



CANADA

FINANCIAL SECTOR ASSESSMENT PROGRAM

TECHNICAL NOTE—SYSTEMIC RISK OVERSIGHT AND MACROPRUDENTIAL POLICY

January 2020

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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 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

AMF	Autorité des marchés financiers
BOC	Bank of Canada
CAPSA	Canadian Association of Pension Supervisory Authorities
CCIR	Canadian Council of Insurance Regulators
CCyB	Countercyclical Capital Buffer
CDCS	Canadian Derivatives Clearing Service
CDIC	Canada Deposit Insurance Corporation
CMHC	Canada Mortgage and Housing Corporation
CMRA	Capital Markets Regulatory Authority
CMRS	Cooperative Capital Markets Regulatory System
CMSA	Capital Markets Stability Act
CUPSA	Credit Union Prudential Supervisors Association
CSA	Canadian Securities Administrators
DOF	Department of Finance
DSB	Domestic Stability Buffer
D-SIB	Domestic Systemically Important Bank
D-SIFI	Domestic Systemically Important Financial Institution
ETF	Exchange Traded Fund
FCAC	Financial Consumer Agency of Canada
FISC	Financial Institutions Supervisory Committee
FMI	Financial Market Infrastructure
FSAP	Financial Sector Assessment Program
FSB	Financial Stability Board
FSR	Financial System Review
GDP	Gross Domestic Product
HELOC	Home Equity Line of Credit
HOA	Heads of Agencies Committee
LCR	Liquidity Coverage Ratio
LTV	Loan-to-value
LVTS	Large Value Transfer System
MBS	Mortgage-Backed Securities
MFRAF	Macro-Financial Risk Assessment Framework
MICAT	Mortgage Insurer Capital Adequacy Test
MoF	Minister of Finance
MOU	Memorandum of Understanding
NHA	National Housing Act

CANADA

OSFI	Office of the Superintendent of Financial Institutions
OTC	Over-the-Counter
SAC	Senior Advisory Committee
SRAC	Systemic Risk Assessment Committee
TDSA	Top-down Solvency Assessment

EXECUTIVE SUMMARY¹

The current arrangement for systemic risk oversight seems to have worked well.² The responsibility for systemic risk oversight is not explicitly assigned to any specific body. At the federal level, the Bank of Canada (BOC) albeit with no explicit mandate plays a leading role in systemic risk surveillance; policy discussion takes place at the Senior Advisory Committee, which in turn provides advice to the Minister of Finance who has the mandate of maintaining overall financial stability in Canada. Powers over macroprudential tools lie with the Ministry of Finance (MoF) and the Office of the Superintendent of Financial Institutions (OSFI). Systemic risk oversight at the federal level appears adequately effective, in part due to strong collegial culture and inter-agency cooperation. However, such effectiveness becomes less apparent at the provincial level or with respect to federal-provincial collaboration on these issues.

Modernization of the financial stability architecture would help enhance systemic risk oversight. The financial system has been evolving rapidly, with new exposures and instruments, complex interconnectedness, and fintech developments blurring traditional financial sector boundaries. Significant vulnerabilities are emerging in nonbank financial sectors. As a result of the Canadian legal framework, the spread of systemic risk oversight responsibilities over multiple government layers and across sectoral boundaries has prevented the development of comprehensive Canada-wide framework for systemic risk surveillance and mitigation. These factors call for concerted efforts to modernize the current arrangement to overcome data gaps, enhance the surveillance capacity, develop and implement policies more inclusively and effectively, and increase policy transparency.

Steps can be taken to improve the current system with a more formalized arrangement for systemic risk oversight. A single body in charge of systemic risk oversight would be the first-best option. Second-best options include formalizing and strengthening the BOC's leading role in systemic risk surveillance and creating a federal-provincial platform to discuss systemic risk issues and formulate policy responses. A more unified approach to data collection needs to be developed to support Canada-wide systemic risk surveillance. Regarding the federal-provincial platform, one option is to reconstitute the Heads of Agencies Committee (HOA). In particular, the HOA needs to define its terms of reference and expand its membership to include all relevant provincial prudential regulators. Furthermore, the new arrangement should be supported by a robust transparency framework.

Over time, the authorities should review whether systemic risk oversight under the HOA leadership with no statutory mandate is adequate. One potential challenge is that systemic

¹ This Technical Note was prepared by Adrian Alter (IMF) under the 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).

² Systemic risk oversight broadly refers to (i) the conduct of systemic risk surveillance, including data collection, as well as risk monitoring and analysis, and (ii) the conduct of policies (particularly, macroprudential policy) to mitigate systemic risk.

threats may emerge beyond the existing competent authorities' remit. The envisaged Capital Markets Stability Act, which would consolidate responsibilities relating to systemic risk in capital markets at a single body, can further strengthen monitoring and managing systemic risk in capital markets. This can support the development of a more complete macroprudential policy framework for nonbanks.

Macroprudential policy at the federal level has been effective, but better coordination is essential given multiple provincial authorities' ownership of prudential tools. The federal toolkit has a broad coverage of the financial system. OSFI can issue guidelines setting prudential capital and liquidity requirements for banks, while the MoF can modify the mortgage insurance rules that prescribe limits on Canada-wide insured mortgages. The financial stability mandate should be further strengthened given the MoF's other objectives (e.g., housing affordability). Nevertheless, non-negligible parts of the financial system lie outside the federal perimeter, including Québec's domestic systemically important financial institution. Furthermore, the British Columbia and Ontario governments have implemented housing market measures that constitute as capital flow management measures. Federal-provincial coordination is thus critical to limit policy leakages.

The current macroprudential stance is broadly adequate given declining macrofinancial vulnerabilities. The revision of OSFI's B-20 guidelines, with similar measures adopted in Alberta, Québec, and Saskatchewan, appears to have improved the underwriting standards of uninsured mortgages. However, additional measures seem warranted to handle a shift in risky mortgage origination to nonbanks and limit vulnerabilities arising from home equity lines of credit. OSFI also introduced the domestic stability buffer (DSB), essentially a systemic risk buffer to improve the resilience of domestic systemically important banks. The use of DSB could be made Pillar 1 (currently, Pillar 2) and extended to other deposit-taking institutions.

Table 1. Canada: Recommendations on Systemic Liquidity Issues

Recommendations	Priority	Timeframe
Systemic Risk Oversight		
Modernize the systemic risk oversight framework, underpinned by a federal-provincial platform (potentially HOA) to discuss systemic issues and formulate policy responses, supported by enhanced transparency (HOA, BOC)	H	I
Develop a comprehensive systemic risk surveillance framework, supported by a more unified approach to data collection and a strategic plan to address data gaps (BOC lead, HOA)	H	I
Address data gaps, particularly related to cross-sectoral exposures, unregulated nonbank financial intermediation, and funding market activities (BOC, competent authorities, DOF, provincial governments)	H	NT
Strengthen further the technical capacity for the systemic risk monitoring and analysis (BOC, competent authorities)	M	NT
Use the Financial System Review to communicate more effectively systemic risk surveillance to the public (BOC)	M	I
Macroprudential Policy		
Expand the scope of macroprudential toolkit to address risks that may originate from lending by nonbank financial institutions and to limit policy leakages (DOF)	M	I
Develop a set of prudential instruments to deal with emerging risks stemming from home equity lines of credit and other risky mortgage products (DOF, OSFI)	M	I
Expand the application of the cyclical capital requirements to all other deposit-taking institutions (OSFI, provincial supervisors of deposit-taking institutions)	M	I
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).		

INTRODUCTION

1. This Technical Note provides a summary of the review of systemic risk oversight arrangements and macroprudential policy issues. The review was part of the 2019 Canada FSAP. The Technical Note is structured as follows. Section II first discusses the existing systemic risk oversight arrangements and potential challenges, and then presents steps that can be taken to modernize the framework to ensure its effectiveness going forward. Section III focuses on systemic risk surveillance, including the current approaches and existing challenges such as data gaps and coordination. Section IV covers macroprudential policy issues, including the toolkit, the current policy stance and overall policy effectiveness.

SYSTEMIC RISK OVERSIGHT ARRANGEMENTS

2. The responsibility for systemic risk oversight is not explicitly assigned to any specific body. This reflects the fact that financial sector oversight is the responsibility of multiple federal and provincial authorities (see Box 1 for an overview of financial sector oversight and safety net arrangements). At the federal level, the Bank of Canada albeit with no explicit mandate plays a leading role in systemic risk surveillance; policy discussion takes place at the Senior Advisory Committee (SAC), which in turn provides advice to the Minister of Finance (MoF) who has the mandate of maintaining overall financial stability in Canada. Most of the powers over macroprudential tools lie with the MoF and the Office of the Superintendent of Financial Institutions (OSFI). The former can set the mortgage insurance rules and the latter issues prudential guidelines that prescribe capital, liquidity, and other requirements for deposit-taking institutions. At the same time, non-negligible parts of the financial system are under provincial authorities' responsibility. In particular, some domestic systemically important financial institutions (D-SIFIs) are provincially regulated.³ Furthermore, the British Columbia and Ontario governments have implemented housing market measures that can affect financial stability in the regions.

3. The 2014 FSAP made several key recommendations with respect to systemic risk oversight, including the legal mandate, data gaps, and coordination between federal and provincial authorities. First, a clear mandate to an entity to monitor systemic risk to facilitate macroprudential oversight should be provided. Second, the cooperation among federal and provincial supervisors should be enhanced. Third, data collection and dissemination with a view to enhancing coverage, regularity and availability of time-series data should be expanded to facilitate system-wide risk analysis of the financial sector. Finally, top-down stress testing framework for banks should be augmented with risk-sensitive concepts of key credit risk input parameters and econometric, model-based approaches using longer time series.

³ In Canada, the federal and provincial competent authorities designate D-SIFIs in their own jurisdictions. There is no single body tasked with the responsibility to designate D-SIFIs in Canada as a whole. At the moment, Canadian D-SIFIs include six largest banks (designated by OSFI), Québec's major credit cooperative group (designated by Autorité des marchés financiers (AMF)), and British Columbia's credit union central (designated by British Columbia's Financial Institutions Commission).

Box 1. Financial Sector Oversight and Safety Net Arrangements in Canada: An Overview

Financial sector oversight is the responsibility of multiple federal and provincial authorities. The lion's share of financial institutions (particularly, all banks and some insurers) are federally regulated, while securities markets are overseen by provincial authorities. Some D-SIFIs are provincially regulated; e.g., Autorité des marchés financiers (AMF) supervises Québec's major credit cooperative group (see Footnote 3). Other deposit-taking institutions (loan and trust companies, and credit unions), insurers and private pension funds can be licensed and regulated under federal or provincial regimes. At the federal level, OSFI is responsible for prudential oversight of federally regulated financial institutions. Conduct oversight of banking business is under responsibility of the Financial Consumer Agency of Canada (FCAC), while the BOC, the DOF and three provincial securities regulators share responsibility of overseeing financial market infrastructures (FMIs) "designated" as systemically important (or as prominent payment systems). The remaining responsibilities lie with provincial authorities, including prudential oversight of provincially regulated financial institutions and conduct oversight of all nonbanking businesses.¹ Each province/territory can set its own regulatory and supervisory frameworks. Public pension funds have independent governance structures.

