



CANADA

FINANCIAL SECTOR ASSESSMENT PROGRAM

TECHNICAL NOTE—HOUSING FINANCE

January 2020

This Technical Note on Financial Safety Net and Crisis Management for the Canada FSAP was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed in October 2019.

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International Monetary Fund
Washington, D.C.



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December 20, 2019

TECHNICAL NOTE

HOUSING FINANCE

Prepared By

**Monetary and Capital
Markets Department**

This Technical Note was prepared by IMF staff in the context of the Financial Sector Assessment Program that visited Canada in October 22–November 14, 2018 and February 6–26, 2019. It contains technical analysis and detailed information underpinning the FSAP’s findings and recommendations. Further information on the FSAP can be found at <http://www.imf.org/external/np/fsap/fssa.aspx>

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Glossary

BOC	Bank of Canada
Can\$	Canadian dollar
CMB	Canada Mortgage Bond
D-SIB	Domestic-Systemically Important Bank
D-SIFI	Domestic-Systemically Important Financial Institution
DOF	Department of Finance
GoC	Government of Canada
HELOC	Home Equity Line of Credit
IRB	Internal Ratings Basis
LGD	Loss Given Default
LTV	Loan-to-Value
LTI	Loan-to-Income
MBS	Mortgage-backed Securities
MFC	Mortgage Financing Company
MIC	Mortgage Investment Company
NHA	National Housing Act
OSFI	Office of the Superintendent of Financial Institutions
PD	Probability of Default
RMBS	Residential Mortgage-backed Securities

EXECUTIVE SUMMARY¹

Housing finance is broadly resilient, but pockets of vulnerabilities exist. Mortgage finance is dominated by domestic systemically important financial institutions (D-SIFIs) and supported by the government via mortgage insurance, securitization guarantees, and other policies. With a market share of about 70 percent, D-SIFIs focus on prime borrowers, and their lending is backed by their strong balance sheets. The smaller (uninsured) non-prime lending segment is largely served by smaller banks and prudentially unregulated lenders, which are comparatively less resilient. Some of these lenders rely on less stable, higher-cost funding such as brokered deposits or redeemable equity, and their lending is concentrated in regions with large housing market imbalances. Market concerns about the business model of non-prime lending were manifested by the liquidity crisis at a mid-sized deposit-taking institution in 2017.

The cost of prime mortgage financing is low and little differentiated, with credit risk being underpriced in some segments. Various government policies aim at ensuring housing affordability contribute to low mortgage financing costs. Capital charges for uninsured mortgage lending are low and do not fully reflect through-the-cycle credit risk. The long period of benign macrofinancial conditions contributes to lenders' assessment of risk in their lending as extremely low, justifying minimal capital and mostly uniform pricing offered to borrowers. For insured mortgages, costs faced by riskier borrowers are compressed by mortgage insurers' practice of insuring loans that fund insurance premiums (up to 4.5 percent of principal) on the same terms as the mortgages. Consequently, borrowing costs for riskier borrowers are near risk-free levels, increasing debt accumulation among such borrowers and intensifying aggressive lending competition. Credit spreads of prime mortgage lending have narrowed in recent years, undermining the impact of macroprudential policy tightening.

Aspects of Canada's mortgage finance may amplify procyclical effects of falling house prices during severe downturns. Core lenders focus on low-risk mortgage lending. In response to deteriorating household debt-servicing capacity, they may constrain new lending or renewals of maturing uninsured mortgages (typically, 5-years contractual maturity and 25-years amortization period), potentially adding pressures on the housing market. Alternatively, a sudden adoption of risk-based pricing to accommodate financially weak borrowers might amplify household debt-servicing fragility. Rising losses and tighter funding conditions at weaker lenders might impair the flow of credit to riskier, non-prime borrowers who would also face increased refinancing pressure due to their shorter-maturity mortgages (typically, 1–2 years).

¹ This Technical Note was prepared by Henry Hoyle (IMF) under guidance of Phakawa Jeasakul (FSAP deputy mission chief). The review was conducted as part of the 2019 Canada FSAP led by Ghiath Shabsigh (FSAP mission chief).

Table 1. Canada: Recommendations on Housing Finance Issues

Recommendations	Priority	Timeframe
Improve risk-based pricing in insured mortgage lending by (i) tightening lending terms for mortgage insurance premiums; and (ii) expanding use of borrower risk factors in determining capital requirements, premiums, and the government's cost of reinsurance.	M	MT
Improve risk-based pricing in uninsured mortgage lending by making prudential adjustments to risk-based capital calculations to better account for Canada's lack of a full default cycle.	M	MT
Develop a clear set of principles and guidelines for managing a housing market downturn that protects taxpayer interests and limits moral hazard.	L	NT
Authorities should limit use of portfolio insurance as a crisis management tool, except at punitive premiums that reduce moral hazard and ensure taxpayer profits.	M	NT
<p>Note: Institutions in the parenthesis are the agencies with responsibilities. In terms of priorities, H, M, and L stand for high, medium, and low. In terms of timeframe, I, NT, and MT stand for immediate (within one year), near-term (within 2–3 years), and medium-term (within 3–5 years).</p>		

MARKET STRUCTURE

A. Mortgage Lending and Origination

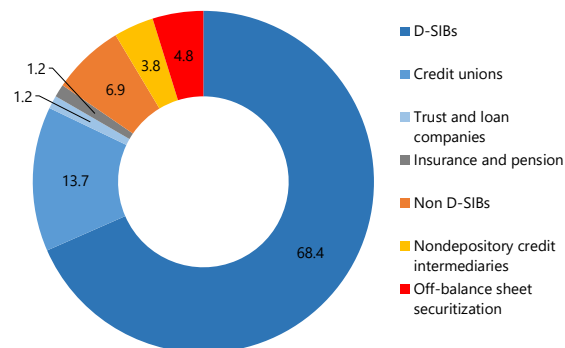
1. **Residential mortgage credit is sizeable relative to GDP, but its growth has slowed in recent years.** Residential mortgage credit in Canada was Can\$1.54 trillion as of December 2018, equivalent to 69 percent of GDP and 11 percent of financial system assets. Other housing-secured retail lending by banks was around Can\$250 billion, with all residential housing-secured exposures about one-third of Canadian banks' Canadian dollar-denominated bank assets. Mortgage growth has averaged around 5.5 percent annually since end-2014 but has recently slowed to 3.1 percent.
2. **Mortgages are largely financed on the balance sheets of deposit-taking institutions.** The six domestic systemically important banks (D-SIBs) hold over two-thirds of residential mortgages on their balance sheets (68 percent), in part reflecting a significant quantity of mortgages purchased from other institutions (Figure 1). Provincially regulated deposit-takers such as credit unions (14 percent), federally regulated smaller banks (6 percent), and nonbanks (10 percent) finance relatively smaller shares of the market.
3. **Private and nonbank lending outside the regulatory perimeter is growing but still very small.** Private mortgage lending outside the bank regulatory and insurance underwriting perimeter has grown in recent years as bank mortgage lending to riskier borrowers has been curbed by regulation. While the size of this lending is difficult to assess given data gaps around private market activities, it is seen as small, in part limited by the absence of institutional funding sources. Mortgage investment companies (MICs), for instance, a common entity type in this market, were recently assessed by Statistics Canada to have only about Can\$10 billion in mortgage assets as of end-2017. There is less data around lending activities by larger institutional funds, with some active in commercial real estate and construction lending.
4. **Nonbanks and smaller banks nevertheless play an important role in mortgage finance within the regulatory perimeter (Figure 2).** Nonbanks known as mortgage finance companies (MFCs) are important originators, sellers, and servicers of mortgages. MFCs have accounted for roughly 31 percent of all insured mortgage originations since 2013 despite retaining a significantly smaller share on their balance sheets. Most mortgages generated through this channel comply with federal underwriting guidelines and are ultimately sold to banks or institutional investors and are often securitized via the public securitization program (i.e., National Housing Act Mortgage-backed Securities (NHA MBS)) (see below). Some smaller banks and credit unions are also active in the originate-to-distribute business, although to a lesser extent. Lending institutions in this business model tend to rely on networks of independent mortgage brokers to source mortgages, rather than their own staff and branch networks. This can create operational risks related to broker fraud.
5. **Mortgage contractual maturities are shorter than amortizations.** Most mortgages have contractual maturities of 5 years or less, but amortizations of typically around 25 years. This in part

Figure 1. Canada: Housing Finance: Market Structure

D-SIBs dominate mortgage lending in Canada, with provincially regulated deposit-takers also large.

