Analysis of Household Vulnerabilities Using Loan-Level Mortgage Data

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- Mortgage debt is a primary contributor to high household indebtedness—a key vulnerability of the Canadian financial sector. To better understand vulnerabilities coming from the mortgage market, we examine data from individual mortgage loans from 2014 to 2016.
- The proportion of new mortgages for purchase with a loan-to-value ratio of 80 per cent or less is increasing. This rise is highly concentrated in regions with strong house price growth, such as Toronto and Vancouver and their surrounding areas.
- Among these mortgages, a growing share have high loan amounts relative to income, as well as longer amortization periods. All else being equal, households with mortgages that have these two characteristics are more vulnerable in the event of a major adverse shock to household income.
- These trends are more pronounced among younger households. They are also concentrated in regions with imbalances in the housing market.

Introduction

Mortgage debt has been the main driver behind the increasing Canadian household indebtedness over the past decade. Various factors are underpinning this credit expansion, including demographic demand, low borrowing rates, improved access to credit and strong growth in house prices in some major markets. A better understanding of mortgage products and borrowers helps us improve our assessment of the underlying financial system vulnerabilities.

More specifically, this report focuses on the loan-to-value ratio (LTV), loan-to-income ratio (LTI) and amortization period for new mortgages used to purchase residential properties. The analysis in this article relies on loan-level data from 18 federally regulated financial institutions from 2014 to 2016 (**Box 1**).

Analyzing the characteristics of mortgage holders by age, income and location helps identify the most vulnerable groups, namely those that are more likely to experience financial stress in the face of an adverse shock, such as a widespread decline in income, a sharp rise in mortgage borrowing costs or a correction in house prices.

Box 1

Description of the Loan-Level Mortgage Data

The data include only federally regulated lenders. They exclude credit unions and caisses populaires, which are provincially regulated, as well as mortgage investment companies, mortgage finance companies and other private lenders. The largest portion of excluded mortgages are insured mortgages because many of the lenders that are not federally regulated focus on issuing this type of mortgage.

We focus on the most uniform set of mortgage products: mortgages for property purchases, excluding refinances and renewals. A portion of the purchase loans are readvanceable mortgages, which combine a mortgage with a home equity line of credit (HELOC). Our analysis is based only on the mortgage component of the purchase loan and assumes that HELOCs are not drawn at origination. We also exclude insured low-ratio mortgages.[1] These mortgages may have different vulnerability characteristics and account for a small portion of purchase loans (about 3 per cent). Finally, fewer than 1 per cent of purchases have no loan-to-value information and are therefore omitted.

The final sample consists of a total of 1.3 million mortgages for properties purchased between 2014 and 2016.

1 Transactional mortgage insurance can be voluntarily taken out by lenders for low-ratio mortgages at origination. Lenders tend to use this insurance for narrow categories of mortgages with different risk characteristics. A small number of mortgages that are portfolio-insured at origination are also excluded from our sample.

This report aims to complement the analysis in the *Financial System Review* Assessment of Vulnerabilities and Risks, as well as previous reports analyzing vulnerabilities associated with mortgage holders, including Cateau, Roberts and Zhou (2015) and Crawford and Faruqui (2011–12). This report differs from earlier ones by examining new mortgages used to make purchases rather than the outstanding household debt as captured by Ipsos in its *Canadian Financial Monitor*. This allows us to understand the recent evolution of vulnerabilities centring on the most important borrowing decision made by households. Our data cover only a fraction of lenders' portfolios, however, and do not allow us to assess their overall underwriting or risk-management processes.

In this report, we first discuss how LTV relates to the characteristics of borrowers. We also show that high-LTV mortgages have decreased in importance. We then describe different ways to measure vulnerabilities in the mortgage market, how these relate to borrower characteristics and how they are changing over time.

