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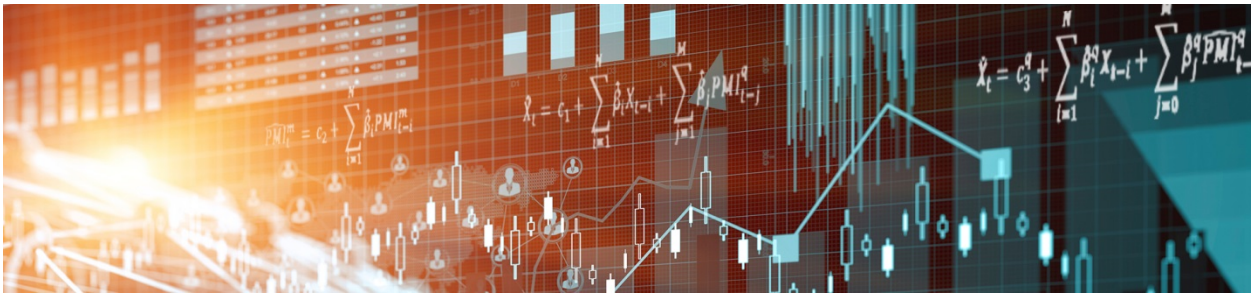
Disentangling the Factors Driving Housing Resales



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Abstract

We use a recently developed model and loan-level micro data to decompose movements in housing resales since 2015. We find that fundamental factors, namely housing affordability and full-time employment, have had offsetting effects on resales over our study period. Recent mortgage rule changes have likely contributed to slower resale activity in Canada, but their impact is estimated to be relatively small. Thus, much of the variation in resales since 2015 reflects deviations from long-run fundamentals, most notably in British Columbia and Ontario. We show that the deviations from fundamentals in these provinces are strongly correlated with house price expectations, which rose rapidly in 2016 but then retreated following provincial housing policy changes.

Topics: Econometric and statistical methods; Financial stability; Financial system regulation and policies; Housing; Recent economic and financial developments

JEL codes: C, C2, C22, E, E2, R, R2, R21

Résumé

Nous utilisons un modèle élaboré récemment et des microdonnées sur les prêts individuels pour décomposer les mouvements sur le marché de la revente depuis 2015. Nous constatons que les facteurs fondamentaux, notamment l'accessibilité au logement et l'emploi à temps plein, ont fait contrepoids aux ventes de maisons existantes pendant la période visée par notre étude. Les modifications apportées récemment aux règles hypothécaires ont vraisemblablement contribué à ralentir l'activité de revente au Canada, mais nous estimons que leur incidence a été relativement faible. Ainsi, les variations des reventes depuis 2015 reflètent surtout des écarts par rapport aux fondamentaux de long terme, principalement en Colombie-Britannique et en Ontario. Nous montrons que les écarts dans ces provinces présentent une forte corrélation avec les attentes à l'égard des prix des logements, qui ont crû rapidement en 2016 puis diminué compte tenu des nouvelles orientations des politiques provinciales du logement.

Sujets : Méthodes économétriques et statistiques; Stabilité financière; Réglementation et politiques relatives au système financier; Logement; Évolution économique et financière récente

Codes JEL : C, C2, C22, E, E2, R, R2, R21

Introduction and key messages

Housing resale activity in Canada rose markedly between 2015 and mid-2016, reaching a historic high in the second quarter of 2016. Since then, resales have fallen substantially and in the first quarter of 2019 stood roughly 20 per cent below peak levels. This slowing resale activity has coincided with the introduction of various housing-related policy measures and a period of monetary policy tightening. Disentangling the relative importance of the factors influencing resale activity has therefore proved to be challenging. This note uses a recently developed model and loan-level micro data to decompose movements in resales. Our analysis starts in early 2015 because this is the last time resales were estimated to be near levels consistent with fundamentals. Following are the key messages:

- Between the first quarter of 2015 and the fourth quarter of 2018, national housing resales declined by 17,000 units. Only a small portion (fewer than 3,000 units) of this decline can be attributed to fundamentals, reflecting sizable though offsetting movements in housing affordability and employment.
    - A deterioration in housing affordability is estimated to have reduced the fundamental level of resales by 46,000 units, 40 per cent of which can be attributed to the direct effects of higher mortgage rates. The remainder is largely due to strong house price growth observed from 2015 to mid-2017.
    - Changes to mortgage rules (in both the insured and uninsured markets) have collectively lowered the estimated fundamental level of resales by about 10,000 units. We show that the rule changes have materially increased the time that constrained borrowers need to save for a down payment. These changes will therefore persistently weigh on resales without a significant reduction in house prices relative to incomes.
    - A strong labour market and, to a much lesser extent, robust migration in British Columbia have mostly offset (by more than 53,000 units) the drag on the fundamental level of resales coming from deterioration in affordability and changes to mortgage rules.
- Disequilibria in resales since 2015 are largely attributable to developments in British Columbia and Ontario and appear to be driven by house price expectations.[1]
    - Resales rose above their long-run fundamentals in 2015 and 2016, a period characterized by “froth” in the housing markets of Toronto, Vancouver and their surrounding areas.
    - The disequilibria in provincial resales are highly correlated with house price expectations, which rose rapidly in 2016 but then retreated following the provincial housing policy changes in British Columbia and Ontario. This supports the view that much of the previous strength in resale activity was influenced by extrapolative expectations (and is supported by data on investor activity). These expectations quickly faded following the policy measures.

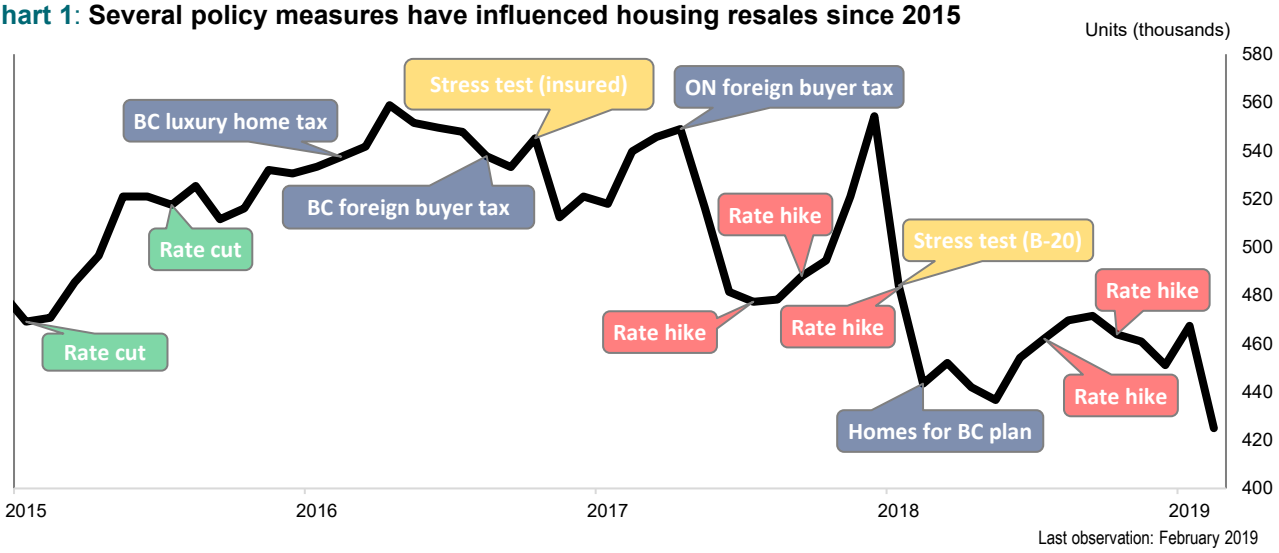
Context

Over the past three years, several policy measures have influenced housing resales in Canada. These measures include tighter federal policies around mortgage qualification, changes in mortgage rates (in part induced by monetary policy) and provincial measures aimed at easing housing market imbalances in certain jurisdictions (**Chart 1**). The measures operate through various channels and thus have different implications for resales, in

[1] Disequilibria in this note refers to the deviation between resales and their estimated long-run fundamental level.

both the short and the long run. Disentangling the relative importance of these measures is therefore crucial to form a view on past and future developments in the resale market.

Chart 1: Several policy measures have influenced housing resales since 2015



In this note, we use a recently developed error-correction model (Webley 2018) and loan-level micro data to provide a detailed account of resale activity in Canada since 2015. There are two main advantages to using this model:

1. It helps distinguish movements in resales driven by long-run fundamentals from those that represent transitory deviations from those fundamentals.
2. It is estimated at the provincial level, allowing us to exploit the great deal of heterogeneity observed in housing activity across the country.

