HOUSING MARKET INFORMATION

HOUSING NOW
Canada


CANADA MORTGAGE AND HOUSING CORPORATION

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Highlights

- This special edition of *Housing Now Canada* presents CMHC's House Price Analysis and Assessment (HPAA) framework which is designed to detect the presence of problematic conditions in Canadian housing markets.
- The HPAA looks at four key risk factors: overheating, price acceleration, overvaluation, and overbuilding.
- At the national level, other than a modest amount of overvaluation, we did not detect problematic conditions. The risk of overvaluation is most evident in Montréal and Québec Census Metropolitan Areas (CMAs), but the trend is improving. A modest risk of overvaluation is also present in Toronto, Calgary and Halifax. There is also a cautionary note with respect to overbuilding in Toronto and Montréal. The number of units under construction is elevated in these centres, relative to population. This could develop into overbuilding if these units are completed but not sold. To mitigate this risk, builders will need to hit the appropriate balance in channeling new demand between units that are currently under construction but not sold and units that are in the planning stage.
- HPAA results for 8 major CMAs are presented in table 3 on page 4.

Introduction

Since the brief recession that was caused by the global financial crisis, the Canadian house price index has seen steady gains and has pulled significantly ahead of average price indices in Australia, the United Kingdom, and the United States. As a result, many commentators have expressed concern that Canada's housing market is overvalued and that a house price correction might be looming (see Figure 1).

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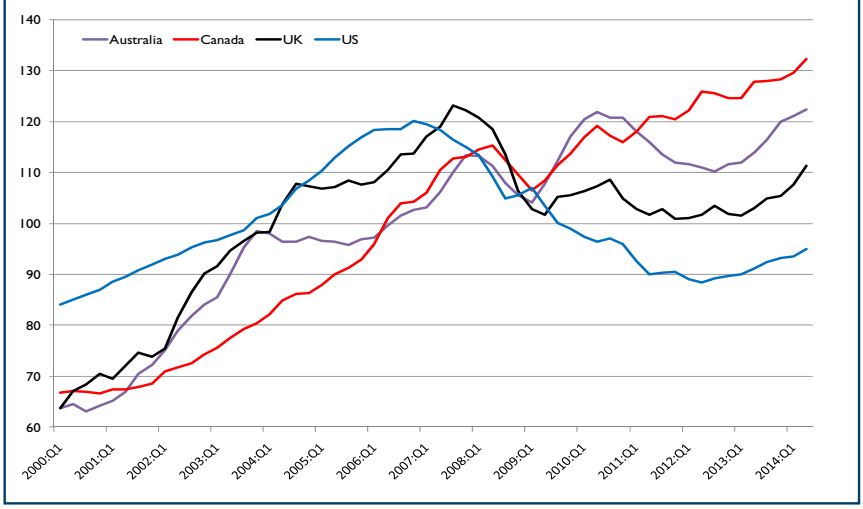
Figure 1: Since the recession, Canadian prices have shown greater increase relative to other countries

(Index base = average of 2000-2014)



Sources: Federal Reserve Bank of Dallas (Globalization & Monetary Policy Institute), Canadian Real Estate Association (CREA); calculations by CMHC

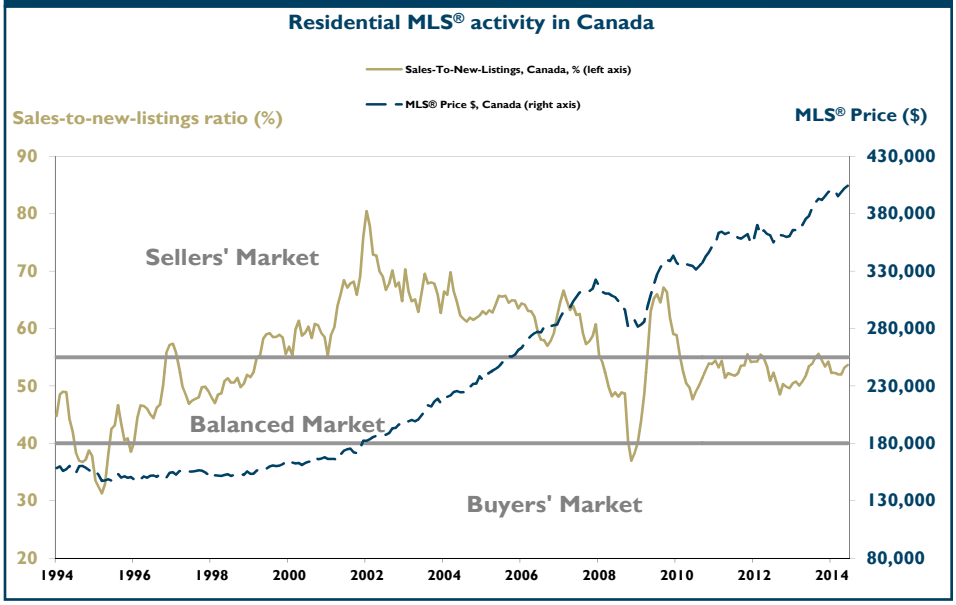
It can be a challenge to determine if such concerns are valid given the mixed signals from available data. For example, the sales-to-new-listings ratio is widely used to gauge how balanced supply and demand are in the resale market and the resulting implications for price growth. Taking the Canadian Multiple Listing Service® (MLS®)[1] 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 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, where home price growth remains in line with overall inflation.