Segmenting the Mortgage Market by Loan-to-Value Ratio

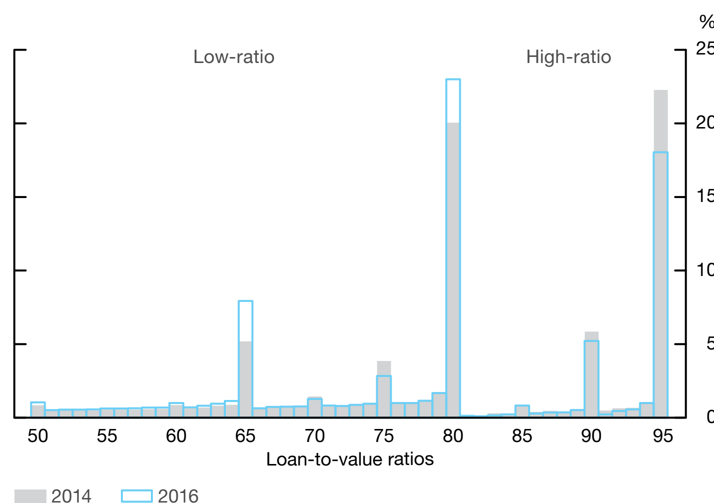
The Canadian mortgage market can be divided into high- and low-ratio segments based on LTVs (**Table 1**). High-ratio mortgages—which federally regulated lenders are required to insure—are subject to stringent rules-based mortgage insurance underwriting criteria that determine when a loan can be granted. Low-ratio mortgages have somewhat more flexible underwriting rules based on the risk appetites of individual lenders, although federally regulated lenders must operate within principle-based underwriting guidelines established by the Office of the Superintendent of Financial Institutions (OSFI). We exclude low-ratio mortgages with voluntary insurance because they likely have different risk characteristics than other low-ratio mortgages (**Box 1**).

Table 1: High-ratio and low-ratio mortgages originated by federally regulated lenders

	High-ratio mortgages	Low-ratio mortgages
Loan-to-value ratio	Above 80 per cent	At or below 80 per cent
Minimum down payment	5 per cent on portion of purchase price up to $500,000 and 10 per cent on remainder	20 per cent
Mortgage insurance	Required	Optional
		The rows below assume no insurance
Underwriting requirements	Mortgage insurance rules and OSFI guidelines B-20 and B-21	OSFI guideline B-20
Eligible purchase price	Less than $1 million	No regulatory limit
Maximum amortization period	25 years	No regulatory limit—banks typically impose a maximum of 30 years
Debt-service requirements	Strict limits on payment amounts relative to income	No regulatory limit—based on lenders' risk appetites with exceptions allowed

Note: OSFI stands for Office of the Superintendent of Financial Institutions.

Chart 1: Distribution of loan-to-value ratio for new mortgages used for purchases, 2014 and 2016



Note: 14 per cent of mortgages with a loan-to-value ratio below 50 per cent are not presented in the chart.
Sources: Regulatory filings of Canadian banks and Bank of Canada calculations

Chart 1 shows that borrowers often choose the loan with the largest possible LTV in either the high- or the low-ratio segment, given their wealth and ability to service debt. Borrowers may choose an 80 per cent LTV loan rather than a larger high-ratio loan to avoid the extra fees paid for mortgage insurance, to avoid the more stringent income qualification criteria required for high-ratio mortgages, or to buy a house priced at or above $1 million, which is not eligible for mortgage insurance.

There is a notable cluster of borrowers with an LTV of 65 per cent. OSFI guidelines require that federally regulated lenders have a maximum LTV of 65 per cent when a loan does not conform to a lender's typical underwriting policies. For example, the borrower may have weaker income documentation, imperfect credit history, high debt-service ratios or a property with characteristics that may lead to elevated credit risk. For these mortgages, lenders focus on other underwriting criteria to assess the borrower's ability to repay, such as borrower wealth. The 65 per cent LTV group may also include some borrowers accessing specific lending products that are restricted to this LTV threshold.

Regional and life-cycle determinants of mortgage choice

Low-ratio mortgages are more common in markets with strong house price growth (**Table 2**).[1] This reflects a larger share of houses priced at $1 million or greater, as well as the fact that the strict debt-service constraints on high-ratio mortgages are more often binding for insured mortgages in strong housing markets.

