

Financial System Review

December 2013



The *Financial System Review* is available on the Bank of Canada's website at bankofcanada.ca.

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Financial System Review

December 2013

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This report includes data received up to 3 December 2013.

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Preface

The financial system makes an important contribution to the welfare of all Canadians, since the ability of households and firms to channel savings into productive investments, allocate the associated risks, and transfer financial assets with confidence is one of the fundamental building blocks of our economy. A stable and efficient financial system is therefore essential for sustained economic growth and rising living standards. In this context, financial stability is defined as the resilience of the financial system to unanticipated adverse shocks, which enables the continued smooth functioning of the financial intermediation process.

As part of its commitment to promote the economic and financial welfare of Canada, the Bank of Canada actively fosters a stable and efficient financial system. The Bank promotes this objective by providing central banking services, including the various liquidity and lender-of-last-resort facilities; overseeing key domestic clearing and settlement systems; conducting and publishing analyses and research; and collaborating with various domestic and international policy-making bodies to develop policy. The Bank's contribution complements the efforts of other federal and provincial agencies, each of which brings unique expertise to this challenging area in the context of its own mandate.

The *Financial System Review* (FSR) is one avenue through which the Bank of Canada seeks to contribute to the longer-term resilience of the Canadian financial system. It brings together the Bank's ongoing work in monitoring developments in the system with a view to identifying potential risks to its overall soundness, as well as highlighting the efforts of the Bank, and other domestic and international regulatory authorities, to mitigate those risks. The focus of this FSR, therefore, is on assessing the downside risks rather than characterizing the most likely future path for the financial system. The context for this assessment is our baseline view of how the global and domestic economies are likely to evolve, as well as the risks to this outlook. Economic stability and financial stability are interrelated, so any risks to either must be considered in an integrated fashion. Thus, the FSR's discussion of risks to the Canadian financial system takes into account the macroeconomic environment presented in the Bank of Canada's *Monetary Policy Report*.

The FSR also summarizes recent work by Bank of Canada staff on specific financial sector policies and on aspects of the financial system's structure and functioning. More generally, the FSR aims to promote informed public discussion on all aspects of the financial system.

Overview

This section of the *Financial System Review* (FSR) summarizes the judgment of the Bank of Canada's Governing Council on the main risks to the stability of the Canadian financial system and on the policy actions required to mitigate them.

Five years after the start of the global financial crisis, economic growth remains modest, dampened by the repair of balance sheets by households, financial institutions and governments. Nonetheless, there have been positive developments in the global financial system since the June FSR, in part reflecting some encouraging signs about the global economy. First, and most importantly, the euro area has continued to stabilize. A modest economic recovery has begun, and there are clearer indications that structural imbalances are subsiding. As a result, the likelihood of a euro-area financial crisis has diminished. Second, long-term interest rates in most advanced economies have increased, helping to improve the financial position of institutional investors with long-duration liabilities, such as pension funds and life insurers. This should also help to moderate household borrowing. Shifting expectations of when the U.S. Federal Reserve will begin to scale back its asset-purchase program triggered the rise in rates and caused some initial volatility, especially in emerging-market economies (EMEs). However, these effects were absorbed relatively quickly and with little disruption to the global financial system.

At the same time, significant vulnerabilities remain.

- The euro-area financial system remains fragile. The sluggish recovery and the slow implementation of structural reforms leave the region open to a renewed bout of financial turmoil.
- In Canada, the high level of household indebtedness and imbalances in some segments of the housing market make Canadians vulnerable to an adverse macroeconomic shock and a sharp correction in the housing market.
- In the advanced economies, a more prolonged period of low interest rates would provide greater incentives for excessive risk taking by investors, and the eventual exit by major central banks from unconventional monetary policies could lead to an overshooting in interest rates and financial market turbulence.
- In the emerging-market economies, a rapid expansion of credit and uneven progress on financial and macroeconomic reforms have made some EMEs more vulnerable to a financial or economic shock.

The likelihood and impact of a materialization of these vulnerabilities are conditioned by the evolving macroeconomic environment. Subdued global economic growth and the process of balance-sheet repair have persisted much longer than expected. Of note, the contentious fiscal situation in the United States has led to repeated near-collisions with the debt-ceiling limit. Although the likelihood of a U.S. sovereign default appears very small, and markets remained relatively tranquil in the period leading to the October debt-ceiling deadline, such an event could have far-reaching consequences. Market participants are already looking ahead to the next deadline for amending the U.S. debt limit in February 2014. At the same time, with interest rates in the advanced economies at historically low levels, owing to weak growth in global demand and low inflationary pressures, authorities have few conventional policy options to offset shocks that could lead to the realization of financial system risks.

On the positive side, significant progress has been made since the crisis on strengthening the regulation and supervision of the global financial system. The G-20 financial reform agenda is well advanced: banks are deleveraging and improving their capital and liquidity positions; authorities are building a suite of measures to address systemically important financial institutions and financial market infrastructures; regulatory standards have been developed to make shadow banking activities more resilient; and reporting and central clearing requirements are beginning for trades in over-the-counter derivatives. These initiatives will help to prevent financial system risks from materializing and will also help to mitigate the impact in the event that they do occur, thereby boosting confidence in the financial system and contributing to stronger economic growth.

Taking all of these factors into account, the Governing Council judges that the overall risk to the stability of Canada's financial system has decreased from "high" to "elevated" over the past six months. This overall level of risk would diminish further with continued progress on banking sector repair and other reforms in the euro area, and with further moderation of imbalances in Canadian household finances and the housing sector. At the same time, the level of risk could move higher if the current low interest rate environment in the advanced economies persists even longer than anticipated, increasing balance-sheet pressures on institutional investors and risk-taking behaviour by all investors, and ultimately exacerbating existing vulnerabilities.




In defining these individual risks, the Bank has adjusted the categories used in the June FSR. Financial vulnerabilities in certain emerging-market countries have become more evident, and are now presented as a separate category. A prolonged period of deficient global demand is no longer viewed as a specific risk; rather, it is a feature of the global economic environment that can affect all of the key risks to the Canadian financial system.

These risks are highly interconnected and mutually reinforcing. For example, if economic growth does not pick up as anticipated, interest rates in the advanced economies could remain low for a much longer period, building up further risks in financial markets, in the housing sector and in emerging-market economies. This buildup would make the eventual transition to more normal interest rates very challenging, with the possibility of an overshooting in interest rates, a sharp reversal of capital flows and significant market volatility. A protracted global economic recovery would further strain euro-area banks and sovereigns, potentially reigniting a financial crisis in that region.

Table 1: Key sources of risk to the stability of the Canadian financial system^a

Weaknesses in euro-area banks and sovereigns	↓
Imbalances in Canadian household finances and the housing market	↔
Financial behaviour in a low interest rate environment	↔
Financial vulnerabilities in emerging-market economies	new
Overall level of risk	↓

Legend

Level of risk	Direction of risk (change since June FSR)
 Very high	↑ Increased
 High	↔ Unchanged
 Elevated	↓ Decreased
 Moderate	⋮ Dotted lines indicate that risk has increased/decreased but remains within the same risk category since the last FSR.

a. The first three risks are the same as those discussed in previous FSRs, although their titles have been adjusted to provide a more accurate description. The last risk is new and, as such, the assessment is not comparable to the June FSR.

Risks would be mitigated if various policy actions were implemented, including further steps to improve fiscal positions and implement banking and structural reforms in the euro area, credible plans to address medium-term fiscal challenges in some other advanced economies, and continued progress in developing coherent and supportive financial and macro-economic policy frameworks in emerging-market economies.

In Canada, the high level of household debt and imbalances in the housing sector are the most significant domestic vulnerabilities to address. Federal authorities have taken measures to reduce risks in the residential mortgage market, and they continue to monitor the situation closely. It is also the responsibility of the private sector—including households, builders, developers and lenders—to manage risks wisely, ensuring that debts can continue to be serviced over time as interest rates return to normal. More generally, financial system participants must also remain alert to other potential emerging risks and take actions to safeguard financial stability.

Risk Assessment

This section of the *Financial System Review* (FSR) outlines the Governing Council's evaluation of the key risks to the Canadian financial system. After a brief survey of macrofinancial conditions, the principal risks are examined. The objective of the FSR is not to predict the most likely outcomes for the financial system but to raise early awareness of key risks and promote actions that reduce the likelihood or the impact of these risks being realized.

Macrofinancial Conditions

In many advanced economies, including the United States and the euro area, the economic recovery continues to proceed slowly, owing to strong headwinds from fiscal consolidation, private deleveraging and lingering financial imbalances. Global economic growth is expected to pick up as these effects dissipate.

Economic growth in China remains solid, supported by infrastructure investment and consumption. Activity in other major emerging-market economies (EMEs) is expected to be somewhat restrained by weaker growth in the advanced economies, structural bottlenecks and tighter credit conditions since the June FSR.

In Canada, weakness in exports and business investment has resulted in modest growth in recent quarters. Economic activity should pick up through 2014 as foreign demand strengthens and business confidence rises. This broader-based growth will support domestic financial stability.

Financial conditions in the advanced economies remain supportive...

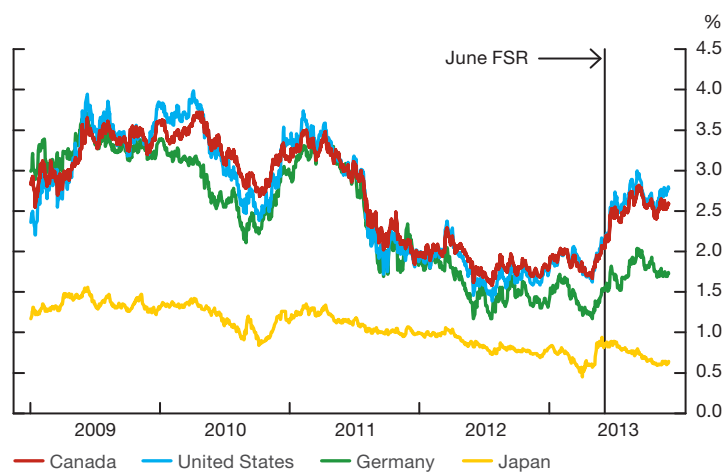
Yields on long-term government bonds in most advanced economies rose over the early summer from their historic lows in response to an anticipated slowing in the pace of asset purchases by the U.S. Federal Reserve (**Chart 1**). Since September, there has been a partial retracement in long-term yields, as the U.S. tapering was postponed pending further improvement in economic activity. Throughout this period, largely because of low interest rates, global financial conditions have remained supportive of an economic recovery.

...and emerging-market countries withstood the recent market turbulence

The anticipation of U.S. tapering and a reassessment of the growth prospects for emerging-market economies led to portfolio outflows in certain EMEs between mid-May and mid-September. In most cases, the outflows were accompanied by lower equity prices, higher bond yields,

Chart 1: Financial conditions are still very accommodative, despite higher bond yields

Yields to maturity on 10-year sovereign bonds

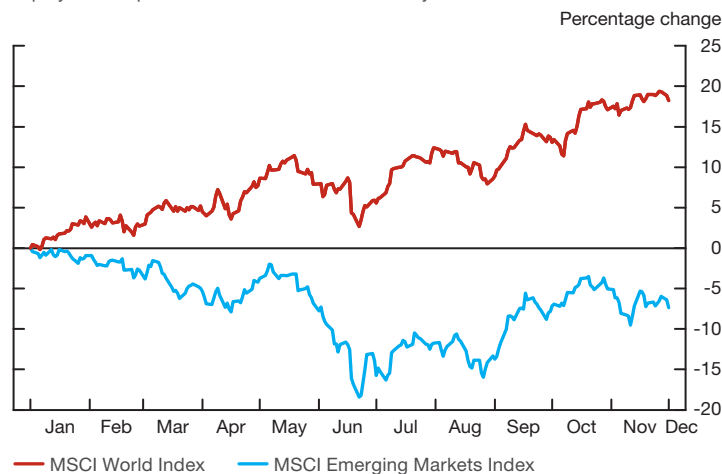


Source: Reuters

Last observation: 3 December 2013

Chart 2: Emerging-market equities have underperformed

Equity market performance indexed to 3 January 2013



Source: Bloomberg

Last observation: 3 December 2013

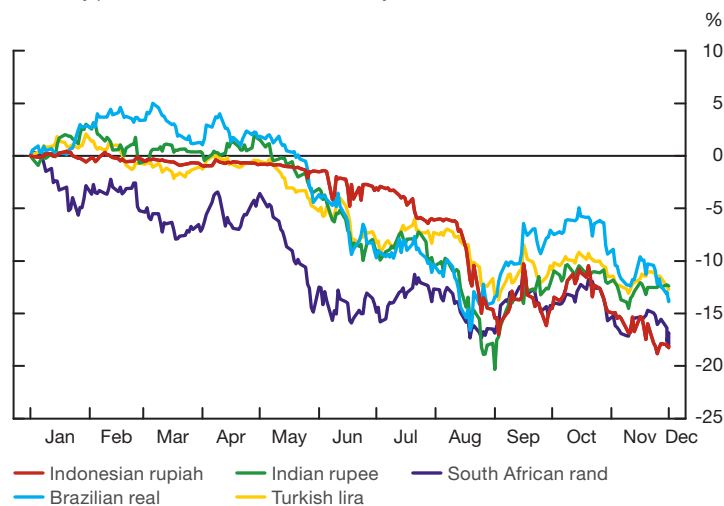
and a depreciation of their currencies against the U.S. dollar (Chart 2 and Chart 3). However, the stress in emerging markets was much lower than that experienced in 2008 or during the 1997 Asian crisis. Since September, EMEs have recovered somewhat from these market movements, and some portfolio investments have returned.

The North American corporate sector continues to show strength

The aggregate financial position of the Canadian non-financial corporate sector remains strong, as indicated by healthy liquidity positions and the continued reduction of corporate leverage to record lows. In addition, conditions in credit and equity markets remain buoyant. Yields on U.S. and Canadian corporate bonds have followed the rise in government bond yields, yet issuance has remained robust over 2013. In fact, Canadian non-financial corporate issuance has been tracking at a record annual pace (Chart 4). Many bond issues have been oversubscribed by investors and, in response to strong demand, some issues have been increased above

Chart 3: Emerging-market currencies have depreciated against the U.S. dollar since May

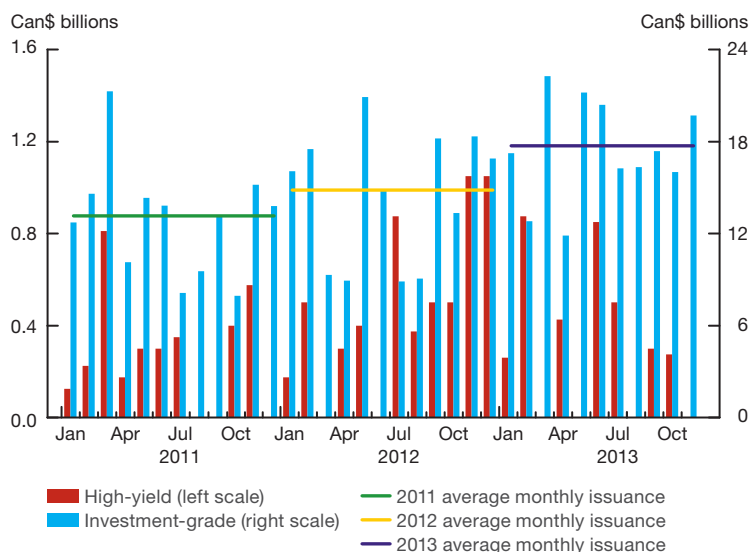
Currency performance indexed to 3 January 2013



Source: Bloomberg

Last observation: 3 December 2013

Chart 4: Canadian-dollar corporate issuance has been tracking at a record pace



Source: Bank of Canada

Last observation: November 2013

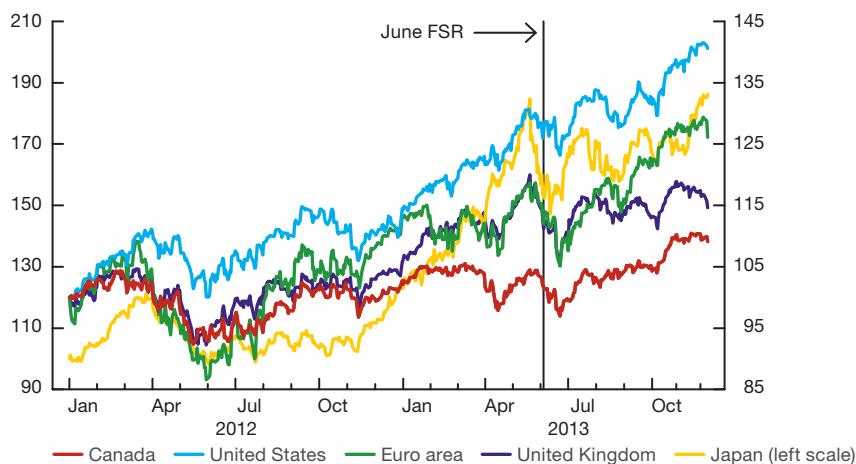
the announced size. North American equities have climbed higher since the summer, while equity indexes in several advanced economies are at multi-year high levels (Chart 5).