At the national level, Canada's resale market has been balanced since 2010, thus indicating that MLS® price growth should be generally in line with overall inflation (see Figure 2). However, national annual MLS® price growth has exceeded growth in the overall consumer price index (CPI) almost every year since 2010. Through the first nine months of 2014, the average MLS® price for Canada was up 6.9 per cent compared to the 1.9 per cent increase in the CPI.

The variation in price levels and price growth across the country is evident in Table 1. Year-to-date price growth has ranged from -1 per cent in the Québec Census Metropolitan Area (CMA) to highs of 6.3 per cent in the Vancouver CMA, and 8.1 per cent in the Toronto CMA. This underscores the importance of drilling down to smaller geographies in order to get a true picture of price performance. Canada is not one large market, rather, it is a collection of many housing markets which differ in factors such as size, price segments and types of homes. Such factors contribute to variation in price levels and price growth among centres. For example, in Toronto and Vancouver, it is the sale of single-family homes in higher-priced neighbourhoods that has pushed up the average year-to-date MLS® price in these centres.

Moreover, in order to assess the presence of problematic conditions which could lead to a price correction, it is important to consider a framework that relies on multiple lines of evidence in order to draw robust conclusions. This is why CMHC developed the HPAA.

Figure 2: Canadian sales-to-new listings ratio has been within balanced thresholds since 2010



Data are seasonally adjusted and annualized, and cover Canada's major markets
Sources: CMHC, Canadian Real Estate Association (CREA), MLS®
Last data point: September 2014

Table 1: MLS® house price growth is stronger in Toronto and Western centres[2]

	January to September 2014 price growth (%)	January to September average price ($)
Canada	6.9	406,504
Vancouver	6.3	812,394
Calgary	5.5	460,386
Edmonton	4.5	362,129
Toronto	8.1	563,639
Ottawa	1.5	364,861
Montréal	1.9	324,040
Québec	-1.0	263,815
Halifax	1.0	279,364

Source: Canadian Real Estate Association (CREA), MLS®; calculations by CMHC

[1] The Multiple Listing Service® (MLS®) is a registered trademark owned by the Canadian Real Estate Association. All price measures used to assess conditions under the HPAA are adjusted for inflation and for seasonality.

[2] Year-to-date average price is calculated using the sum of MLS® dollar volume from January to September 2014 divided by the sum of the number of MLS® sales from January to September 2014. Year-to-date average price growth is the per cent change in the year-to-date average price from 2013 to 2014. This method takes into account overall changes due to the number of transactions and changes in price.

House Price Analysis and Assessment (HPAA) - Overview[3]

The HPAA looks at four key risk factors: overheating, price acceleration, overvaluation, and overbuilding. It considers how intense they are, and how persistent they are. The idea being that we need to be able to distinguish between a blip that may quickly disappear versus a genuine signal indicating the presence of problematic conditions.

The HPAA reflects the fact that housing markets are influenced by demographic, economic, and financial factors such as population growth, changes in personal disposable income, and interest rates. The framework also takes into account that the overall housing market is impacted by developments in the resale market and the new home construction market.

House Price Analysis and Assessment (HPAA) - Results

At the national level, other than a modest amount of overvaluation, we did not detect problematic conditions. However, there is also a cautionary note with respect to overbuilding in Toronto and Montréal. The number of units under construction is elevated in these centres. This could develop into overbuilding if these units are completed but not sold. To mitigate this risk, builders will need to hit the appropriate balance in channeling new demand between units that are currently under construction but not sold and units that are in the planning stage. Table 3 presents the assessment results at the CMA level.

An illustrative example of the interplay between the four HPAA risk factors

The following is an illustrative example of a scenario including the dynamics between the four key risk factors of the HPAA (see Table 2).

We have a resale market where demand is running well ahead of supply, a situation we describe as overheating. That is, as soon as new listings appear on the market, they turn into sales. As a result, potential home buyers have to compete with one another and start offering higher prices to secure a purchase and/or they may turn to the new home market to meet their needs.

However, if the new home market cannot bring on supply fast enough to meet the spill over demand from the resale market, prices may begin to rise even faster. If these conditions persist, house prices can rise above levels that can be supported by the underlying demographic, economic, and financial drivers, leading to the presence of overvaluation.

The price gains that give rise to overvaluation can attract speculators who buy homes with the hope of making a quick profit. This speculative buying often results in an acceleration in house price growth. At the same time, the persistence of elevated price levels provides confidence to the new home construction industry to increase the supply of new units.

However, in doing so, if they start building units based on speculation that there will be enough demand for them, they may build too many units resulting in supply overtaking demand, thereby necessitating a price reduction or correction to bring the market back in balance.

Of course it is possible for the four key risk factors to be present separately in the market place at any time and not necessarily occur in a sequential manner as described above. The key is to determine how these factors are interrelating at any point in time as an early warning of problematic conditions.