A substantial part of the financial system is covered by federal crisis management and safety net arrangements that are well-established. By law, the MoF has the mandate of maintaining overall financial stability in Canada. At the federal level, multiple agencies are involved in crisis management and safety net, including the BOC, the Canada Deposit Insurance Corporation (CDIC), the DOF, and OSFI. CDIC is the resolution authority for its member deposit-taking institutions and the federal deposit insurance system administrator. The BOC recently became the resolution authority for domestic designated FMIs. Each province/territory has its own crisis management and safety net arrangements.

There are several inter-agency coordination forums for financial sector oversight and safety net. At the federal level, the SAC is the main forum to discuss financial sector policy issues and address systemic matters, including crisis preparedness. The Financial Institution Supervisory Committee (FISC) is the forum to exchange information related to supervision of federally regulated financial institutions and deal with institution-specific problems (i.e., early intervention). On resolution, the CDIC's Board is the decision-making body of CDIC, while the BOC chairs the committee for coordinating resolution of designated FMIs. Provincial authorities also set up four associations along the line of sectoral competency. These associations mainly serve as platforms for exchanging information and coordinating policy development. The only federal-provincial forum that discusses systemic risk matters is the Heads of Agencies Committee (HOA), but it is primarily for coordination on issues related to capital markets.²

Inter-agency Committees at the Federal Level

Committee	Statutory	BOC	CDIC	DOF	FCAC	OSFI
CDIC's Board	Yes	o	o	o	o	o
Committee for resolution of designated FMIs	Yes	o	o	o		o
Financial Institutions Supervisory Committee (FISC)	Yes	o	o	o	o	o
Heads of Agencies Committee (HOA) 1/	No	o		o		o
Senior Advisory Committee (SAC)	No	o	o	o	o	o

Notation: o indicates chair; o indicates member.

1/ Membership also includes four provincial securities commissions—Alberta Securities Commission, AMF, British Columbia Securities Commission, and Ontario Securities Commission.

1/ Insurers (including federally regulated insurers) can be subject to provincial authorities' prudential powers derived from the responsibility for licensing insurance products sold in their respective provinces (e.g., in Québec).

2/ There are some other federal-provincial forums, such as the Annual federal-provincial Financial Sector Policy Dialogue, but they are tasked with other purposes, not with discussing and addressing systemic risk issues.

4. Progress has been made to enhance systemic risk surveillance in recent years, especially in terms of data collection and inter-agency cooperation. For instance, several initiatives were undertaken to improve data collection and close existing data gaps, including in areas of mortgage origination, nonbank credit intermediation, and housing market. At the same time, the HOA became a more active platform for federal-provincial collaboration that discusses issues such as over-the-counter (OTC) derivatives, mortgage investment corporations, fintech

developments, and emerging risks in securities markets (e.g., high-frequency trading and exchange traded funds (ETFs)). A number of working groups have been created to examine some of the above-mentioned issues.

5. Cooperation between federal and provincial authorities has improved since the 2014 FSAP, but significant scope for further enhancement remains. For example, OSFI and AMF had worked closely together to introduce a new solvency framework for life insurers. The BOC signed memorandums of understanding (MOUs) with Manitoba, Québec, and Saskatchewan to enhance cooperation on systemic risk surveillance. Cooperation between OSFI and key provincial authorities is important because regulatory divergences could be the source of policy leakages. For example, OSFI's B-20 guideline on residential mortgage underwriting practices and procedures would have resulted in a significant risk migration towards provincially regulated entities if AMF and major credit unions did not voluntarily adopt a similar measure. MOUs still do not exist between OSFI and all provincial authorities, limiting information exchange and policy coordination.

6. The authorities of the federal and participating provincial/territorial jurisdictions have pursued the Cooperative Capital Markets Regulatory System (CCMRS) initiative. The CCMRS envisages a single Capital Markets Regulatory Authority (CMRA) responsible for the oversight of securities markets in participating provincial/territorial jurisdictions and systemic risk surveillance and mitigation for Canada-wide securities markets. At this moment, two major provinces (Alberta and Quebec) have decided not to participate.⁴ The CCMRS includes three pieces of capital markets legislation—first, uniform capital markets laws which will replace the existing securities legislation in participating provinces and territories;⁵ second, complementary federal Capital Markets Stability Act (CMSA) which will address systemic risk related to capital markets; and third, laws that establish the CMRA. The Supreme Court's ruling in November 2018 removed legal obstacles, and participating jurisdictions are moving forward to complete this initiative.

7. The current systemic risk oversight arrangement seems to have worked well, but an institutional modernization is essential to ensure effective systemic risk oversight going forward. The financial system has been evolving rapidly, with new exposures and instruments, complex interconnectedness, and fintech developments blurring traditional financial sector boundaries. Significant vulnerabilities are emerging in nonbank financial sectors. The prolonged period of benign macrofinancial conditions may have masked important gaps that could undermine policy responses at time of stress. As a result of the Canadian legal framework, the spread of systemic risk oversight responsibilities over multiple government layers and across sectoral boundaries has prevented the development of comprehensive Canada-wide framework for systemic risk surveillance and mitigation. These factors call for concerted efforts to modernize the current arrangement:

⁴ Given the current incomplete participation of provinces/territories in the CCMRS, mechanisms to ensure effective cooperation between the envisaged CMRA and provincial securities regulators are necessary.

⁵ Seven provinces/territories are currently jointly engaged as participating jurisdictions in the implementation of the CCMRS: British Columbia, Ontario, Saskatchewan, New Brunswick, Nova Scotia, Prince Edward Island, and Yukon.

- **Significant data gaps**, both in terms of collecting available relevant data to support Canada-wide surveillance, with challenges due to different definitions and/or unresolved overlapping collection (e.g., OTC derivatives), as well as important data that are not collected and may have been overlooked at the inter-agency boundaries, including information related to cross-sectoral exposures and activities, and unregulated nonbank financial intermediation;
- **Capacity to effectively carry out important systemic risk analysis**, particularly with respect to intra-system and cross-border interconnectedness, shadow banking, integrated stress testing (e.g., banks and mortgage insurers), and systemically relevant financial institutions (e.g., pension funds) and markets (e.g., securities lending);
- **The ability to carry out broader and more inclusive dialogue on macroprudential policy development** given that multiple federal and provincial agencies are involved in systemic risk surveillance and control prudential tools;
- **Lack of a single mechanism to monitor and follow up on the implementation and outcome of policies** that are relevant to mitigating the buildup of systemic risk, especially in the areas where federal and provincial coordination is needed; and
- **Lack of transparency**, particularly when compared to the high-transparency standards adopted at the individual agency level, which weakens accountability and increases the chances of systemic risk policy failure.

8. The 2014 FSAP recommendation to have an entity responsible for systemic risk oversight remains the preferred reform option. This would require providing a clear and, preferably, statutory mandate to an entity to carry out systemic risk oversight with participation broad enough to allow a complete view of systemic risk, along with powers to collect all necessary data for systemic risk analysis. The authorities noted that implementing the recommended preferred option may not be possible at present. The authorities cited complex constitutional, legal and practical factors that preclude establishing a single entity to be mandated with the systemic risk oversight responsibility.

9. Nonetheless, several steps can be taken to improve the current system with a more formalized arrangement for systemic risk oversight, leveraging recent progress in this area. These steps could focus on three areas:

- **Surveillance.** The BOC should lead systemic risk surveillance in cooperation with relevant authorities. The BOC and all relevant authorities should agree on first how the framework for systemic risk monitoring and analysis should be and then how data collection should be carried out to support surveillance. Collective efforts are needed to develop a more unified approach to data collection and information gathering, supported by adequate legal powers. Data gaps should be identified and addressed on an ongoing basis. The BOC should continue reporting the findings of systemic risk monitoring and analysis to the existing inter-agency bodies. This BOC's leading role in systemic risk surveillance should also be formalized.

- **Policy discussion.** There should be a federal-provincial platform to discuss systemic risk issues and formulate policy responses. The HOA could be one option.⁶ However, the mandate and structure of the HOA, which has not changed since its establishment at the beginning of 2000s, need to be modernized, including by defining its terms of reference and expanding its membership to include all relevant provincial prudential regulators. The HOA would serve as a platform to discuss and formulate policies necessary to address identified risks, based on technical advice jointly developed by staff of the relevant authorities. The BOC, in its capacity as the HOA chair and with systemic risk surveillance responsibility, could facilitate the process of developing policy advice and proposing available policy options, given its neutral position (with no regulatory authority except in the area of systemically important FMIs).
- **Policy implementation.** The existing competent authorities should remain responsible for implementing policy, within their respective mandates and independent statuses. The HOA should have the ability to make recommendations to all relevant authorities on a “comply or explain” basis, or similar arrangements, to strike a right balance between enhancing accountability and respecting autonomy.

10. It is critical to put in place a robust transparency framework for the new arrangement to operate effectively. This should cover the mandate, structure, functions, and roles of individual agencies, as well as assessment of systemic risk, policy decisions and implementation progress. The latter should be with appropriate confidentiality safeguards for sensitive information. The transparency framework is a critical element to help build trust and establish accountability.

11. The CCMRS initiative should be completed to overcome risks from dispersed oversight of securities markets. Following the recent Supreme Court’s ruling that removed legal obstacles, this initiative should be moved forward as a priority in part to ensure that system-wide risks and vulnerabilities in securities markets are effectively monitored, identified and addressed. As with any significant organizational change, it is important to properly manage transition risks to ensure that the strengths of the existing arrangements are retained. Given that some major provinces may not participate in the CCMRS, it is important to set up mechanisms to ensure effective cooperation between the envisaged CMRA and provincial securities regulators.

12. Over time, the authorities should review whether systemic risk oversight under the HOA leadership with no statutory mandate is adequate. One potential challenge is that the mandate of the existing competent authorities may not fully support policy measures that need to be taken to maintain overall financial stability. There could also be a case in which systemic threats emerge outside the existing regulatory perimeter. The envisaged CMSA, which would consolidate responsibilities at a single body, can further strengthen monitoring and managing systemic risk in capital markets. This can support the development of a more complete macroprudential policy framework for nonbanks.

⁶ Given the mandate and membership of the SAC, it may not be the right platform to fulfil this function. In contrast, the HOA, given that it is the only federal-provincial forum that discusses systemic risk matters, could expand its role to cover all systemic risk matters (from issues related to capital markets).

SYSTEMIC RISK SURVEILLANCE

13. Systemic risk surveillance is the work of multiple federal and provincial authorities, with coordination through several inter-agency arrangements (Table 2). At the federal level, the SAC and its sub-committees, including the Systemic Risk Assessment Committee (SRAC), facilitates analytical collaboration and information sharing, and coordinates policy measures required to address financial stability risks. The SRAC, chaired by the BOC, identifies, monitors, and assesses systemic vulnerabilities and emerging risks to the Canadian financial sector.⁷ Regarding securities markets, which are under provincial authorities' responsibility, the systemic risk surveillance is coordinated under the auspice of the Canadian Securities Administrators' (CSA) Systemic Risk Committee. Other association of provincial financial authorities appear to focus more on regulatory and supervisory matters, and less so on systemic risk surveillance. In addition, the HOA, which is the only federal-provincial platform that discusses systemic risk matters, serves as the main coordination forum largely on issues related to capital markets.