Canadian business-lending conditions and bank balance sheets are healthy

Business-lending conditions have eased slightly during 2013, continuing the trend observed since late 2009. Responses to the Bank of Canada's most recent *Senior Loan Officer Survey* point to some easing in the price aspects of business lending for all categories of borrowers, as well as a slight easing in the non-price aspects of lending for small businesses. As indicated in the Bank's autumn 2013 *Business Outlook Survey*, credit conditions for businesses are very favourable.

Chart 5: Equity indexes in several advanced economies are at multi-year high levels

Equity indexes (3 January 2012 = 100)

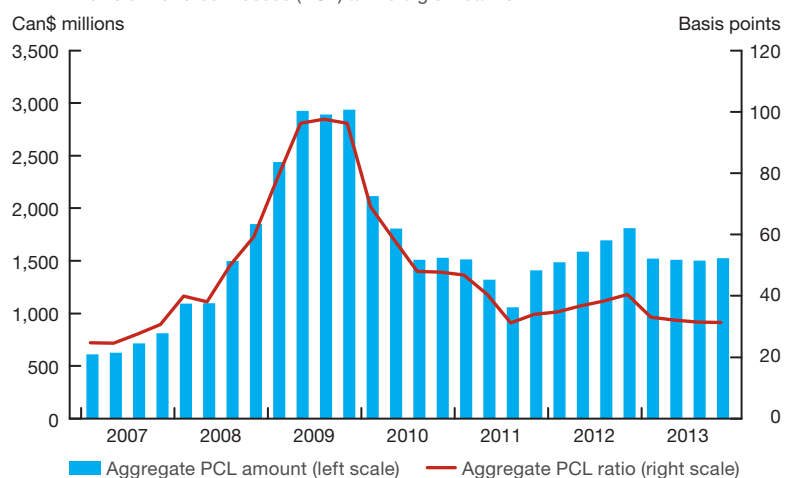


Source: Bloomberg

Last observation: 3 December 2013

Chart 6: The quality of loans at Canadian banks has been stable

Provision for credit losses (PCL) at the big six banks



Note: PCL ratio = provision for credit losses divided by total loans and acceptances

Source: Regulatory filings of Canadian banks

Last observation: October 2013

Canadian banks continue to have ready access to funding markets at attractive rates, and their balance sheets are healthy. For the 2013 fiscal year, banks have reported solid earnings, despite a decrease in the growth of household credit and continued pressure on net interest margins. Provisions for credit losses remain low (Chart 6). The Basel III common equity Tier 1 capital ratios at Canada's six largest banks have increased, standing at 9.3 per cent on average, well above the minimum of 8 per cent specified by the Office of the Superintendent of Financial Institutions (OSFI) that will apply to domestic systemically important banks commencing on 1 January 2016.¹

¹ Capital ratios are calculated on an "all-in" basis, i.e., considering full implementation of the Basel III capital requirements. Further information on OSFI's guidelines for domestic systemically important banks can be found at: http://www.osfi-bsif.gc.ca/Eng/Docs/DSIB_adv.pdf.

Key Risks

This section explores each of the risks that the Governing Council judges to be the most important for assessing the stability of the Canadian financial system. The sources of these key risks are broadly the same as those noted in the June FSR and emanate mainly from the external environment.²

Although the key risks are interrelated and mutually reinforcing, the following discussion focuses on the underlying vulnerabilities that are distinct for each risk.

Key Risk 1: Weaknesses in Euro-Area Banks and Sovereigns

The most important external risk to financial stability in Canada stems from the euro area. This risk involves two main interconnected elements: (i) an adverse feedback loop between fragilities in the banking sector, high sovereign and private sector debt, and a sluggish economic recovery; and (ii) the slow implementation of necessary reforms.

The risk of a crisis event in the euro area has continued to decline, owing largely to the commitment by the European Central Bank (ECB) to take whatever measures are needed to avert such an outcome, together with the resumption of modest economic growth and ongoing reform efforts. Market conditions have remained steady during 2013, despite the banking crisis in Cyprus and political stresses in several other peripheral countries. In particular, stable and generally narrower sovereign spreads have reduced the likelihood of a self-reinforcing debt spiral. At the same time, persistent imbalances in trade and other macroeconomic fundamentals are decreasing, and some progress has been made on structural reforms.

The euro area is still facing a subdued recovery. Weak banks and stretched governments in the peripheral countries remain a significant source of vulnerability. Lower political resolve, due to reduced market pressures or reform fatigue, could delay much-needed progress on reforms, leaving the euro area vulnerable to a renewed period of financial turmoil. The adverse spillover effects to the Canadian financial system through financial, confidence and trade channels could be substantial.

With the reduced risk of an extreme event and some positive signs related to structural imbalances, the Governing Council has lowered the level of the euro-area risk from “very high” to “high.” Continued progress on banking sector repair and other reforms could further reduce the level of risk.

There have been positive developments since the June FSR...

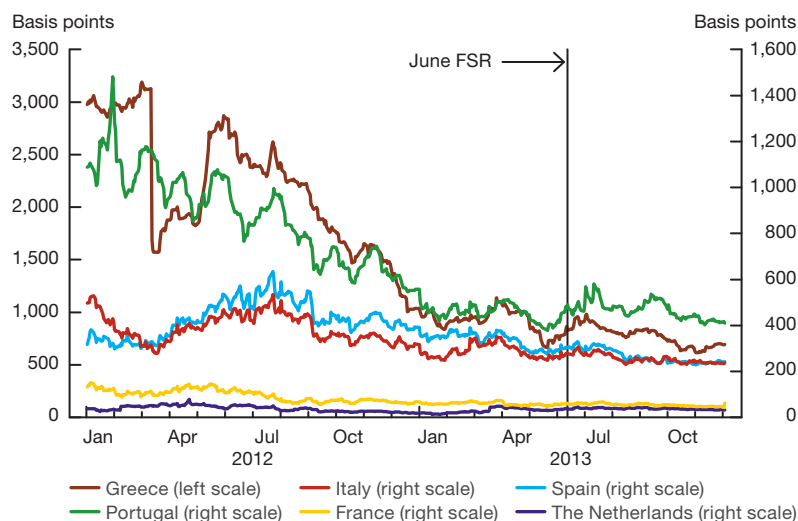
Signs of a nascent recovery are boosting investor confidence. Euro-area real GDP is now rising, with survey indicators suggesting continued, albeit modest, growth. In addition, euro-area financial markets have been resilient to the political and fiscal instability in Italy, Greece, Portugal and Spain. European equity funds have seen steady inflows since the summer, while long-term sovereign spreads across the core and peripheral countries have been stable for the most part (Chart 7).³

² The risks have evolved in such a way that their descriptions and assessments have been adjusted since the June FSR. First, while a deficiency in global demand remains a concern, a prolonged period of subdued economic growth is now considered to be a feature of the macroeconomic environment that could increase the likelihood and impact of all of the key risks to the Canadian financial system. Second, financial vulnerabilities in China and in other EMEs could develop into a source of economic and financial stress in Canada, and, as such, these elements have been combined into a distinct risk category.

³ The exception is Portugal, where spreads increased temporarily over the summer in response to market uncertainty regarding the continuation of the joint European Union/International Monetary Fund financing program.

Chart 7: Bond markets in most euro-area countries have been relatively stable

Spreads between 10-year sovereign bonds and 10-year German Bunds



Source: Bloomberg

Last observation: 3 December 2013

The balance sheets of most major banks in the core euro-area countries continue to strengthen, capital ratios have increased on average, and loan losses are declining.⁴ Many banks are repaying funds extended under the long-term refinancing operation (LTRO).⁵

There are signs that longer-run conditions are also moving in the right direction. The fiscal imbalances of the peripheral countries have been reduced to levels consistent with a more sustainable path for public debt. The substantial current account deficits of the peripheral countries have also been largely eliminated. This improvement mainly reflects reduced aggregate demand in the peripheral countries as a result of fiscal austerity and unfavourable financial conditions, but some progress has also been made in addressing competitiveness gaps within the euro area through difficult adjustments in relative prices and wages (Chart 8).

... but significant longer-run challenges remain

Banks in the peripheral countries are still weak, and there continues to be an increased degree of fragmentation of the euro-area financial system along national lines. There is also a growing concern about the underlying quality of loans (Chart 9).⁶ Spanish and Italian banks have increased their loan-loss provisioning and, more generally, there is anecdotal evidence of considerable forbearance across the peripheral euro-area countries. The extent of

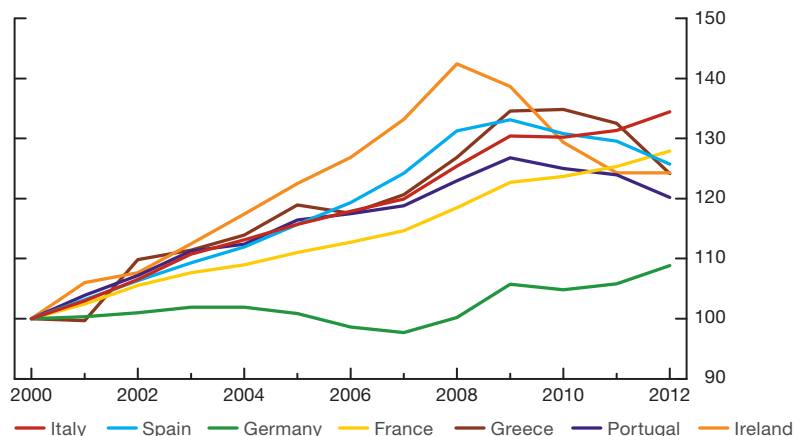
⁴ The average common equity Tier 1 capital ratio of the largest European banks was about 9.8 per cent of risk-weighted assets at the end of June 2013, up from 8.9 per cent at the end of 2012. Capital ratios vary across these banks, and differences in risk-weight modelling make it difficult to assess their true loss-absorbency capacity. See, for example, findings by the Basel Committee on Banking Supervision regarding its analysis of risk-weighted assets for credit risk in the banking book and market risk in the trading book at <http://www.bis.org/bcbs/implementation/13.htm>.

⁵ These LTRO repayments are largely from major core-country banks that, in some cases, had borrowed funds as a form of insurance. This is a sign of greater confidence, although as it continues, it will put upward pressure on market interest rates. Banks in the peripheral countries remain reliant on central bank funding, and the European Central Bank is considering another facility to replace the LTRO when it expires at the end of 2014.

⁶ In Chart 9, the non-performing loans at Italian banks cannot be directly compared with those of Spanish banks owing to definitional differences. As well, under bankruptcy laws, non-performing loans remain on the balance sheets of Italian banks longer than for banks in Spain.

Chart 8: The competitiveness of peripheral Europe is improving

Unit labour costs (2000 = 100)

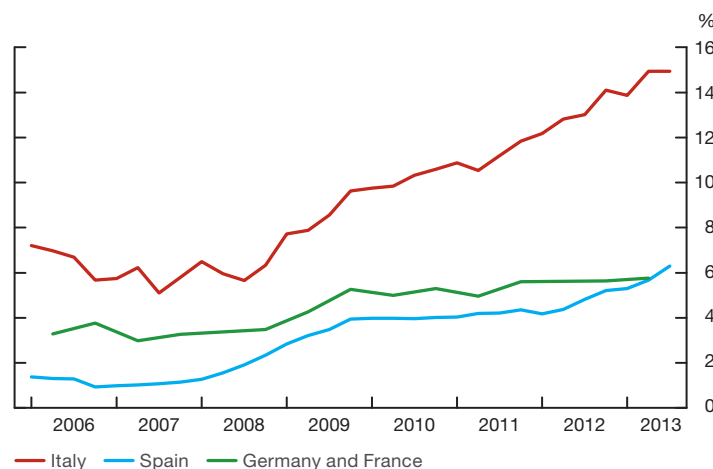


Sources: Eurostat and Haver Analytics

Last observation: 2012

Chart 9: Non-performing loans at Italian and Spanish banks have increased in 2013

Non-performing loans as a percentage of total loans



Note: The sample includes 9 major euro-area banks
(2 in Italy, 2 in Spain, 2 in Germany and 3 in France).
Source: Bloomberg

Last observations: Italy and Spain, September 2013;
Germany and France, June 2013

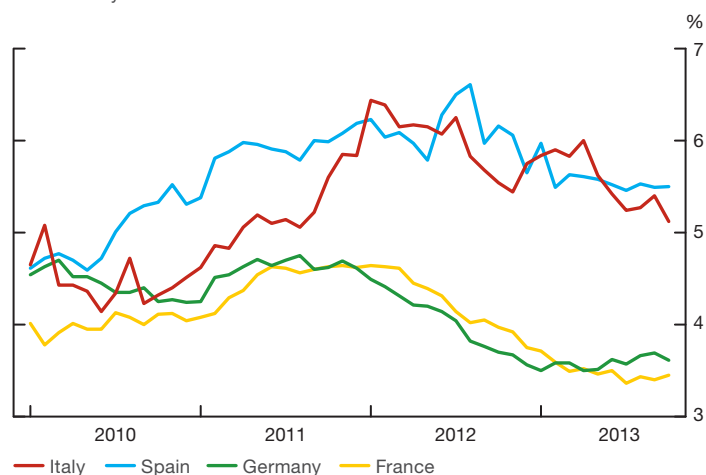
non-performing private sector loans, as well as growing exposure to debt issued by their own governments, has kept market funding costs relatively high for banks in the peripheral countries.⁷

These disparities have entrenched a pronounced divergence in business-lending conditions within the euro area. This can be seen in the elevated interest rates charged by Italian and Spanish banks and the reduction in the volume of loans to non-financial corporations, particularly in Spain (Chart 10 and Chart 11). High debt-servicing costs, combined with weak economies, have reduced the ability of firms and households in the peripheral countries to service their loans. Slow economic growth has also hindered fiscal consolidation in these countries, making it more difficult to provide the resources necessary to recapitalize their banks if the need arises.

⁷ Since the end of 2012, government securities held by peripheral-country banks have increased by almost 17 per cent.