Table 2: Overview of CMHC's House Price Analysis and Assessment (HPAA) framework

1. Overheating	
Demand significantly running ahead of supply	Can lead to speculative demand
2. Price Acceleration	
Exuberant expectations of price growth	May indicate some speculative activity
3. Overvaluation	
Home prices significantly stronger than warranted by fundamentals	Incentives for excessive construction
4. Overbuilding	
Supply significantly running ahead of demand	Price correction may be needed to absorb excess supply

[3] See the appendix for a detailed description of the statistical analysis underlying the results. The appendix complements and expands on the less technical overview contained in the main part of this article.

Table 3: Overall housing market assessment for Canada's major centres

HPAA Risks Factors	Current Overall Assessment		Overheating	Acceleration in house prices	Overvaluation	Overbuilding
National	●	**Low Risk** – At the national level, modest overvaluation is observed meaning house prices are slightly higher than levels consistent with personal disposable income and population growth. Overheating, acceleration in house prices and overbuilding are not a concern at this time.	↔	↔	↓	↔
Vancouver	●	**Low Risk** – The level of home prices in Vancouver is supported by local growth in personal disposable income and long-term population growth.	↔	↔	↔	↔
Calgary	●	**Low Risk** – Overvaluation in Calgary reflects the combination of strong growth in house prices and modest gains in personal disposable income.	↔	↔	↑	↔
Edmonton	●	**Low Risk** – While price growth in Edmonton has increased slightly since 2011, price increases remain in line with growth in the population of first-time homebuyers and growth in personal disposable income.	↔	↔	↔	↔
Toronto	●	**Moderate Risk** – Overvaluation in Toronto is due to steady price growth that has not quite been matched by growth in personal disposable income. The level of completed and unabsorbed units and the rental vacancy rate are both below their respective historical averages. However, the level of units under construction relative to population is near historical peaks – inventories need to be managed.	↔	↔	↓	↑
Ottawa	●	**Low Risk** – House prices in Ottawa are in line with population growth and growth in personal disposable income.	↔	↔	↔	↔
Montréal	●	**Moderate Risk** – In Montréal, overvaluation reflects slower growth in the pool of first time home buyers since 2012, impacting demand, combined with house price growth that has generally exceeded growth in personal disposable income since 2004. The level of completed and unabsorbed units is close to its average but the level of units under construction relative to population is near a historical peak – inventories need to be managed.	↓	↔	↓	↑
Québec	●	**Moderate Risk** – In Québec, overvaluation reflects slower growth in the pool of first time home buyers since 2012, impacting demand, combined with house price growth that has generally exceeded growth in personal disposable income since the early 2000s. The supply in the new home market relative to population is elevated but remains within historical norms.	↔	↔	↓	↑
Halifax	●	**Low Risk** – In Halifax, despite essentially flat home price growth overvaluation is detected due to a decrease in the borrowing capacity of households due to higher inflation-adjusted mortgage rates in late 2013. The level of completed and unabsorbed units relative to population increased recently but remains below historical peaks. The risk of overvaluation has moderated in 2014 as a result of decreases in mortgage rates combined with stronger growth in the 25 to 35 year-old population.	↓	↔	↓	↑

Level of risk
- Low risk
- Moderate risk
- High risk

Direction of risk from the last assessment
- ↔ Stable, unchanged
- ↑ Increased
- ↓ Decreased

Level of risk: The HPAA does not only test for the presence or incidence of signals of potentially problematic conditions, but also considers the intensity of signals (that is, how far the signal is from its historical average) and the persistence of signals over time. Generally, low intensity and persistence are associated with a lower potential of evolving into a problematic condition. As the number of persistent signals increases, the associated risk of a problematic condition developing increases.

Direction of risk: The HPAA is regularly updated over time, as new data becomes available. As a result, we are able to monitor the direction in which risks are moving or if they are stable. Also, local market analysts provide insight based on their local market intelligence that can influence the direction of risk. For example, in the chart above, upward pointing green arrows are used to indicate that the risk has increased since the last evaluation, but the risk of problematic conditions arising remains low, nonetheless. An arrow that points downward, on the other hand, is used to indicate that the risk has lessened since the last evaluation. For example, a downward pointing red arrow indicates that risks remain elevated, but have nonetheless decreased since the last evaluation. A sideways pointing arrow indicates that the risk has not changed significantly since the previous evaluation.

Note 1: Results at the CMA level are not segmented by housing type or neighbourhood. They represent an assessment of the entire CMA.

Note 2: The colour scale extends to red only for those risk factors that have multiple indicators signalling 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.

Appendix - Methodology

The House Price Analysis and Assessment (HPAA) framework encompasses a large number of economic, financial and demographic drivers of the housing market, including disposable income, mortgage rates, population growth and construction costs. The HPAA is based on published economic and financial research on asset price bubbles and problematic housing market conditions.

This appendix provides a more technical discussion of the HPAA framework, CMHC's comprehensive approach to assessing housing market conditions and to identifying potentially problematic conditions.

HPAA Framework Overview

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. Failure to do so could result in an inaccurate portrayal of overall housing market conditions.

A reliable approach seeks a comprehensive and integrated view that relies on a combination of signals to assess housing market conditions. This is the approach we take with our HPAA framework[4].