The long-run fundamental level of resales in the model is determined by full-time employment, housing affordability and migration.[2,3] In comparison with the baseline version of this model, we attempt to quantify the impact of the recent changes to mortgage rules by modifying the housing affordability index. This modification is guided by rich micro data on all mortgages originated by federally regulated entities in Canada.

Our analysis starts at the beginning of 2015, which is the last time resales were estimated to be near levels consistent with fundamentals, both nationally and in most provinces. As a result, our study period covers the exceptional strength in resales witnessed in 2016 as well as the subsequent pronounced declines.

We begin by quantifying the share of resale activity that can be explained using fundamentals in the baseline model. We then supplement that with an estimate of the effect of the macroprudential policies not previously captured by the model. Finally, we examine the remaining unexplained variation in resales.

[2] Migration is included only in the equation for British Columbia because it was not found to be statistically significant elsewhere.

[3] Housing affordability is calculated as $affordability_{i,t} = \frac{\overbrace{\left[\frac{i_t^h/c}{1-\left(1+i_t^h/c\right)^{-nt*c}}\right]*LTV_t*P_{i,t-1}^h}^{mortgage\ payments}}{\underbrace{y_{i,t}/hh_{i,t}}_{per\ household\ income}}$.

Fundamentals in the baseline model

National resales rose materially in early 2015 (**Chart 2**) largely because of strength in British Columbia and Ontario. The decline in resale activity in Canada since the historic peak in the second quarter of 2016 has been dramatic. Even though resales comprise less than 2 per cent of economic activity, their fall has removed about 0.2 per cent from the level of real gross domestic product. However, neither the strong growth in resales from the first quarter of 2015 to the second quarter of 2016 nor the subsequent pronounced declines can be accounted for by model fundamentals. Indeed, the estimated fundamental level of resales has not changed meaningfully since 2015 because the support from solid employment growth and migration flows has been roughly offset by a drag from deteriorating housing affordability (**Chart 3**).

Chart 2: Resales began to diverge from fundamentals in early 2015

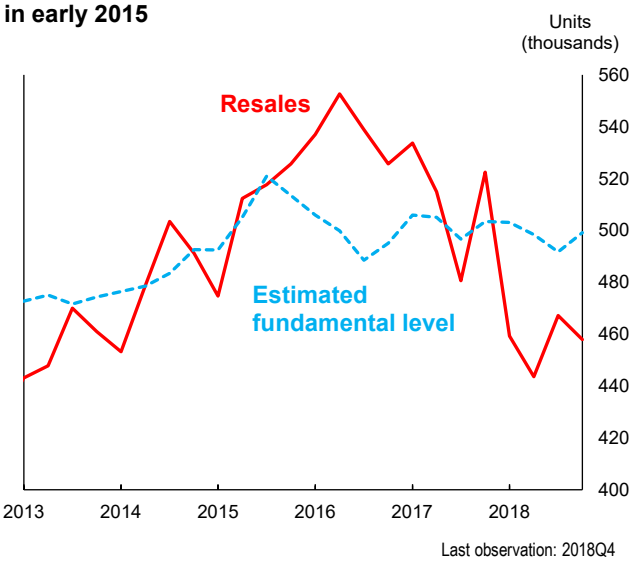
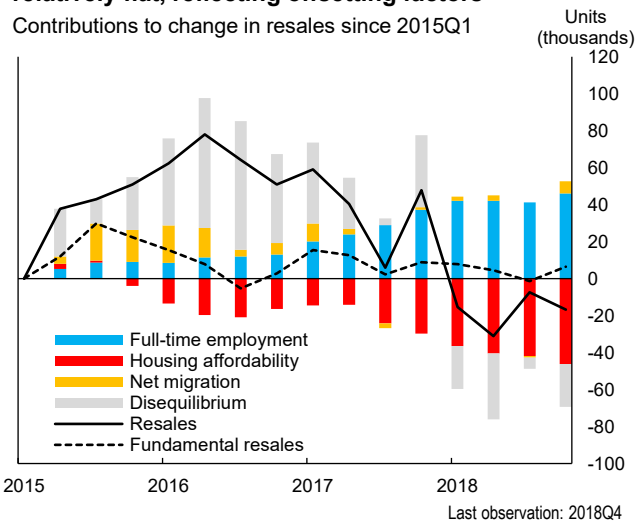