14. The BOC plays a leading role in systemic risk surveillance, focusing primarily on key macrofinancial vulnerabilities and risks. The BOC has conducted systemic risk surveillance in the areas of household indebtedness, housing market imbalances, bank solvency and liquidity, nonbank financial intermediation, financial markets, and financial system interconnectedness.⁸ Moreover, the BOC has carried out the top-down macro stress tests for banks, initially developing the Macrofinancial Risk Assessment Framework ([MFRAF](#)) that analyzes solvency-liquidity spillovers and contagion effects, and more recently developing a more full-fledged solvency module that analyzes pre-loss income and credit loss. In addition, the BOC has conducted top-down stress tests for mutual funds which primarily hold corporate bonds.

15. The BOC's Financial System Review (FSR) is the key instrument of communicating financial sector risk assessment to the public. The publication frequency of the FSR has been recently reduced from twice a year to annually. In addition to the FSR, the setup of the Financial System Hub in autumn 2018 has further strengthened the surveillance framework and facilitated access of the public to cutting-edge analytical work led by BOC staff on systemic risk matters. However, this surveillance work has been conducted beyond the scope of the BOC's existing mandate, which is to maintain price and output stability and more broadly promote the economic and financial welfare of Canada ([Bank of Canada Act](#)) and to oversee systemically important FMIs and prominent payment systems (Payment Clearing and Settlement Act).

⁷ The SRAC is composed of senior representation from the BOC, CDIC, the DOF, and OSFI, CDIC, and reports on a quarterly basis to the SAC's sub-committee (sub-SAC) which is chaired by Assistant Deputy Minister, DOF.

⁸ A description of the BOC's analytical approaches to systemic risk monitoring and analysis is summarized in Appendix I.

Table 2. Canada: Systemic Risk Oversight: Inter-agency Committees and Other Coordination Fora

	Federal Deposit-taking Sector	Federal Insurance Sector	Securities Markets	Financial Market Infrastructure	Investment Funds	Pension Funds	Provincial Deposit-taking Sector	Provincial Insurance Sector
Financial Institutions Supervisory Committee (FISC)	Dark Blue	Dark Blue				Light Blue		
Senior Advisory Committee (SAC)	Dark Blue	Dark Blue	Light Blue	Light Blue	Light Blue	Light Blue		
Heads of Agencies (HOA)			Dark Blue	Dark Blue	Light Blue			
Canada Deposit Insurance Corporation (CDIC) Board of Directors	Light Blue							
Canadian Securities Administrators (CSA) Systemic Risk Committee			Dark Blue	Light Blue	Dark Blue			
Other Provincial Regulator Associations						Light Blue	Light Blue	Light Blue

Sources: Canadian Authorities; IMF Staff.

Note: Dark blue indicates primary area of discussion; Light blue indicates other areas of discussion.

The FISC is chaired by the Superintendent of OSFI and comprises Deputy Minister of Finance, the Governor of the BOC, the Chief Executive Officer of CDIC, and the Commissioner of FCAC.

The SAC is chaired by Deputy Minister of Finance and comprises senior officials of the BOC, CDIC, and DOF, FCAC and OSFI. When appropriate, other government agencies are invited (e.g., CMHC to discuss issues related to the housing market).

The HOA is chaired by the Governor of the BOC and includes officials from the DOF, OSFI, as well as the Alberta Securities Commission, AMF, the British Columbia Securities Commission, and the Ontario Securities Commission.

The CDIC's Board comprises five ex-officio members (Deputy Minister of Finance, the Governor of the BOC, the Superintendent of OSFI, a Deputy Superintendent of OSFI, the Commissioner of the FCAC), and five directors from the private sector, and a chairperson who is from the private sector.

Other provincial regulator associations refer to the CUPSA, the CAPSA, and the CCIR.

16. The conduct of systemic risk surveillance would benefit from a more systematic approach with a system-wide perspective. In addition to highlighting key systemic vulnerabilities and risks, the BOC's FSR covers interesting topical issues relevant for financial stability (e.g., housing finance, shadow banking, capital markets, and fintech). However, there is no Canada-wide surveillance of key sectors, including deposit-taking and insurance, in part because the supervisory responsibilities belong to multiple federal and provincial authorities. Surveillance in the areas of securities markets and nonbank financial intermediation, although has improved since the 2014 FSAP, still faces challenges stemming from data gaps. A more unified, systematic approach would help provide a more complete picture of systemic risk, especially in light of potential risk buildups in areas outside the regulatory perimeter and/or potential risk migration across sectors. The analysis would need to cover the full spectrum of activities, markets and entities which might pose systemic

risk, as well as intra-system interconnection and cross-border linkages. This additional work might entail extra resources for both collecting data and carrying out risk monitoring and analysis.

17. Going forward, the systemic risk surveillance framework should comprehensively cover all relevant sources of systemic risk. Canada's financial system continues to evolve rapidly, with complexity and interconnectedness potentially masking vulnerabilities and amplifying spillovers.⁹ In addition to the macrofinancial vulnerabilities and linkages extensively covered by the BOC, several aspects should be systematically considered:

- **Risk-taking in financial market activities and nonbank financial institutions.** In response to the low interest rate environment, institutional and retail investors (e.g., life insurers, pension funds, and investment funds) are taking greater risks to achieve higher returns, contributing to compressed risk premiums.¹⁰ The rapid unwinding of these investment positions could amplify market volatility.
- **Overseas exposures and cross-border spillovers.** Abstracting from the diversification benefits of risks and revenues from abroad, the performance of major Canadian banks can be affected by macrofinancial developments in key host countries (e.g., the United States). So do globally active Canadian life insurers. Thus, monitoring risk exposures of Canadian financial institutions abroad should be done in a systematic way with adequate access to comprehensive data.¹¹ Furthermore, the increase in banks' external funding, foreign-currency liabilities and use of OTC derivatives poses another concern. Cross-border spillovers can also occur through stronger financial linkages due to holdings to foreign assets (e.g., by investment funds and pension funds).
- **Intra-system interconnectedness.** Banks and nonbank financial institutions (particularly, pension funds) are increasingly linked through repo and OTC derivatives transactions.¹² Other cross-sectoral exposures and risk transfers also exist, primarily involving mortgage financing—i.e., between mortgage lenders and mortgage insurers due to mortgage insurance, and between mortgage lenders and ultimate investors that fund mortgages via market funding sources. More complex interaction among various types of financial institutions could also have implications on systemic liquidity.
- **Common exposures to housing market and/or through housing finance.** Banks and nonbank lenders provide a substantial amount of mortgages (Can\$1.8 trillion, or around 79 percent of GDP). Life insurers and pension funds have also increased their investment in commercial real estate. Over the past decade, vulnerabilities due to elevated household debt and housing market imbalances have been substantial. A sharp housing market correction could

⁹ Appendix II provides an overview of the Canadian financial system structure.

¹⁰ As mentioned above, the BOC has also developed a stress-testing framework for investment funds.

¹¹ The lack of adequate granular data (e.g., income statement items and credit risk exposures by key operating markets) is a key challenge for developing the top-down bank stress testing framework.

¹² More recently, the authorities started collecting data on collateral pledged for securities financing and derivatives transactions.

have a significant, protracted impact on economic growth, with lengthy balance sheet adjustments to overcome debt overhang. In addition, the government plays a dominant role in backstopping housing finance and is thus exposed to contingent liabilities.

18. Progress has been made in closing some of the existing data gaps, including in the areas of mortgage origination, nonbank credit intermediation, and the housing market. For instance, loan-level origination data have been collected by OSFI and shared with the BOC for domestic systemically important banks (D-SIBs) since 2013, and for the rest of the federally regulated financial institutions with large residential mortgage exposures since 2015. In March 2018, CMHC started to collect detailed data¹³ on Approved Issuers' uninsured lending activities, which informs risk analysis at the federal agencies. At the same time, a national credit registry that covers credit provided by banks, credit unions, or any other financial institutions would facilitate system-wide view of household indebtedness and credit risks.¹⁴ Moreover, a national property and land transaction registry would allow identification of non-first-time buyers, speculators, corporate buyers, and facilitate targeted macroprudential policies.¹⁵

19. Continued efforts to address data gaps would help gather a more complete picture of risk buildups. Key data gaps are in the areas of cross-sectoral exposures, unregulated nonbank financial intermediation, and funding market activities. Many data exist, but existing data still do not cover the entire system. For example, comprehensive data on bond and repo transactions are necessary to complement the existing collection by IROC which only covers government securities dealers. In addition, information on asset holdings of unregulated nonbank financial intermediaries such as mortgage finance companies and mortgage investment companies, as well as hedge funds, private equity funds, and nonbank broker dealers would help improve monitoring of risk-taking in these sectors. Other areas to improve data collection concern OTC derivative markets, securities lending, and cross-border investment activities and exposures. A comprehensive assessment of data gaps should be conducted, and existing data gaps should be swiftly addressed to support a comprehensive assessment of systemic risk. See Appendix III for a summary on key data gaps.

20. Given the growing systemic relevance of nonbank financial intermediation, strengthening oversight of large public pension funds would be helpful. Increasing the detail, standardization, and reporting frequency of financial disclosures, as well as introducing standardized liquidity stress testing requirements, would improve risk monitoring and assessment of large pension funds. Thus, determining whether risks are shifting to nonbank financial intermediaries and whether the valuation of some asset classes is diverging from fundamental values, potentially giving rise to asset bubbles, remains of great importance.

¹³ <https://eppdscrmssa01.blob.core.windows.net/cmhcprodcontainer/sf/project/cmhc/pdfs/content/en/advice-no2-new-mortgage-portfolio-data-reporting-en.pdf>

¹⁴ The Statistics Canada is in the process of developing such a registry.

¹⁵ Despite jurisdictional and constitutional challenges, CMHC and Statistics Canada are jointly making progress of putting this information together.

21. A clear mandate for the BOC's role in systemic risk surveillance for the entire financial system needs be formalized, supporting the BOC's access to necessary data to support this function. Canada-wide surveillance, currently missing, will enhance risk monitoring and identification, including of nonbank financial intermediation such as insurance and pension, as well as other market-based financing. In addition, this clear mandate would allow the development of a comprehensive Canada-wide framework for systemic risk surveillance and data collection.

MACROPRUDENTIAL POLICY

A. Macroprudential Toolkit and Recent Measures

22. The remit of macroprudential toolkit under the federal jurisdiction covers a significant share of the financial system. At the federal level, macroprudential tools are under the responsibility of OSFI and the DOF. Other agencies, both federal and provincial, also control other policy tools, some of which are for addressing housing market related vulnerabilities.