Chart 10: Business-lending conditions remain divergent in the euro area

Annualized agreed rates on loans of nominal size less than €1 million with maturities from 1 to 5 years

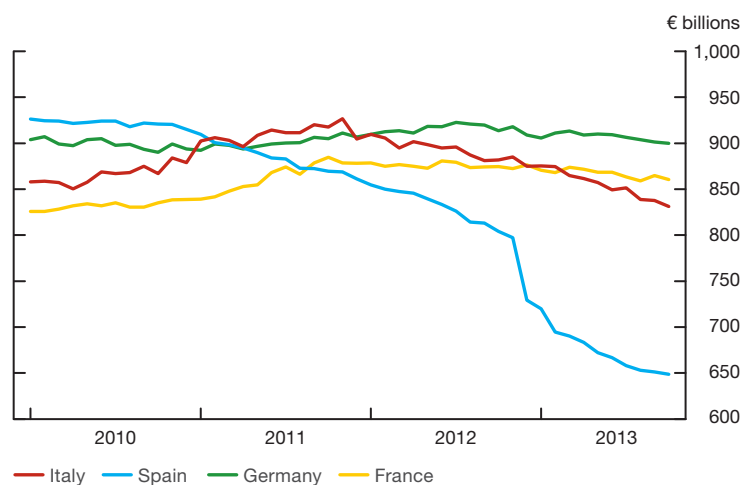


Source: European Central Bank

Last observation: October 2013

Chart 11: Corporate lending has continued to decline in Italy and Spain

Loans to non-financial corporations, all maturities



Source: European Central Bank

Last observation: October 2013

These conditions will likely remain a drag on economic growth, perpetuating the self-reinforcing feedback loop between weak macroeconomic activity, fragile bank balance sheets and elevated sovereign risk.

Banking sector reforms are crucial

Financial system fragmentation is likely to persist until more progress is made on the European banking union. The Single Supervisory Mechanism is the most advanced reform initiative, with the ECB positioned to take control of banking supervision in November 2014. Many significant issues will need to be addressed, however, before the remaining pillars of a European banking union can be established (**Box 1**).

A three-step assessment of the balance sheets of euro-area banks—composed of (i) a supervisory risk assessment, (ii) an asset-quality review and (iii) stress testing—will continue until late 2014. This is a complex, but

Box 1

The European Banking Union: Milestones and Challenges

The creation of a European banking union is essential to break the link between the solvency of banks and that of sovereigns, and to promote an integrated, efficient and resilient banking sector in Europe. The banking union is based on three pillars: (i) a Single Supervisory Mechanism, (ii) a Single Resolution Mechanism,¹ and (iii) a Single Deposit Guarantee Scheme (**Table 1-A**). Several important issues remain to be settled, including the key challenge of burden sharing.

Should the ECB's asset-quality reviews and stress tests of banks uncover major capital shortfalls, a recapitalization or restructuring of weak banks will be required. However,

adequate recapitalization options are not yet in place. For insolvent banks, a potential source of capital is private creditors, but the power to "bail in" bank creditors will not be in place until 2018. In addition, although there had been an agreement in principle that the European Stability Mechanism (ESM) could be used for direct bank recapitalization once the Single Supervisory Mechanism is in place, some countries have expressed reservations regarding a mutualization of losses through a European backstop. A single resolution authority and a common resolution fund will promote the timely recapitalization of European banks. Co-operation on these arrangements could also help to reduce uncertainty regarding the implementation of the Single Deposit Guarantee Scheme over the longer term, because its operation in a crisis could also depend on some form of fiscal support from member states.

¹ In addition, the proposed Bank Resolution and Recovery Directive is aimed at providing national authorities with common powers and instruments to pre-empt, intervene in and resolve a bank crisis. The Directive is scheduled to become effective in 2015, with a bail-in tool in place in 2018.

Table 1-A: Key elements of the European banking union

	Single Supervisory Mechanism	Single Resolution Mechanism	Single Deposit Guarantee Scheme
Components	Single supervisor (European Central Bank) Single rulebook, under European Banking Authority (EBA) Single supervisory handbook, under EBA	Single resolution board €55 billion single resolution fund	Common deposit guarantee fund
Milestones	Single rulebook guidelines published Drafting of binding technical standards will continue through 2014 Asset-quality reviews and stress tests for major banks will be conducted by November 2014 Use of ESM for direct bank recapitalization (except for legacy losses)	Council of the European Union will agree on a general position by the end of 2013 Resolution fund to be built up over 10 to 14 years	National deposit guarantee schemes to be harmonized (date to be determined)
In force	November 2014	2015 (European Commission target)	To be determined

essential, exercise for reducing uncertainty, restoring investor confidence and promoting the repair of the banking system. The results could necessitate higher-than-expected deleveraging and provisioning requirements for banks in both the core and peripheral countries. Implementation of a credible European backstop mechanism to address any shortfalls in bank capital that cannot be met through the private sector or domestic governments will ensure the ultimate effectiveness of the process to repair European banks.

There are risks related to the implementation of other structural reforms

There are still macroeconomic imbalances within the euro area that need to be addressed. Political resistance to austerity is growing, and equity prices and bond yields suggest that market-driven incentives for fiscal discipline are declining. In addition, high unemployment is reducing the political will to introduce further labour market reforms. Slow progress on reforms will constrain a full recovery in the euro area, leaving the region vulnerable to another financial crisis.

Canadian financial institutions are still vulnerable to an intensification of stress in the euro area

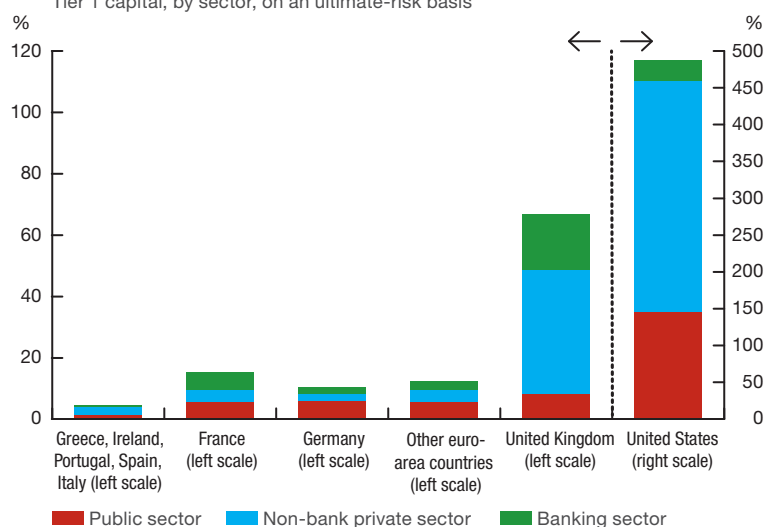
To date, stresses in the euro area have had a limited impact on the Canadian financial system, both because Canada's direct links to troubled countries are limited and because, even at their worst, these stresses have been relatively contained. However, Canada is still exposed to the possibility of an extreme financial event originating from the euro area, the likelihood of which has been reduced, but not eliminated.

A severe intensification of stress in one of the larger, more systemically important peripheral countries such as Italy or Spain, possibly combined with the failure of one or more financial institutions, could reignite a euro-area financial crisis. Financial linkages could then spread the effects worldwide, leading to a loss of investor confidence, extreme financial market volatility and flight-to-safety effects, including a broad repricing of assets. Although the direct exposures of Canadian banks to the euro area are relatively small, their indirect exposures through U.K. or U.S. banks are extensive (**Chart 12**).

Global credit markets could become severely impaired, restricting access to wholesale funding for Canadian banks and potentially leading to a serious impact on domestic financial activity. A reversal of the euro-area economic recovery would also dampen the already modest trajectory for global economic growth, leading to reduced Canadian exports and lower prices for Canada's commodity exports. These financial and trade channels could lead to higher loan losses for Canadian financial institutions and a significant tightening of domestic credit conditions.

Chart 12: Canadian banks have limited direct exposure to credit claims on entities from peripheral Europe

Cross-border claims of Canadian domestic banks as a percentage of total Tier 1 capital, by sector, on an ultimate-risk basis



Note: Direct exposures are defined as direct foreign claims only (and exclude other contingent or potential exposures).

Last observations: Cross-border exposures, September 2013 for all banks; Tier 1 capital, September 2013 for December year-end banks and October 2013 for October year-end banks (Basel III basis)

Source: Regulatory filings of Canadian banks

Key Risk 2: Imbalances in Canadian Household Finances and the Housing Market

The elevated level of household indebtedness and imbalances in some segments of the housing market continue to be the most important domestic sources of risk to financial stability in Canada.

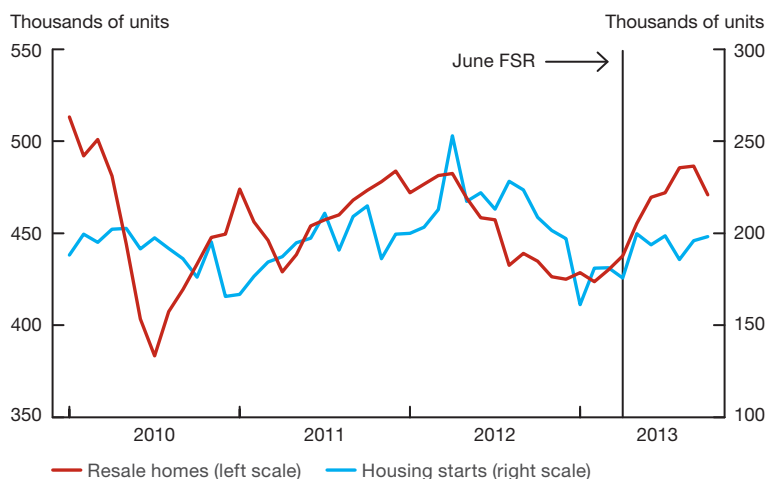
Household debt accumulation, housing market activity and increases in house prices have all picked up since the June FSR, following a period of significant moderation starting around mid-2012. The Bank views this pickup as temporary and believes that these imbalances will stabilize and then gradually unwind. However, the adjustment process will take some time to complete and, during this period, the Canadian financial system will remain vulnerable to macroeconomic shocks that affect the ability of households to service their debts. Stretched housing valuations and the elevated number of units under construction could also lead to a sharp correction in the housing market. A more persistent pickup in housing activity and credit growth would exacerbate existing imbalances and increase this risk. These scenarios could lead to significant adverse feedback effects between economic and financial conditions.

Overall, the Governing Council judges that the risks associated with high levels of household debt and housing market imbalances are unchanged since the June FSR, and continue to be categorized as “elevated.” The overall moderating trend is expected to resume in due course. As long-term interest rates normalize with the strengthening global economy, the risk will diminish over time.

There has been a pickup in housing market activity and prices...

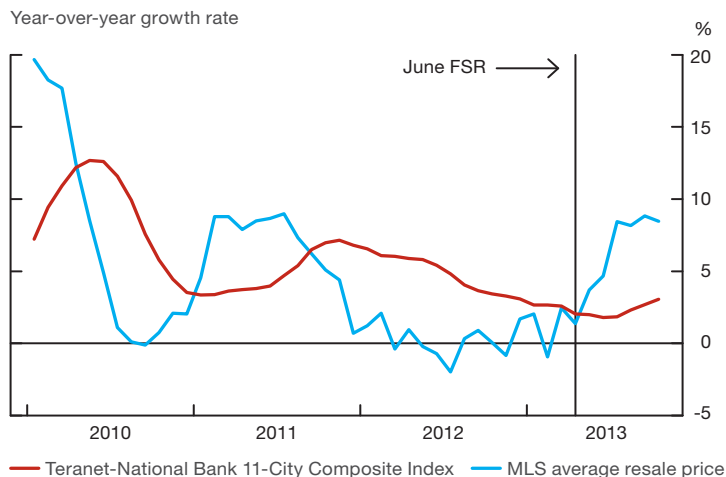
The housing market has shown renewed vigour over much of 2013 (Chart 13). Most notably, there has been a rise in the sales of existing homes. Housing starts have also increased in recent months, and although they remain well below 2012 levels, they are likely to show continued

Chart 13: The housing market has shown renewed vigour since early 2013

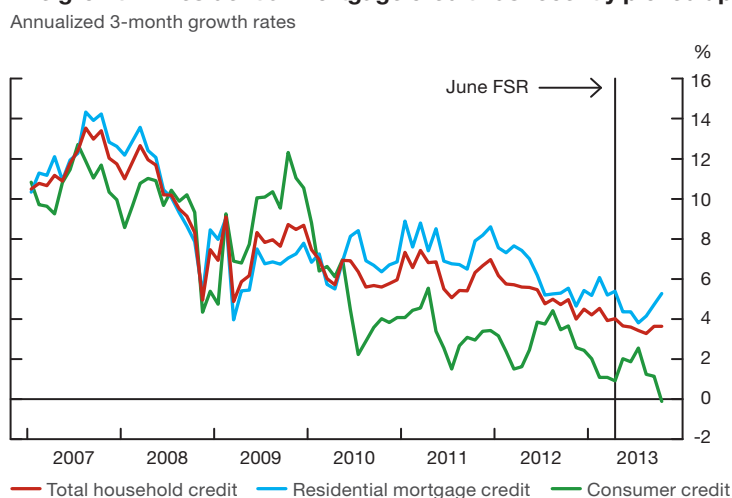


Sources: Canadian Real Estate Association and
Canada Mortgage and Housing Corporation

Last observation: October 2013

Chart 14: The growth in house prices has picked up in recent months


Sources: Canadian Real Estate Association and Teranet-National Bank Last observation: October 2013

Chart 15: The growth in residential mortgage credit has recently picked up


Source: Bank of Canada

Last observation: October 2013

strength over the coming months.⁸ This rebound may partly reflect purchases that have been pulled forward to avoid expected increases in mortgage costs. Since June, the interest rate on a typical 5-year fixed-rate mortgage has increased by about 60 basis points, and anecdotal information suggests that some households have timed their purchases to take advantage of pre-approved mortgages at more attractive rates than are currently available.

The upturn in housing market activity has been accompanied by increases in house prices (Chart 14). In line with the recent strength in resale activity, the growth of residential mortgage credit has also experienced an uptick since the summer, although the broader downward trend in growth since 2008 remains intact (Chart 15).

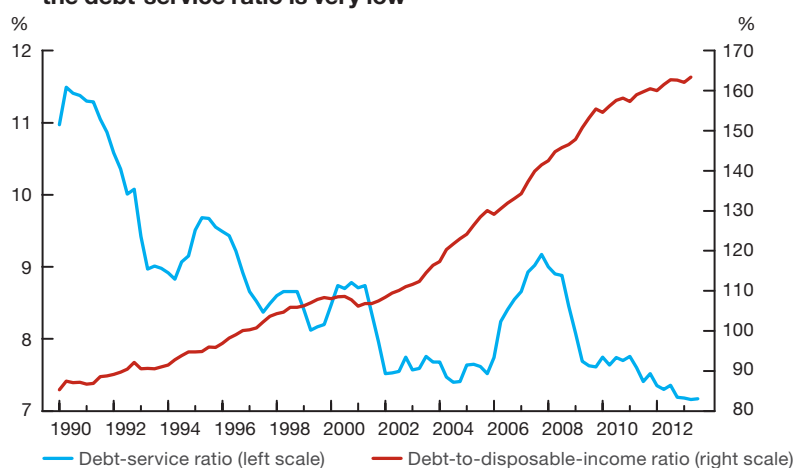
⁸ This is suggested by data for building permits, particularly permits for multiple-unit dwellings. The sharp increase in building permits in Toronto over the spring, due in part to builders avoiding planned increases in development charges, has not yet translated into starts.