Chart 3: The fundamental level of resales has been relatively flat, reflecting offsetting factors

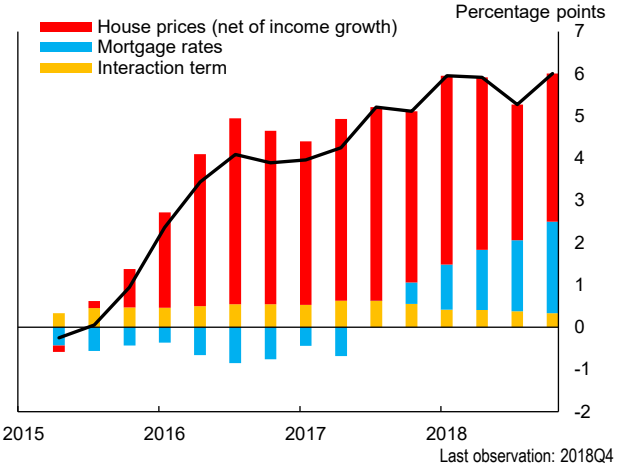
Contributions to change in resales since 2015Q1



While housing affordability deteriorated over the full study period, two distinct phases to this deterioration are worth highlighting (**Chart 4**). The largest deterioration in housing affordability occurred between 2015 and mid-2016 because of rapid house price inflation in British Columbia and Ontario. Mortgage rates, in contrast, provided a partial offset over that period, as the Bank twice lowered the target for the overnight rate in 2015. House prices have stabilized since 2017 and have not contributed any further to the deterioration in housing affordability. Meanwhile, monetary policy tightening has pushed up mortgage rates and has begun to weigh on housing affordability. As of the fourth quarter of 2018, higher interest rates accounted for about 40 per cent of the deterioration in housing affordability since 2015. This is believed to be an upper bound, however, since higher rates are likely responsible for at least some of the slowdown in house price appreciation.

Chart 4: Mortgage rates are playing an increasingly important role in deteriorating affordability

Contributions to change in the affordability index since 2015Q1, percentage point change in share of disposable income



Overall, we find that fundamentals account for only about 10 per cent of the 78,000-unit rise in resales between the first quarter of 2015 and their peak in the

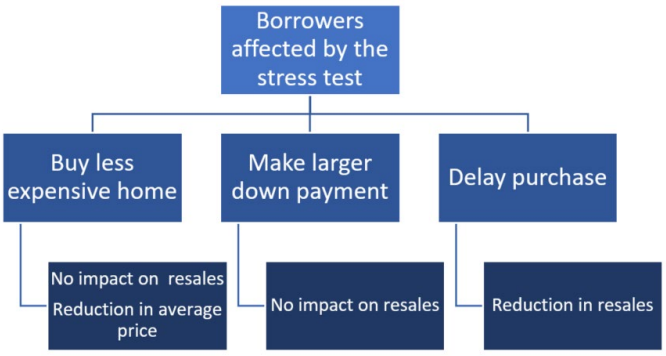
second quarter of 2016, and roughly 1 per cent of the 95,000-unit decrease since. However, there are reasons to suspect that the changes to mortgage rules have exerted a drag on the fundamental level of resales not previously captured in the model.

Incorporating the mortgage rule changes

Following revisions to mortgage insurance rules (2016) and the B-20 guideline (2018), potential borrowers of all mortgages originated by a federally regulated lender in Canada must pass a mortgage rate stress test. Borrowers directly affected by the stress tests (i.e., who no longer qualify for desired mortgages under the new rules) can respond in three broad ways (**Figure 1**). They can

1. choose to buy a less expensive home,
2. increase their down payment to bring their debt-service ratio below the qualifying threshold, or
3. delay their purchase and save for a larger down payment.

Figure 1: Options for borrowers affected by the stress test



Borrowers who fall into categories 1 and 2 will not affect the level of resales in Canada. In contrast, resale activity will fall in proportion to the number of prospective homebuyers who delay their purchases. The persistence of this effect will depend on the additional length of time needed for a given cohort of homebuyers to save for a down payment (**Box 1**).