Residential Mortgage Loans by Holders, 2018Q3

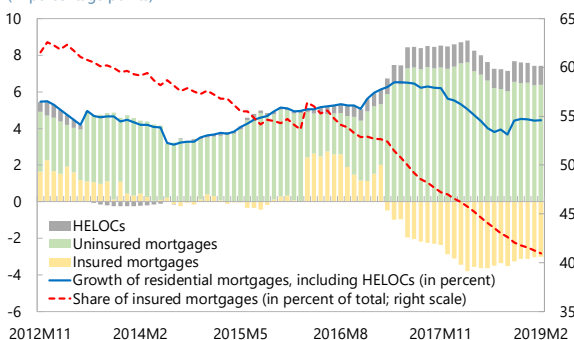
(In percent of total)



Insured lending has been declining on the balance sheets of federally regulated banks

Contribution to Growth of Banks' Residential Mortgage Lending, 2013-19

(In percentage points)

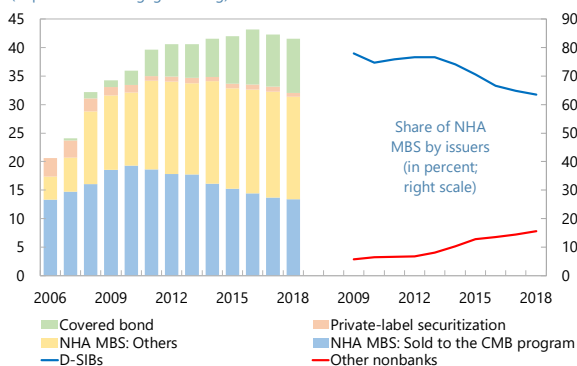


Sources: OSFI; Bank of Canada; Statistics Canada; CMHC; Haver; and IMF staff calculations.

Use of NHA MBS funding increased post-crisis; recently D-SIBs and Desjardins have increased use of covered bonds.

Market-Based Funding for Mortgage Lending, 2005-18

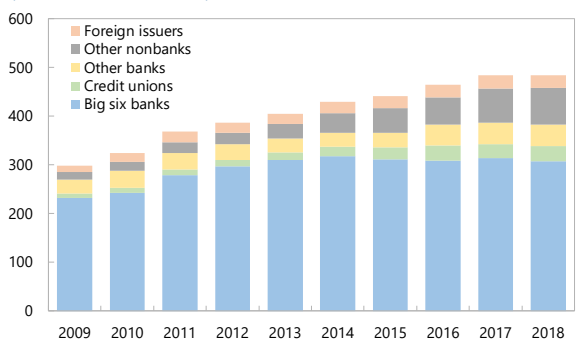
(In percent of mortgage lending)



...in part reflecting the larger role of nonbanks in directly issuing insured mortgages via the NHA MBS program

Outstanding National Housing Act Mortgage-Backed Securities by Issuers, 2009-18

(In billions of Canadian dollar)



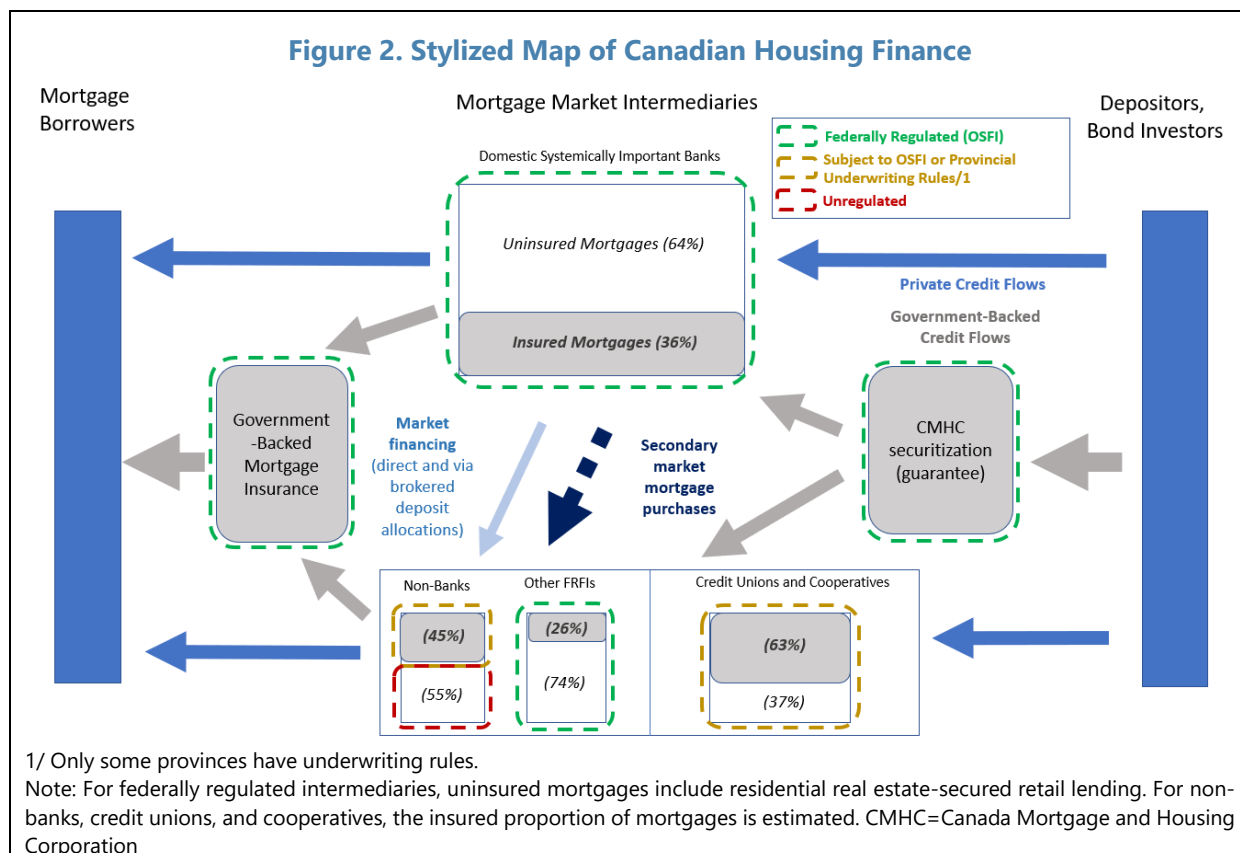
reflects a longstanding law that limits pre-payment penalties on loans above five years, which makes such loans unattractive to lenders, as well as regulations of the Office of Superintendent of Financial Institutions (OSFI) that limit banks' asset-liability maturity mismatches. This maturity-amortization mismatch means borrowers and lenders must roll over, or "renew," mortgages that have matured but not fully amortized. Lender renewal is required by mortgage insurers for insured mortgages but not obligatory for uninsured mortgages, although lenders rarely decline to renew maturing mortgages in practice.²

6. The "prime" segment is the largest and most competitive part of the lending market.

There is no single definition for this market segment, but it is generally characterized by borrowers able to meet conservative underwriting and income documentation standards, with conventional product structures. The most important sources of mortgage supply for prime borrowers are the D-

² Recent tightening in underwriting standards do not apply for borrowers renewing existing mortgages with their lending institution but do apply to borrowers refinancing at any institution or renewing at other institutions.