- OSFI has authority over a broad range of prudential tools such as bank capital and liquidity requirements, and systemic risk buffers, which are applied to federally regulated financial institutions.
- The MoF can set mortgage insurance rules, which prescribe various prudential limits on Canada-wide insured mortgages with the powers arising from the arrangement that the government backstops mortgage insurance. The DOF plays a central role in advising the MoF.
- CMHC, with the approval of the MoF, can adjust mortgage insurance premiums (the price setter for mortgage insurance in the 'sandbox') and guarantee fees for the National Housing Act (NHA) mortgage-backed securities and Canada Mortgage Bond.
- Provincial governments can set property-related taxes, primarily to deal with housing affordability issues.¹⁶ In addition, provincial supervisors control prudential tools for provincially regulated financial institutions; they can also designate D-SIFIs in their jurisdictions.
- At the federal level, policy coordination typically takes place at the SAC. Policy action is transparent, typically involving public consultations. However, better coordination with provincial authorities seem warranted given their ownership of certain policy tools.
- Macroprudential policy at the federal level appears to be effective. However, some policy leakages exist given that some federal policy measures (particularly, those employed by OSFI) are not applied to provincially regulated entities.

23. OSFI has the power to issue guidelines setting prudential requirements regarding capital and liquidity to federally regulated deposit-taking institutions. As the federal financial

¹⁶ For instance, a speculation and vacancy tax was introduced by the British Columbia government in 2018.

sector supervisor, OSFI has control and powers over prudential tools which may be also deployed to enhance system-wide financial stability. To address structural systemic risk stemming from D-SIBs, OSFI introduced in March 2013 (effective in January 2016) a D-SIB capital surcharge, equivalent to 1 percent of risk-weighted assets, to the six D-SIBs. In addition, OSFI publicly announced the domestic stability buffer (DSB) in June 2018, a Pillar 2 requirement for D-SIBs which is intended to cover systemic vulnerabilities such as domestic household indebtedness, Canadian asset imbalances and institutional leverage in Canada.¹⁷ In November 2014, OSFI implemented the leverage ratio requirement, consistent with the Basel III framework; this replaced the previous asset-to-capital multiple requirement. Regarding foreign-currency liquidity, OSFI implemented a tool to monitor liquidity coverage ratios (LCRs) by significant currencies, in line with the Basel III framework.

24. The DSB, imposed by OSFI on D-SIBs, effectively serves as a systemic risk buffer to improve the resilience of D-SIBs (Table 3).¹⁸ The DSB is currently applied only to D-SIBs and is implemented as a Pillar 2 requirement. Hence, if a D-SIB breaches the buffer, there would be no automatic constraints on dividend distributions; however, OSFI will require a remediation plan. In principle, the calibration of the DSB is based on the financial institutions' exposures to specific systemic vulnerabilities. In December 2018, OSFI raised the DSB for all six D-SIBs by 25 basis points to 1.75 percent of total risk-weighted assets (all exposures, including those overseas), which came in effect in April 2019. The DSB was further raised to 2 percent in June 2019, which will come in effect in October 2019.

25. The countercyclical capital buffer (CCyB) framework is in place, but the CCyB has not been activated. The CCyB regime consists of three important elements. First, OSFI, in consultation with the SAC partners, assesses whether credit growth is excessive and could lead to a buildup of systemic risk. Second, for exposures in Canada, the CCyB can be set between 0 and 2.5 percent of risk-weighted assets. In addition, additional CCyB may be required for exposures outside Canada in line with the Basel reciprocity framework. Third, the CCyB must be met with common equity tier-1 capital, and financial institutions will be subject to restrictions on the dividend distribution when the requirement is not met. The decision to activate, increase, decrease, or release the CCyB will be formally communicated through an OSFI Advisory. The CCyB for exposures in Canada has so far been at zero.

26. To address potential policy leakages outside the insured mortgage perimeter and to increase the resilience of mortgage borrowers, the B-20 Guideline were revised by OSFI in 2018. The new guidelines extended the requirement of "stress testing" debt servicing capacity to uninsured mortgage borrowers accessing fixed-rate loans with a low LTV ratio and maturity beyond

¹⁷ The criteria to include a vulnerability rely on whether it is measurable, material, cyclical and has a system-wide impact that could materialize in the foreseeable future (see also the DSB Guideline for banks—<http://www.osfi-bsif.gc.ca/Eng/Docs/dsb.pdf>).

¹⁸ Unlike systemic risk buffers in the European Union, which are used to address structural systemic risk, the DSB has been used to address cyclical systemic risk.

5 years.¹⁹ In addition, all borrowers subject to the B-20 Guidelines must be able to service their obligations if their interest rates increase by 2 percentage points or reach the level of the BOC's 5-year fixed posted mortgage rate (whichever is higher) (see Appendix IV, Table 3).²⁰ In addition, OSFI is requiring lenders to enhance their loan-to-value (LTV) measurement and limits so that they are reflective of current risk environment and are being updated as the housing markets evolve. The B-20 Guideline issued in 2012 also included the maximum LTV of 65 percent for non-conforming loans at 65 percent and the restrictions on certain lending arrangements that are designed to circumvent LTV limits such as "co-lending" practices.²¹

27. The MoF controls the rules of mortgage insurance that is backstopped by the government. The government-owned CMHC provides mortgage insurance, and the government backs mortgage insurance provided by two private insurers (subject to a 10 percent deductible). The mortgage insurance rules prescribe various parameters within the so-called 'sandbox', including an LTV cap, a limit on amortization period, the maximum property value and the minimum credit score to qualify for mortgage insurance, and the stress test qualifying rate for insured mortgages (see also Appendix IV, Table 1).²² In addition, the MoF can decide which types of loans are eligible for mortgage insurance; for example, HELOCs are ineligible.

28. The MoF undertook two additional rounds of tightening mortgage insurance rules since the 2014 FSAP (Table 3). After four consecutive tightening rounds between 2008 and 2012, the MoF increased the minimum down payment for new mortgage from 5 to 10 percent on the portion of the house value exceeding \$500,000 in December 2015 (effective in February 2016). To further deal with the risk buildup due to household debt in the low interest rate environment, the MoF also introduced in October 2016 a stress testing requirement to assess the debt servicing capacity of insured mortgage borrowers. Furthermore, the rules for high-ratio mortgages were extended to portfolio insurance of low-ratio mortgages, effective in November 2016. The limit on amortization period remains at 25 years, as set in 2012.

29. In Québec where the major credit cooperative group is a D-SIFI, AMF as the prudential supervisor largely aligned its regulatory regime for deposit-taking institutions with the federal regime.²³ AMF has also put in place the CCyB framework; similar to OSFI, AMF has never activated the CCyB. In 2018, AMF issued the Residential Hypothecary Lending Guideline, which is similar to OSFI's B-20 Guideline, to ensure a level playing field in Québec. While AMF has not

¹⁹ The B-20 Guideline issued in 2012 covered low-ratio mortgages with variable rates and low-ratio fixed-rate mortgages with maturity shorter than five years. For more details about the timeline see also BOC's June 2018 FSR.

²⁰ In 2012, OSFI issued Guideline B-20 covering low-ratio loans with variable rates and low-ratio fixed-rate mortgages with a maturity shorter than five years. For more details about the timeline see also the BOC's June 2018 Financial Stability Review—<https://www.bankofcanada.ca/wp-content/uploads/2018/06/fsr-june2018.pdf>

²¹ Only co-lending that breaches the B20 LTV limits is not permitted.

²² For instance, the upper limits on the gross debt servicing ratio and total debt servicing ratio are currently 39 and 44 percent, respectively.

²³ OSFI and AMF also worked together to develop the regulatory capital framework for life insurers given that major life insurers are operating in Québec.

implemented a measure similar to the DSB, it is noteworthy that the Québec's D-SIFI has much larger capital buffers than federally regulated D-SIBs.

Table 3. Canada: Recent Macroprudential Measures, 2014–19		
Date	Agency	Measures
October 2019	OSFI	The domestic stability buffer increased to 2 percent of risk-weighted assets.
April 2019	OSFI	The domestic stability buffer increased to 1.75 percent of risk-weighted assets.
July 2018	OSFI	The domestic stability buffer at 1.5 percent of risk-weighted assets was formally introduced. This Pillar 2 measure had been in place but was not publicly announced.
January 2018	OSFI	B-20 Guideline was revised, among others, to include a requirement to stress test the debt-servicing capacity of uninsured mortgage borrowers and disallow arranging mortgages secured by the same property to circumvent the maximum LTV limit. Lenders were also required to establish appropriate LTV limits that reflect macroeconomic and housing market conditions. Alberta, Québec and Saskatchewan subsequently implemented similar stress-testing requirement measures, which came in effect in March 2018, May 2018 and July 2019, respectively.
November 2016	DOF	The eligibility requirements for low-LTV mortgage insurance became the same as those for high-LTV mortgage insurance. Effectively, certain types of mortgages were no longer eligible for mortgage insurance (e.g., cash-out refinance, mortgages with amortization above 25 years, mortgages for investment properties) and low-LTV insured mortgage borrowers were subject to the stress testing requirement.
October 2016	DOF	The requirement to stress-test the debt-servicing capacity was extended to all high-LTV insured mortgage borrowers.
February 2016	DOF	The minimum down payment increased from 5 to 10 percent for the portion of a property price above Can\$500,000. The minimum 5 percent down payment for properties up to Can\$500,000 remained unchanged.
Sources: Canadian authorities.		
Note: Date indicates when the measure became in effect, if not otherwise specified.		

30. In addition, CMHC and provincial governments used a few other housing finance-related tools (Table 5). Provincial governments in British Columbia and Ontario have implemented housing market measures including foreign buyers stamp duties and vacant home taxes. Some of these measures are considered capital flows management measures.²⁴ At the same time, CMHC increased the insurance premium for borrowers with down payments between 5 and 25 percent, effective in March 2017. Moreover, CMHC introduced a 0.01 percent administration fee that will be assessed against a portion of an issuer's unused NHA mortgage-backed securities guarantee allocations beyond a specified threshold in April 2017.

²⁴ These tax measures are targeted at nonresidents or existing homeowners and should be replaced with broad-based tax measures that address speculative activities more generally, consistent with the IMF's Institutional View on the Liberalization and Management of Capital Flows.