The age distribution of mortgage originations for home purchases reflects the life-cycle profile of home ownership.[2] Households under the age of 35 represent close to half of the high-ratio borrowers, but less than one-quarter of low-ratio mortgages, because they are less likely to have sufficient savings for the minimum 20 per cent down payment.[3] However, borrowers in

Table 2: Socio-demographic characteristics of mortgage borrowers, 2014 to 2016 (per cent)

Category	High-ratio mortgages	Low-ratio mortgages				
		All	LTV = 80%	65% < LTV < 80%	LTV = 65%	LTV < 65%
All	31	69	22	16	7	24
Region						
Strong house price growth	24	50	46	48	73	49
Modest house price growth	76	50	54	52	27	51
Age						
< 35	49	23	31	24	26	15
35 to 44	27	28	30	30	27	26
45 to 54	15	27	23	27	29	30
55 to 64	6	15	12	14	13	20
≥ 65	2	6	4	5	5	9
Household income						
1st (lowest income)	22	19	15	18	24	22
2nd	25	18	18	19	15	16
3rd	23	19	20	19	15	17
4th	19	20	22	20	17	19
5th (highest income)	11	24	24	24	29	25

Notes: The thresholds for the gross approval income quintiles in the 2016 mortgage originations data are (1st) less than $58,600, (2nd) $58,600 to $81,100, (3rd) $81,100 to $108,000, (4th) $108,000 to $153,700, and (5th) $153,700 and above. Areas with strong house price growth include Toronto and Vancouver census metropolitan areas and forward sortation areas with at least 15 per cent year-over-year gains in any year between 2014 and 2016, based on the Teranet–National Bank House Price Index™. All percentages are calculated using equal weights. LTV means loan-to-value ratio.

Sources: Regulatory filings of federally regulated financial institutions and Bank of Canada calculations

1 For a breakdown of mortgages by LTV for selected Canadian cities, see Table A-1 in the Appendix.

2 For a discussion of the life-cycle choices of Canadians related to home ownership, see Hou (2010) and Rea, MacKay and LeVasseur (2008).

3 Homeowners generally have a higher income than renters in the same age group. This also implies that the thresholds for income quintiles are higher than in the general population.

the low-ratio space in Toronto are somewhat younger compared with those in the low-ratio space overall. Younger borrowers from regions with modest house price growth are common in the cluster of low-ratio mortgages at an LTV of 80 per cent, thereby avoiding extra charges for mortgage insurance.

As households age, more people enter the housing market and others upgrade in terms of quality or size. Increased wealth and income may allow for a larger down payment, which is reflected in a higher likelihood of borrowing with a low-ratio mortgage. Older borrowers are relatively more prevalent in mortgages with an LTV under 65 per cent.

Recent movement from high- to low-ratio mortgages

Low-ratio mortgages have become more prevalent over time and accounted for 72 per cent of new home purchases in 2016, up from 67 per cent in 2014 (**Table 3**). The initial level and the increase are somewhat larger, rising from 70 to 76 per cent, when we take into account the dollar value of mortgages.

Rising housing market imbalances in Toronto, Vancouver and their surrounding areas contributed to this shift in two ways. First, an increasing share of housing market activity was concentrated in areas with strong house price growth. While 40 per cent of all mortgages were issued in these areas in 2014, this share increased to 44 per cent by 2016. Importantly, areas with strong house price growth have historically had a higher share of low-ratio mortgages than other areas. Second, within these strong house price growth areas, the share of low-ratio mortgages increased from 80 per cent in 2014 to 85 per cent in 2016. One important reason is the increasing share of homes in Toronto and Vancouver priced at $1 million or greater, which nearly doubled in the mortgage origination data from 13 per cent in 2014 to 25 per cent in 2016. Additionally, the upward

Table 3: Share of low-ratio mortgages across socio-demographic characteristics of borrowers, 2014 and 2016 (per cent)

Category	Share of low-ratio mortgages within category	
	2014	2016
All	67	72
Region		
Strong house price growth	80	85
Modest house price growth	59	61
Age		
< 35	49	55
35 to 44	69	71
45 to 54	80	82
55 to 64	84	85
≥ 65	89	89
Household income		
1st (lowest income)	65	66
2nd	59	61
3rd	62	65
4th	67	73
5th (highest income)	80	87