SIBs and entities funding through the NHA MBS program. Competition for borrowers in this segment is intense, reflecting the low cost of capital for the D-SIBs, the absence of lender credit risk for insured mortgages, and the low cost of funding available via the NHA MBS program. New immigrants, the self-employed, and households with weaker credit profiles tend to be catered to by the smaller banks and unregulated lenders like MICs. Mortgage maturities tend to be shorter in this non-prime segment, reflecting limited term funding sources for these lenders and borrowers’ desire to “graduate” to cheaper prime mortgages in a short time period.



7. Consumer lending backed by residential property is small but growing quickly and a potential source of riskier lending. Home equity lines of credit (HELOC) and other property-backed lending are growing 6 percent year-on-year, faster than mortgages at federally regulated banks, although still about one-fifth the size of their mortgage loan portfolio.³ The majority of lending in this segment is part of riskier and more complex structures like “re-advanceable” mortgages, which incentivize further borrowing and typically have interest-only repayment periods.⁴

³ This figure includes both stand-alone HELOCs and the HELOC portions of re-advanceable mortgages (see Footnote 3). Stand-alone HELOCs are a smaller share of this segment and contracted in net terms in 2018. See Al-Mqbali, Bilyk, Caputo and Younker, “Re-assessing the Growth of HELOCs in Canada Using New Regulatory Data,” Bank of Canada Staff Analytical Note (2019–14). <https://www.bankofcanada.ca/wp-content/uploads/2019/05/san2019-14.pdf>

⁴ A re-advanceable mortgage typically links a standard residential mortgage with a customized HELOC. Each repayment of mortgage principal is re-borrowed under linked HELOCs, maintaining the borrower’s net indebtedness.

(continued)

Nonregulated institutions appear to play a significant role in secured consumer lending, particularly in key regions of house price alignment with high levels of investor-led demand.⁵

B. Mortgage Insurance

8. Mortgage insurance plays an important albeit shrinking role in the Canadian mortgage market. Around half of all Canadian residential mortgages were insured in 2018Q2, reflecting in part the requirement that all mortgages with a loan-to-value (LTV) ratio of over 80 percent must have mortgage insurance. This proportion is however down from about 60 percent in 2014, partly reflecting the gradual tightening of mortgage insurance underwriting standards and higher costs charged to insured borrowers.

9. The mortgage insurance market is divided into two key products: loan-level insurance and bulk insurance. The former, known as “transactional” insurance, is required for all mortgages with an LTV ratio above 80 percent and is underwritten for an individual loan at the time of origination. The borrower is charged a single up-front premium, which is typically funded by the bank and added to the mortgage principal. The latter product is “portfolio insurance,” where lenders can pay to bulk-insure existing mortgages with LTV ratios of 80 percent or below, as long as they conform with mortgage insurance underwriting standards. This product has historically been attractive to lenders because it allows them to access the government-guaranteed securitization program, which requires insured mortgages.

10. Bulk insurance has been an important driver of overall mortgage insurance growth but has slowed significantly after tighter rules were introduced late in 2016. Portfolio insurance volumes grew rapidly in 2015 and 2016, accounting for over half of total new insurance volume in those years. Average volumes have however dropped around 75 percent since 2016, when the Department of Finance (DOF) tightened mortgage insurance rules and OSFI required mortgage insurers to hold more capital against such products.⁶ Transactional mortgage insurance volumes have remained relatively stable but have declined recently. Reflecting their important role in originating mortgages within the prime segment, MFC mortgages accounted for 31 percent of all insurance volumes between 2013 and 2018Q2, while smaller banks and provincially regulated lenders accounted for another 16 percent.

One advantage of this structure is that interest on HELOC borrowings used for investment purposes are tax-deductible under Canadian law. https://www.canada.ca/en/financial-consumer-agency/news/2017/06/fcac_report_homeequitylinesofcreditmayputconsumersatrisk.html.

⁵ According to data from the mortgage registry Teranet, private, unregulated lenders accounted for 20 percent of mortgage refinancings (defined as mortgage transactions without a home sale) in the Greater Toronto Area in 2018Q2, up from 12 percent in 2016Q2. Half of all private lending is used for these refinancing transactions. <https://www.purview.ca/october-2018-teranet-market-insights-report-surge-in-private-lending-in-the-gta/>. Investor-led demand was calculated as the share of properties purchased that were immediately relisted for rent. See Bank of Canada Financial System Review June 2018. <https://www.bankofcanada.ca/wp-content/uploads/2018/06/fsr-june2018.pdf>.

⁶ Another factor likely contributing to declining portfolio insurance volumes was the DOF’s introduction of a purpose test in July 2016, prohibiting the use of portfolio insurance as a means of obtaining capital relief.

11. The government stands behind the mortgage insurance market, operating the largest insurer and backstopping mortgage insurance provided by other players. The market features a public-private hybrid model, where the government-owned mortgage insurer Canada Mortgage and Housing Corporation (CMHC) competes with two smaller private entities (Genworth Financial and Canada Guaranty, which collectively have a market share of about 35 percent of insurance-in-force). In order to provide a more level playing field for the private insurers, the government guarantees their obligations in the event of default with a 10 percent deductible for the lender. Insurance coverage covers most costs and expenses related to work-out and foreclosure in addition to 100 percent of the lost principal and interest on mortgage exposures.⁷ Because of this government-backed risk mitigation, banks are required to hold minimal or no capital against insured mortgage exposures.⁸

12. CMHC and the government are dominant in determining mortgage insurance pricing. In practice, insurance pricing for high-LTV mortgages is determined by CMHC, which offers seven tiers of pricing based on the original LTV of the mortgage and the source of the down payment. There is more price competition in the smaller portfolio insurance space, where private mortgage insurers have played a comparatively larger role, although volumes in this segment have declined due to tighter regulation. Mortgage insurers do not reinsure their obligations but pay the government a guarantee fee for their federal backstops, with CMHC paying 3.25 percent of total premiums and private insurers paying 2.25 percent. The lockstep pricing in transactional mortgage insurance and the fixed guarantee cost offer limited input for market-based pricing of risks.

13. Mortgage insurance policy has also been a key part of the government's toolkit for managing housing market vulnerabilities. Tightening eligibility for mortgage insurance has been a key prudential tool for authorities in addressing housing market vulnerabilities. Authorities also consider the provision of insurance via CMHC a potential countercyclical tool in the event of an economic downturn. During the global financial crisis, CMHC rapidly increased its use of portfolio insurance to facilitate the creation of insured mortgages eligible for government-backed securitization. Many of these securities were then purchased by the government (via CMHC) as part of the Can\$69 billion Insured Mortgage Purchase Program. By seeking to achieve housing market stability via transferring credit risk to the government, the use of portfolio insurance during a crisis may increase moral hazard and expose the taxpayer to losses.