...although there are underlying signs of moderation

The ratio of household debt to disposable income has been relatively stable over the past year (Chart 16). The household credit-to-GDP gap (Chart 17), another measure of aggregate household leverage, has continued to decrease at a gradual pace, reflecting the pronounced decline in the growth of total household credit since 2008.⁹

This broader moderation in household credit growth has been driven in part by the cumulative effects of stricter mortgage insurance rules and the implementation of OSFI's Guideline B-20 for mortgage underwriting.¹⁰ Although

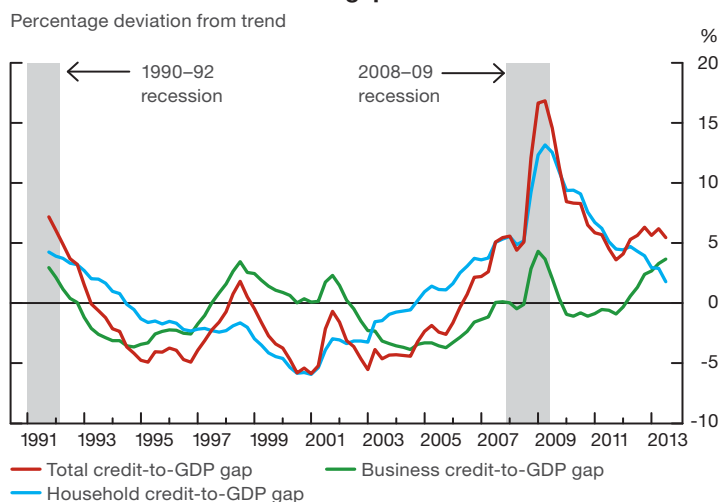
Chart 16: The ratio of household debt to disposable income is high but stable; the debt-service ratio is very low



Source: Statistics Canada

Last observations: Debt-to-income ratio, 2013Q2
debt-service ratio, 2013Q3

Chart 17: The household credit-to-GDP gap has continued to decrease



Sources: Statistics Canada and Bank of Canada calculations

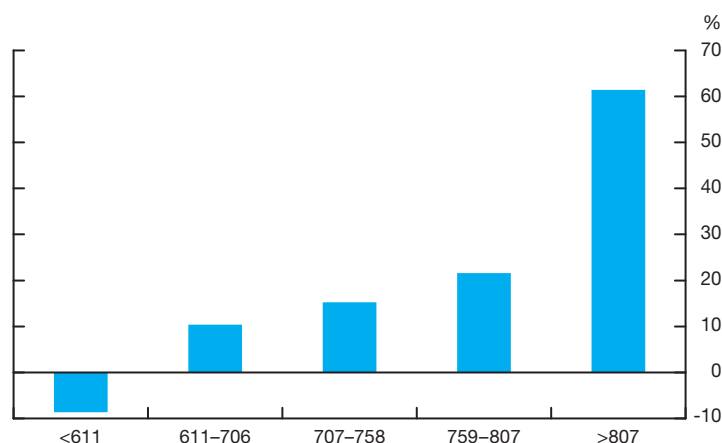
Last observation: 2013Q3

⁹ The total credit-to-GDP gap is unchanged because the slowdown in the growth of household credit was offset by the pickup in the growth of business credit. The credit-to-GDP gap is the percentage deviation between the credit-to-GDP ratio and an estimate of its trend. International evidence has shown that the total credit-to-GDP gap is a useful guide for identifying a potential buildup of imbalances in the banking sector. For more information on the construction of the credit-to-GDP gap, see Box 3 in the June 2011 FSR.

¹⁰ See Box 2 in the December 2012 FSR for an outline of the key changes in government-backed mortgage insurance rules since 2008. The enhanced OSFI guidelines were implemented in late 2012 and early 2013.

Chart 18: Consumer credit growth has largely been among households with higher credit scores

Share of consumer credit growth from 2010Q3 to 2013Q3, by credit score



Source: Equifax Canada Inc.

Last observation: 2013Q3

resales of existing homes have increased recently, there are indications that fewer first-time homebuyers have been entering the market over the past several years. These factors will have a permanent impact on the level of household indebtedness, although their effect on the growth rate of household credit will diminish over time.

The slowdown in the pace of debt accumulation in recent years is also consistent with signs that households are becoming increasingly cautious in view of their high indebtedness. The growth of consumer credit is at its lowest level in 20 years, despite low debt-servicing costs (**Chart 16**) and evidence that many households still have considerable unused credit limits. The proportion of households with a debt-service ratio of 40 or more has been stable since 2010. In addition, the percentage of mortgage holders that add to their principal through refinancing has been declining over this period. These indications of underlying household caution suggest that the broader trend toward more sustainable conditions will resume after the temporary pulling forward of housing market activity has dissipated.

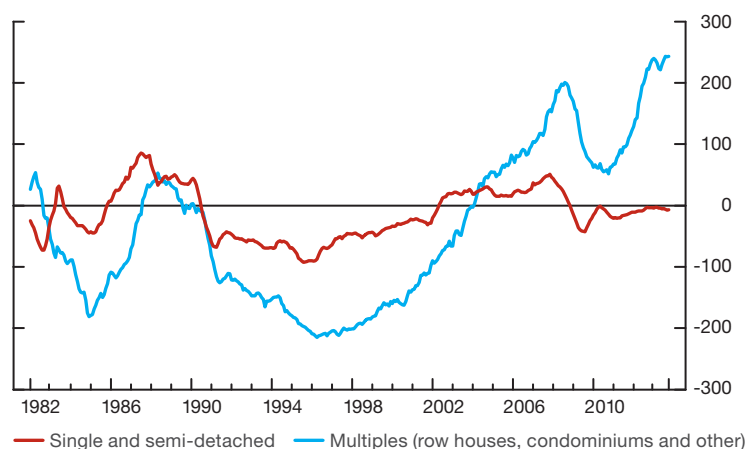
The B-20 underwriting guidelines and the changes in mortgage insurance rules have also contributed to favourable changes in the composition of borrowers at federally regulated financial institutions. The average credit scores of borrowers receiving high-ratio mortgages have increased, and the growth in consumer credit has largely been among households with higher credit scores (**Chart 18**).¹¹ Measures of borrower risk are discussed further in the report “The Residential Mortgage Market in Canada: A Primer” in this issue.

Although credit growth has risen recently with the higher level of housing market activity, the broader backdrop suggests that the household debt-to-income ratio will remain stable and eventually diminish over the coming years, depending in part on the pace at which mortgage and other consumer borrowing rates rise to more normal levels as the global economic recovery strengthens.

¹¹ In addition, the distribution of consumer credit has shifted toward consumers with higher credit scores since 2002.

Chart 19: The supply of multiple-unit dwellings under construction remains high

Deviation from historical average, per 100,000 people (aged 25+ years),
major metropolitan areas



Sources: Canada Mortgage and Housing Corporation,
Statistics Canada and Bank of Canada calculations

Last observation: October 2013

Vulnerabilities persist in some segments of the housing market...

Important risks to the outlook stem from a number of sources. First, the recent rebound in the housing market and in the growth of mortgage credit could be more persistent than expected. This outcome would exacerbate current imbalances and increase the risk of a sharp correction in the housing market. Second, even with the expected unwinding of imbalances in household finances over time, ongoing monitoring of certain segments of the market is warranted.

It appears that there is still an oversupply of multiple-unit dwellings, where the number of units under construction remains significantly above the historical average relative to the population (**Chart 19**).¹²

In the Toronto condominium market, the number of unsold high-rise units under construction has remained at elevated levels, although those in the pre-construction stage have declined from their peak in early 2013 (**Chart 20**).¹³ Prices for high-rise units have remained flat, and sales have declined further in 2013 (**Chart 21**).

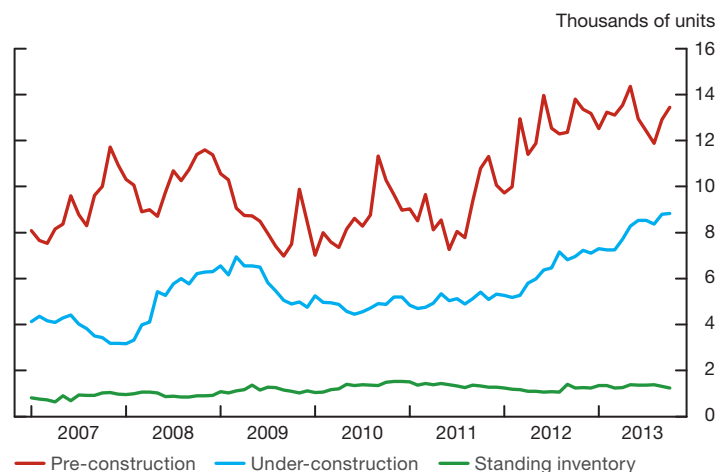
If the upcoming supply of units is not absorbed by demand as units are completed over the next few years, there is a risk of a correction in prices and construction activity.¹⁴ Moreover, if investor demand has boosted construction in the condominium market beyond demographic requirements, this market may be more susceptible to shifts in buyer sentiment. A sharp

¹² While the line for multiple units under construction in Chart 19 controls for population growth, it does not control for other factors that could affect the balance of supply and demand in the condominium market, including shifts in preference over time toward condominiums (driven, in part, by demographic trends); constraints on land supply; the greater use of condominiums in the rental market; and demand by non-residents, which is difficult to measure. However, it is unlikely that these factors could explain most of the deviation of multiple units under construction from their historical average.

¹³ See Box 3 in the December 2012 FSR for a discussion of the Toronto condominium market.

¹⁴ The Toronto housing bust in the early 1990s illustrates how shifts in the balance between supply and demand can lead to a severe correction. In the late 1980s, real estate prices and the number of multiples under construction rose significantly in response to a booming economy, rapid population growth, market exuberance and lower real interest rates that drew investors as well as homebuyers into the real estate market. As supply increased and higher interest rates reduced demand, inventories of completed multiple units rose and house prices began to correct quite quickly. The effects were relatively confined to the greater Toronto region because house prices were not as stretched elsewhere.

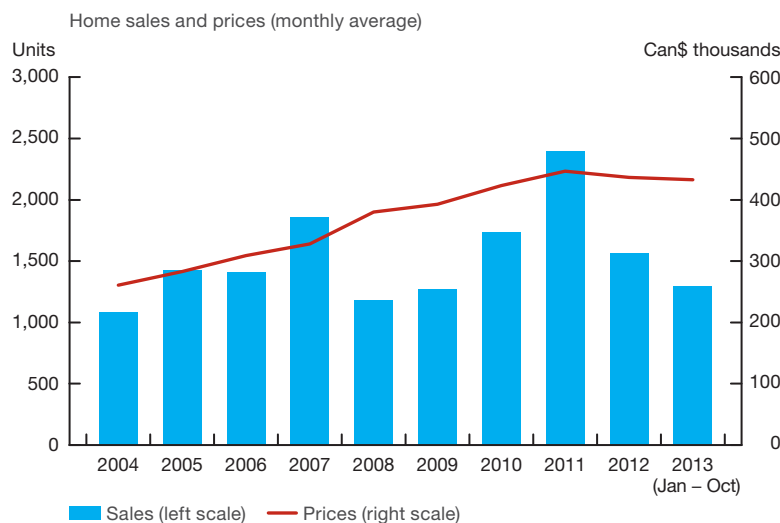
Chart 20: The Toronto condominium market has an elevated number of unsold high-rise units in the pre-construction and under-construction stages...



Source: RealNet Canada Inc.

Last observation: October 2013

Chart 21: ...while prices for high-rise units have been flat and sales have declined further in 2013



Source: RealNet Canada Inc.

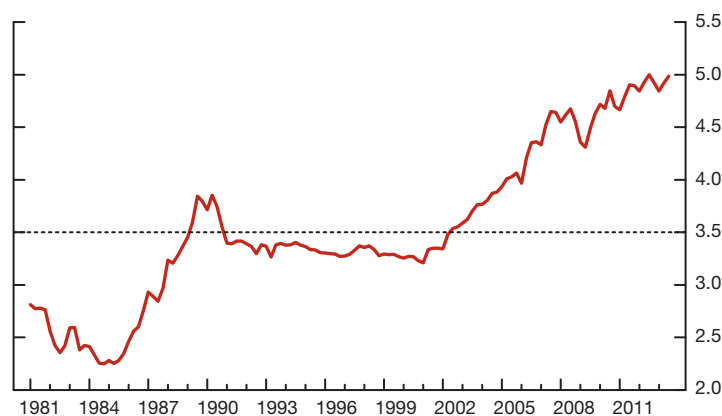
Last observation: October 2013

correction in the condominium market could spread to other segments of the housing market with stretched valuations, as buyers and sellers adjust their expectations of the future path of house prices. Such a correction could also have significant repercussions on the real economy, since the construction sector is an important component of economic activity.

Simple indicators continue to suggest overvaluation in the Canadian housing market more generally. For example, house prices have remained high relative to income (Chart 22). A correction in a major metropolitan centre could spread across the country if price expectations are affected in other centres and if localized real estate losses affect lending in other markets. Such an occurrence would generate widespread reductions in household net worth, market confidence and consumer demand, with negative spillover effects on income and employment. These adverse effects would then weaken the credit quality of banks' loan portfolios and, in turn, lead to tighter lending conditions.

Chart 22: House prices in Canada are high relative to disposable income

House-price-to-income ratio



Note: The broken line indicates the historical average from 1981 to the present.

Sources: Teranet-National Bank, Statistics Canada,
Canadian Real Estate Association and Bank of Canada calculations

Last observation: 2013Q3

Smaller financial entities that are active in financing residential construction and mortgages represent a source of vulnerability in these scenarios.¹⁵ Some of these entities may have limited experience in underwriting and managing these types of risks. In addition, smaller lenders that rely on non-traditional sources of funding are also becoming increasingly important drivers of the growth in residential mortgage lending (Box 2). Since these entities have greater exposure to rollover risk and interest rate risk, as well as higher leverage, they could suffer substantial credit losses and severe shortages of funding liquidity in the event of a housing market correction or a severe economic downturn.¹⁶ The failure of one or more of these entities could affect confidence and lead to an increase in funding costs for all Canadian financial institutions.

...and some households are vulnerable to an increase in interest rates or a reduction in income

For some segments of the population, debt-servicing costs could become a concern as interest rates eventually normalize (Chart 23). While many households have managed their exposures to future increases in interest rates by shifting into fixed-rate mortgages, approximately one-third of the outstanding stock of mortgage credit has variable rates, and the size or structure of payments would be immediately affected by a rate increase.¹⁷ In the case of a sharp interest rate increase, perhaps due to an overshooting in global interest rates as a result of a withdrawal from unconventional monetary stimulus, the effects on these households would be significant.

¹⁵ Smaller financial entities include credit unions and private equity/investment funds, some of which are not as tightly regulated and closely supervised as those under OSFI's supervision.

¹⁶ The failures of the Canadian Commercial Bank and the Northland Bank in the 1980s illustrate how small financial institutions with heavy concentrations in real estate lending and non-traditional funding models can be more vulnerable to a macroeconomic shock, and can cause broader reputational aftershocks despite a relatively marginal share of the banking system. For example, see M. Illing and Y. Liu, "An Index of Financial Stress for Canada," Bank of Canada Working Paper No. 2003-14.

¹⁷ The proportion of new mortgage loans with variable rates has been growing in recent months. However, it is still lower than the proportion of variable-rate mortgages in the total stock of outstanding mortgages.