Table 4. Canada: Other Housing Finance-Related Measures, 2014–18

Date	Agency	Measures
January 2018	CMHC	Guarantee fees for National Housing Act mortgage-backed securities (NHA MBS) were raised from 80 to 100 basis points for annual guarantees in excess of Can\$9 billion.
January 2018	British Columbia government	The property transfer tax on foreign buyers in Vancouver was increased to 20 percent, and its geographic coverage was also expanded. A speculation and vacancy tax on homeowners (both foreign and domestic) who do not pay income taxes in British Columbia was introduced, in the range between 0.5 and 2 percent.
November 2017	City of Vancouver	The Vancouver ten-year Housing Strategy was announced, along with its three-year action plan, including references to potential changes to real estate-related taxes and restrictions on property ownership.
April 2017	Ontario government	The Housing Fair Plan was announced, including measures to cool off the housing market, contain rent increases, curb speculative transactions, and boost housing supply. Specific measures included a 15 percent tax on nonresident home buyers in the Greater Golden Horseshoe area.
March 2017	CMHC	Mortgage insurance premiums were raised.
January 2017	OSFI	A risk-based solvency framework for federally regulated mortgage insurers ("Advisory") was introduced, raising capital requirements for mortgage insurance.
January 2017	Ontario government	The maximum land transfer tax refund was doubled to eligible first-time home buyers to Can\$4,000.
October 2016	MoF	A capital gain tax exemption for the principle residence was introduced. Individuals who were not Canadian residents in the year the property was acquired are not eligible.
August 2016	British Columbia government	A 15 percent property transfer tax on foreign buyers in Vancouver.
July 2016	MoF	Portfolio mortgage insurance was restricted only to facilitate NHA MBS (rather than private-label securitization or capital relief).
July 2016	CMHC	Guarantee fees for NHA MBS and Canada Mortgage Bond were raised to encourage development of private market funding alternatives.
February 2016	MoF	Insured mortgages could only be securitized under the NHA MBS program. Low-ratio portfolio-insured mortgages must be securitized via the NHA MBS program within six months of being insured. .
June 2015	CMHC	Mortgage insurance premiums were raised by about 15 percent for mortgage loans with LTV above 95 percent and non-traditional down-payment.
May 2015	Legislature	The Protection of Residential Mortgage of Hypothecary Insurance Act was amended to prohibit the substitution of loans in portfolio insurance pools.
May 2014	CMHC	Mortgage insurance premiums were raised by 15 percent for all LTV ranges.
Sources: Canadian authorities.		
Note: Date indicates when the measure became in effect, if not otherwise specified.		

B. Macroprudential Policy Stance

31. Credit growth has moderated in the past year in line with the softening housing market due to monetary policy tightening and prudential measures. The long credit upcycle has led to a large, sustained credit-to-GDP gap, rapidly rising house prices in major cities (e.g., Toronto and Vancouver), and localized construction booms, all amidst an already high level of household debt. However, the credit cycle has turned. As of 2019Q1, credit growth moderated to 4.8 percent year-on-year. Several rounds of policy measures have successfully reduced insured mortgage lending and improved credit quality, with the share of banks' new lending to highly indebted borrowers falling sharply. Meanwhile, house prices have been broadly stable in the past couple years, while housing market related activities—including construction, inventory and sales, and mortgage lending—no longer point to overheating. As a result, the credit-to-GDP gap has narrowed, and household debt-to-gross disposable income has stabilized.

32. The current macroprudential stance is broadly adequate given declining macrofinancial vulnerabilities. The revision of OSFI's B-20 guidelines (came in effect in January 2018), with similar measures adopted in Alberta, Saskatchewan, and Québec, appears to have improved the underwriting standards of uninsured mortgages. The overall macroprudential stance remains relatively tight, including the six rounds of tightening mortgage insurance rules by the DOF, with the last act around end-2016.

33. There is evidence that recent macroprudential measures were effective in reducing household credit growth and cooling the housing market, but proper identification is challenging. [IMF \(2017\)](#) finds compelling evidence that three of the six rounds of macroprudential tightening rounds in Canada, which were taken between 2008 and 2016 with respect to mortgage insurance rules, were effective in reducing mortgage credit growth. Additionally, the BOC's recent [analytical note](#) attempts to gauge the impact of recent policy changes such as the tightening of mortgage insurance rules and the revision of Guideline B-20 on the Canadian mortgage market. This study shows that fewer low-ratio mortgages were originated to highly indebted borrowers in 2018 compared to the previous year. At the same time, the distribution of new borrowers has moderately improved, and the overall mortgage activity has significantly slowed, with the caveat that the revision of the Guideline B-20 coincided with a substantial increase in interest rates. Finally, using a microsimulation model and the Survey of Financial Security, mortgage demand of first-time buyers was found to be more sensitive to LTV limits than policies targeting the debt service ratio ([Allen et al., 2016](#)).

C. Policy Issues

34. The current macroprudential toolkit should be expanded to address risks associated with household lending by nonbank financial institutions. The tightening of macroprudential measures has led to a shift in risky mortgage origination to nonbank financial institutions. The growth of financial intermediation outside the traditional banking system is a shared concern with Canadian authorities ([Coletti, Gosselin, and MacDonald, 2016](#)). However, the extent of policy

leakages does not pose a serious concern in part because funding of these nonbank financial institutions is not easily scalable. Along with a careful monitoring of the risks originating from the nonbank financial intermediation, addressing macroprudential policy leakages is important. The scope of macroprudential measures should be extended to cover all mortgage lending, irrespective of lenders (including provincially regulated lenders and unregulated nonbank lenders).

35. International experience suggests that macroprudential tools could suffer from policy leakages, where credit from financial intermediaries outside the regulatory perimeter increases substantially. There is compelling evidence that tightening LTV limits has economically significant effects on household credit, and at the same time, a milder, dampening side effect on private consumption. However, the effects of additional tightening on credit are diminished while those on consumption are strengthened when LTV limits are already tight at the onset ([Alam et al. 2019](#)). Thus, complementing the existing policy toolkit with other macroprudential tools might entail better outcomes. For instance, extending the regulatory perimeter to nonbank financial intermediaries or foreign-owned providers of financial services could address some of the policy leakages. Another strategy to address leakages is to engage in reciprocity agreements with other jurisdictions, extending the scope of the application of the macroprudential policies to foreign-owned financial intermediaries ([IMF-BIS-FSB 2016](#)).

36. Additional measures seem warranted to limit vulnerabilities arising from HELOCs, especially when financially weak borrowers are considered. There are significant undrawn exposures related to HELOCs on bank balance sheets, which could bear systemic importance in crisis times. Following the industry review of these complex and risky mortgage products, the [FCAC survey-based study](#) identified four potential issues with HELOC borrowers—overborrowing, debt persistence, wealth erosion and uninformed decision-making.²⁵ Similar complex mortgage products have been heavily criticized in policy circles as one of the main culprits of the global financial crisis.²⁶ Thus, macroprudential policies to limit potential systemic risk from these products should be considered.²⁷ For instance, in addition to the maximum LTV permitted to borrow, these products could be limited to those borrowers with a total debt-to-income ratio below a certain threshold

²⁵ For instance, less than 15 percent of respondents were aware that the bank can increase a HELOC's interest rate at its discretion. In addition, more than 60 percent of the HELOC holders did not know that the lender can require the borrower to repay a HELOC at any time. At the same time, a quarter of the borrowers would struggle if their HELOC payments would increase by 100 Canadian dollars or less. In the case of federally regulated financial institutions, two out of five outstanding loans secured with real estate assets are HELOC-type loans. See also [Bank of Canada \(2017\)](#) and [IMF \(2018\)](#).

²⁶ For instance, there is compelling evidence that U.S. prime borrowers used complex mortgage products to smooth their consumption prior to the global financial crisis. At the same time, they made use of their valuable default option when house prices significantly declined (i.e., strategic default). For more details, see [Amromin et al \(2018\)](#).

²⁷ At the moment, HELOCs cannot be (mortgage) insured. In addition, the maximum amount of HELOC has been capped by the LTV limit at 65 percent.

(e.g., below 300 percent). This threshold can be calibrated based on the distribution of household indebtedness and its associated risks.²⁸

37. Cyclical capital buffer measures should be applied to all deposit-taking institutions.

Given that other federally regulated non-D-SIBs and provincially-regulated deposit-taking institutions are similarly exposed to systemic risk stemming from high household indebtedness and housing market imbalances, cyclical capital buffer measures (i.e., the DSB or similar provincial capital instruments) should be more broadly applied, including to the large credit unions and the mid-sized banks. Furthermore, the use of DSB could be made Pillar 1. If this is outside the scope of the DSB, then the CCyB should be activated at an appropriate level for all regulated deposit-taking institutions.²⁹ This would improve further the transparency and strengthen the existing capital requirement framework.

38. Similar to capital requirements for mortgage insurance (OSFI's [MICAT Guideline](#)), other macroprudential policies should consider the heterogeneity of household indebtedness and housing market imbalances across regions.

The house price-at-risk analysis emphasized a significant variability in terms of downside risks to housing markets across cities (see Appendix V). Differentiating various tools such as the LTV limits or the debt service criteria across regions has been implemented in other countries, including Norway and South Korea. For instance, tighter requirements on borrowers such as the debt service stress test could be imposed in regions where downside risks to house prices are more severe. Moreover, borrowing limits could be tighter for homeowners with multiple properties, which could be considered speculative investments.

²⁸ For instance, using micro-level data from Europe, households with total debt exceeding 300 percent of their disposable income are found to be more vulnerable to income shocks and to reduce consumption more than the less constrained borrowers, evidence that debt overhang plays an important amplifying role (see [Alter, Feng, and Valckx 2018](#)).

²⁹ While the DSB is a Pillar 2 buffer, the CCyB along with D-SIB surcharge and capital conservation buffer are Pillar 1 buffers, breaches to which would entail automatic constraints on dividend distribution. Several jurisdictions, including, Sweden, Switzerland and the United Kingdom, have recently activated or tightened the CCyB at a non-zero level (see also IMF 2019).

Type of Risks	Quantitative Indicators	Hyperlinks
Risks from overall credit growth	The Vulnerabilities Barometer is composed mostly of several credit variables with several transformations; thresholds are displayed in the Appendix 1 of the paper.	https://www.bankofcanada.ca/wp-content/uploads/2017/12/san2017-24.pdf
Banks' solvency risk from the household sector	Monitored through exposures and credit quality. BOC's systemic risk assessment is informed by our suite of models to conduct top-down financial system resilience. For the household sector, we generate estimated default rates using our Household Risk Assessment Model, and then assess the impact on banks using our top-down solvency assessment (TDSA) tool and MFRAF.	Peterson, B. and T. Roberts, " Household Risk Assessment Model ," Technical Report No. 106 (2016)
Banks' solvency risk from the corporate sector	Monitored through exposures and credit quality. Similar to the above, we use our "Corporate PD" model to estimate default rates under a stress scenario, and then assess the impact on banks using our TDSA tool and MFRAF.	Bruneau, G. and R. Djoudad, " Probabilities of default for the corporate sectors in Canada: A panel error correction model approach ", Technical Report, forthcoming.
Banks' solvency risk from the sovereign	Assessed through monitoring exposures and credit quality, as well as through banks bottom up submissions under the OSFI-BOC biennial macro stress tests.	
Banks' solvency risk from cross-border exposures and international operations	Interbank (D-SIBs) interconnectedness analyzed using centrality measures applied to interbank regulatory data. Market-based indicators to gauge the market's assessment of the stability of banks, which provide information on direct and indirect sensitivity to common shocks. MacDonald and Van Oordt (2017) and Ouellet Leblanc and Van Oordt (2017)	Retrieving Implied Financial Networks from Bank Balance-Sheet and Market Data