C. Mortgage Funding

14. Most mortgages are funded by deposits, however capital market funding plays an important role. Over four-fifths of mortgages are funded by the D-SIBs and provincially regulated

⁷ Earthquake risk is not covered, which is a notable exception. Western provinces are more vulnerable to catastrophic earthquakes, but uptake of property-and-casualty insurance to cover earthquake damages is more common. In the Eastern provinces, where earthquake risk is lower, property-and-casualty insurance coverage is far more limited.

⁸ Canadian D-SIFIs' internal ratings-based insured mortgage risk weight density was under 3 percent as of end-2018. Mortgages insured by CMHC have risk weights of around 0 percent, while privately insured mortgages carry slightly higher risk weights, reflecting the Canadian government's backstop of 90 percent of private insurance claims.

institutions. These lenders rely on large, low-cost customer deposit bases, accounting for roughly 60 and 69 percent of total assets at these respective institutions. For the domestic systemically important financial institutions (D-SIFIs),⁹ strong capital and liquidity buffers also support access to low cost wholesale funding at longer maturities.

15. The government-guaranteed securitization program (i.e., NHA MBS) is a key mortgage funding tool and has enabled wider participation by nonbanks. Thirty one percent of all mortgages are securitized via the NHA MBS program, where CMHC provides a timely payment guarantee for securitization of insured mortgages.¹⁰ With issuance quotas distributed equally among qualified issuers regardless of size, the program has facilitated greater participation of nonbanks in mortgage lending by providing a low-cost longer-term funding with government guarantee of credit risk. Nonbanks (mostly MFCs) accounted for roughly 16 percent of the Can\$485 billion in outstanding issuance as of 2018Q3, up from 10 percent in 2014, with other nonbanks and credit unions accounting for another 16 percent (Figure 1).

16. NHA MBS allow insured mortgages to be funded at close to sovereign yields. Around 45 percent of NHA MBS (roughly Can\$200 billion) have been sold to Canada Housing Trust (CHT), a unit of CMHC. CHT packages these bonds into Canada Mortgage Bonds (CMB), which are standard bullet payment bonds without the pre-payment risk of the NHA MBS. With yields typically only 20–40 basis points above equivalent Government of Canada (GoC) bond maturities, and with a diversified ownership base including pension funds and foreign investors, these instruments help drive the intense cost competition in the insured mortgage market. Of NHA MBS not sold to the CMB program, funding costs are around 40–80 basis points higher than sovereign yields with similar maturity, reflecting both pre-payment risk and non-standardized size and payment terms of NHA MBS. About 36 percent of NHA MBS were retained by banks on their balance sheets and have status as high-quality liquid assets (HQLA) Level 1 assets.

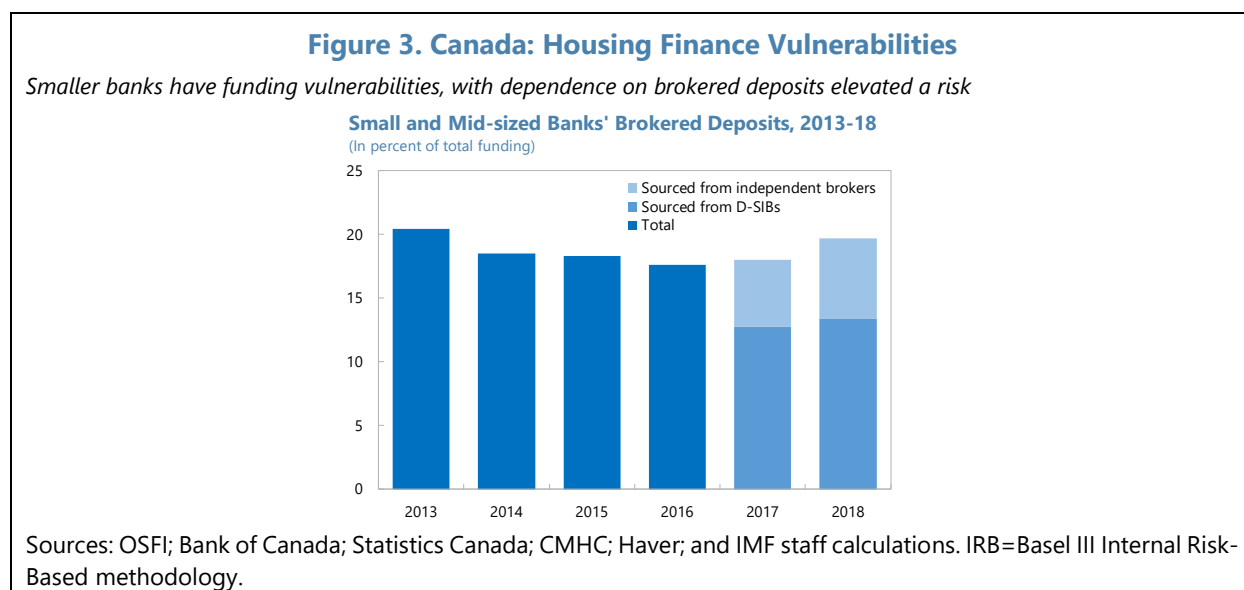
17. Covered bonds have grown in importance as a funding instrument, financing almost 10 percent of mortgages. Covered bonds have more than doubled since end-2013, to Can\$147 billion, but are only available to the D-SIFIs due to the cost and complexity of establishing a covered bond program. They are largely issued in foreign currencies to foreign investors and offer a low cost of funding. Covered bonds are limited to 5.5 percent of an issuer's assets and cover pools are restricted to uninsured mortgages.

18. Some smaller banks however have weaker funding structures, which could be vulnerable under stressed market conditions. A number of smaller federally regulated lenders have elevated reliance (above 50 percent in many cases) on more expensive brokered deposits (Figure 3). These instruments are considered vulnerable to depositor runs even with full deposit insurance coverage, as brokers have an incentive to avoid tying up their clients' liquid assets in bank

⁹ D-SIFIs include all six D-SIBs and the major provincially regulated credit cooperative in Quebec.

¹⁰ This guarantee ensures that all contractual cash flows are made to securitized instrument holders in full and on time. The sole exception is for pre-payments, which are not protected by the guarantee. The CMHC's exposure to guarantee losses is limited by the securitization issuers' responsibility to make payments to bondholders.

recovery and resolution proceedings. The liquidity crisis experienced by a monoline lender in early 2017 was triggered by news that the firm had mishandled disclosures of mortgage broker fraud, which led to a pullback in brokered deposits. Monoline mortgage lending institutions in particular may face limited access to stable, long-term funding or sticky customer deposits, limiting their growth and exposing them to funding pullback risk in a crisis.



19. Unregulated private lenders have a variety of funding structures, some of which would likely be unstable in a downturn. MICs, estimated to have only about Can\$10–15 billion in assets under management, and similar private mortgage funding structures are in some cases funded through redeemable equity, typically supplemented with bank credit lines secured by the underlying property. Even when subject to lock-up periods, this funding could be drawn down over time in a housing downturn. Some larger MICs raise capital through publicly listed equity offerings and may not face similar risks.