Box 2

The Changing Composition of Lenders in the Residential Mortgage Market

Approximately two-thirds of outstanding mortgages are held by Canada's six largest banks. In recent years, however, a group of lenders with non-traditional funding models (i.e., those not funded through retail deposits) has become a growing source of mortgage credit to households.¹

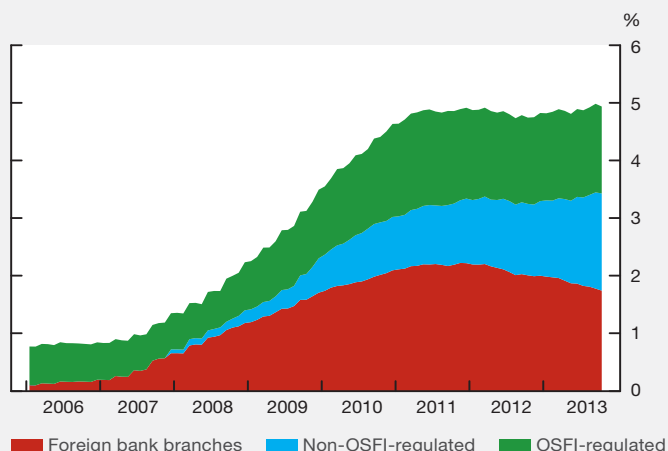
There are two main models of non-traditional funding. First, the Canada Mortgage Bond (CMB) securitization program allows all approved issuers of National Housing Act Mortgage-Backed Securities (NHA MBS) to fund mortgages, up to established access limits, at rates that are roughly equivalent to government-guaranteed debt. Since 2007, this program has helped a group of NHA MBS issuers (consisting of some trust companies, aggregators and non-depository mortgage lenders) to increase their share of the aggregate mortgage-lending business.² These entities have become the fourth-largest issuer of NHA MBS.³ Although the share of outstanding mortgages funded by their issuance of NHA MBS has been relatively stable, at about 5 per cent since 2011 (**Chart 2-A**), they have accounted for an increasing share of new mortgages in 2013 (**Chart 2-B**).

Second, in addition to NHA MBS, a number of smaller mortgage lenders have funded rapid balance-sheet growth with brokered deposits.⁴ Many of these lenders specialize in non-prime lending, which has rebounded moderately since the crisis and now represents over 5 per cent of aggregate residential mortgage growth.⁵ Since brokered deposits offer

higher rates than traditional retail deposits, these entities invest the funds into higher-return, non-prime mortgages to achieve a targeted spread.

Chart 2-A: The NHA MBS of non-traditional entities fund a small percentage of total outstanding mortgages...

NHA MBS-funded mortgages as a percentage of total outstanding mortgages

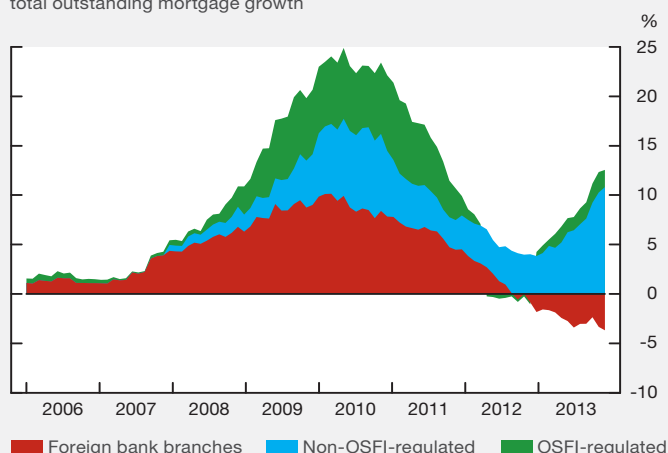


Sources: Canada Mortgage and Housing Corporation and Bank of Canada

Last observation: October 2013

Chart 2-B: ...but entities not regulated by OSFI are becoming more active

Year-over-year growth of NHA MBS-funded mortgages as a percentage of total outstanding mortgage growth

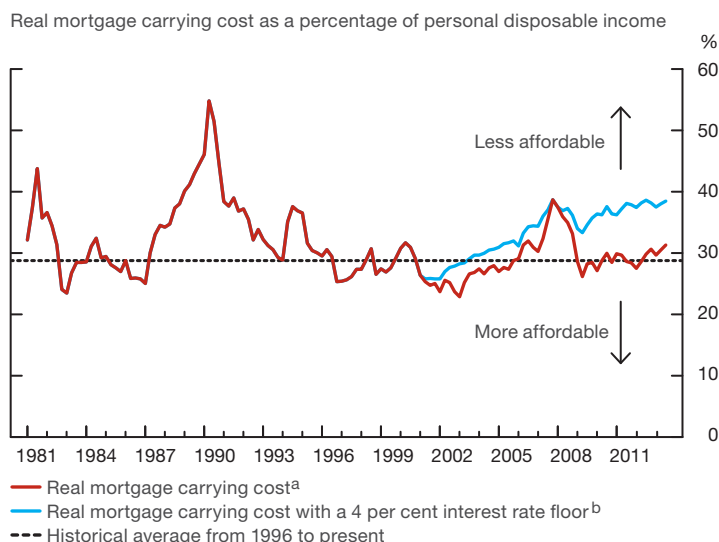


Sources: Canada Mortgage and Housing Corporation and Bank of Canada

Last observation: October 2013

- 1 For more information on non-traditional suppliers of residential mortgages, see "Monitoring and Assessing Risks in Canada's Shadow Banking Sector" in the June 2013 FSR.
- 2 Aggregators are financial institutions (usually subsidiaries of foreign financial institutions) that typically do not originate mortgages, but instead purchase insured mortgages from smaller lenders and then securitize them.
- 3 Some of these entities also fund their mortgage lending by issuing asset-backed commercial paper backed by the insured mortgages they issue. This funding source may be adversely affected by the policy announced in the federal government's 2013 budget to prohibit the use of any government-backed insured mortgage as collateral in securitization vehicles that are not sponsored by the Canada Mortgage and Housing Corporation.
- 4 Brokered deposits are acquired by deposit-taking institutions through broker-dealers and wealth managers that represent investment clients seeking the highest possible return on their deposits.
- 5 Non-prime lending is discussed in the report "The Residential Mortgage Market in Canada: A Primer" in this issue.

Certain households are also vulnerable to an adverse income shock. This type of shock could arise from the materialization of external risks, such as a severe escalation of the euro-area crisis. It could also result from a sharp decrease in domestic spending, perhaps in response to increased concerns by households about their debt levels. The Bank's regular stress-testing exercise examines the impact of a severe (3-percentage-point) rise

Chart 23: Housing affordability would deteriorate if interest rates were closer to historical norms

- a. This measure estimates the size of mortgage payments for a representative first-time homebuyer, given prevailing interest rates and house prices, and then scales this value by personal disposable income per worker in order to measure affordability.
- b. To illustrate affordability if interest rates were closer to historical norms, the average real mortgage rate from 1996 (4 per cent) is used to set a floor for the real interest rate; if the observed value is below 4 per cent in a period, the floor is used in the calculation.

Sources: Teranet-National Bank, Statistics Canada,
Canadian Real Estate Association and Bank of Canada calculations

Last observation: 2013Q3

in the unemployment rate, a six-week increase in the average duration of unemployment and a rise in the interest rate risk premium for household debt. Similar to the results reported in the June FSR, the updated simulation suggests that loan arrears could increase significantly, from about 0.4 per cent in mid-2013 to 1.2 per cent by early 2016.

A number of actions are needed to mitigate the risks and vulnerabilities related to the housing market and household finances. Households should assess their ability to service their debt over the entire maturity of their loans. For their part, lenders must follow prudent underwriting practices and carefully consider the aggregate risk of their household exposures, consistent with OSFI's Guideline B-20. The Bank continues to work closely with other federal authorities to monitor developments in these areas.

Key Risk 3: Financial Behaviour in a Low Interest Rate Environment

The long period of low interest rates in the advanced economies, while necessary to support the global economic recovery, is contributing to a buildup of vulnerabilities in the financial system. Low interest rates continue to provide incentives for excessive risk taking by investors as they search for higher yields, and there has been greater use of leverage and maturity transformation in some sectors. Institutional investors such as life insurers and pension funds have faced intense balance-sheet pressures from low interest rates because of the resulting increase in the present value of their long-duration liabilities. Although pressures on these institutions have lessened somewhat since the June FSR, owing to the rise in long-term rates and higher stock prices, meeting target rates of return in a low interest rate environment remains a challenge.

Risks could materialize under two scenarios. First, a sharp rise in long-term interest rates, possibly in reaction to shifting expectations of monetary policy tightening or to an adverse financial or political event, could cause significant disruption across financial markets and investor losses. The large and abrupt increase in yields that occurred in the early summer, prompted by speculation about U.S. tapering of asset purchases, exposed vulnerabilities in some segments of credit markets and in certain economies. Second, if interest rates in the advanced economies remain low for a much longer period, because the economic recovery is weaker than projected, returns for institutional investors would languish as expected returns and prices on equities and other assets are revised downward. In addition, risk-taking behaviour among all investors could escalate. This would exacerbate existing vulnerabilities and increase interest rate risk, creating even greater challenges for an eventual exit from unconventional monetary policy.

The Governing Council judges that these underlying conditions have not changed materially since the June FSR, and the risks to Canadian financial stability from a low interest rate environment remain at a “moderate” level. However, the level of risk could grow as the current low interest rate environment in the advanced economies persists.

U.S. financial markets continue to indicate the search for additional yield

Despite the forewarning in May 2013 that the U.S. Federal Reserve is actively planning the transition to a more normal interest rate environment, some elements of risk-taking behaviour appear to have increased in recent months. The September and October decisions by the Federal Open Market Committee not to reduce the pace of asset purchases have led market participants to expect a longer period of low policy rates and low volatility.¹⁸ Corporate leverage is approaching pre-crisis levels, and leveraged buyout transactions have had their most prolific year since 2007.¹⁹ The demand for investment products with lower credit quality remains high as investors continue to search for yield: the issuance of high-yield bonds has been strong in 2013; pay-in-kind bonds are at their highest level since the crisis;²⁰ and the issuance of leveraged loans, including covenant-lite structures, in the United States has reached record amounts (Chart 24).^{21, 22} In addition, spreads for both leveraged loans and high-yield bonds have been declining. Spreads for high-yield bonds are now within about 180 basis points of the historical lows reached in mid-2007 (Chart 25).

However, a large proportion of the high-yield debt that has been issued since 2009 has been channelled toward refinancing at lower rates, resulting in an extension of the maturity profile (Chart 26).

¹⁸ Market expectations are split in relation to when the U.S. Federal Reserve might start tapering its asset purchases, ranging from December 2013 to March 2014. Market participants now expect U.S. policy rates to start increasing in the autumn of 2015, which is at least six months later than what had been expected at the time of the June FSR.

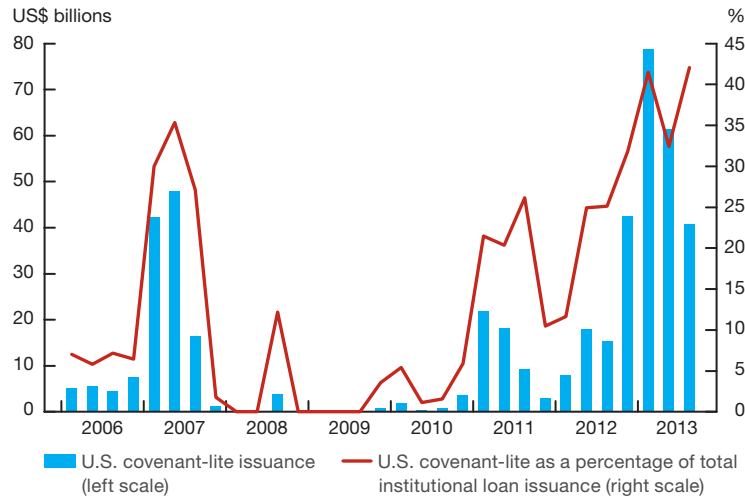
¹⁹ Leveraged buyout activity accounted for US\$74 billion, or 44 per cent, of the issuance related to mergers and acquisitions as of the end of October. This is largely attributable to some large transactions in 2013: for example, Dell (US\$25 billion) and Heinz (US\$28 billion). Source: Thomson Reuters LPC.

²⁰ Pay-in-kind bonds provide the borrower with the option of making interest payments in the form of cash or additional bonds. This bond product is often viewed as being riskier because of its deep subordination and low recovery rate in the event of a borrower default.

²¹ While there is no strict definition of a leveraged loan, the term generally refers to broadly syndicated bank loans to speculative-grade borrowers that carry larger debt levels relative to investment-grade borrowers.

²² Covenants refer to the contractual obligations in a loan agreement that set out specific standards of future conduct and performance for the borrower. Covenant-lite loans are often viewed as a sign of weaker underwriting standards, since their structure can delay defaults and lead to lower recoveries.

Chart 24: The issuance of covenant-lite loans in the United States is at a record level

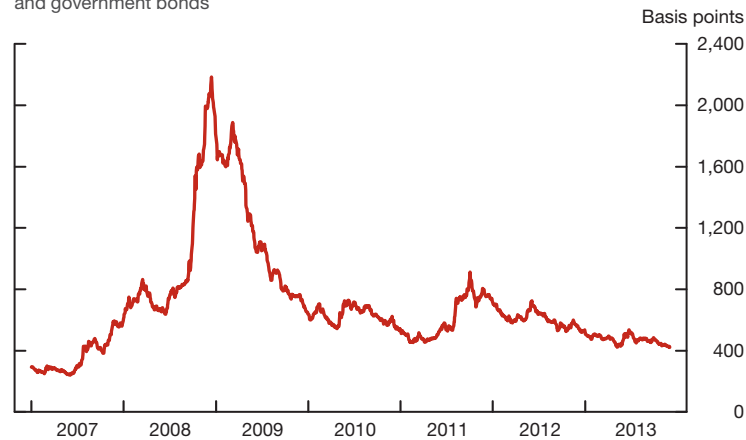


Source: Thomson Reuters LPC

Last observation: 2013Q3

Chart 25: Spreads on U.S. high-yield corporate debt are low, although still above pre-crisis levels

Options-adjusted spread between indexes of high-yield corporate debt and government bonds

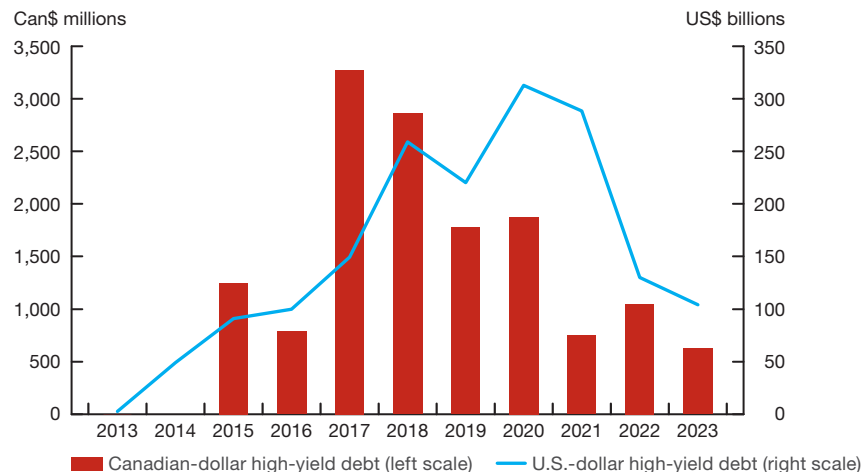


Source: Bank of America Merrill Lynch

Last observation: 3 December 2013

Chart 26: The maturity schedule for high-yield debt has been extended

Amount maturing in each year



Sources: Bank of Canada and Bloomberg

Last observation: 3 December 2013

Markets for Canadian high-yield bonds and leveraged loans remain small, with limited use of covenant-lite products. Canadian banks, however, have participated in syndications of U.S. leveraged loans, including the riskier covenant-lite segment of the market. As in the United States, refinancing risk for Canadian high-yield issuers is low, with the bulk of maturities dated beyond 2017.

