prices on the market—is determined using a threshold based on statistically significant deviations from historical averages. The threshold is determined as the boundary for the highest decile of estimated historical differences between observed and estimated fundamental levels.

Hence, we detect moderate evidence of overvaluation if the residuals from at least one of the overvaluation models are unusually high, i.e. when the normalized residuals are large (i.e. exceeding 1.29 standard deviations). Strong evidence of overvaluation is assessed if the residuals from several models are unusually high.

Persistence

Indicators for overvaluation have to remain above their thresholds for at least two quarters over the last four quarters preceding the assessment to be deemed persistent.[16]

Text box 2: Description of the models used to assess overvaluation

For each model, observed house prices and fundamental factors (such as personal disposable income and mortgage rates) are adjusted for CPI inflation.

According to the **classic demand-driven model**,[13] the level of house prices is determined by the level of disposable income per capita, the effective five-year mortgage rate and young adults' population. Intuitively, the classic demand-driven model supposes that increased household income raises housing demand since it reduces the burden of home ownership costs and facilitates access to credit for households. Mortgage rates are considered since they impact the size of the monthly mortgage payment. The model also supposes that an increase in population, for a fixed stock of housing units, would push house prices upward, with housing units becoming relatively scarcer and, hence, more expensive until supply adjusts through the construction of new housing units.

From the perspective of the **urban growth model**,[14] the level of house prices is affected by the construction costs of housing, land prices, and expected growth in city size. Intuitively, lower construction costs and higher productivity reduces the overall cost of producing new housing units hence putting downward pressures on housing prices. The urban growth model also suggests that an increase in city size will push house prices upward because of land scarcity and commuting costs.

The **borrowing capacity model**[15] focuses on the fact that households have limited borrowing capacity and could face difficulties accessing mortgage credit for a home purchase. This model estimates the price level consistent with fundamentals in relation to a maximum borrowing amount; which is the maximum amount an household can borrow given a 25-year amortization period and the current five-year mortgage interest rate for a mortgage payment equivalent to 30 per cent of the household's income.

The hybrid model takes into account the factors considered in the three previous models.

OVERBUILDING

The lack of supply in the resale housing market can push potential buyers to the new housing market to meet their housing needs. Strong demand for housing can lead to higher house prices which, in turn, can lead to a supply increase. The larger supply of housing units will eventually alleviate the upward pressures on house prices and contribute to limit their increase

[12] Our overvaluation assessment uses exclusively the models that are statistically reliable according to the selected econometric methodology.

[13] The framework of the demand model was recently used by Gallin (2006) and the IMF for Canada (see Tsounta [2009]). The demand model was originally developed by Muth (1960) and now appears in introductory textbooks such as Mankiw (2001).

[14] See Kahn (2008) and Mayer and Somerville (2000) for more details.

[15] See Kiyotaki and Moore (1997) and McQuinn and O'Reilly (2008) for more details.

[16] The lengths of time periods that are used to evaluate the persistence of signals are based on CMHC's analysis of mortgage insurance claims rate. See footnote 7 for further details.

However, it is possible that supply may temporarily exceed demand. As a result, this excess supply could put significant downward pressures on house prices. Alternatively, a reduction in demand for existing homes could also result in a condition of excess supply, even in the absence of new construction. The key idea is that a housing market is considered overbuilt when supply significantly exceeds demand. In such a context, downward pressures on house prices would occur until excess supply is absorbed.

To assess the possibility of overbuilding conditions in the housing market, the framework uses two indicators that relate to the supply of readily available housing units: the rental vacancy rate, and the inventory of completed and unsold ownership and condominium housing units per 10,000 population.[17]

Intensity

The overbuilding indicators are deemed unusually high if their value lies within the highest decile of their historical values.

Persistence

We detect moderate evidence of overbuilding if one of the indicators (the rental vacancy rate and/or the number of completed and unsold units relative to the population) is above its threshold for at least two quarters over the last four quarters preceding the assessment.[18] We detect strong evidence of overbuilding if both indicators are above their thresholds for at least two quarters over the last four quarters.

[17] The inventory of completed and unsold units for the national level corresponds to the sum of the inventory in Census Agglomerations and in Census Metropolitan Areas.

[18] The lengths of time periods that are used to evaluate the persistence of signals are based on CMHC's analysis of mortgage insurance claims rate. See footnote 7 for further details.

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