20. MFCs' business models pose potential vulnerabilities, but the largest appear to have conservative funding profiles. MFCs face funding risks primarily related to the potential loss of access to the NHA MBS securitization program or other mortgage sales channels, which could require them to find alternate funding sources for any mortgages that had been originated but not yet sold.¹¹ The largest MFCs however maintain large, term-matched credit lines from banks in excess of their committed exposures, asset-backed commercial paper programs, and have access to repo liquidity for their mortgage assets. Their access to funding is also bolstered in most cases by their emphasis on underwriting prime borrowers and, in some cases, by their direct origination and

¹¹ An NHA MBS issuer could lose access to the securitization program if it was disqualified due to underwriting problems, or due to adverse market conditions. They may also require liquidity to fund payouts on existing NHA MBS issuance, in instances where securitization asset delinquencies rise but before insurance can cover the claim.

servicing partnerships with D-SIBs. Access to funding may nevertheless be a problem under stressed market conditions, or if MFC underwriting deteriorated.

21. Private (uninsured) mortgage securitization fell sharply post crisis but is actively being explored. Private-label mortgage securitization accounts for just 0.7 percent of all mortgage funding, down from around 3 percent pre-crisis. Recently one MFC has attempted to restart the residential mortgage backed securities (RMBS) market, with the encouragement of authorities, but early transactions were seen as not sufficiently profitable to make this a viable funding source. Available market funding costs were not low enough to support the low interest rates on prime uninsured mortgages plus the costs of setting up the structure. Market participants are hoping to support this market by having AAA-rated tranches of RMBS become eligible as CMB reinvestment pool assets, which would create additional demand for these products.¹²

KEY POLICY DEVELOPMENTS

22. Authorities have progressively tightened mortgage underwriting policies in recent years (Table 2).¹³ In October 2016, authorities broadened use of borrower stress tests to all insured mortgages, which requires lenders to assess mortgage borrowers' debt-servicing ratio at the higher of their contractual interest rate or the Bank of Canada (BOC)'s posted five-year rate.¹⁴ In January 2018, OSFI expanded the stress test requirement (Guideline B-20) to uninsured mortgage borrowers. The "stress test" interest rate is the higher of the contractual rate plus two percentage points or the BOC five-year rate. The new rules do not apply to existing mortgages at renewal with the same lender.

23. Authorities also tightened mortgage insurance and securitization rules significantly in 2017.¹⁵ OSFI revised a risk-based capital framework for mortgage insurers, increasing capital requirements, particularly for portfolio-insured mortgages, and adding a capital surcharge for mortgages in areas with price-to-income ratios above historical norms. Authorities also announced

¹² The CMB program removes pre-payment risk on behalf of investors. To do so, it requires that proceeds of pre-paid NHA MBS backing CMBs are re-invested in set of a highly liquid, low credit-risk securities like GoC bonds, repo, and new NHA MBS.

¹³ These measures follow several rounds of progressively stricter insured mortgage eligibility rules introduced from 2008–12. These included reducing the maximum amortization period to 25 years; introducing a minimum down payment of 5 percent for owner-occupied properties; and setting the maximum LTV for refinancing at 80 percent. For other policies and further details, see International Monetary Fund, "Canada: Financial Sector Assessment Program: Background Note on Housing," 2014.

¹⁴ Previously, this stress test applied to borrowers of insured high-ratio mortgages with variable interest rates or fixed interest rates with terms of less than five years. The October 2016 changes expanded the test to all insured mortgage borrowers, including low-ratio mortgages. Gross debt-service and total debt-service ratios (all housing payments and all housing payments plus other debt-servicing payments as a share of total income, respectively) must be 39 percent and 44 percent respectively. The BOC's posted five-year rate is the mode average of the D-SIBs' posted 5-year mortgage rates. These are benchmark rates used for qualifying borrowers and calculating mortgage penalties, and in recent years tend to be significantly higher than the actual contracted mortgage interest rates.

¹⁵ In addition to limiting the risks of its exposure to mortgage insurance and securitization via insurance underwriting standards, authorities have also used overall limits on insurance-in-force and securitization.

mortgage insurance premium increases for borrowers with down payments between 5 and 25 percent. In July 2016, CMHC raised their guarantee fees for a single issuer's securitization issuance above Can\$9 billion per year.

24. These policies have led to a decline in insured mortgage origination, slowing net issuance of NHA MBS, and improvements in borrower credit profiles at federally regulated lenders. Total mortgage insurance-in-force declined to Can\$743 billion as of 2018Q2, down from Can\$796 billion in 2016. The insured share of federally regulated lenders' mortgage portfolios declined to 43 percent, from 53 percent at end-2016, as new insured lending slipped to 29 percent of all new mortgages in 2018, down from 36 percent in 2014. For new insured mortgages originated by federally regulated lenders, the share with loan-to-income (LTI) ratios above 450 percent fell from 20 percent to 10 percent in 2017. A similar but smaller decline was evident among new uninsured mortgages in the first quarter of 2018 following the introduction of the revised B-20 guidelines. The use of new portfolio insurance origination dropped significantly, slowing growth in NHA MBS issuance.

25. Authorities explored increasing lender risk sharing in 2016. The Department of Finance launched consultations on changing risk sharing between lenders and insurers, i.e., limiting the coverage of mortgage insurance for lenders' mortgage-related losses through a fixed deductible or a proportionate loss arrangement. This initiative was in line with 2014 FSAP recommendations that the government should scale back the extent of mortgage insurance.¹⁶ There have been no follow-up proposals on this policy initiative since the consultation closed in 2017.

¹⁶ See International Monetary Fund, "Canada: Financial Sector Stability Assessment", IMF Country Report No. 14/29, February 2014, p. 15.

Table 2. Canada: Selected Housing Finance Policy Changes Since 2016

Date	Area	Description
February 2016	Underwriting	Increased minimum down payments for home prices. Down payments raised to 10 percent for the portion of a home price over Can\$500,000 (from 5 percent).
July 2016	Insurance	Portfolio insurance restricted. Limited to use to facilitate government-backed securitization, rather than capital relief or private securitization.
October 2016	Underwriting	The stress test is expanded to all insured mortgages. All insured mortgage borrowers' debt-servicing was assessed at the higher of their contractual interest rate or the BOC posted five-year rate. Previously, loans with LTV below 80 percent and maturities shorter than five years were excluded. Insurance eligibility of low-LTV mortgages is limited, e.g., for cash-out refinances, mortgages with amortization periods above 25 years, investment properties, etc. Mortgages insured by lenders through portfolio insurance and other low-LTV mortgage insurance are required to meet same loan eligibility criteria as mortgages with an LTV above 80 percent.
January 2017	Insurance	OSFI revised the risk-based capital framework for mortgage insurers. Changes included increasing capital requirements, particularly for portfolio-insured mortgages, and adding a capital surcharge for mortgages in areas with price-to-income ratios above historical norms.
March 2017	Insurance	CMHC raised mortgage insurance premiums. Premiums were increased for both transactional and portfolio (bulk-pooled) insurance. The two private insurers followed the pricing change.
January 2018	Underwriting	OSFI expanded borrower stress tests for uninsured mortgages (B-20 guidelines).* Borrower debt-servicing ratios are required to be assessed at the higher of the BOC posted 5-year rate or 2 percentage points above the contractual rate. While a stress test previously applied to variable rate and fixed term uninsured mortgages with maturities below five years, the stress test is expanded to borrowers of uninsured fixed term mortgages of five years or more. B-20 disallows arranging mortgages secured by same property to circumvent the maximum LTV ratio.
January 2018	Securitization	CMHC raised guarantee fees for NHA MBS. Guarantee fees were raised from 80 to 100 basis points for annual guarantees in excess of Can\$9 billion.
* Autorité des marchés financiers, Quebec's regulatory authority, issued equivalent provisions in its Residential Hypothecary Lending Guideline.		