A large and abrupt increase in long-term interest rates could cause a severe market disruption

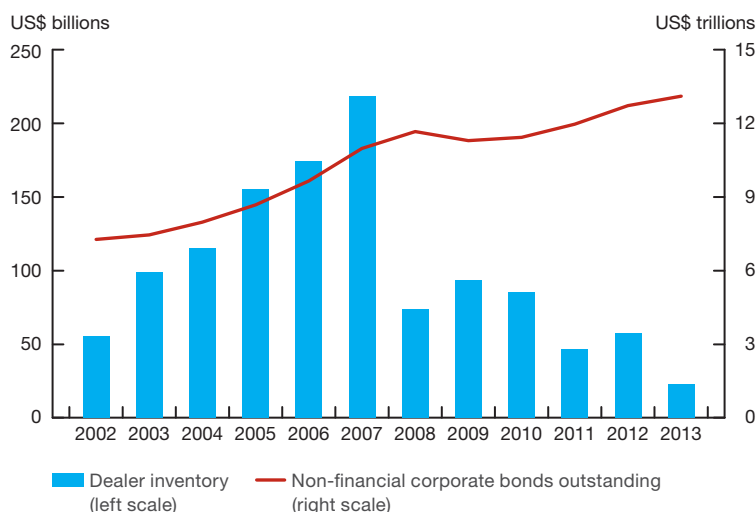
The suggestion in May by the U.S. Federal Reserve that it might begin to taper asset purchases triggered a sharp rise in long-term rates and an increase in market volatility. The episode revealed vulnerabilities in certain market sectors, particularly in the case of long-duration, leveraged exposures. U.S. mortgage real estate investment trusts (REITs), particularly those that purchase agency mortgage-backed securities and fund themselves using short-term repo markets, came under stress as the rise in yields reduced the value of their holdings. U.S. risk-parity funds experienced large declines in value,²³ and municipal, closed-end bond funds also saw significant reductions in their net asset values.²⁴ In addition, there was a large unwinding of carry trade strategies (borrowing in currencies with lower interest rates, such as the U.S. dollar, and investing in higher-yielding assets), with significant portfolio flows out of emerging-market economies. The effects on the Canadian and global financial systems were short-lived and relatively minor. However, this experience underscored the fact that effective communication of exit strategies by central banks is exceptionally challenging as well as essential to minimize any unintended consequences, particularly given the unconventional nature and unprecedented size of the current policy stimulus in the advanced economies.

In a worse scenario, a sudden and dramatic shift in market expectations for monetary policy, or an adverse political or sovereign credit event, could trigger a more severe outcome. A large and rapid rise in long-term interest rates that is accompanied by a loss of confidence among investors could lead to a globalized retrenchment from risk with destabilizing portfolio adjustments. Leveraged investors and certain investment strategies could realize significant losses, which could in turn spur a broader run on credit and equity assets. As rates overshoot, financial market losses, coupled with tighter financial conditions, would lead to weaker economic activity. For example, losses in the U.S. mortgage REIT market could reduce access to mortgage credit and dampen the U.S. recovery. The Canadian financial system would then be affected through trade and financial channels.

Market volatility would be amplified by the decline in market liquidity in a number of sectors. Financial institutions have been scaling back their market-making activities, owing in part to deleveraging in the wake of the global financial crisis as well as tightening financial regulations. This trend is reflected in smaller dealer inventories and wider bid-ask spreads. In corporate bond markets in particular, there has been a notable decline in dealer

²³ A risk-parity portfolio equalizes risk allocation throughout an investment portfolio by overweighting asset classes with lower volatility. These funds allocate a greater portion of their assets to fixed income because, historically, this asset class has exhibited lower volatility compared with equities and commodities. The universe of risk-parity funds is currently estimated at close to US\$85 billion.

²⁴ As of July 2013, 188 leveraged municipal closed-end bond funds were in operation, with more than US\$90 billion in assets under management and US\$33 billion in balance-sheet leverage. Of the 71 per cent of funds that have portfolio durations of more than 10 years, a 1 per cent rise in interest rates would lead to an immediate 16 per cent decline in net asset values. See "NAV Declines Show Interest Rate Impact on Leveraged Municipal Closed-End Funds," Fitch Ratings Special Report, 9 August 2013.

Chart 27: Dealer inventories of corporate bonds have declined, while issuance has grown

Note: Dealer inventory indicates the last observation in a given year. Non-financial corporate bonds outstanding represent total credit market instruments held by non-financial businesses.

Sources: U.S. Federal Reserve Board and New York Federal Reserve

Last observations: Dealer inventory, 20 November 2013; non-financial corporate bonds, 2013Q2

inventories in both Canada and the United States at a time when corporate issuance has been at record levels (Chart 27). As a result, these dealers may be less able to function as “liquidity shock absorbers” during times of stress. In addition, the growing presence of mutual funds and exchange-traded funds could amplify market movements, since large redemptions during a period of increasing yields would further depress liquidity and asset prices.

An alternative risk scenario would see low interest rates for a much longer period

Some institutional investors have benefited from the recent rise in long-term interest rates, because the present value of their liabilities has fallen more than the decline in the value of their assets.²⁵ This has contributed to improved measures of solvency for pension funds, and has reduced balance-sheet strains for Canadian life insurers.²⁶ Yet long-term rates are still relatively low.

A prolonged period of low interest rates in the advanced economies would limit the pace of balance-sheet strengthening for institutional investors. It could also lead investors to reassess their expectations for returns on a broad range of assets, particularly if there is also a deterioration of global economic conditions. In such a scenario, asset prices and investment returns would fall more broadly, increasing the pressure for all investors to pursue riskier behaviour and amplifying the current buildup of vulnerabilities. The resulting tensions could necessitate changes in the business models of some financial institutions. Depending on the nature of these changes, there

²⁵ A 1 per cent increase in long-term interest rates reduces the liabilities of most pension plans by 10 to 15 per cent. See “Funded Status of Canadian Pension Plans at Highest Level in 6 Years,” Mercer press release, 1 October 2013.

²⁶ Ibid. Mercer reports that the proportion of Canadian pension plans that are less than 80 per cent funded, on a solvency basis, decreased from 60 per cent at the start of 2013 to about 10 per cent by the end of September.

could also be longer-term ramifications for the economy as the declining wealth of households, including pensioners and insurance beneficiaries, potentially creates credit losses for financial institutions and further fiscal strains for governments. This interplay between financial system and macro-economic risks would exacerbate existing vulnerabilities, creating even greater challenges for an eventual exit from unconventional monetary policy.

Key Risk 4: Financial Vulnerabilities in Emerging-Market Economies

Despite substantial improvements in economic fundamentals in many emerging-market economies since the last wave of EME crises in the mid-to-late 1990s, important financial vulnerabilities persist in several countries. Strong growth, fuelled by rapid credit expansion, aggressive policy stimulus, and underdeveloped financial regulation has masked a significant buildup of financial stability risk in some countries. The slowdown in economic growth in EMEs has exacerbated the vulnerabilities in the countries that have not made greater progress on their financial and macroeconomic policy frameworks.

There are two components to this risk. First, countries with a high dependence on external, market-based financing are sensitive to a surge in interest rates in the advanced economies and foreign capital outflows. Second, in China there continue to be financial fragilities related to the banking and shadow banking sectors, imbalances in the real estate market, and local government borrowing.²⁷ The nature of the vulnerabilities and the potential triggers (external versus internal) for each risk element are different. However, economic and financial linkages, as well as the potential for indiscriminate investor reactions, could lead to broader EME stress, which in turn could be transmitted back to Canada through trade, commodity and financial channels. Although Canada's exposures to individual emerging-market economies are small, broader EME stress could have a significant adverse effect on Canada.

Overall, the Governing Council judges that persistent financial vulnerabilities in some EMEs pose a "moderate" level of risk to the Canadian financial system. If progress on financial and economic reforms in EMEs languishes, the likelihood of a materialization of widespread stress in EMEs will increase, particularly in the case of a turbulent transition toward a more normal interest rate environment in the advanced economies.

The capital outflows from emerging-market economies during the summer were relatively small

The inherent attractiveness of investing in high-growth EMEs, combined with the low interest rate environment in the advanced economies, has induced significant capital flows into EMEs since 2009, of which only a small proportion of portfolio investments was withdrawn from mid-May to mid-September (Chart 28).²⁸ Although financial markets in EMEs have since stabilized, the earlier episode suggests that these countries may be susceptible to further market turbulence and sharp capital outflows when extraordinary monetary policy in the advanced economies is unwound.²⁹

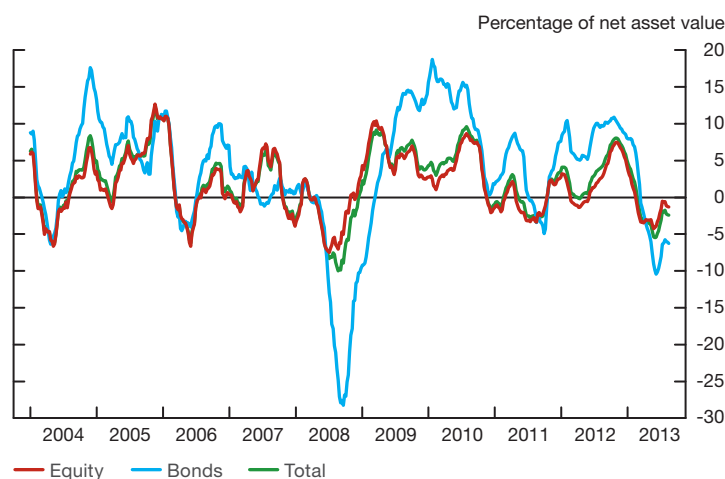
²⁷ Financial vulnerabilities in China were included in the "Deficient global demand" risk in the June 2013 FSR.

²⁸ According to EPFR Global, of the approximately US\$300 billion in flows to EME bond and equity funds since U.S. quantitative easing began in early 2009, about US\$55 billion was withdrawn between 22 May and 17 September 2013. Although the dollar volumes were large, the outflows amounted to only 5 per cent of EME assets under management. In contrast, there have been other reports that direct investment flows were relatively stable during the period, and that some investors increased their equity and fixed-income investments to maintain their portfolio allocations. See, for example, IIF Research Note, "Capital Flows to Emerging Market Economies," 7 October 2013.

²⁹ The recent turmoil in EMEs was modest from a historical perspective. For example, the MSCI Emerging Market Equity Index declined by about 5 per cent between 22 May and 17 September 2013, compared with nearly 30 per cent in the second half of 1997 during the Asian crisis.

Chart 28: Only a small portion of capital was withdrawn from emerging markets over the summer

Emerging-market fund flows, rolling 17-week average



Source: EPFR Global

Last observation: 27 November 2013

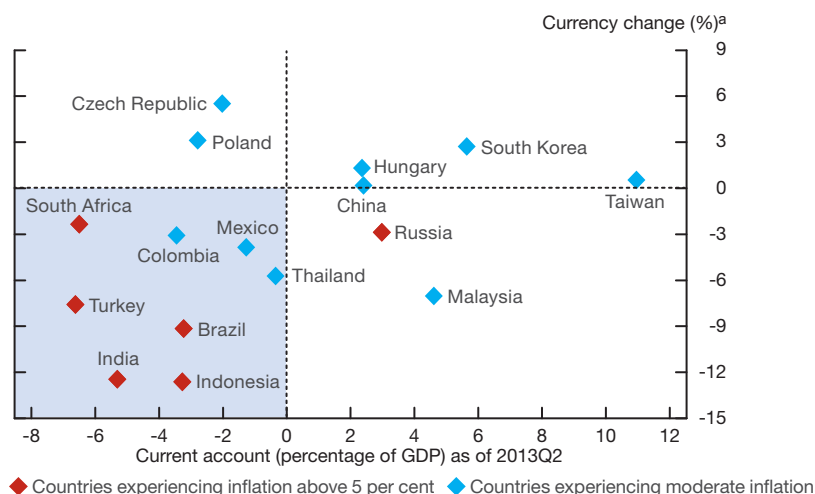
Market pressures have been greater for certain EMEs than for others

During the summer period, investors seem to have discriminated on the basis of country fundamentals. EMEs with combinations of deteriorating growth prospects, high inflation, large fiscal or current account deficits, and a high dependency on foreign funding were subject to the greatest market pressures (Chart 29).³⁰ The May–September experience suggests the need for EMEs to press forward with macroeconomic and financial reforms and to implement policies that promote more sustainable growth.

If stresses in some EMEs were to escalate again, contagion to other EMEs could occur. For example, if foreign investors suddenly seek a reduction in their portfolio holdings of EME investments, difficulties in selling the assets of a weaker country could lead investors to sell their assets of another EME country in order to meet their portfolio-allocation targets. Indeed, this occurred during May and June 2013.³¹ In addition, regional linkages could spread the resulting financial and economic problems more broadly among EMEs. However, a more likely trigger for widespread deterioration in economic growth in EMEs would be China, which is an important trade partner for many EMEs, including the more vulnerable countries. If the Chinese economy were to suffer a sharp slowdown, the economies of both Latin American (commodity-exporting) countries and other Asian EMEs would be affected.

³⁰ See, for example, the chapter “Markets Precipitate Tightening” in the September 2013 BIS *Quarterly Review*.

³¹ For example, constrained liquidity in certain EME local-currency bond markets made it difficult for some investors to sell their holdings and contributed to volatility in May and June, although this effect was short-lived.

Chart 29: Investors discriminated on the basis of economic fundamentals

a. Evaluated between 22 May 2013 and 17 September 2013

Note: The shaded area highlights countries with current account deficits that experienced currency depreciation during the 22 May 2013 to 17 September 2013 period.

Source: Bloomberg

Last observation: 17 September 2013

Sizable financial system risks continue to stem from China

Vulnerabilities continue to build in China's financial system owing to robust credit growth and rapid expansion of the shadow banking system, where regulation is light and there is uncertainty regarding exposures. Shadow banking activity includes non-banks as well as banks through off-balance-sheet structures.³² Banking and shadow banking entities can be closely linked through ownership and business activities, and relationships are often complex and opaque.³³ The Chinese authorities are trying to reduce leverage, improve liquidity management at financial entities and discourage regulatory arbitrage. This effort is challenging and could have unforeseen consequences. For example, attempts by the central bank in June to deter the use of short-term, interbank funding for longer-term loans caused significant funding pressures. If actions by authorities or market events were to lead to a more severe tightening and prevent financial entities from rolling over their financing, a long chain of defaults could be triggered. A serious credit squeeze could ensue, with significant effects on the economy and the financial system.

Chinese bank loans are showing signs of deteriorating credit quality, particularly those of the smaller banks.³⁴ For example, local government financing vehicles (LGFVs) have turned increasingly to the smaller, state-owned banks for financing, and the government initiatives being financed are often long-term infrastructure projects with delayed returns. Because a large portion of local government revenue is tied to land sales and development taxes, a more severe slowdown in the economy or a sharp correction

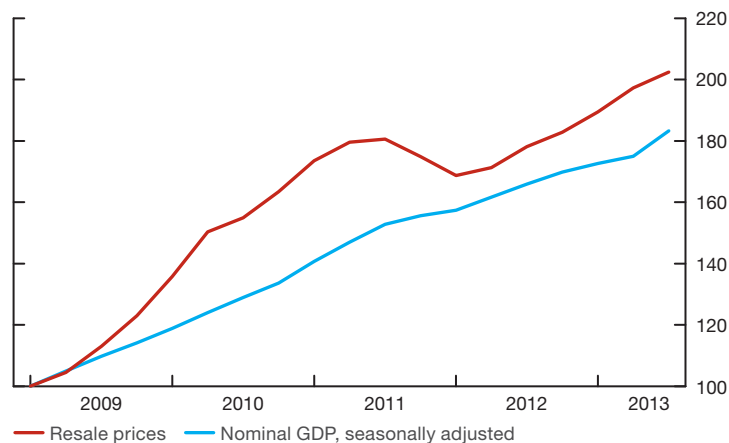
³² The rapid expansion of the shadow banking system over the past several years represents a liberalization of the financial system. New financing by banks has slowed, while shadow bank lending by trust companies and brokerage firms, for example, has grown dramatically. See Federal Reserve Bank of San Francisco, *Asia Focus*, April 2013.