The HPAA not only 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 different is the signal from its historical average and; (3) the persistence of signals over time.

Table 4 : HPAA's risk factors and related indicators

Risk Factors	Indicators
Overheating	• Multiple Listing Service® (MLS®) sales-to-new listings ratio[5]
Acceleration in house prices[6]	• MLS® average price
Overvaluation[7]	• MLS® average price • Statistics Canada's New Housing Price Index (NHPI) • Teranet-National Bank House Price Index™
Overbuilding	• Rental vacancy rate[8] • Inventory of completed and unabsorbed housing units per 10,000 population[9]

Source: CMHC

Specifically, the HPAA considers the incidence, intensity and persistence of four main risk factors that may provide an early indication of potentially problematic housing market conditions: (1) overheating of demand in the housing market (i.e. demand significantly outpacing supply), (2) acceleration in the growth rate of house prices, (3) overvaluation in the level of house prices and (4) overbuilding of the housing market (i.e. supply significantly outpacing demand, which can reflect excess new construction and/or a decline in demand for existing homes). Again, the emphasis on using multiple lines of evidence is important because analysis that focuses solely on testing for the incidence of one of the above risk factors can be misleading. Each of these risk factors is measured using one or more indicators (see Table 4).

[4] CMHC is always seeking to enhance the robustness of the HPAA framework, both with respect to data sources and in the adoption of methodologies from the reference literature. For example, we are examining the incorporation of data on units under construction.

[5] 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 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.

[6] 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.

[7] For each of the three price measures used to assess overvaluation, there are four econometric models that are used to estimate the level of house prices that would be consistent with the fundamental drivers of housing activity captured by the models. When observed price levels diverge significantly and persistently from the levels indicated by our models, overvaluation is usually assessed. The models include 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 house prices, including personal disposable income, mortgage interest rates, population growth and composition, and construction costs.

[8] 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.

[9] 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 unabsorbed units at a specific time. A unit is defined as "absorbed" when an agreement is made to buy the dwelling.

The HPAA uses a colour scale to summarize the assessment of each of the four risk factors. Green means that the risk factor is not present or not persistent enough to signal problematic conditions. Yellow is an early warning that the risk factor shows stronger signs of intensity and persistence, but not over multiple indicators. The colour scale extends to red only for those risk factors that have multiple indicators signalling 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.

The HPAA framework was tested against CMHC's mortgage insurance claims rate. The analysis showed that the incidence of a combination of risk factors is potentially more problematic than the incidence of one risk factor. Therefore, the individual risk factors are jointly assessed to arrive at an overall assessment of the market, which is also rated on a 3 colour scale (red, yellow, and green). This is important because every situation is unique. One market may receive an overall assessment of red due to a combination of overbuilding and price acceleration. However, another market may not be experiencing price acceleration but receives a red rating due to overbuilding and overvaluation.

In addition, the HPAA framework recognizes that housing markets can temporarily diverge from their fundamentals and that this is not necessarily a sign of problematic conditions if the divergence is mild and short-lived. In some cases the divergence could be caused by temporary factors in markets. For example, a shift in demand among potential home buyers from larger single-detached homes in suburban areas to smaller condominium dwellings in central areas could lead to temporary price acceleration of the latter type and temporary overbuilding of the former type of housing as supply adjusts to the change in preference. Additionally, acceleration in house prices might reflect rapid growth in general economic activity and improvements in underlying economic fundamentals like income growth, which might not result in overvaluation. Alternatively, acceleration in house prices might also reflect a scarcity of housing units if the inventory of unsold homes is very low. Temporary divergence caused by these types of situations are not evidence of problematic conditions.

The following section provides greater technical details regarding our assessment of the Canadian housing market.

HPAA Risk Factors

As shown in table 4, the HPAA framework considers four risk factors to assess housing market conditions: overheating, acceleration in house prices, overvaluation, and overbuilding. The following section describes each of these risk factors in greater detail and assesses their incidence, intensity and persistence in the Canadian housing market.

OVERHEATING

Overheating is a possible early indicator of problematic housing market conditions. Overheating is caused by demand running "too far ahead" of the supply of housing. The sales-to-new listings ratio is used as an indicator to assess possible overheating conditions in the existing home market. To identify problematic overheating conditions, the HPAA framework compares the sales-to-new listings ratio to thresholds. When demand is strong relative to supply, house prices typically grow at a faster rate. This set of circumstances can attract speculative activity.

The resulting pressure on supply from stronger demand in the existing home market can push potential buyers to the new home market, thus placing upward pressure on the supply of new homes while relieving some of the demand pressures in the existing home market. In the interim, indicators would likely signal some degree of overheating for existing homes. In addition, until the rebalancing of demand and supply occurs, sustained overheating conditions on the existing home market may lead to acceleration in house prices for existing and new homes. However, as supply and demand begin to balance out, indicators of overheating (and acceleration) would begin to soften and house price growth would gradually moderate.