The affordability index in the model offers a channel through which to incorporate the mortgage rule changes. We use loan-level micro data to calculate the reduction in the maximum amortization period required to generate the same impact on mortgage qualification as the imposition of the stress tests.[4] We then feed this through the long-run equation of the model, meaning that the mortgage rule changes affect the estimated fundamental level of resales. **Box 1** provides justification for this modelling choice, showing that the impact of the rule changes on resales is likely to persist far beyond horizons considered relevant for monetary policy.

Table 1 summarizes the results of the amortization exercise. We find that the rule changes to both insured and uninsured mortgages are roughly equivalent to a reduction in the maximum amortization period of 0.7 years across all borrowers. In provinces with relatively low house prices (and also a higher share of insured mortgages), the insured rule change has a larger impact relative to the uninsured rule change. Not surprisingly, the rule change for uninsured mortgages has a larger impact in Ontario and British Columbia, where house prices are the highest and uninsured mortgages comprise a vast majority of purchases.

Table 1: Reduction in the maximum amortization period consistent with the stress tests (in years)

	AB	BC	MB	NB	NL	NS	ON	PE	QC	SK	**Canada**
Insured mortgages	1.1	0.6	0.9	0.5	0.7	0.6	0.6	0.5	0.5	1.1	**0.7**
Uninsured mortgages	0.6	0.9	0.5	0.2	0.3	0.3	0.8	0.3	0.4	0.4	**0.7**

Note that the stress tests in amortization-equivalent units are less stringent than historical changes to the maximum amortization period, which are typically done in five-year increments. This is because the stress tests,

[4] In principle, this can also be done by "shocking" the mortgage rate used to compute the affordability index. We prefer to use the maximum amortization period since, unlike mortgage rates, changes in this variable over history are attributable solely to changes in macroprudential regulations.

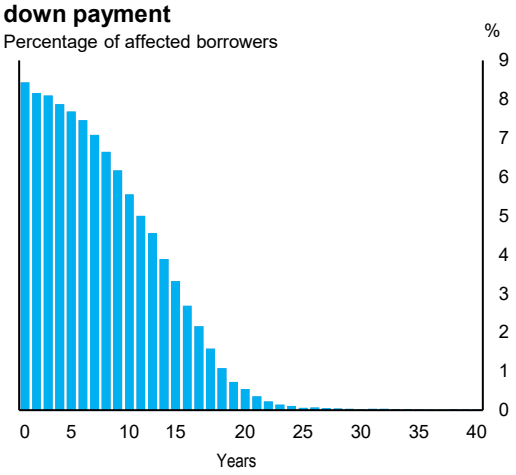
while applying to all borrowers, affect only those with debt-service ratios relatively close to regulatory limits. Indeed, the implicit amortization reduction for *affected* borrowers is much higher than the numbers shown in **Table 1**: six and nine years for insured and uninsured borrowers, respectively. To quantify the impact of each rule change on the full pool of borrowers (and thus on resales), these numbers are scaled by the share of affected borrowers and by the relative shares of the insured and uninsured segments of the market. For instance, the revised B-20 guideline affected roughly 10 per cent of borrowers within the uninsured market, which comprised about 75 per cent of the mortgage market.

Box 1: Mortgage stress tests and the time needed to save for a down payment

Using loan-level data on mortgage originations, we attempt to quantify the extra time needed to save for a down payment following recent changes to mortgage rules.[5]

First, we identify borrowers in both insured and uninsured markets that would have failed the stress test had it been in place during the four quarters before each rule change. We then compute the extra down payment (in dollars) each affected borrower would have needed to pass the stress test. We then apply a savings rate of 7 per cent[6] to the incomes of those borrowers to derive an estimate of their annual savings. Finally, we calculate how many years of savings they would need to accumulate the extra down payment funds required. Our calculations implictly assume a constant ratio of house prices to incomes.

Chart 1A: Extra time needed to save for a down payment



As shown in **Chart 1-A**, there is a great deal of heterogeneity across borrowers. For instance, almost 1 in 10 affected borrowers would need less than a year's worth of additional savings to pass the stress test. At the same time, about 1 in 5 affected borrowers would need more than 15 years of savings. The median additional time needed to save for a down payment is 6.3 years.