Type of Risks	Quantitative Indicators	Hyperlinks
Banks' liquidity risk	Assessed through monitoring liquidity metrics, funding mix, and access to funding markets. Considered under a stress scenario using MFRAF.	Figure J, "The Macro-Financial Risk Assessment Framework (MFRAF), Version 2.0," Technical Report No. 111 (2017)
Risks from disruptions in financial market infrastructures	LVTS, CDCS, CDSY <u>Operational risk indicators</u> -system and participant availability rates; number and severity of incidents (among other indicators) <u>Financial risk indicators</u> -reductions in bilateral credit limits; repeated large overnight advances; collateral availability; payment values, volumes and throughput; interbank lending rates -Back testing of participant funds collateral requirements -Stress testing -IIROC early warning indicators -Sources used to determine extender of credit participant system operating cap calculation	When determining whether or not to designate a system as systemically important, the Bank of Canada considers three key factors (size of transactions cleared, degree to which the FMI plays a critical role in supporting Canadian financial markets and the economy, and the size of obligations that Canadian participants can incur through their participation). See S2.2: Guideline Related to Bank of Canada Oversight Activities under the PCSA
Nonbank financial institutions' solvency and liquidity risks - Insurers - Investment funds - Pension funds	<u>Insurers</u> These include indicators of capital adequacy, leverage, actuarial liabilities and asset mix quality, liquidity, profitability, pricing of risk, and credit risk exposures. <u>Investment funds</u> Net flows as a percentage of total net assets. Cash and liquidity ratio, Growth of less-liquid funds <u>Pension funds</u> - No quantitative indicator available to monitor liquidity risks. - Solvency position of Canadian DB plans is estimated by relevant regulatory agency. In some jurisdictions, the information is aggregated and published quarterly or annually. - For the solvency position estimate of the sector, we use quarterly estimates from two consultant firms: Mercer Pension Health Index and Aon's Median Solvency Ratio Survey.	

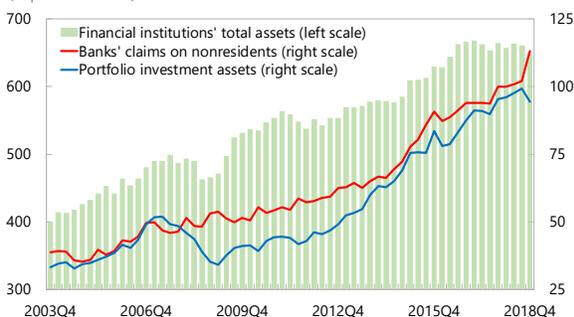
Type of risks	Quantitative indicators	Hyperlinks
Interconnectedness, interbank contagion, macroprudential policies	A micro-founded framework of capital surcharges that target the interconnectedness component of systemic risk.	"A Microfounded Design of Interconnectedness-Based Macroprudential Policy" https://www.bankofcanada.ca/2016/02/staff-working-paper-2016-6/
Sources: Canadian Authorities; IMF Staff.		

Appendix II. Financial System Structure

Canada has one of the largest and most developed financial systems in the world (Appendix Figure II.1). As of end-2018, total assets of financial institutions reached US\$10.2 trillion or 626 percent of GDP, and outstanding debt securities and stock market capitalization amounted to US\$2.2 and US\$1.9 trillion, or 133 and 119 percent of GDP, respectively. Deposit-taking institutions, pension funds, mutual funds, and insurers dominate the financial system, accounting for about 45, 18, 17, and 13 percent of financial institutions' total assets, respectively. Each segment of Canada's financial system—deposit-taking, insurance, pension, asset management, and capital markets—is among the largest in the world in nominal terms.

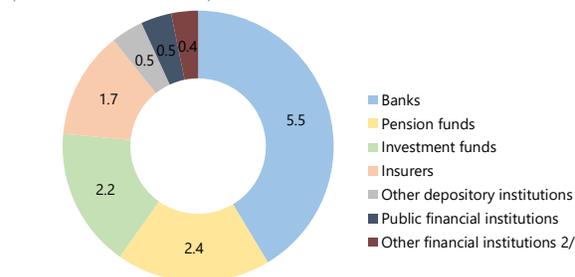
The financial system has enjoyed solid overall growth and international expansion since the 2014 FSAP. Total assets of financial institutions have increased by 31 percent (since end-2013), underpinned by robust assets growth of banking sector, mutual funds and pension funds. Overall banking sector growth is partly driven by the expansion of U.S. operations, with total claims on nonresidents increasing to 41 percent of banking sector assets (from 31 percent). Royal Bank of Canada became a global systemically important bank in 2017. Mutual funds and pension funds have also expanded their cross-border investment, driving Canada's international portfolio investment assets to 95 percent of GDP (from 60 percent). Domestically, banks finance about two-thirds of private sector credit, while bond issuance and nonbanks are important alternative funding sources.

Financial System: Size and Internationalization, 2003-18
(In percent of GDP)



Source: Bank of Canada; IMF, International Financial Statistics and World Economic Outlook database; Haver Analytics.

Composition of Financial Institutions' Total Assets, 2017¹
(In trillions of Canadian dollar)



Source: IMF staff estimate based on data from Canadian authorities, FSB, Haver Analytics and OSFI.

1/ Based on consolidated balance sheet basis.

2/ Excluding captive financial institutions and money lenders.

The financial system is highly concentrated. The six largest banks and Québec's major credit cooperative group—designated as domestic systemically important financial institutions (D-SIFIs)—account for about 90 percent of deposit-taking sector assets, while the three largest life insurers account for about 70 percent of total net premiums. These banks and life insurers, together with large public pension funds, are globally active and systemically relevant for Canada's financial system. Major banks' main businesses comprise retail and wholesale banking, wealth management, and capital markets; their subsidiaries are among leading securities market intermediaries and asset managers.

Financial markets also provide an important venue for public and private sector financing.

While bond markets continue to expand by about 39 percent since end-2013, Canadian corporates

and financial institutions have increasingly issued debt internationally, driving up the share of foreign-currency debt securities from 26 percent to 34 percent. The public debt market also comprises provincial debt securities and government-guaranteed mortgage-backed securities (MBS), which jointly account for two-third of public debt instruments. Other core funding markets include money markets (repo, securities lending, and bankers' acceptances) and foreign-exchange markets (spot and swap).

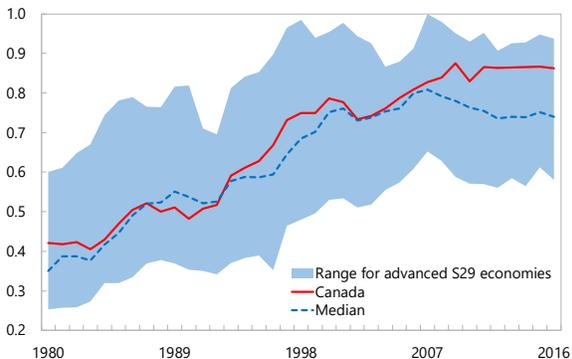
The government plays a central role in housing finance. The government provides mortgage insurance through CMHC and backstops private insurers' mortgage insurance (subject to a 10 percent deductible). Furthermore, CMHC provides a timely payment guarantee for securitization of qualifying insured mortgages. As of 2018Q3, insured mortgages and government-guaranteed MBS (i.e., National Housing Act (NHA) MBS) amounted to Can\$723 and Can\$485 billion, respectively.

Appendix Figure II.1. Canada: Financial System Structure

Canada's financial system is well developed based on the combined metrics of depth, access and efficiency.¹

Financial Development Index, 1980-2016

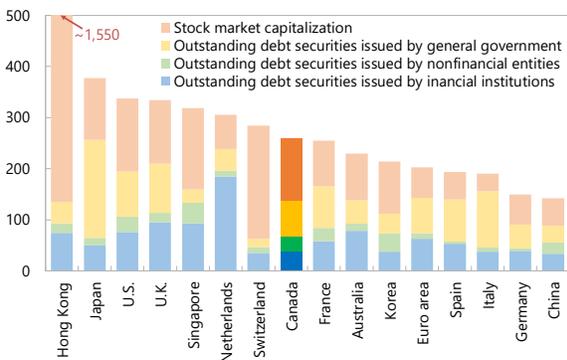
Value between 0 and 1, with the higher value, the more developed financial system



The bond and stock markets are deep, serving as important venues for governments, financial institutions, and nonfinancial entities to raise funding.

Value of Financial Markets, 2018Q1

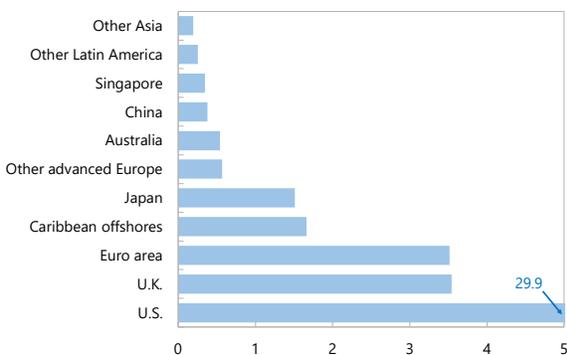
(In percent of GDP)



Canadian banks have significant exposures to the United States due to their overseas operations via subsidiaries and branches.

Banking Sector's Overseas Exposures, 2018Q4

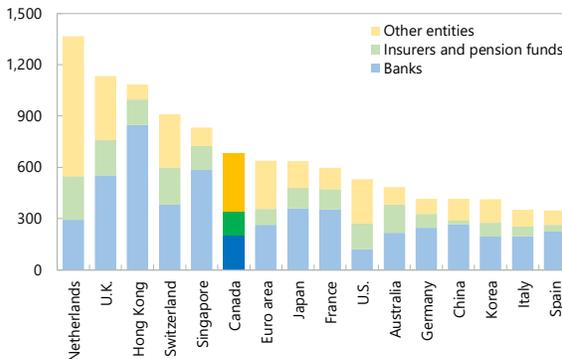
(In percent of total claims; based on the ultimate risk basis)



The financial system is large, with banks, investment funds and pension funds dominating the landscape.

Total Assets of Financial Institutions, 2017

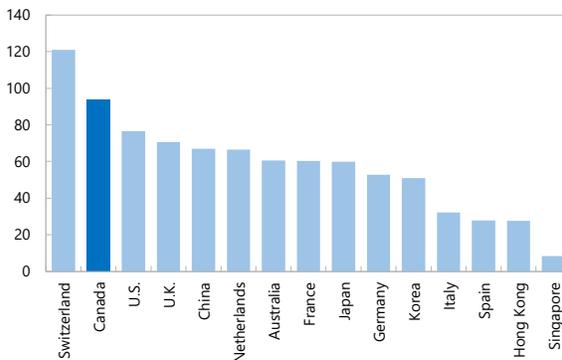
(In percent of GDP)



Nonbank financial intermediation is relatively large, but mainly comprises collective investment schemes susceptible to run.