An assessment of overheating is triggered if the sales-to-new listings ratio is above 70 per cent, which is also a measure of the intensity of the sales-to-new listings ratio. This risk factor is assessed as persistent only if the sales-to-new listings ratio remains above its threshold for at least 2 quarters over a 1 year period, in the four years preceding the assessment[10]. This prevents relying on signals that are just blips. As Figure 3 shows, in recent years, the sales-to-new listings ratio has remained well below its risk threshold. As a result, the colour rating for this risk is green for Canada (Table 3).

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

ACCELERATION IN HOUSE PRICES

It is possible that 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.

Under balanced market conditions, house prices are expected to increase over time, in line with inflation. There is acceleration when the growth in house prices starts increasing in time, and that it keeps increasing for several quarters, departing from inflation. The level of house prices increase at an ever-more rapid rate over time (exponential growth would be the extreme case).

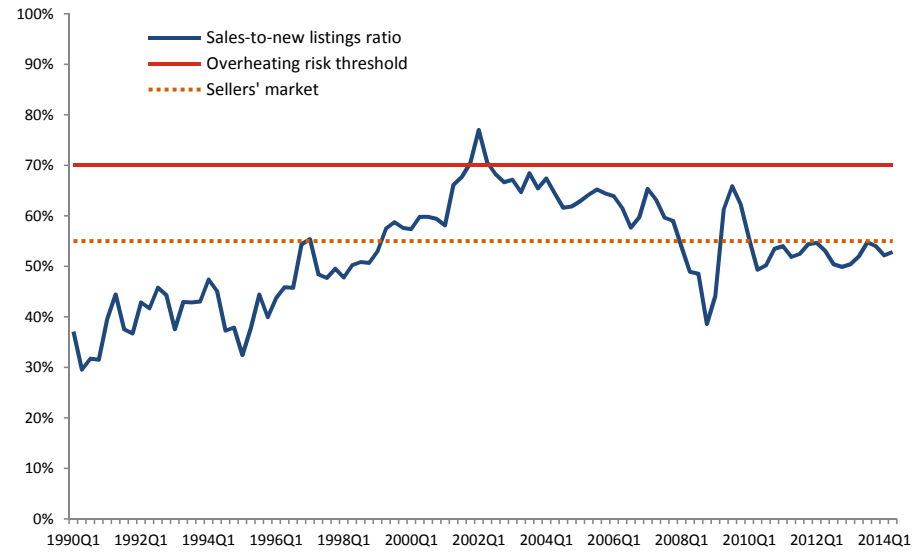
Acceleration in house prices over a sustained period of time can eventually cause house prices to depart from the levels warranted by the underlying demographic, economic and financial drivers of housing activity, thus eventually indicating the condition we refer to as overvaluation.

To assess acceleration in real[11] house prices, the HPAA framework adapts a statistical test that was developed to identify periods of accelerating asset price growth[12]. It has been found that speculative activity, fad-based behaviour or excessive leveraging can cause house price growth to accelerate, encouraging additional speculative activity, fad-based behaviour or excessive leveraging, thus propelling prices further upward in a spiral of increasing price growth.

The HPAA formally assesses the incidence of the acceleration risk factor when the test statistic is above its risk threshold. If house price growth is unsustainable, the test statistic would likely be above the risk threshold. This risk threshold is based on examination of historical data over periods of particularly strong house price growth.

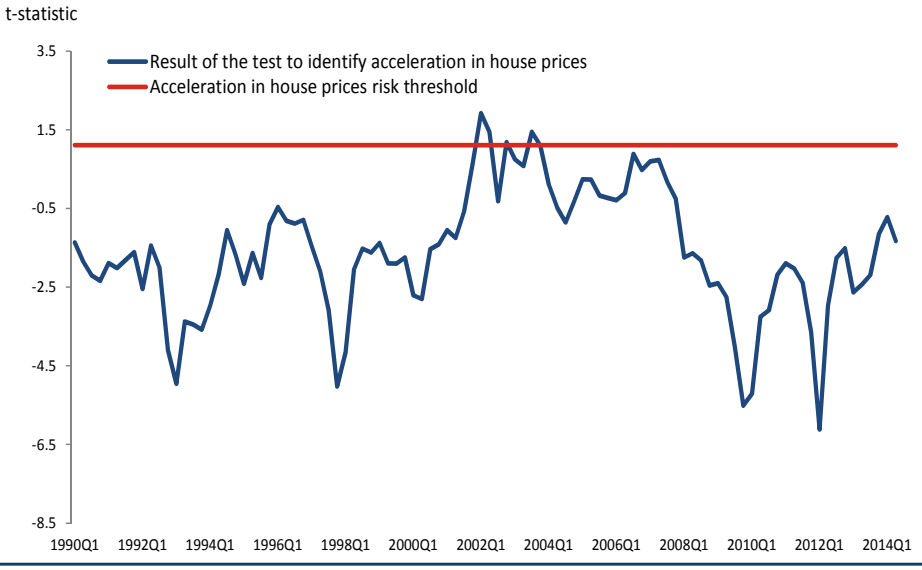
This implies that a test statistic that is above the risk threshold is signalling a similar scenario of unusually strong price growth. Incidence and persistence are assessed jointly since acceleration of house prices occurs over time[13], rather than instantaneously.