Table 1-A: Sensitivity analysis

Savings rate (%)	Median extra years to save
3.5	12.7
7	6.3
10	4.4
15	3.0

These estimates are subject to much uncertainty, particularly because little is known about savings rates at the individual level. For sensitivity analysis, **Table 1-A** shows how the median time needed to save changes depending on the assumed savings rate of prospective homebuyers. Irrespective of the savings rate assumed, the message is consistent: the impact of the mortgage rule changes on resales is likely to be highly persistent since most affected borrowers will require many years of savings to offset the impact of the stress tests.

Of course, a reduction in the price-to-income ratio is an important potential offset to the increased time required to save. We find that a 20 per cent reduction in house prices (relative to incomes) would eliminate the need for additional savings among all borrowers affected by the stress tests.

[5] We are grateful to Maria teNyenhuis for assisting with the micro data calculations.

[6] Micro data from the 2009 Survey of Household Spending yields a median savings rate of 7 per cent among individuals that are renters and under 40 years old. However, these data are not available after 2009. If the savings rate of this group has declined in line with the aggregate savings rate since 2009, it would currently stand at 3.5 per cent.

Chart 5 shows the impact on the housing affordability index of including the mortgage rule changes, while **Chart 6** demonstrates how this alters the contribution of fundamentals to the changes in resales.[7] As of the fourth quarter of 2018, the fundamental level of resales is estimated to be about 10,000 units lower due to the combined effects of the two mortgage rule changes.[8]

There are two important caveats to this estimate. First, the estimated 10,000-unit reduction in the fundamental level of resales represents only the *direct* impact of the stress tests. While we do not expect that the stress tests have materially affected either employment or household incomes, it is possible that the reductions in housing demand as a result of the policies can account for some share of the observed slowdown in house price appreciation. The extent to which this is true, however, offsets the direct negative impact on resales over time by making housing more affordable.

Chart 5: Incorporating the rule changes raises the affordability index by about 4 per cent

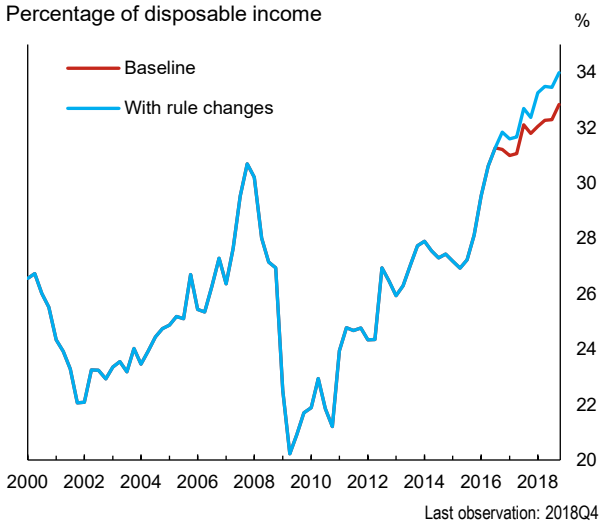
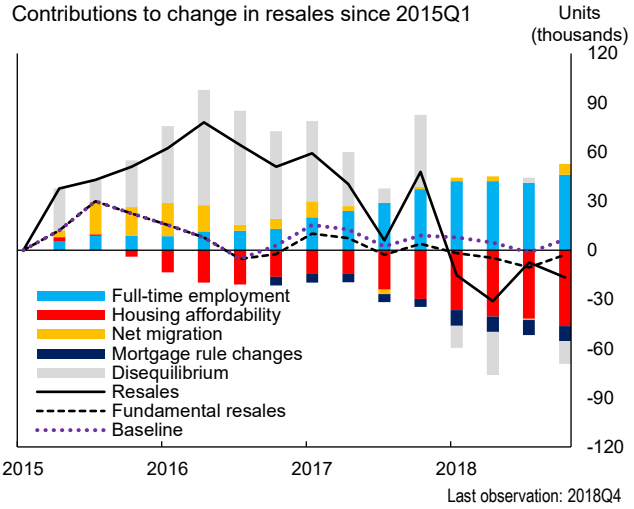


Chart 6: Mortgage rule changes have lowered the fundamental level of resales by about 10,000 units



The second caveat is that the affordability index has historically been associated with changes in *actual* payments relative to incomes, whereas the mortgage rule changes raise only *qualifying* debt-service ratios. Therefore, adjusting the affordability index to incorporate the rule changes is appropriate only to the extent that the increased burden of saving for a larger down payment has a similar effect on home buying behaviour as higher mortgage servicing costs. Nevertheless, we believe this approach provides a pragmatic first step toward distinguishing between the effects of the rule changes and other factors influencing resales in Canada.