MARKET RISKS AND VULNERABILITIES

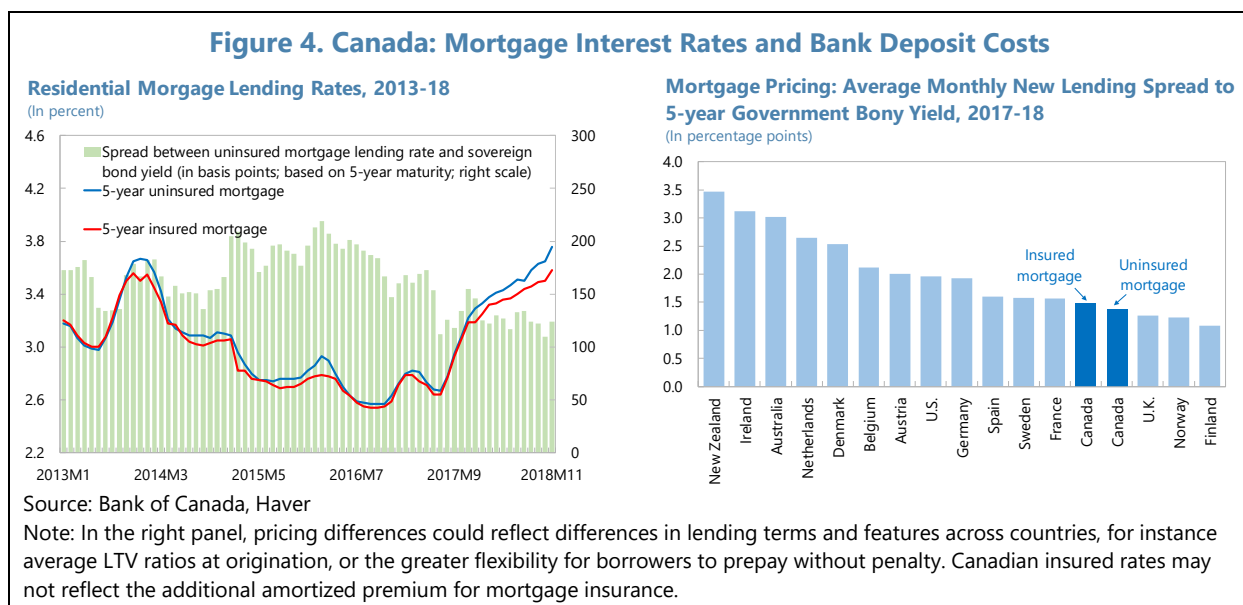
26. Institutions providing housing finance are broadly resilient, but there are potential vulnerabilities. Mortgage pricing is low, reflecting government-backed insurance and homeowner equity for uninsured loans, but is otherwise relatively little-differentiated by borrower risk factors. This raises the probability of an increase in risk-based pricing during a downturn and contributes to the accumulation of debt among potentially weaker borrowers. Non-prime lenders are small but less resilient, with more concentrated exposures to riskier borrowers. The policy framework may be driving borrower migration to weaker lenders and contributing to lower mortgage pricing for higher quality borrowers, and this approach could lose effectiveness over time. These factors could increase risks during housing market stress, particularly by increasing the procyclicality of household stress, house price declines, and bank losses.

27. Within the prime lending segment, the cost of mortgage finance is low. Prime mortgage pricing (as measured by 5-year new mortgage rates less 5-year GoC bond yield) has trending lower in recent years despite rising systemic risk from elevated household indebtedness and housing market imbalances, and macroprudential policy tightening (Figure 4). While international comparison of mortgage pricing is difficult due to heterogeneity of pricing terms and product features, average mortgage lending costs in Canada do appear to be low in international context (Figure 4). The tightening trend in pricing coincides with policy-driven tightening in underwriting standards for this segment and also reflects the high level of competition in this market. Prime mortgage pricing has generally been too low to be sufficiently profitable for smaller lenders, which have a higher cost of capital and funding compared to the D-SIFIs that dominate this market (Figure 5). Uninsured prime mortgage rates have also been too low to profitably fund via private-label securitization, hindering industry efforts to jumpstart this market.

28. Tight pricing and low capital costs may limit risk-based differentiation in mortgage interest rates for prime borrowers. From the lender perspective, insured mortgages are effectively free of credit risk and carry no pricing inputs that are sensitive to the risk profile of the borrower. Insured borrowers face a risk-sensitive price component in the form of the mortgage insurance premium, which can be as high as 4 percent of the loan principal. The price impact is however minimized by banks' practice of funding this cost on the same terms as the mortgage itself.¹⁷ Risk weights for uninsured mortgages are risk-sensitive, but most prime borrowers are assessed to be extremely low risk, with 83 percent of mortgage and HELOC exposures assigned a probability of default (PDs) of less than 0.5 percent (with an aggregate PD of 0.11 percent for that exposure segment).¹⁸ As a result, uninsured prime mortgage pricing has historically been close to the risk-free

¹⁷ Insured mortgage borrowers must pay an upfront insurance premium that varies by LTV ratio. The price impact to the borrower is minimized by the practice of capitalizing these premiums into the principal of the loan, i.e., at the low interest rate and extended amortization of the underlying mortgage. In practice, this is typically equivalent to a small add-on to the borrower's all-in interest rate, at maximum around 30–40 basis points.

¹⁸ This would apply primarily to banks using an internal ratings-based approach to risk weights, which would include the D-SIFIs but not many smaller federally regulated banks. PD figures based on Canadian D-SIFIs' Pillar 3 disclosures as of end-January 2019.



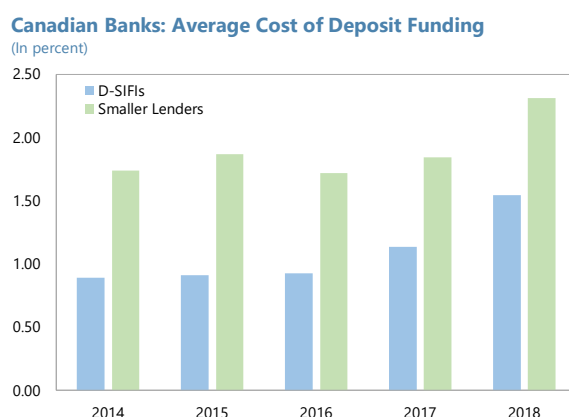
pricing seen for insured mortgages. Mortgages on investment properties, cash-out refinances, interest-only HELOCs and other mortgage types that prove to have higher default rates in cross-country experience are also typically assigned PDs as low as those for single-family mortgages. This reflects the very benign default history for residential mortgages of all types in Canadian experience. The low estimated PDs for nearly all prime uninsured lending however mean that there are few risk-based capital incentives to differentiate pricing by these potential risk characteristics.

29. This implies that risk could be underpriced for certain higher-risk prime borrower types if future mortgage defaults prove to be worse than in recent Canadian historical experience. Excess borrowing by prime borrowers is a risk in part because housing market stress in cross-country experience has often been driven by borrowers within the prime segment. Ferreira and Gyourko (2015) found that in the U.S. post-global financial crisis, prime borrowers accounted for twice as many home losses (foreclosures and short sales) than subprime borrowers.¹⁹ Albanesi, De Giorgi, and Nosal (2017) also found that the rise in defaults was concentrated in the middle of the credit score distribution, despite higher default rates among individuals with lower credit scores, and that most delinquencies in this segment were from real estate investors, rather than borrowers with one first mortgage.²⁰ While OSFI has tightened underwriting standards for certain investor-type mortgages, and recourse rules in most provinces reduce the appeal of strategic default for investors, their low estimated probability of default may nonetheless underprice the potential risks associated with such exposures.