Figure 3: Overheating is currently not detected in Canada



Source: Canadian Real Estate Association (CREA) and calculations by CMHC
Last data point: 2014Q2

Figure 4: Price acceleration is not currently detected in Canada



Source: Canadian Real Estate Association (CREA) and calculations by CMHC
Last data point: 2014Q2

[11] Real house price refers to observed (or nominal) house prices that are adjusted for inflation.

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

[13] We adapted a custom statistical test (unit root test) to detect house price acceleration over a 3-year period which moves through time one quarter at a time.

As Figure 4 shows for the National case, real house prices are not accelerating, as the test statistic is below its risk threshold. As a result, the colour rating for this risk is green for Canada (Table 3).

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, with alternating periods of slight and non-problematic overvaluation and undervaluation 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, wherein price levels may be driven by intangibles like speculative investment activity to levels significantly above those that would be consistent with fundamental drivers. Overvaluation is thus assessed when house prices remain significantly above the levels warranted by fundamental drivers of housing demand.

The HPAA framework uses different house price measures and house price models, in combination, to estimate the levels of house prices warranted by fundamental factors. The difference between house prices observed on the market and their estimated long-term equilibrium levels allows for an estimation of overvaluation and undervaluation. The use of different price measures and models improves the robustness of results. See the text box for a description of the models.

There are up to 12 possible estimates of equilibrium price levels – and corresponding estimates of overvaluation and undervaluation – based on the combinations of the three different price measures and the four different models. Of those 12 combinations, 7 are currently statistically significant at the national level. The range of these 7 combinations is represented by the grey zone in Figure 5. The thick blue line represents the average of these significant combinations[17]. The figure shows that some of the models and price measures are signalling overvaluation (3 combinations) but the average of these combinations of models and price measures is below its risk-threshold[18].

The gap between estimated house prices and observed house prices is an indication of overvaluation and undervaluation. The intensity of a given gap (i.e. the assessed significance of the difference between house prices observed on the market and their estimated long-term equilibrium level) is determined using a risk

Description of the models used to assess overvaluation

The classic demand-driven model[14] assumes that the level of house prices in the long term is determined by inflation, the level of disposable income per capita, the effective five-year mortgage rate and population growth among young adults. Intuitively, the classic demand-driven model supposes that increased household income implies increased housing demand and an easier access to credit for households. Mortgage rates are considered since they impact the size of the monthly mortgage payment, limiting household borrowing capacity. 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.

The urban growth model[15] assumes that the level of house prices in the long term is affected by inflation, the construction costs of housing, land prices, and expected growth of the city. Intuitively, this model assumes that lower construction costs and higher productivity can constrain house price growth and vice versa. 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[16] assumes that households have limited borrowing capacity and could therefore face difficulties accessing mortgage credit to finance a home purchase. This model estimates the level of prices that is consistent with fundamentals in relation to a maximum affordability measure; this measure is the maximum house value an average household could buy using the maximum amortization period and the current five-year mortgage interest rate if the mortgage payment were equivalent to 30 per cent of the household's income.

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

[14] 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).

[15] CMHC's model is mostly based on Kahn (2008) and Mayer and Somerville (2000).

[16] The borrowing capacity model was recently developed and applied by McQuinn and O'Reilly (2008).

[17] To obtain the average of the significant price-model combination each combination is first normalized to ensure the compatibility of estimates.

[18] The normalized estimates are compared to a 90% confidence interval.

threshold based on statistically significant deviations from historical averages. The threshold is determined by using the cut off value of the 10 per cent highest estimates.

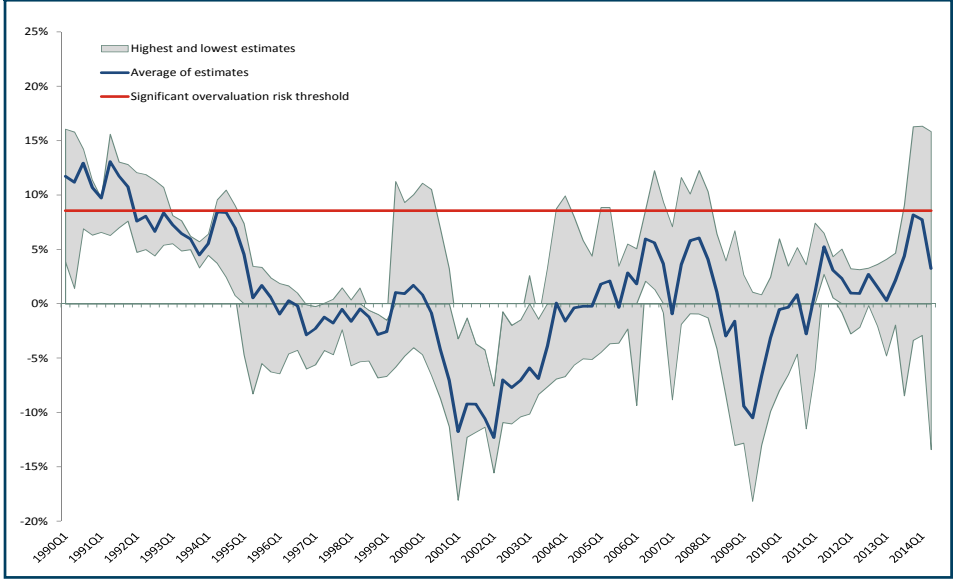
To avoid relying on signals with little persistence over time ("blips"), the HPAA also considers the persistence of signals. To be formally persistent, the indicators have to remain above risk thresholds for at least 2 quarters over the last 4 quarters preceding the assessment[19].