This section has focused on the persistent effects of the rule changes on the fundamental level of resales through borrowers failing the stress test. It is likely that the rule changes have also lowered market sentiment among some unaffected borrowers, thus amplifying the negative impact on observed resale activity in the near term.

[7] The model is not re-estimated with the revised affordability index. Rather, we use the estimated coefficients up to 2015 and perform a dynamic simulation thereafter.

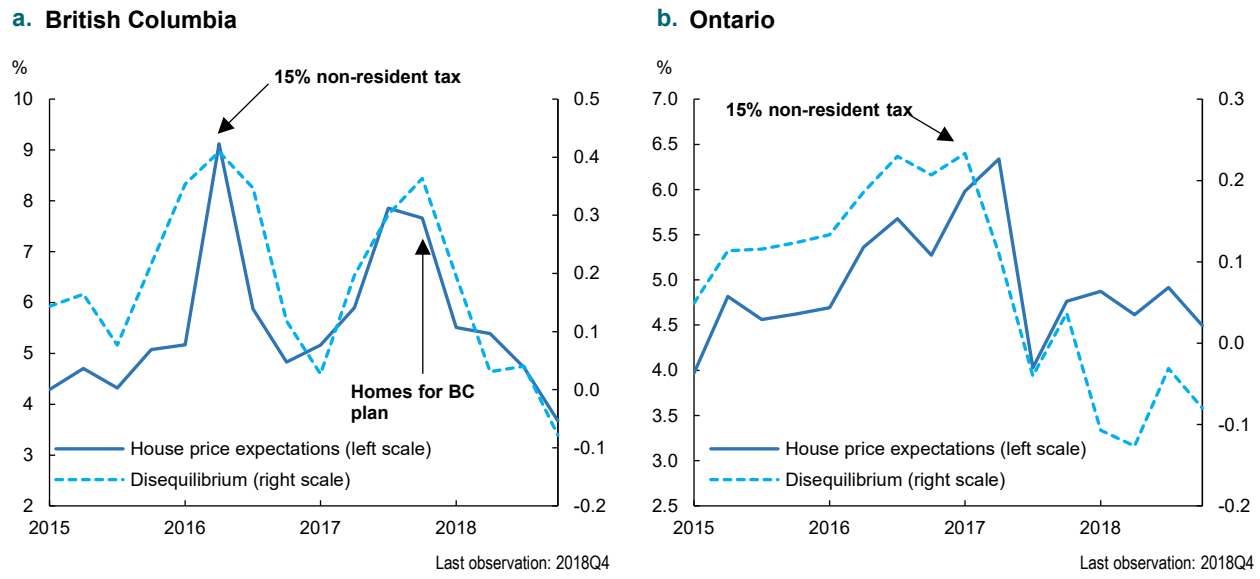
[8] The data show that the revisions to the B-20 guideline had a strong intertemporal substitution effect in the fourth quarter of 2017, as borrowers pulled forward purchases to get ahead of the stress test implementation in the first quarter of 2018. This pull-forward and its subsequent reversal should no longer influence the level of resale activity as of the fourth quarter of 2018.

Interpreting disequilibria in the resale market

Accounting for the changes to mortgage rules improves our ability to explain resale activity, but a material portion of movements in resales since 2015 remains unexplained by model fundamentals.[9] This is particularly the case in 2015 and 2016, when resales rose far above levels estimated to be consistent with fundamentals. The fact that model fundamentals cannot explain why resales were so strong over that period is perhaps unsurprising, since housing markets in Ontario and British Columbia were widely believed to be exhibiting signs of froth. Indeed, British Columbia and Ontario accounted for 90 per cent of the disequilibria in resales between early 2015 and the peak in the second quarter of 2016.