Note: All percentages are calculated using equal weights.
Sources: Regulatory filings of federally regulated financial institutions and Bank of Canada calculations

shift in the distribution of house prices also raised the income required to satisfy the debt-servicing criterion for high-ratio mortgages.[4] Thus, some households might have chosen to take low-ratio mortgages to alleviate debt-service constraints. Outside the regions where house price growth was high, the share of low-ratio mortgages increased only slightly, remaining near 60 per cent.[5]

Persistently strong house price growth has also shaped the increase of low-ratio mortgages among different age and income groups. Between 2014 and 2016, we see an increasing share of low-ratio mortgages across nearly all age cohorts. This trend is most pronounced for the under-35 age group. The move by the youngest households to a low-ratio mortgage helped them relax their debt-service constraints but required a larger down payment, which could come from a number of sources. One source of down payments has been family, with first-time homebuyers receiving 18 per cent of the down payment from family over 2014–16.[6]

Regional differences also explain a more pronounced shift to low-ratio mortgages among richer households, as the increase by 7 percentage points of the low-ratio mortgage space among top income quintiles is largely driven by a bigger presence of high-income borrowers in the Ontario and British Columbia housing markets.

Measuring Vulnerabilities in the Mortgage Market

We focus on the possibility of systemic risk originating in the mortgage market. In particular, we are interested in the implications of a notable rise in unemployment, higher mortgage interest rates and a sharp correction in house prices.[7]

As a result of changes to mortgage financing policy announced in autumn 2016, there was a significant drop in the volume of new high-ratio mortgage originations, as well as a sharp decline in the share of high-ratio, high-LTI mortgages. This can be seen initially in the data from the fourth quarter of 2016, but most prominently in 2017 after the end of the data used in this analysis (see Assessment of Vulnerabilities and Risks in this *Financial System Review*). In contrast, both the volume of new low-ratio mortgages and the share of low-ratio, high-LTI mortgages have continued to increase. Given these developments, the remainder of the analysis focuses on vulnerabilities in the low-ratio mortgage market.[8]

Three metrics are considered in assessing the vulnerability of new low-ratio mortgages.

Loan-to-income ratio

All else being equal, mortgages with higher LTIs are more vulnerable to financial stress, i.e., there is an increased likelihood of mortgage arrears in the event of an adverse income shock or a rise in mortgage interest

4 Both high and low gross debt-service ratios have become more common in Toronto and Vancouver with little effect on the average. The increase in mortgages with high debt-service ratios is mostly associated with rising house prices.

5 For the share of low-ratio mortgages for selected Canadian cities, see Table A-2 in the Appendix.

6 Mortgage Professionals Canada, *Annual State of the Residential Mortgage Market in Canada, Fall 2016 Survey Report.* In addition, the *2017 Mortgage Consumer Survey* from Canada Mortgage and Housing Corporation confirms the importance of family support for first-time homebuyers.

7 See Risk 1 and Risk 2 in the June 2017 Bank of Canada *Financial System Review*, Assessment of Vulnerabilities and Risks section.

8 For details regarding the most recent changes to the OSFI Guideline B-20, see the Assessment of Vulnerabilities and Risks in this *Financial System Review*.

rates. Cateau, Roberts and Zhou (2015) find that this relationship is most pronounced for households with the highest LTI. We use the share of mortgages with an LTI greater than 450 per cent to identify the most vulnerable borrower group.[9] A high LTI also suggests that, in the presence of an aggregate adverse income shock, affected households are more likely to reduce non-housing-related expenditures, with negative implications for aggregate consumption.[10]

There are several other possible measures of borrowers' ability to pay, including debt-service ratios and credit scores. We focus on LTI because it can be consistently calculated in our data and it provides a good through-the-cycle assessment of the vulnerability of borrowers.

Amortization period

A longer amortization period reduces monthly payments, creating more financial flexibility in the short term. But a long amortization also allows a slower paydown of mortgage principal, which can lead to less equity in the house and higher ongoing indebtedness. Longer amortization periods can also be a symptom of borrowers stretching to meet their debt-service requirements. If borrowers select a long amortization period with a monthly payment they can just afford, they are more vulnerable if there is an adverse income shock because they do not have the flexibility to extend the amortization further to reduce these payments.