30. The non-prime segment is small but may be vulnerable due to lenders' concentrated credit risk exposures and weak funding profiles. With higher funding costs largely precluding

¹⁹ Fernando Ferreira and Joseph Gyourko, "A New Look at the U.S. Foreclosure Crisis: Panel Data Evidence of Prime and Subprime Borrowers from 1997 to 2012," NBER Working Paper No. 21261, June 2015.

²⁰ S. Albanesi, G. De Giorgi, and J. Nosal, "Credit Growth and the Financial Crisis: A New Narrative," NBER Working Paper No. 23740, August 2017.

Figure 5. Canada: Bank Deposit Costs

Source: Bank of Canada, S&P Market Intelligence.

Note: Smaller lenders include Laurentian Bank, Equitable Bank, Home Capital, Canada Western Bank, and Manulife Bank.

participation in prime mortgage lending markets, a number of smaller banks and private lenders focus on higher interest rate lending to non-prime borrowers that do not qualify for cheaper D-SIFI or MFC mortgage financing. These lenders as a result tend to have relatively concentrated exposures to higher-risk mortgages, particularly in areas of large house price misalignments such as the Vancouver and Toronto areas, where they are most active. They are also comparatively more reliant on less stable, higher-cost funding like brokered deposits or redeemable equity, suggesting these institutions would be vulnerable to a pullback in funding during downturns. Market concerns about the fragility of the non-prime business model were reflected in part in the liquidity crisis at a monoline mortgage lender in 2017.

31. The lack of risk-based pricing also forces authorities to rely on tightening the underwriting perimeter to curb risk, which has downsides. This policy approach could lead to borrower migration away from the more resilient prime lending institutions to financially weaker smaller banks and private lenders outside the regulatory perimeter.²¹ Affected borrowers may face significantly higher funding costs and shorter available mortgage maturities outside the prime perimeter, while the authorities' ability to monitor such vulnerabilities may be weakened. In the context of Canada's highly competitive mortgage lending landscape, this policy framework may also create unintended consequences for the price of mortgage funding. Mortgage rates fell relative to benchmark interest rates after policy tightening began in 2016, with the spread between the two reaching the lowest level in published BOC data in late 2018 (Figure 4). This suggests that if further countercyclical tightening is required, additional narrowing of the underwriting perimeter may be needed to offset unwanted easing in mortgage risk pricing. This could potentially accelerate borrower migration from prime lending institutions to financially weaker lenders or make policy overly restrictive once housing market and household credit conditions begin to deteriorate.

²¹ The BOC's analysis based on Teranet data suggests that this has happened only to a modest degree so far, as smaller banks and private lenders have slowed lending by less than prime lenders during this period. For details, see Bank of Canada, "Financial System Review," June 2018, <https://www.bankofcanada.ca/wp-content/uploads/2018/06/fsr-june2018.pdf>

32. Aspects of Canada’s mortgage system may also amplify procyclical tightening in housing market conditions during a severe downturn. The system’s core lenders have business models oriented around low risk mortgage lending, which enables their low cost of capital. In a scenario of deteriorating household credit quality and falling house prices, this might constrain their appetite for new lending, or for renewing existing uninsured mortgage borrowers with weak credit. Alternatively, if increasing defaults lead banks to reassess PD assumptions, banks would have to introduce risk premiums to accommodate weaker borrowers. In the midst of a downturn, this might amplify household debt-servicing fragility. As documented in the FSAP stress tests, the introduction of a small risk premium to the mortgage interest rates faced by higher risk borrowers with renewing mortgages would increase estimated system-wide cumulative defaults and cumulative losses considerably (by 44 and 48 percent, respectively).²²

33. Weaker lenders and shorter maturities outside of the prime segment could also compound financial tightening. Outside of the D-SIB segment, rising losses and tighter funding conditions might impair the risk appetite of weaker non-prime lenders, curbing the flow of credit to riskier borrowers. The prevalence of short-term maturities (particularly for higher credit-risk mortgages) means that over a quarter of existing borrowers must renew their mortgage every year, with an additional 13 percent facing HELOC re-pricing.²³ This may increase the share of borrowers facing refinancing pressure when lending appetite is constrained, increasing downward pressure on housing markets.

POLICY ISSUES

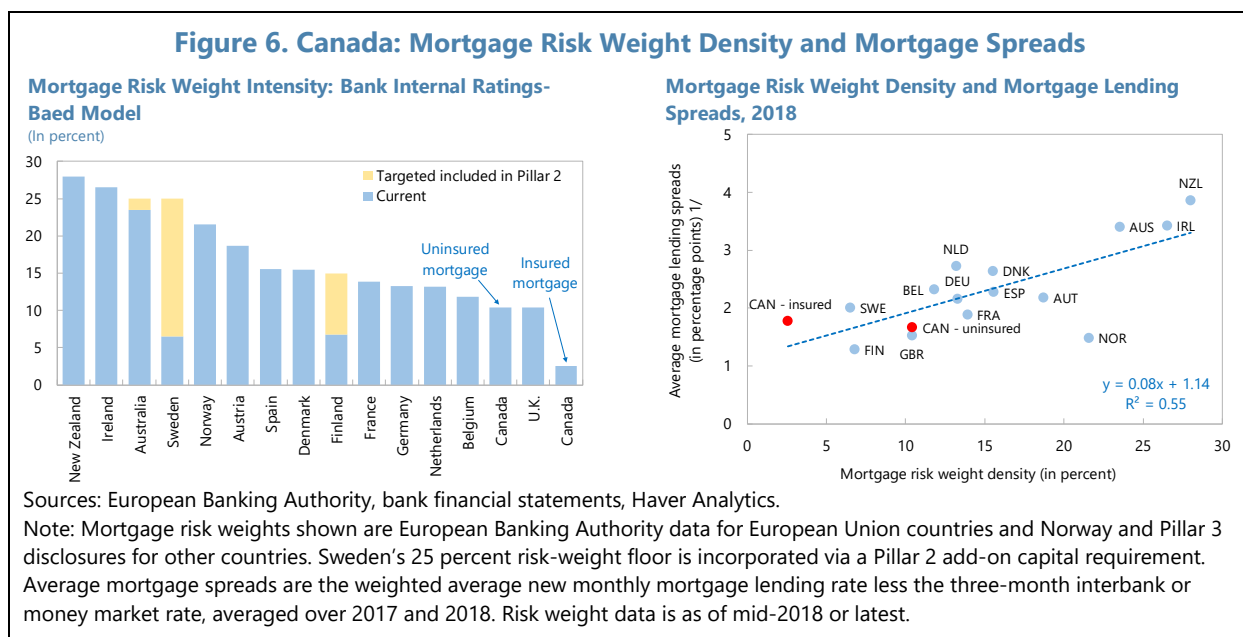
34. Increasing lender pricing of potential future risk factors in mortgage interest rates can further improve the resilience of housing finance and policy. Increasing the cost of mortgages for potentially higher risk borrowers will limit the accumulation of higher risk mortgages in the system. In a downturn, properly incorporating an additional credit risk premium will also limit the potential increase in interest rates that higher risk borrowers will face at renewal. It will complement the existing policy framework by ensuring that borrower debt-servicing capacity is stress tested at a rate that accurately incorporates the additional risk premia they may face in a downturn. It will reduce the need to dynamically adjust underwriting standards as a countercyclical policy tool. It would also help level the playing field between the largest banks and their smaller peers, which tend to use standardized risk-based capital approaches that result in significantly higher capital requirements for mortgages.