Interestingly, we find the disequilibria in provincial resales to be highly correlated with house price expectations[10] (**Chart 7**) from the Canadian Survey of Consumer Expectations. In previous work (Khan and Verstraete 2018), these house price expectations were shown to display extrapolative tendencies. This correlation is particularly striking in British Columbia, where house price expectations rose rapidly in 2016 before retreating. The subsequent declines coincided with the implementation of a 15 per cent tax on home purchases by non-Canadian residents in August 2016. This tax was then raised to 20 per cent in February 2018 as part of a broader housing plan. Similarly, in Ontario, house price expectations rose strongly until the second quarter of 2017 when the Ontario Fair Housing Plan also introduced a 15 per cent tax on non-resident home purchases. The declines in resales following both provincial policy measures far exceeded the number of non-resident homebuyers in these markets. This suggests that the largest impact of the policies came through shocks to expectations of domestic homebuyers (see Khan and Verstraete 2019), which appear to explain a large share of the deviations in resales from fundamentals over the period studied.

Chart 7: **Disequilibria in provincial resales are highly correlated with house price expectations**



Note: The labels for the provincial policy measures point to the quarter *before* their implementation.

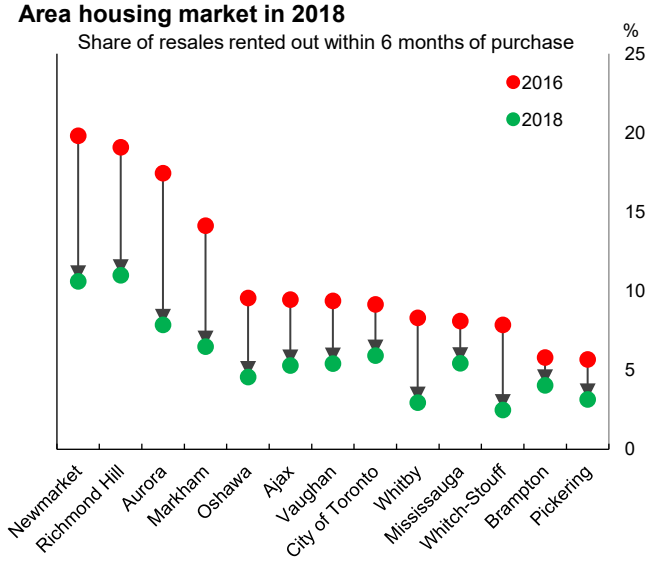
[9] We focus on deviations from fundamentals in the context of the long-run equation of the model because fundamentals play a very limited role in explaining short-run movements in resale activity (due largely to their extreme relative volatility).

[10] As measured by the median expected change in house prices over the next 12 months

Additional evidence of resales departing from fundamentals comes from Realosophy data, which show that investor activity accounted for as much as one in five resales in certain parts of the Greater Toronto Area in 2016. By 2018, the share of investor activity had roughly halved (**Chart 8**), returning to levels last seen in 2014.

Overall, the evidence presented in this section suggests that the unexplained strength in resales reflects extrapolative expectations, which drove up speculative demand and caused some households to pull forward purchases in fear of later being priced out of the market. Importantly, the provincial housing measures appear to have played the dominant role in eliminating these sources of demand. This is mainly because the measures, while directly targeted at the relatively small portion of home purchases by non-residents, altered the expectations of residents and generated an outsized response in the housing market.

Chart 8: Investors retreated from the Greater Toronto Area housing market in 2018



More recently, however, resales have been below their estimated fundamental level. Since the previous strength in resales reflected a pull-forward of activity from future periods, it would be natural to observe a period of undershooting. This source of drag is unlikely to be large, since 85 per cent of the cumulative gap between resales and fundamentals over our period of study has disappeared. However, house price expectations remain quite subdued, particularly in British Columbia. While the provincial housing measures have clearly reduced house price expectations, it is likely that all the measures are collectively weighing on expectations to varying degrees. It is also possible that their combination is amplifying their impact on market sentiment.

Conclusion

In this note, we have provided a method for disentangling the relative importance of various factors influencing housing resale activity in Canada. The key takeaway in the current context is that much of the decline in resales since the 2016 peak can be attributed to deteriorating affordability and to a dissipation of previous froth in the market (which coincides with the implementation of provincial housing policies and the subsequent evaporation of house price expectations). The direct impact of recent mortgage rule changes, in contrast, is estimated to be relatively small, while robust labour markets across many provinces are providing some underlying support to resales.

Of course, the housing market is currently in uncharted territory. Several policy measures are working their way through the system within the context of record household indebtedness and elevated housing imbalances. We will therefore need to closely monitor ongoing developments to assess whether the historical relationships underpinning our work remain appropriate.

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