Some households can afford prepayments that, by reducing the amount of the mortgage principal, shorten the amortization. By looking only at amortization at the time a mortgage is issued, we assess the worst-case scenario where no prepayments occur.

Loan-to-value ratio

Mortgages with lower LTVs are less vulnerable to financial stress from two perspectives. First, lenders are more likely to recover the loan value after a default, even if house prices have declined. Second, borrowers have more equity available to cushion financial stress, for example, by taking out a second mortgage or selling their home.

The vulnerability from high-LTV mortgages can be amplified by housing market imbalances, which are likely highest in the regions with strong house price growth, most notably Vancouver, Toronto and their surrounding areas.[11] Strong economic fundamentals in these regions make them relatively resilient to income shocks, but there is a higher probability of house price declines that might erode mortgage equity among recent homebuyers.

The LTV is also less effective at mitigating vulnerabilities if part of the down payment is borrowed rather than obtained from savings or friends and family.[12]

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9 Cateau, Roberts and Zhou (2015) find a stronger relationship between LTI and future arrears at an LTI threshold of 350 per cent. We choose the higher threshold because we look at new debt rather than the stock of existing debt.

10 See Baker (forthcoming) for an assessment of how household leverage modifies the consumption response to income shocks.

11 See Vulnerability 2 in the Assessment of Vulnerabilities and Risks section in this *Financial System Review.*

12 See the June 2017 Bank of Canada *Financial System Review,* Assessment of Vulnerabilities and Risks section, Vulnerability 1.

Variation in mortgage vulnerabilities across households

Loan-to-income ratio and amortization period across households

The share of low-ratio mortgages with an LTI above 450 per cent is greatest in markets with strong house price growth, among households younger than 35 and for low-income earners (**Table 4**).[13] A similar pattern emerges for the incidence of extended amortizations.

In regions with strong house price growth, 31 per cent of low-ratio mortgages had a high LTI in 2016, compared with 12 per cent in the rest of the country. Extended amortization is also more prevalent in regions with strong house price growth where housing market vulnerabilities are high, with the highest share, 79 per cent, in Vancouver.[14]

LTIs generally decrease with age as the share of high-LTI mortgages declines from 29 per cent among the youngest borrowers to 17 per cent among the 55–64 age group. One notable exception is the category of 65 years and older, which has a 21 per cent share of high-LTI mortgages. This is largely due to lower incomes in retirement. Similarly, the share of mortgages with extended amortization periods declines somewhat with age.

The share of high-LTI mortgages is the lowest among households in the top income quintile and the highest for the bottom income quintile, making the latter group particularly vulnerable to income shocks.

Loan-to-value ratio across households

Low-LTV borrowers create fewer vulnerabilities for lenders, all else being equal, because of their larger equity cushion. Given this equity cushion, borrowers face different underwriting standards. Among the 65 per cent LTV group, for example, some borrowers have no income reported in the data. In these cases, lenders focus underwriting decisions on other factors, including borrower wealth. Among those with reported income, this group has the highest proportion of borrowers with an LTI greater than 450 per cent of any LTV group (**Table 4**).

Mortgages with an LTV of 80 per cent are more closely scrutinized by lenders because they have the maximum possible LTV without requiring mortgage insurance, resulting in a larger expected loss in the event of a default. While this segment has a low proportion of high-LTI borrowers, it accounts for close to one-third of low-ratio mortgages. Moreover, 46 per cent of mortgages in this segment stem from areas with strong growth in house prices (**Table 2**).

Mortgages with an LTV between 66 and 79 per cent have a somewhat greater incidence of high LTIs and are almost equally present in regions with high and moderate price growth. Since these mortgages combine high LTI with moderately high LTV, they present elevated overall vulnerabilities.

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13 The high-LTI share calculations in Table 4 differ from those used in Table 1 of the June 2017 Bank of Canada *Financial System Review*. The current table includes all federally regulated financial institutions and excludes mortgage refinancing.