Currently, based on the rules defined above, combining the results from the statistically significant models estimated over the 3 price measures shows that overvaluation is present, has some intensity and persistence and hence requires closer monitoring. As a result, the colour rating for this risk is yellow for Canada. Since the average estimate over all the models does not show overvaluation, the colour rating for this risk is yellow for Canada. However, if the average estimate were to signal persistent overvaluation, the assessment would be changed to red, indicating a higher risk of problematic conditions because a greater number of model and price measure combinations would be signalling overvaluation.

OVERBUILDING

An elevated level of demand for housing can lead to higher house prices which, in turn, can be expected to lead to an increase in the supply of housing units through the signal of higher prices. The larger supply of housing units will eventually alleviate the upward pressure on house prices and contribute to moderating their growth rate.

Figure 5: A moderate risk of overvaluation is detected at the National level



Source: Teranet-National Bank, Canadian Real Estate Association (CREA), Statistics Canada, Conference Board of Canada and calculations by CMHC
Last data point: 2014Q2

However, it is possible that the supply response may temporarily exceed demand. As a result, this excess supply could put significant downward pressure on house prices. Alternatively, a reduction in demand for existing homes could result in a condition of excess supply, as well, 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, greater-than-necessary declines in house prices could occur in order to ensure that the excess supply is absorbed.

To assess the possibility of overbuilding conditions in the housing market, the HPAA framework uses two indicators that relate to the supply of readily available housing units: the rental vacancy rate, and the inventory of completed and unabsorbed housing units per 10,000 population[20]. The HPAA framework compares the current level and recent trends in these indicators to risk thresholds.

The HPAA assesses overbuilding as present if at least one of these indicators is above its historical average. However, it also takes into account the intensity of this signal: an indicator that is slightly above its average does not have the same impact on the assessment as an indicator that is well above its historical average. To assess the intensity of the signal, the HPAA uses a risk threshold based on statistically significant deviations from historical averages.

Currently we observe that the number of units completed and unabsorbed is above its average but below its risk threshold (see Figure 6).

The rental vacancy rate, another indicator of potential overbuilding, is also currently below its risk threshold. (see Figure 7). The third characteristic

[19] 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 10 for further details.

[20] The inventory of completed and unabsorbed units for the National level corresponds to the sum of the inventory in Census Agglomerations and in Census Metropolitan Areas.

taken into account is the persistence of the signal. To be persistent, the indicator for the overbuilding risk-factor has to be above its risk threshold for at least 2 quarters over the last 4 quarters preceding the assessment[21].

At the national level, the inventory of unabsorbed units and the rental vacancy rate are below their risk threshold. As a result, the colour rating for this risk is green for Canada. If either indicator of overbuilding was persistent, the assessment would be yellow, and if both indicators were above their thresholds, the assessment would be red.

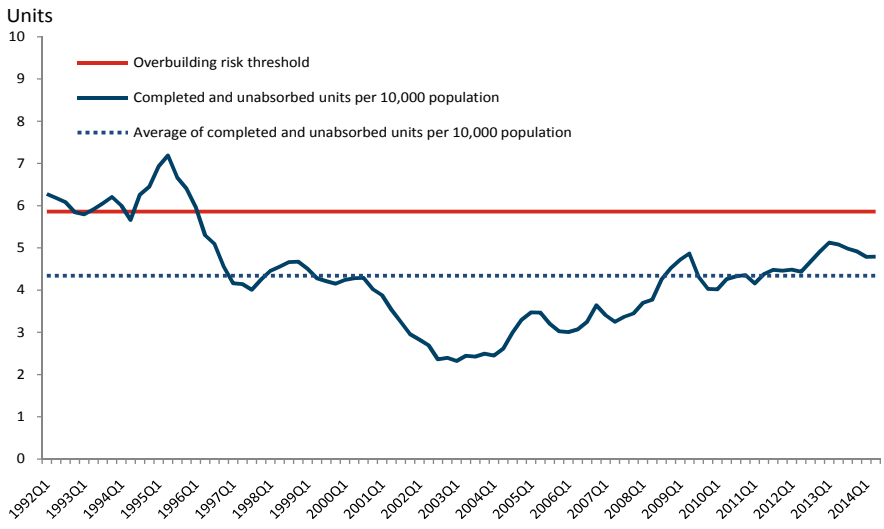
HPAA Case Study: Toronto in the late 1980s and early 1990s

It is generally acknowledged that Toronto experienced a house price bubble, wherein house prices were significantly overvalued in the late 1980s and early 1990s. This view is grounded in the sustained decline in house prices observed in Toronto from the first quarter of 1990 to the final quarter of 1995. During that period, real (i.e. inflation-adjusted) resale house prices declined by 32 per cent. When the HPAA is applied to data for Toronto from this time period, the analytical framework would have assessed overvaluation in house prices for Toronto.