Nonbank Financial Intermediation, 2017

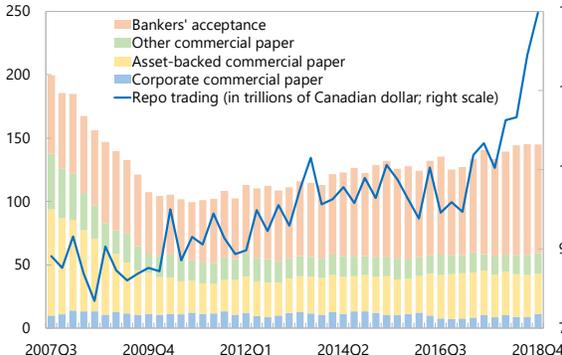
Based on the FSB's "narrow measure" of "shadow banking" (in percent of GDP)



The money market continues to function well, though asset-backed commercial paper activity not fully recovering to the pre-2008 level.

Selected Outstanding Money Market Instruments, 2007-18

(In billions of Canadian dollar)



Sources: Bank of Canada; Bloomberg; FSB, Global Monitoring Report on Nonbank Financial Intermediation 2018; Haver Analytics; IMF, Financial Development Index database and World Economic Outlook database; and IMF staff calculations.

1/ For more details about the financial development index, see IMF SDN/15/08 and IMF WP/16/5.

Appendix III. Main Data Gaps for Systemic Risk Surveillance

Areas with Potential Systemic Risks	Description of Data	Priority
Securities Markets Data		
Fixed income markets – Domestic transactions and activity	<ul style="list-style-type: none"> • IIROC maintains fixed income trades for domestic transactions. • Aggregated format of all activity 	Medium
Equity markets	<ul style="list-style-type: none"> • Combination of vendor market data and aggregated transactional data received from IIROC 	Low
Repurchase agreements	<ul style="list-style-type: none"> • Transactions other than what is currently tracked by IIROC. Only repo transactions of Government Securities Dealers (GSDs) are available. This is a small sample of the marketplace traditionally reported on by the Bank of Canada. • Data on collateral reuse and tri-party repo. 	High
Securities lending	<ul style="list-style-type: none"> • Counterparty-identified transaction data. 	Medium
Benchmark related information	<ul style="list-style-type: none"> • Sourced from Morningstar—focus is on the investment funds data • Used for quantifying benchmark activity and usage 	Medium
National view of derivatives (OTC and exchange)	<ul style="list-style-type: none"> • A national repository of Trade Repository data. • Granular data from central counterparties. 	High
Holdings and position	<ul style="list-style-type: none"> • Detailed data for both institutional and retail investors • Flow of funds between types of securities. • Cross border investment activities and exposures. 	Medium
Nonbank Financial Institutions		
Nonbank financial institutions - some data is available on these institutions but requires more information for comprehensive systemic risk assessment.	<ul style="list-style-type: none"> • Mortgage finance companies and investment corp. • Auto financing companies, and equipment leasing • Private equity providers. • Hedge funds and prospectus-exempt pooled funds. • Credit unions. • Nonbank broker-dealers. • Peer-to-peer lending. 	Medium
National view of private/exempt markets—some data is available provincially but not readily accessible in a national view.	<ul style="list-style-type: none"> • Exempt market distribution by type of exemptions (e.g., capital raised; geographical and sectoral distribution). • Private equity. • Private companies' activities in capital markets. 	Medium

Areas with Potential Systemic Risks	Description of Data	Priority
Housing markets/Housing finance		
Securitization (public and private sources)	<ul style="list-style-type: none"> • Information on the composition of individual pools. • where the credit risk lies 	Low
System-wide view of household indebtedness and credit risks.	<ul style="list-style-type: none"> • National credit registry where any type of loan above a certain threshold, facilitated by banks, credit unions, or any other financial institutions are reported. • Complete data on loan terms, borrower characteristics, lender identifier, etc. 	High
National property and land transaction registry	<ul style="list-style-type: none"> • Harmonized and complete transaction-level data across all provinces. • Allows identification of non-first-time buyers, speculators, corporate buyers. 	High
Other		
Cross-border and cross-sector exposure data	<ul style="list-style-type: none"> • Overseas credit and derivatives exposure data are necessary to gauge potential spillovers from cross-border activity and linkages • Exposures between banks and nonbank financial intermediaries (by type of financial intermediary) over time 	High
Sources: CSTO; BOC; DOF; OSFI; CMHC; IMF Staff.		

Appendix IV. Government-backed Mortgage Insurance Rules

Appendix Table IV.1. DOF: Government-backed Mortgage Insurance Rules (2019)

Parameter	Limit
Amortization period limit	25 years
Minimum down payment for new mortgages	5 percent for the first \$500,000 and 10 percent for the portion above \$500,000
Refinancing mortgages	Non-insurable
High-ratio investment properties	Non-insurable in high-ratio
Low-ratio investment properties	Single-units non-insurable 2–4 units are insurable with LTV ≤ 80 percent
Debt-service ratio limits	Gross-debt-service (GDS): 39 percent Total-debt-service (TDS): 44 percent
Stress test qualifying rate for insured mortgages	Greater of: (i) the contractual mortgage rate, or (ii) the Bank of Canada 5-year fixed posted rate
Maximum property value to qualify for insurance	\$1,000,000
Credit score	≥ 600, with a 3 percent exception bucket
Source: Department of Finance; IMF Staff.	

Appendix Table IV.2. The Revision of Government-backed Insurance Rules (2016)

DOF 2016 Revisions

(1) Loan-to-value (LTV) limit for new mortgages was tightened from 95 to 90 percent on the portion of the house price more than \$500,000 (effective February 15, 2016).

(2.a) Debt service criteria were expanded to all borrowers who have to qualify under maximum debt-servicing standards based on the higher of the mortgage contract rate or the Bank of Canada conventional five-year fixed posted mortgage rate (effective 17 October 2016).

(2.b) Rules for high-ratio mortgages were extended to portfolio insurance of low-ratio mortgages (effective November 30, 2016)

Source: Department of Finance; IMF Staff.

Appendix Table IV.3. The Revision of B-20 Guideline (2018)
OSFI B-20 Guideline 2018 Revisions

- (1) "Stress test" for uninsured mortgages, greater of: (i) the contractual mortgage rate +2 percent, or (ii) the Bank of Canada 5-year fixed posted rate
- (2) OSFI is requiring lenders to enhance their loan-to-value (LTV) measurement and limits so that they will be dynamic, reflective of risk, and are updated as housing markets and the economic environment evolve
- (3) OSFI is placing restrictions on certain lending arrangements that are designed, or appear designed to circumvent LTV limits (i.e., no "co-lending")

Source: Department of Finance; OSFI; IMF Staff.

Appendix V. Household Indebtedness and Housing Market Imbalances

Macrofinancial vulnerabilities—notably, elevated household indebtedness and housing market imbalances—remain substantial, posing financial stability concerns. During the decades-long credit upcycle, low interest rates and low capital charges for mortgage lending, together with policies promoting housing affordability, have fueled borrowing to finance home purchases in the face of rapidly rising house prices. Downside risk to house prices in the medium term are sizeable given existing overvaluation, and Canada-specific housing finance characteristics may amplify procyclical effects of falling house prices due to borrowers' refinancing pressures and lenders' sudden adoption of risk-based mortgage pricing. During severe downturns, the household sector would be affected, with a significant increase in debt belonging to financially weak households, while the corporate sector would remain more robust.

Macrofinancial vulnerabilities have declined recently but are still substantial, with significant downside risk to growth. Credit growth has moderated in line with the softening housing market due to monetary tightening and prudential measures. As of 2019Q1, credit growth moderated to 4.8 percent year-on-year. Several rounds of policy measures have successfully reduced insured mortgage lending and improved credit quality, with the share of banks' new lending to highly indebted borrowers falling sharply. Meanwhile, house prices have been broadly stable in the past couple years, and housing market-related activities—including construction, inventory and sales, and mortgage lending—have also moderated. However, macrofinancial vulnerabilities remain substantial, and growth-at-risk analysis (as of 2018Q3) suggests a 5 percent probability that real GDP growth would be -1.7 percent or less over the next year, and -1.6 percent (annualized) over the next three years.¹

Household indebtedness is high by historical and international standards. Household debt reached 96 percent of GDP at end-2018. Canadian households are among the most indebted in advanced economies. Their debt-servicing obligations, already relatively large, could increase as interest rates rise. Households as a whole have large buffers, with net wealth of 489 percent of GDP. However, the share of debt belonging to households with excessive indebtedness or weak debt-servicing capacity has increased significantly over the past decade.

Alongside the high level of household debt, Canada faces persistent housing market imbalances, with a surge of house prices across major cities. Canada-wide house prices have trended upwards over the past decade, increasing by more than 20 percent in real terms. Overvalued house prices (relative to fundamentals such as income or rent) continue to underpin the imbalances. House price-at-risk analysis suggests that house price overvaluation and tight financial conditions have contributed to downside risk to house prices. Based on current macrofinancial

¹ Growth-at-risk analysis provides a distribution of real GDP growth forecasts conditional on financial conditions and macrofinancial vulnerabilities, the latter capturing corporate and household sector vulnerabilities, housing market imbalances, and credit-to-GDP gap.

conditions, a large housing market correction in the medium term is possible. With a 5 percent probability, average real house price could fall by at least 12 percent year-on-year over the next three years, with potential larger price declines in major cities such as Toronto and Vancouver.

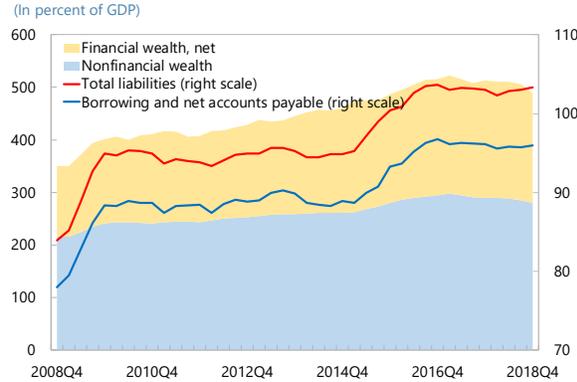
British Columbia and Ontario face more heightened financial stability risks given their larger household debt-at-risk and downside risk to house prices. Household debt relative to income is higher in these two provinces, in part due to the need of households to borrow more for their home purchases as regional house prices have risen much more rapidly. Furthermore, downside risk to house prices in British Columbia and Ontario is greater due to the larger degree of house price misalignments. At the same time, the share of debt belonging to financially weak households is higher in these two provinces and would also increase by a larger magnitude in an adverse scenario.

The dynamics of housing market risks in major cities are partially correlated with capital inflows, which seem to both amplify and mitigate downside risks to house prices across Canadian cities. In general, foreign direct investment (FDI), typically long-term investment, is associated with lower future risks to several Canadian regional housing markets. In contrast, other capital inflows (i.e., non-FDI or portfolio flows), typically attributed to foreign bank transactions, are found to amplify downside risks to house prices in cities such as Toronto, Vancouver, and Calgary.