14 Table A-3 in the Appendix presents the share of high-LTI mortgages as well as the share of mortgages with extended amortization for selected Canadian cities.

Table 4: Characterizing vulnerabilities in low-ratio mortgages, 2014 and 2016 (per cent)

	Share of low-ratio mortgages with LTI greater than 450 per cent		Share of low-ratio mortgages with amortization greater than 25 years	
Category	**2014**	**2016**	**2014**	**2016**
All—by count	16	22	53	62
All—by value	23	32	62	72
Region				
Strong house price growth	23	31	67	75
Modest house price growth	9	12	40	47
Age				
< 35	21	29	59	66
35 to 44	15	22	55	64
45 to 54	14	19	49	60
55 to 64	12	17	46	55
≥ 65	16	21	48	55
Household income				
1st (lowest income)	37	44	55	63
2nd	21	28	55	63
3rd	14	21	54	63
4th	7	14	52	62
5th (highest income)	3	7	49	62
LTV group				
LTV = 80%	17	24	61	70
65% < LTV < 80%	20	26	56	65
LTV = 65%	29	31	65	72
LTV < 65%	10	15	39	49

Notes: All percentages are calculated using equal weights unless otherwise noted. LTIs are calculated by assuming that the readvanceable portion of mortgages is not drawn at origination and exclude mortgages with no income reported in the data. LTI means loan-to-income ratio; LTV means loan-to-value ratio.

Sources: Regulatory filings of federally regulated financial institutions and Bank of Canada calculations

Increase in mortgage vulnerabilities over time

Loan-to-income ratio and amortization period over time

Mortgages with high LTIs became more prevalent between 2014 and 2016 across almost all demographic characteristics and market segments (**Table 4**). Households with LTIs above 450 per cent account for 22 per cent of low-ratio mortgages in 2016, up from 16 per cent in 2014. The mortgages of these more vulnerable households are larger than the average mortgage, making up 32 per cent of the value of all low-ratio mortgages in 2016, up 9 percentage points from 2014.[15] The fact that the share of high-LTI mortgages increased to almost one-third of the low-ratio mortgage originations suggests stronger household sector vulnerabilities.

A rise in the share of mortgages with amortizations longer than 25 years, from 53 per cent in 2014 to 62 per cent in 2016, has also increased vulnerabilities for low-ratio mortgage borrowers. Among mortgages with an LTI greater than 450 per cent, the share with extended amortization rose from 79 to 86 per cent. A high LTI reduces the borrowers' ability to make

15 At origination, some households were approved for a higher loan amount potentially available as home equity lines of credit. Should these credit lines be used, the share of households with an LTI above 450 per cent could be as high as 25 per cent by count and 35 per cent by value based on 2016 originations, up from 19 per cent and 26 per cent in 2014, respectively.

prepayments, suggesting their amortization period will remain long. This pool of borrowers may therefore be more vulnerable to income shocks or unexpected increases in mortgage interest rates.

Regions with strong house price growth contributed the most to the increase in the share of high-LTI mortgages. This occurred for two reasons. First, cities in these regions have the highest price-to-income ratios and experienced the largest increases in mortgage activity, which can be partly related to fundamentals, such as strong employment growth and population gains. Second, price growth continued to outstrip income growth in these cities. In contrast, in Calgary, for example, where price growth was quite weak, the increasing share of high-LTI mortgages is mainly associated with income reductions related to the 2014 oil price decline. Similar reasons are behind the increased length of mortgage amortizations.

Focusing on age and income groups, we find that the incidence of high-LTI, low-ratio mortgages has risen for all age cohorts and income quintiles. The largest increase occurred for the under-35 age group, which contributed the most to the aggregate upward trend. Increasing vulnerabilities for younger households may be significant since, all else being equal, they may have a higher risk of being laid off during recessions, which might cause them to have difficulties repaying their mortgage (Chan, Morissette and Frenette 2011). The share of extended amortization mortgages also increased between 2014 and 2016 for all age and income groups.