³³ For example, trust companies raise funds through bank loans and bank-marketed wealth-management products (WMPs) and purchase higher-risk loans that banks want off their balance sheets. Many investors mistakenly believe that trust-issued WMPs are guaranteed by banks, which may lead banks to backstop trust company WMPs to prevent a broader run on these products.

³⁴ In the first half of 2013, the rate of impairment formation (changes in non-performing loans plus write-offs as a share of total loans) increased by about 50 per cent year over year for the smaller Chinese banks and by less than 10 per cent for the big four Chinese banks.

Chart 30: Prices for resale properties continue to outpace growth in China

Indexes (2009Q1 = 100)



Sources: Soufun, Haver Analytics and Bank of Canada calculations

Last observation: 2013Q3

in the real estate market could result in a cash crunch for local governments and reduce their ability to service their debt.³⁵ House prices and vacancies in Chinese cities continue to rise at a significant pace, as properties are increasingly being purchased for investment purposes (**Chart 30**). In addition, new housing is being built farther away from big city centres, where demand is limited.

Given the extensive links between banks, real estate and shadow banking entities, a property market bust would put domestic financial stability at risk, with adverse effects on bank balance sheets and negative implications for credit growth and the real economy.³⁶

Canada's links to individual EMEs are small, but broader EME stress could have a significant adverse effect on Canada

The direct exposures of Canadian banks, as well as the larger Canadian pension funds, to EMEs are growing but are still relatively small (**Chart 31**).³⁷ Indirect links to EMEs through euro-area, U.K. and Swiss banks are also limited.

However, a financial crisis involving one or more of the larger and more globally integrated EMEs could generate negative systemic effects on a worldwide basis, posing a much greater risk to Canada (**Box 3**). A full-blown crisis in China's financial system, for example, would lead to heightened global market volatility and a broad repricing of risk. In addition, spillover effects to the euro area through trade and financial linkages could reignite a euro-area crisis. This scenario could lead to higher funding costs for Canadian banks, which, in turn, could translate into rising costs for loans and tighter lending conditions for Canadian households and businesses. Lower world commodity prices and weaker demand for Canadian exports

³⁵ China's National Audit Office reported in 2013 that two-thirds of the LGFVs that it audited did not have sufficient revenue to repay principal and interest on their debt. Supplemental fiscal support and/or refinancing are often used by local governments to meet these obligations.

³⁶ For example, trust companies are also linked to the real estate market through their provision of financing for property developers.

³⁷ As of the second quarter of 2013, the total exposures of the big six banks to EMEs amounted to Can\$131 billion, or 4 per cent of total claims on their balance sheets. Most of these exposures are to EMEs in Latin America (79 per cent) and, to a much lesser extent, EMEs in Asia (16 per cent). The exposures to EMEs vary across individual banks.

Box 3

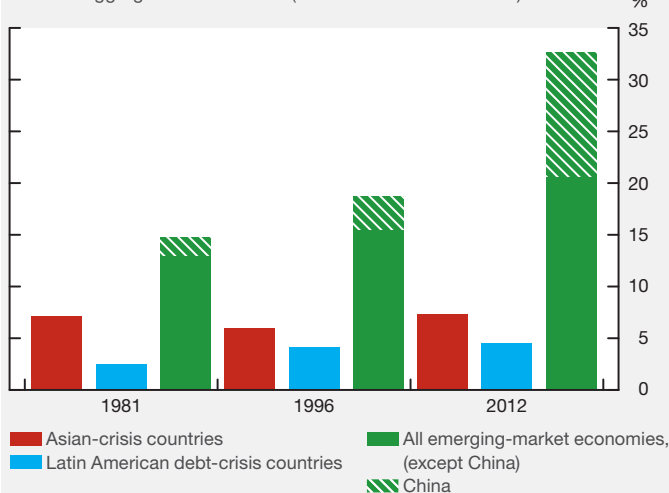
Lessons from Past Crises in Emerging-Market Countries

The run-up to two significant EME crises—the Latin American debt crisis (LDC), which began in August 1982, and the Asian financial crisis (AFC), which began in July 1997—could be characterized by a similar macroeconomic and financial environment: strong, credit-driven economic growth supported by significant levels of foreign capital inflows. In both cases, the materialization of stress in one EME led to a loss of confidence in and capital outflows from many EMEs within a region. The effects were ultimately transmitted beyond EMEs. For example, the total exports of advanced economies to the affected EME countries declined by almost 30 per cent in each of the years immediately following the start of the LDC and the AFC.¹

1 These figures do not reflect a general contraction in world trade at the same time. The total exports of advanced economies to non-crisis countries also fell after the start of the LDC, although this was relatively moderate (4.5 per cent); the total exports of advanced economies to non-crisis countries rose in the year after the start of the AFC.

Chart 3-A: Emerging-market economies have increased their contribution to global GDP

Share of aggregate nominal GDP (annual data in U.S. dollars)



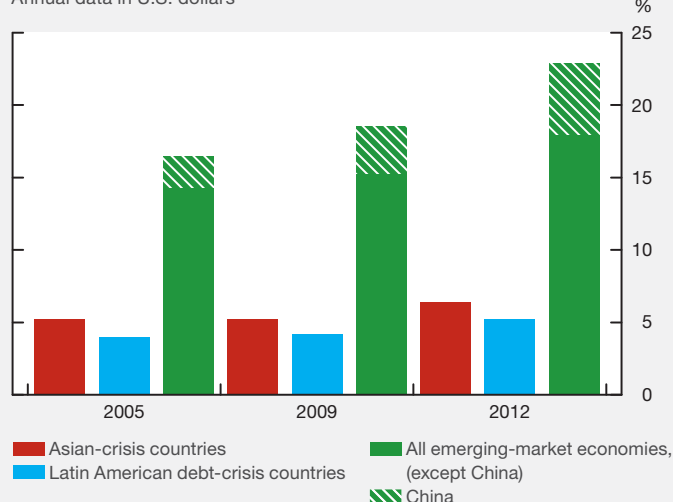
Note: 1981 GDP calculations do not include eastern-European countries.
 Latin American debt-crisis countries: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Uruguay and Venezuela
 Asian-crisis countries: Indonesia, Malaysia, Philippines, Singapore, South Korea and Thailand
 All EMEs: Latin American debt-crisis countries, Asian-crisis countries, China, Czech Republic, India, Poland, Russia, South Africa, Taiwan, Turkey and Ukraine
 Sources: World Development Indicators (World Bank) and Directorate-General of Budget, Accounting and Statistics of Taiwan

Last observation: 2012

Although the financial sectors and regulatory frameworks in EMEs have been strengthened significantly over the past 15 years, the impact from an EME financial crisis could be even greater in the current situation, since EMEs have increased their trade and financial links with the advanced economies and with each other. EMEs now account for about 33 per cent of global GDP (**Chart 3-A**). Of this total, China contributes about 12 per cent, while the EMEs that experienced significant stress during the May–September 2013 period together represent almost 9 per cent of global GDP. The level of financial connectivity between EMEs and the advanced economies has also risen: EMEs now represent about 23 per cent of the cross-border assets of the advanced economies (**Chart 3-B**). Given the sizable global presence of EMEs, an extreme event in an EME, particularly one that is relatively large and globally integrated by trade or through the financial sector, could generate significant adverse effects.

Chart 3-B: Emerging-market economies account for a sizable share of cross-border assets of advanced economies

Annual data in U.S. dollars

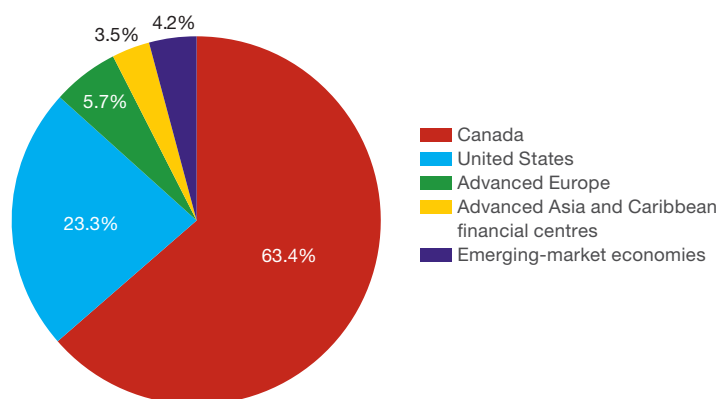


Note: Latin American debt-crisis countries: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Peru, Uruguay and Venezuela
 Asian-crisis countries: Indonesia, Malaysia, Philippines, Singapore, South Korea and Thailand
 All EMEs: Latin American debt-crisis countries, Asian-crisis countries, China, Czech Republic, India, Poland, Russia, South Africa, Taiwan, Turkey and Ukraine
 Source: International Monetary Fund

Last observation: 2012

Chart 31: The exposure of Canadian banks to emerging-market economies is relatively small

Geographic distribution of big six banks' claims on an ultimate-risk basis, as of September 2013



Source: Regulatory filings of Canadian banks

Last observation: September 2013

would also weigh on Canadian incomes.³⁸ The resulting weakness in the Canadian economy could lead to higher loan losses for banks, potentially causing an adverse feedback loop between declining economic activity and stress in the financial system.

Safeguarding Financial Stability

While the Governing Council judges that the overall level of risk to the financial system has moderated since the June FSR, it remains elevated. This assessment arises from the combination of: (i) ongoing banking, sovereign and economic strains in the euro area; (ii) the vulnerability of Canadian households and financial institutions to adverse interest rate, labour market or house-price shocks; (iii) the potential for a disruptive unwinding of risk positions in the advanced economies as they begin to transition from low interest rate environments; and (iv) financial vulnerabilities in certain emerging-market economies.

Reforms to strengthen the global and domestic financial systems are progressing

In addition to the mitigating measures that are specific to each of these risks, the resilience of both the global and domestic financial systems continues to improve as more progress is made on the G-20 reform agenda.³⁹ Canadian authorities are contributing by participating in various international bodies and by applying global policies and standards in the domestic context. For example, since the June FSR, Canadian authorities have introduced new measures for over-the-counter (OTC) derivatives markets in Canada that are a part of the broader global agenda to make these markets safer:

- OSFI has defined further rules for reducing counterparty credit risks for financial institutions dealing in derivatives. Requirements related to the credit valuation adjustment for capital charges will become effective in January 2014.

³⁸ EMEs account for about 12 per cent of Canada's total trade and about 20 per cent of commodity exports on average. This is relatively small in comparison with other advanced economies. For example, exports to EMEs are closer to 50 per cent of total U.S. exports, of which China receives about 7 per cent.

³⁹ See the Financial Stability Board's progress report to the G-20 Leaders in September 2013, at http://www.financialstabilityboard.org/publications/r_130905a.pdf.

- Provincial securities regulators in Ontario, Quebec and Manitoba have adopted rules related to the reporting of derivatives trades. The rules will come into force as of 31 December 2013 in Ontario, and reporting obligations will begin to take effect in July 2014.

Ministers of finance from British Columbia and Ontario as well as the federal finance minister have also agreed to establish a co-operative capital markets regulatory system by July 2015, with an invitation to all provinces and territories to join. The co-operative system is intended to strengthen Canada's capacity to identify and manage systemic risk on a national basis and foster more efficient and globally competitive capital markets.⁴⁰

Efforts are being channelled toward addressing potential emerging risks in the Canadian financial system

Canadian authorities and financial system participants must also remain vigilant to potential new risks that could destabilize the financial system. Cyber security is one area where actions are being taken to safeguard financial stability.

Technology failures and security breaches affecting financial entities have the potential to cause major disruptions in the financial system. Public and private sector initiatives to strengthen business continuity in the face of such operational risk events have been ongoing for some time. One key initiative is the Joint Operational Resilience Management (JORM) Program, which is chaired by the Bank of Canada and includes operators of the three Canadian designated payment clearing and settlement systems, eight financial institution participants in these systems, the Department of Finance, and OSFI. JORM has been working to identify the key assets essential to the operation of the infrastructure that is critical to the financial sector, in order to determine sources of operational risks, and to generate recommendations to enhance resilience. This initiative includes the investigation of an early-warning intelligence system that would cover physical threats as well as cyber security breaches.

Given the proliferation of increasingly sophisticated cyber attacks worldwide, federal authorities and Canadian financial institutions are taking a more concerted approach to addressing cyber security risks. For example, in its medium-term work plan, OSFI has identified technology risk at federally regulated financial institutions, particularly cyber security risk, as one area for increased supervisory focus. In October, OSFI released its Cyber Security Self-Assessment Guidance, which aims to increase awareness and help institutions review their management processes and policies for dealing with cyber risk.

Canadian financial institutions have also taken actions to mitigate these risks. While specific strategies vary among financial institutions, three broad areas are at the core of cyber security preparedness. First, banks continue to improve their security controls and develop new technological strategies to address and mitigate cyber risks. Second, well-developed processes are in place for sharing information among banks about emerging cyber threats. The industry is also working with government and law-enforcement agencies to identify and address cyber risks. Finally, the Canadian banking industry and the federal government have been collaborating on public awareness campaigns to promote safe online and mobile banking practices.

⁴⁰ The announcement is available at <http://www.fin.gc.ca/n13/13-119-eng.asp>.

Reports

Reports examine selected issues of relevance to the financial system.

Introduction

This section of the *Financial System Review* features three reports on topics related to the financial system: methodologies for identifying systemically important banks, insurers and other types of financial institutions; newly agreed international margin requirements for non-centrally cleared derivatives; and the policy framework for housing finance in Canada.

The approaches used by authorities to identify financial institutions that are systemically important for the global or domestic financial systems are explored in **Assessing the Systemic Importance of Financial Institutions**, by Éric Chouinard and Erik Ens. The different methodologies for banks, insurers and other types of financial institutions are critically evaluated and their implications for Canada are discussed. The authors illustrate a possible application of these methodologies by adapting the framework developed by the Basel Committee on Banking Supervision for global systemically important banks to Canadian deposit-taking institutions.

Nikil Chande, Stéphane Lavoie and Thomas Thorn explain the internationally agreed margin requirements that will be applied to derivatives that are not cleared through central counterparties in the report **Margining for Non-Centrally Cleared Over-the-Counter Derivatives**. The authors first describe the market for non-centrally cleared derivatives and then discuss the framework for margining these derivatives and the likely effects for Canada and the world. Future work in this area is also highlighted.

In **The Residential Mortgage Market in Canada: A Primer**, Allan Crawford, Césaire Meh and Jie Zhou assess how the Canadian regulatory and supervisory framework has helped to shape lending practices and contributed to the resilience of Canada's system of housing finance. Lessons from the crisis—and how they have guided changes in the policy framework to mitigate the risk of future instability—are also examined.

Assessing the Systemic Importance of Financial Institutions

Éric Chouinard and Erik Ens

Introduction

The financial crisis showed that some financial institutions have the potential to disrupt the broader financial system if they fail. Whether it is because of their size, their complexity, their global reach, the degree of their financial connections with other financial institutions or the uniqueness of the services they offer, financial institutions that are “too big (or too interconnected) to fail” can pose serious risks to the broader financial system and the real economy.

The fundamental issue is that some of the risks associated with the actual or impending failure of a very large and complex financial institution may be borne, not by its own shareholders and creditors, but by households and corporations that experience spillover effects. Second, the potential for system-wide financial turmoil may motivate the authorities to support a systemically important institution when it comes under duress. For both of these reasons, the funding costs of such an institution may be partly insulated from the risks that it takes—in effect, triggering a breakdown of market discipline. Consequently, the institution’s incentive to manage such risks may diminish as it grows or becomes more complex: actions that are in the best interest of a financial institution’s shareholders can thus be less than optimal from a system-wide perspective. The funding-cost advantage that systemically important financial institutions (SIFIs) enjoy may also further concentrate financial activity and risk in these institutions. All of these factors together could contribute to the probability of distress in the future. The case of AIG demonstrates that such risks stem not only from banks, but from other types of financial entities as well.