Appendix Figure V.1 Canada: Household Indebtedness and Housing Market Imbalances

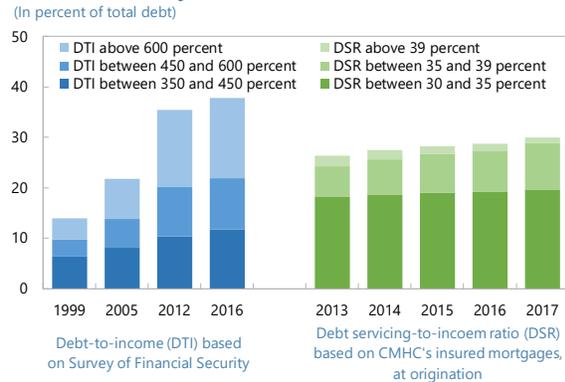
The increase in household debt is significant, albeit concurrently with the increase in household wealth.

Household Indebtedness and Wealth, 2008-18



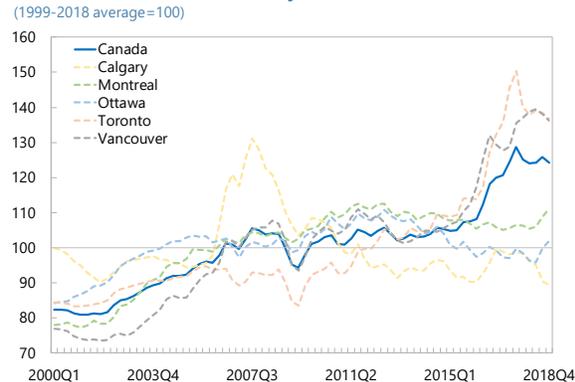
Debt of financially weak households has gained a larger share over the past decade.

Debt of Financially Weak Households, 1999-2017



Toronto and Vancouver metro areas are overvalued based on house price-to-income indicators.

House Price-to-Income in Major Canadian Cities, 2000-18

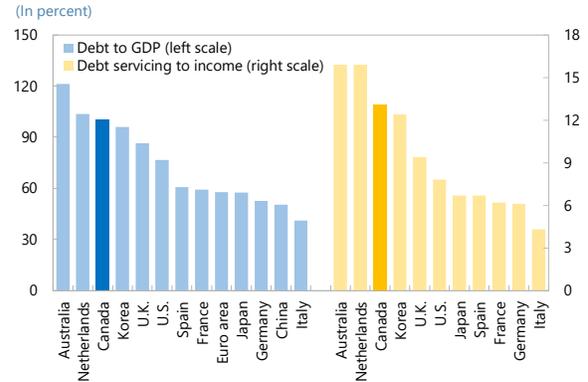


Sources: CMHC; Haver Analytics; OECD; Statistics Canada, Survey of Financial Security; and IMF staff estimates.

- 1/ The 5-percent house price-at-risk measures a potential decline in real house prices (year-on-year) three years ahead with a 5 percent probability.
- 2/ Financially weak households are defined as households whose debt servicing-to-income is above 40 percent. Debt of these financially weak households is considered at risk.
- 3/ The x-percent house price-at-risk measures a potential decline in real house prices with a x percent probability.

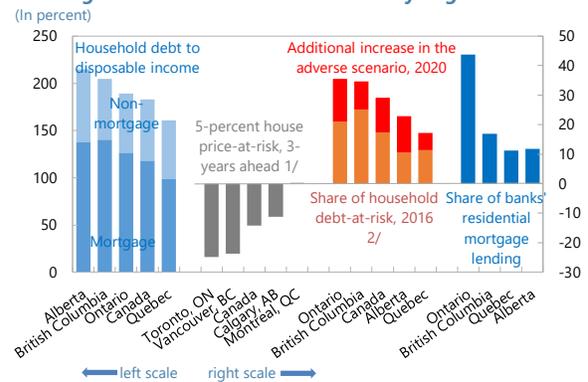
Canadian households are among the most indebted, and their servicing obligations are also relatively high.

Household Indebtedness and Debt Servicing, 2018Q2



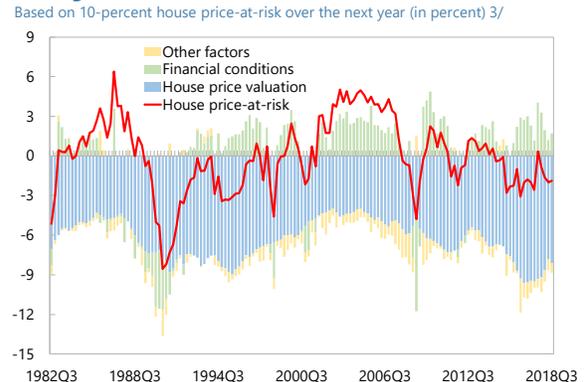
British Columbia and Ontario face more heightened financial stability risks given their larger household debt-at-risk and downside risk to house prices.

Housing Market Related Vulnerabilities By Regions



House price overvaluation is the main driver for downside risk to house prices.

Driving Factors of House Price-at-Risk, 1982-2018

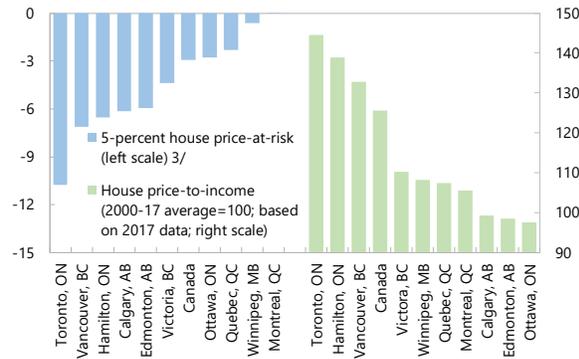


Appendix Figure V.1 Canada: Household Indebtedness and Housing Market Imbalances (concluded)

Cities where house price-to-income most misaligned (i.e., overvalued) face larger downside risk to house prices.

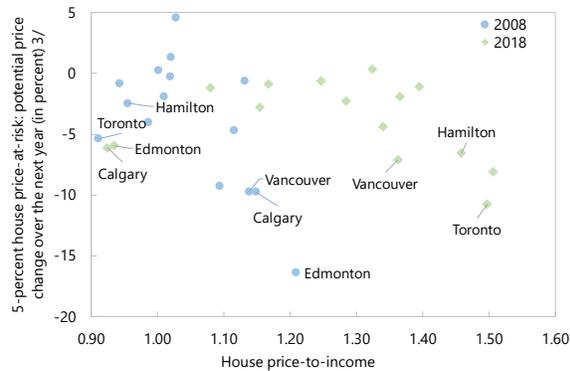
House Price-at-Risk across Cities, 2018

(In percent; showing potential price change over the next year)



Downside risks and valuations across Canadian cities have deteriorated in tandem.

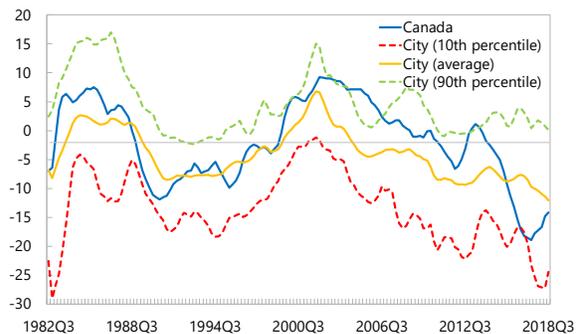
Downside Risks to House Prices Across Cities, 2008-18



Downside risk to house prices over the medium term is particularly sizeable.

Downside Risks to House Prices in the Medium Term, 1982-2018

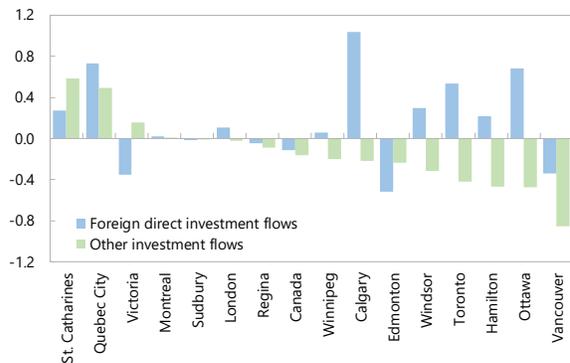
Based on 5-percent house price-at-risk three years ahead (in percent; year-on-year) 3/



The dynamics of housing market risks in some major cities are partially correlated with capital inflows.

Capital Flows as Drivers of Downside Risks to House Prices

Based on coefficients at 10th-percentile, one-year ahead



Sources: CMHC; Haver Analytics; Statistics Canada, Survey of Financial Security; and IMF staff estimates.

References

- Allen, J., T. Grieder, B. Peteron, and T. Roberts, 2016. "The Impact of Macroprudential Housing Finance Tools in Canada: 2005 -2010", Bank of Canada, Staff Working Paper 2016-41.
- Alam, Z., A. Alter, J. Eiseman, G. Gelos, H. Kang, M. Narita, E. Nier, and N. Wang, 2019. "Digging Deeper – Evidence on the Effects of Macroprudential Policies from a New Database", International Monetary Fund, WP/19/, Washington DC.
- Alter, A., Feng, A.X. and Valckx, N., 2018. "Understanding the Macro-Financial Effects of Household Debt: A Global Perspective," International Monetary Fund, WP/18/76, Washington DC.
- Amromin, G., Huang, J., Sialm, C. and Zhong, E., 2018. "Complex Mortgages," *Review of Finance*, 22(6), pp.1975-2007.
- Coletti, D., M-A. Gosselin, C. MacDonald, 2016. "The Rise of Mortgage Finance Companies in Canada: Benefits and Vulnerabilities", *Financial System Review*, December.
- Bank of Canada, 2017. "Financial System Review", November.
- Bilyk, O. and M. teNyenhuis, 2018. "The Impact of Recent Policy Changes on the Canadian Mortgage Market", Bank of Canada – Staff Analytical Note 2018-35.
- Duprey, T., and A. Ueberfedt, 2018. "How to Manage Macroeconomic and Financial Stability Risks: A New Framework", Bank of Canada, Staff Analytical Note 2018-11.
- Duprey, T., X. Liu, C. MacDonald, M. van Oort, S. Prizhkina, X. Shen, and J. Slive, 2018. "Modelling the Macrofinancial Effects of a House Price Correction in Canada".
- Edge, R. and N. Liang, 2017. "New Financial Stability Governance Structures and Central Banks," Hutchins Center Working Paper No 32.
- International Monetary Fund (IMF), 2014a. "Staff Guidance Note on Macroprudential Policy", December.
- _____, 2014b. "Staff Guidance Note on Macroprudential Policy – Detailed Guidance on Instruments", December.
- _____, 2017 "Canada Staff Report for the Article IV Consultation – Macroprudential Tools at Work in Canada", Selected Issues and Analytical Notes, June, pp43-53.
- _____, 2018. "Canada Staff Report for the Article IV Consultation", Country Report 18/221, July.

_____, 2019. "Australia Technical Note – Systemic Risk Oversight and Macroprudential Policy", forthcoming.

Kuttner, K.N. and Shim, I., 2016. "Can Non-interest Rate Policies Stabilize Housing Markets? Evidence from a Panel of 57 Economies," *Journal of Financial Stability*, 26, pp.31-44.