As Figure 8 shows, the HPAA would have signalled an increasing number of potential problems over the 1985 to 1989 period, ahead of the start of the sustained price decline in 1990.

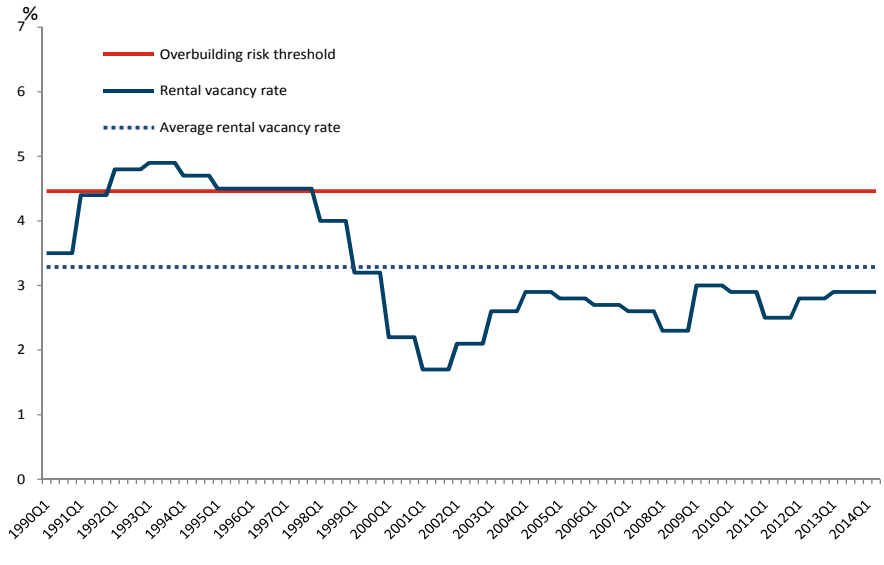
In this particular historical case study, the HPAA framework would have detected the following sequence of risk factors.

Figure 6: At the national level, the number of completed and unabsorbed units relative to population is slightly above the historical average



Source: Statistics Canada, CMHC
Last data point: 2014Q2

Figure 7: The national rental vacancy rate is below the historical average



Source: CMHC
Last data point: 2014Q2

[21] 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 10 for further details.

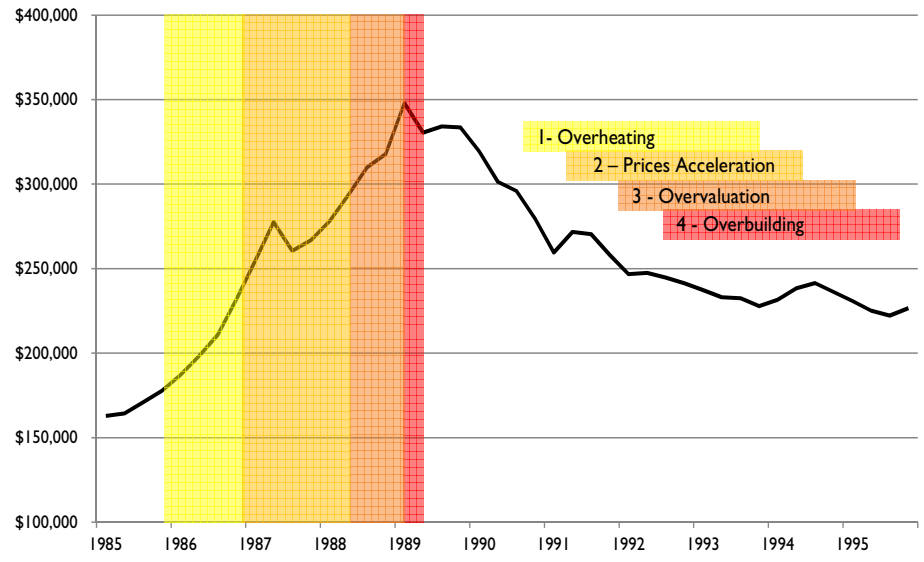
First, roughly four years prior to the sustained drop in house prices, the sales-to-new listings ratio signalled accelerating market conditions which persisted for a year. This would have been an indication that demand was running ahead of supply, thus placing upward pressure on home prices.

Second, roughly three years prior to the sustained drop in house prices, an acceleration in house price would have been detected. This would have provided an indication that upward pressure on prices in Toronto was intensifying, possibly due to an increase in speculative activity.

Third, about one year prior to the sustained decline in the average house price, the HPAA would have assessed house prices in Toronto as significantly overvalued. This would have been an indication that house prices in Toronto were above the range than what would have been consistent with fundamental factors in the late 1980s and early 1990s in Toronto, including population and income growth as well as the level of interest rates.

Fourth, roughly six months prior to the sustained decline in house prices, the number of completed and unabsorbed units moved significantly above its historical average. This would have been an indication of supply running too far ahead of demand in Toronto, which helped precipitate the 1990 to 1995 decline in Toronto's average inflation-adjusted house price.

Figure 8: Toronto (1985Q1-1995Q4 time period), real MLS® average price level and assessment of HPAA risk factors



Source: Canadian Real Estate Association (CREA) and calculations by CMHC

[22] 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 10 for further details.

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