Loan-to-value ratio over time

Among low-ratio mortgages, the average LTV was stable since both the 65 and the 80 per cent groups increased their shares at the expense of the group between these two (**Chart 1**). A regional differentiation shows that the share of low-LTV mortgages increased in markets with strong house price growth, with the additional equity compensating lenders for the rising share of high-LTI mortgages in these regions. However, housing market imbalances in these regions raise the concern that a house price correction could erode the additional equity.

The share of mortgages with a high LTI increased across LTV groups, except for the 65 per cent pool, where it remained stable near 30 per cent.

Conclusion

Using loan-level data from federally regulated financial institutions over the period from 2014 to 2016 allows us to assess the vulnerabilities created by high mortgage debt in Canada, across household types and over time. Low-ratio mortgages grew in importance, representing more than two-thirds of all new mortgages by 2016. At the same time, the share of these mortgages with high LTIs increased across most demographic characteristics and LTV segments, reaching 22 per cent of low-ratio mortgages overall. And the proportion of these mortgages with amortization periods extending beyond 25 years increased to 62 per cent. These trends were more pronounced among younger households and in markets with strong house price growth.

The net effect of these changes on financial system vulnerabilities cannot be summarized simply. The growing prevalence of low-ratio mortgages implies a shift of risk from mortgage insurers to lenders and also increases the amount of overall equity. At the same time, all else being equal, a greater prevalence of high LTIs and extended amortization among low-ratio mortgages suggest increased risk to the financial system in the event of a

major shock to household income. They also create vulnerabilities to higher mortgage interest rates, although many borrowers have payments that are fixed for several years.

A further subdivision of the low-ratio mortgage space reveals substantial heterogeneity in the observable vulnerabilities and characteristics of different LTVs. The group of mortgages with an LTV from 66 up to 80 per cent makes up more than half of low-ratio mortgage originations. Many of these mortgages have high LTIs and long amortization periods.

This analysis has three caveats. First, the data exclude lenders that are not federally regulated. Second, we cannot assess the riskiness of the loan portfolios of lenders because new mortgages used for purchases in any year make up only a fraction of those portfolios. Third, we do not analyze the overall underwriting or risk-management process of lenders in this report, or the amounts of capital they allocate to absorb losses should mortgage defaults occur.

Appendix

Table A-1: Proportion of mortgages by loan-to-value ratio originated in selected cities, 2014 to 2016 (per cent)

City	High-ratio mortgages	Low-ratio mortgages				
		All	LTV = 80%	65% < LTV < 80%	LTV = 65%	LTV < 65%
Toronto	11	28	26	27	42	26
Vancouver	4	11	7	9	23	13
Calgary	6	5	5	6	3	4
Halifax	1	1	1	1	1	1
Montréal	9	8	8	8	6	10
Ottawa–Gatineau	4	4	4	4	2	3
Rest of Canada	65	43	49	45	23	43

Notes: All percentages are calculated using equal weights. LTV means loan-to-value ratio.
Sources: Regulatory filings of federally regulated financial institutions and Bank of Canada calculations

Table A-2: Share of low-ratio mortgages by city, 2014 and 2016 (per cent)

City	Share of low-ratio mortgages within category	
	2014	2016
Toronto	83	87
Vancouver	85	90
Calgary	65	64
Halifax	57	55
Montréal	67	68
Ottawa–Gatineau	68	67

Note: All percentages are calculated using equal weights.
Sources: Regulatory filings of federally regulated financial institutions and Bank of Canada calculations

Table A-3: Characterizing vulnerabilities in low-ratio mortgages by city, 2014 and 2016 (per cent)

City	Share of low-ratio mortgages with LTI greater than 450 per cent		Share of low-ratio mortgages with amortization greater than 25 years	
	2014	2016	2014	2016
Toronto	25	34	69	77
Vancouver	33	38	73	79
Calgary	16	21	55	62
Halifax	6	7	38	38
Montréal	13	13	41	46
Ottawa–Gatineau	8	10	46	51

Notes: All percentages are calculated using equal weights. LTIs are calculated by assuming that the readvanceable portion of mortgages is not drawn at origination and exclude mortgages with no income reported in the data. LTI means loan-to-income ratio.
Sources: Regulatory filings of federally regulated financial institutions and Bank of Canada calculations

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