35. Prudential adjustments to credit risk modeling and mortgage risk weights are widely used in other jurisdictions and would improve risk-based mortgage pricing (Table 3). Risk

²² For details, see International Monetary Fund, “Canada: Financial Sector Assessment Program: Technical Note on Stress Testing and Financial Stability Analysis,” forthcoming 2019.

²³ Bilyk, Olga, Brian Peterson, and Cameron MacDonald, “Interest Rate and Renewal Risk for Mortgages,” BOC Staff Analytical Note 2018–18, June 2018.

weight adjustments that increase banks' cost of capital for potentially riskier mortgages would incentivize either charging higher interest rates or decreasing allocations to such loans. Globally, the cost of capital for mortgages is reasonably well correlated to average spreads of new mortgage loans over three-month money market rates (Figure 6). With internal ratings-based (IRB) risk weights of about 3 and 10 percent for insured and uninsured mortgages, respectively, Canada stands out as having among the lowest overall risk weights among peer countries (Figure 6).²⁴



36. International experience points to several ways to increase mortgage risk weights. One would be to require a floor for the average level of mortgage risk weights, which would allow for more risk weight differentiation across risk types and make overall risk weights more consistent with the through-the-cycle default risk seen in other countries with comparable house price and credit booms.²⁵ This could also be achieved by additional prudential adjustments to credit risk modeling, for instance stepped up correlation factors for certain loan types.²⁶ In recent years, many countries have tightened the Basel III IRB approach to mortgage risk weights to compensate for the lack of a recent default cycle in the data available for modeling PD and loss-given default (LGD) assumptions. Australia, Sweden, Finland, and Hong Kong SAR have incorporated floors of 15 or 25 percent on IRB mortgage risk weights; New Zealand and Belgium have implemented other adjustments that have effectively raised the overall level of mortgage risk weights (see Table 3).

²⁴ The low risk weights for insured mortgages reflect the government backstop for mortgage insurance. Australia's risk weight floor however overrides the level of risk mitigation offered by private mortgage insurance for prudential reasons.

²⁵ This policy adjustment need not require an increase in overall capital levels. Risk weight increases could be offset by equivalent reductions in Pillar 2, i.e., D-SIB Domestic Stability Buffer requirements, which are currently set at 1.75 percent of risk-weighted assets. Sweden recently shifted its mortgage risk weight floors from a Pillar 2 (required add-on relative to risk-weighted assets) to a Pillar 1 requirement (incorporated in risk weights).

²⁶ Authorities currently incorporate a Downturn Loss-Given Default feature to credit risk modeling requirements.

Table 3. Selected Economies: Samples of Adjustments to IRB Approach for Residential Mortgages

Country	Risk Weight 1/ (in percent)	Description
Australia	25	Risk-weight floor (2016) Australian Prudential Regulation Authority (APRA) requires minimum average mortgage risk weighting of 25 percent for owner-occupied properties. This was also undertaken in part to reduce the discrepancy in mortgage risk weights between institutions using IRB and the standardized approach. The APRA has also proposed increased correlation factors in calculating risk weights for investor and interest-only mortgages.
Belgium	12	Risk-weight add-on (2016): proportionate add-on of 33 percent of exposure weighted average of risk-weights; plus flat add-on of 5 percentage points.
Finland	15	Risk-weight floor (2018): Credit institution-specific minimum average of 15 percent risk-weighting.
Norway	21	Input floors (2014): LGD assumptions must be at least 20 percent; other minimums for PD modeling.
Sweden	25	Risk-weight floor (2016): 25 percent. Was a Pillar II add-on, to be converted to Pillar I.
Hong Kong SAR	25	Risk-weight floor (2017): 25 percent, raised from 15 percent.
New Zealand	28	Input floors (2015): Stepped-up minimum LGD and correlation factor inputs based on LTV ratio and loan purpose (higher for investor mortgages); supervisory overlay to probability of default inputs.
1/ Risk weights shown are the regulatory floor for IRB mortgages or the risk weights disclosed by large banks.		

37. Other potential measures might be considered to improve risk-based pricing specifically for insured mortgages.²⁷ One option would be to limit banks' ability to subsidize the cost of mortgage insurance premiums, which would increase borrowers' upfront cost in proportion to their risk profile. For instance, banks could be required to fund mortgage insurance premiums as separate loans, with maximum amortizations (e.g., of five years) and interest rates closer to unsecured consumer rates. Another complementary measure would be to expand the range and detail of mortgage risk characteristics that determine insurer capital requirements, premiums, and the cost of the government guarantee. In particular, authorities might increase the cost of premiums for insurance-eligible multi-unit and investor properties, or withdraw coverage for these properties entirely, given their potentially higher risk profile. A third option would be for insurance contracts to stipulate loan-level pricing adjustments similar to those adopted by the government-sponsored entities in the U.S. post-global financial crisis. This model specifies minimum increases in lender interest rates relative to a specified base rate that accumulate based on a range of risk factors, including LTV, credit score, number of units financed, and loan purpose (investment property, cash

²⁷ Some of these recommendations may negatively impact homeowner affordability at the margin. Those issues must be weighed against the risk that current policy settings incentivize increased household debt and indirectly contribute to increasing home prices. For recommendations on addressing housing affordability concerns, see the 2018 IMF Article IV staff report.

out refinance, second mortgage). Based on Fannie Mae requirements, the mandated difference in interest rates offered to low and high-risk mortgages can exceed 3 percentage points.

38. Given taxpayers' substantial exposure to housing finance, a clear set of principles and guidelines for managing a housing market downturn should be developed. In a downturn, the authorities will need to find a policy response that provides effective countercyclical support for the economy and distressed households while also balancing other important interests such as protecting taxpayer interests, allowing economic adjustments, and limiting moral hazard. Key priorities should include:

- **Protecting taxpayer interests.** The authorities should identify an appropriate level of exposure to housing insurance and develop mechanisms to ensure that the exposure remains within those limits. One policy option to limit taxpayer exposure (and improve risk-pricing) would be to create a professionally managed government-sponsored mortgage reinsurance fund, which could be funded by existing guarantee fees.²⁸
- **Understanding the effectiveness and trade-offs of existing tools.** Identifying the appropriate level of government housing market exposure through the cycle needs to be informed by an understanding of how well the government's macroprudential and other tools would work in a downturn, and how these tools may need to be calibrated. Too little easing may be ineffective in adverse market conditions while too much may increase the government's exposure, exacerbate moral hazard, and limit household deleveraging. In general, countercyclical stimulus should be designed to avoid impeding necessary macrofinancial adjustments (e.g., house price corrections and household deleveraging).
- **Limiting moral hazard.** The authorities should limit use of portfolio insurance as a crisis management tool, except at punitive premiums that ensure taxpayer profits. Banks were able to use this tool to transfer the credit risk of specific mortgage portfolios to the government as part of the Insured Mortgage Purchase Program (IMPP) in the aftermath of the global financial crisis. The perception that this policy tool is an option for future downturns could interfere with risk-pricing for uninsured mortgages. Funding and credit transmission bottlenecks are better addressed by re-financing and liquidity programs that do not involve permanent credit risk transfers to the government.

²⁸ This policy proposal is developed in Koepl and MacGee, "Mortgage Insurance as a Macroprudential Tool: Dealing with the Risks of a Housing Market Crash in Canada." C.D. Howe Commentary No. 430, July 2015.