To address these challenges, the G-20 asked the Financial Stability Board (FSB) to identify SIFIs: banks,

insurers and other financial institutions whose failure could jeopardize worldwide financial stability. Under the FSB’s coordination, methodologies to identify such global SIFIs have been developed, as well as guidance to help national authorities identify banks that pose systemic risks to their domestic economies, even though these risks don’t extend globally. The FSB also adopted a framework to decrease the probability of a SIFI failing, through, for example, capital surcharges and more intensive supervision. In addition, the consequences of a SIFI’s failure are being reduced by effective resolution regimes that lower the potential for contagion.

This report explores the approaches used by authorities to identify SIFIs in both the global and domestic financial systems. We outline the differences in the methodologies tailored to banks, insurers and other types of financial institutions, providing a critical assessment of each and a discussion of their implications for Canada. We also illustrate a possible application of these methodologies, adapting the framework developed by the Basel Committee on Banking Supervision (BCBS) for global systemically important banks (G-SIBs) to Canadian deposit-taking institutions.

International Work on Assessing Systemic Importance

Canada has been an active participant at all levels in the international work to identify SIFIs, including the work done by the FSB, the BCBS, the International Association of Insurance Supervisors (IAIS) and the International Organization of Securities Commissions (IOSCO). Based on the 2013 rankings by these groups, no Canadian financial institution has been identified as globally systemically important.

A fundamental principle guiding the FSB approach to SIFIs is that there are important dissimilarities in the business models of different financial institutions that need to be taken into account in assessing their systemic importance. For example, since insurance policies are typically long-term contracts, insurance companies that engage in traditional activities are less likely than banks to respond to market stress in a way that transmits and amplifies stress, such as selling assets or withdrawing financing from other institutions. Global policy-makers have thus agreed to develop specific methodologies for identifying banks, insurers and other types of financial institutions that are of global systemic importance. These methodologies are intended to measure not the *vulnerability* of a given financial institution, but the *potential* for adverse spillovers in the event that the institution defaults. In short, it is not the probability that a financial institution will fail that determines its systemic importance, but the potential consequences of such an event.

The various methodologies developed for this purpose follow a broadly similar approach, and great care has been taken to ensure that they are mutually consistent. All of the methodologies combine quantitative, indicator-based assessments with supervisory judgment.

Quantitative measures provide a more objective and consistent basis for assessing the systemic importance of firms. However, these measures are sensitive to the specifications used, including the selection of variables and the weightings (which are not calibrated but informed by judgment). Moreover, data are not available for all of the factors that contribute to systemic risk. Each approach uses judgment to varying degrees to consider information that may not be readily quantifiable, as well as to determine cut-off thresholds.

Consistent with the academic literature on the topic (**Box 1**), the international identification exercises all use a set of five factors that can lead to systemic risk:

- (i) **Size:** The larger the firm, the more impact its distress or failure is likely to have on the global financial system.
- (ii) **Interconnectedness:** Measures the extent of the institution's financial system obligations (which provide transmission channels for shocks) and raises the likelihood of common exposures among interconnected firms.
- (iii) **Cross-jurisdictional activity:** The more cross-border activity that a firm engages in, the greater the probability that its distress or failure will have a global impact.

Box 1

Assessing Systemic Risk: Advances in the Academic Literature

Advances in the quantitative assessment of systemic risks are also evident in the academic literature. Where countries have the data and human capital in place to undertake model-based assessments, a more informed assessment is possible. For the most part, however, model-based assessments are currently difficult for regulators to apply, owing to data limitations and other factors. To date, the main benefit of such models has been in guiding the development of future methodologies (including the selection of variables) and improving the understanding of transmission channels.

This work falls into two broad categories:

(i) **Market-based models** extract the default probabilities used by market participants when pricing financial instruments (i.e., each institution's contribution to systemic risk). This approach uses high-frequency data and is considered to be "forward looking." One drawback is that it requires the assumption that asset markets are efficient even during stress periods.

Market-based models have shown that, while size tends to be associated with larger contributions to systemic risk, additional

indicators are also required (Adrian and Brunnermeier 2011; Zhou 2010; Gravelle and Li 2013).

Gravelle and Li (2013) also find that U.S. banks pose the greatest external risks to Canadian banks, but that Canadian banks are more exposed to other domestic financial institutions.

(ii) **Exposure-based network models** use data on bilateral bank exposures to model the direct connections among banks in order to simulate the effects of a systemic event on banks within a network. A chief drawback to this approach is that it has extensive data requirements.

Martínez-Jaramillo et al. (2012) find that interconnectedness in the Mexican banking system is not necessarily related to asset size; De Jonghe (2010) and Knaup and Wagner (2010) find that non-traditional banking practices create more hazardous risk-transmission channels. A number of authors (e.g., Brunnermeier and Pedersen 2009) find that funding relationships between hedge funds and large banks exacerbate systemic risk.

Box 2

Policy Measures to Safeguard the Financial System

Addressing the problem of “too big to fail” requires a multi-pronged and integrated set of policies. Accordingly, the G-20 has agreed to the following policy measures:

- (i) the Key Attributes of Effective Resolution Regimes for Financial Institutions, which are an international standard established by the Financial Stability Board (FSB 2011) that sets out the responsibilities, instruments and powers necessary for all national resolution regimes to enable authorities to resolve failing financial firms in an orderly manner and without exposing taxpayers to the risk of loss;
- (ii) requirements for recovery and resolution planning and resolvability assessments for global systemically important financial institutions (G-SIFIs), and for the development of institution-specific cross-border co-operation agreements and crisis-management groups so that home and host authorities of G-SIFIs are better prepared to deal with crises and have clear guidance on how to co-operate in a crisis;
- (iii) requirements for G-SIFIs to maintain additional loss-absorption capacity that is proportionate to the impact of their default; and
- (iv) more intensive and effective supervision of all SIFIs through, for example, stronger supervisory mandates, resources and powers, as well as higher supervisory expectations for risk-management functions, data-aggregation capabilities, risk governance and internal controls.

The International Association of Insurance Supervisors has committed to develop, by the end of 2014, straightforward, backstop capital requirements that will serve as the foundation for higher loss-absorbency requirements for global systemically important insurers.

In September 2013, the G-20 Leaders endorsed a proposal by the FSB to develop policy requirements for G-SIFIs other than banks and insurers. No timeline has been set.

(iv) **Substitutability:** If a firm plays a relatively large role in providing services in a particular business line or segment of the global market, the likelihood that the institution’s distress or failure would be disruptive to global economic activity increases. If the firm fails, is there another that can readily take its place?

(v) **Complexity (non-traditional business activity in the case of insurers):** The more complex a financial institution’s operations, the more difficult they are to unwind in an orderly manner.

By including factors other than size, authorities are better able to capture systemic risks such as a breakdown in the provision of critical services to other members of the financial system or an institution’s capacity to transmit shocks.

Identifying SIFIs is the first step in safeguarding the financial system against the failure of such institutions. The second step is adopting the appropriate remedial policies. To this end, the FSB has developed a three-pronged approach that subjects SIFIs to stricter supervision, higher capital requirements and more-robust resolution procedures in the event of failure. These policy measures are outlined in **Box 2**. Some commentators have noted that being designated as systemically important could increase a SIFI’s funding advantage by making an implicit government guarantee explicit. However, any such advantage is partly counterbalanced by the higher capital

requirements and the establishment of credible resolution regimes, which should help to mitigate the perception that even the most systemically important financial institutions will not be allowed to fail, thereby levelling the playing field in funding markets.¹

The following sections outline key differences among the methodologies.

Global systemically important banks

The methodology used to identify G-SIBs is based on a quantitative approach, in which a systemic importance score is calculated using one to three indicator(s) for each of the five risk factors described above (see **Table 1** for the indicators).² Each risk factor contributes equally (20 per cent) to the systemic importance score, and each indicator is also equally weighted within the category. Banks that score above a certain threshold on the scale of systemic importance are identified as G-SIBs by the FSB (**Table 2**). National authorities can add to this list if they judge that a bank from their own jurisdiction should be designated as a G-SIB, even if its score is below the numerical threshold. This list is updated annually. See **Box 3** for an application of this approach to Canadian banks.

¹ This is particularly true for resolution regimes that can credibly impose losses on debt holders (i.e., through instruments such as a bail-in).

² For more detail on the G-SIB identification methodology, see <http://www.bis.org/publ/bcbs255.htm>.

Table 1: Indicators of systemic risk for global systemically important banks

Systemic risk factors (weighted at 20% each)	Individual indicator	Indicator weighting (%)
Cross-jurisdictional activity	Cross-jurisdictional claims	10
	Cross-jurisdictional liabilities	10
Size	Total exposures as defined for use in the Basel III leverage ratio	20
Interconnectedness	Intra-financial system assets	6.67
	Intra-financial system liabilities	6.67
	Securities outstanding	6.67
Substitutability/financial institution infrastructure	Assets under custody	6.67
	Payments activity	6.67
	Underwritten transactions in debt and equity markets	6.67
Complexity	Notional amount of over-the-counter derivatives	6.67
	Level 3 assets	6.67
	Trading and available-for-sale securities	6.67

Source: Basel Committee on Banking Supervision (2013)

Global systemically important insurers

A similar approach for identifying global systemically important insurers (G-SIIs) was developed by the IAIS.³ Unlike the approach used to identify G-SIBs, most of the weight is put on two risk factors: (i) the involvement of firms in non-traditional business (45 per cent of the overall score) and (ii) their interconnectedness (40 per cent).⁴ These choices reflect the judgment that insurers with linkages to other insurers or to the banking sector, or that engage in non-traditional activities such as credit default swaps for non-hedging purposes or leveraged investment strategies, are more likely to amplify or contribute to systemic risk.

Another difference between the approach used to identify G-SIIs and that used for G-SIBs is that no specific numerical cut-off point is established for the designation of systemic importance. The FSB and national authorities make these determinations on a case-by-case basis using judgment. Table 2 provides a list of insurers that are currently designated as G-SIIs.

Global systemically important non-bank, non-insurer financial institutions

IOSCO and the FSB will soon propose methodologies to identify systemically important finance companies, broker-dealers and asset-management entities, including mutual funds and hedge funds. While these methodologies propose indicators for each of the risk factors outlined above,

Table 2: Global systemically important banks and insurers in 2013 (alphabetical ranking)

Banks	Insurers
Bank of America	Allianz SE
Bank of China	American International Group, Inc.
Bank of New York Mellon	Assicurazioni Generali S.p.A.
Barclays	Aviva plc
BBVA	Axa S.A.
BNP Paribas	MetLife, Inc.
Citigroup	Ping An Insurance (Group)
Credit Suisse	Company of China, Ltd.
Deutsche Bank	Prudential Financial, Inc.
Goldman Sachs	Prudential plc
Groupe BPCE	
Groupe Crédit Agricole	
HSBC	
Industrial and Commercial Bank of China Limited	
ING Bank	
JP Morgan Chase	
Mitsubishi UFJ FG	
Mizuho FG	
Morgan Stanley	
Nordea	
Royal Bank of Scotland	
Santander	
Société Générale	
Standard Chartered	
State Street	
Sumitomo Mitsui FG	
UBS	
UniCredit Group	
Wells Fargo	

Sources: Financial Stability Board (2013a, b)

³ For more detail on the G-SII identification methodology, see http://www.iaisweb.org/view/element_href.cfm?src=1/19151.pdf.

⁴ The remaining three risk factors each contribute 5 per cent to the overall score.

Box 3

Application of the G-SIB Indicator-Based Methodology to Canadian Banks

To provide an example of the quantitative techniques that can be used by regulators to understand systemic risks, we show how the indicator-based methodology used by the Basel Committee on Banking Supervision (BCBS) to identify global systemically important banks (G-SIBs) could be adapted to Canadian deposit-taking institutions.

To construct our quantitative index, we used the five risk factors applied to G-SIBs¹ and matched the indicators to Canadian data. Based on this approach, an index consisting of 18 indicators was constructed. The sample of banks chosen consisted of a pool of the 15 largest federally regulated banks (as measured by assets), including the Canadian activities of foreign banks. The data were drawn from supervisory returns, payments systems data, Bloomberg and Bankscope.

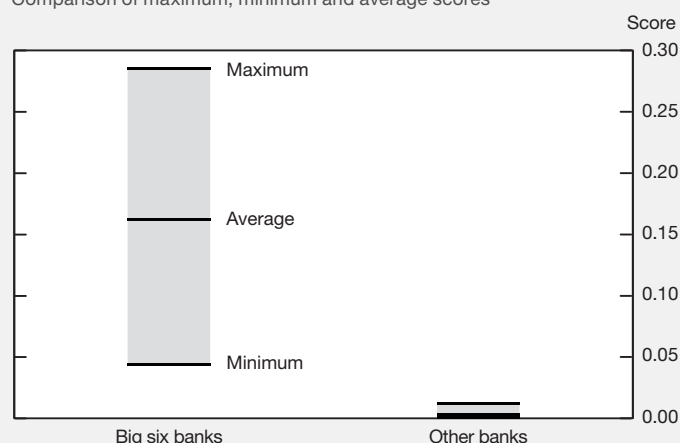
Chart 3-A shows the indicator results for banks. The scores are all relative to the other banks in the sample, and the scores for individual banks sum to one. The big six banks score well above the highest score of the other banks in the sample, suggesting that no federally regulated financial institution outside of the largest six is likely to have systemic effects. This finding is consistent with the Office of the Superintendent of Financial Institutions' designations of the big six banks as domestic systemically important banks (D-SIBs). In Canada, factors other than size have not changed the outcome of the D-SIB designations, although international evidence underlines the importance of ongoing monitoring of the broader set of factors.

Chart 3-B extends this analysis to credit unions and to caisses populaires in Quebec, given that these institutions have grown in both size and complexity in recent years. Doing so reduces our data set to 13 indicators, owing to differences in reporting requirements. Our results suggest that credit unions outside of Quebec pose considerably less systemic risk to the broader Canadian financial system than banks.² Caisses populaires in Quebec score higher, owing to

their larger share of the provincial financial system and integrated structure. This score is consistent with the decision of the Autorité des marchés financiers (AMF) to designate Desjardins Group as being systemically important in Quebec.

Chart 3-A: The big six banks are far more systemically important than other federally regulated banks...

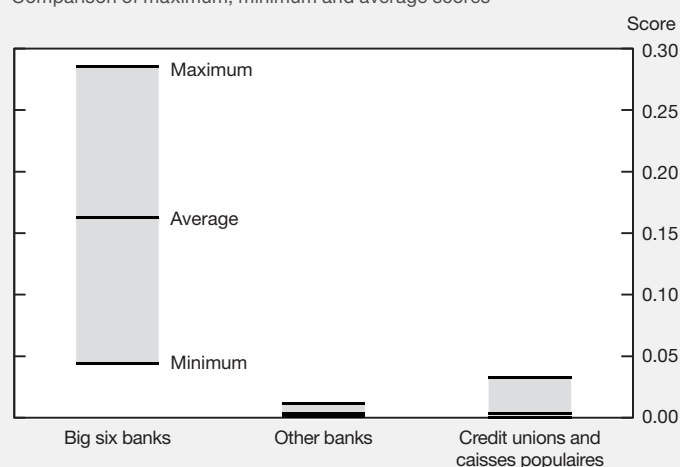
Comparison of maximum, minimum and average scores



Sources: Supervisory data, Bloomberg and Bank of Canada calculations (2012 data)

Chart 3-B: ...and provincial credit unions and caisses populaires

Comparison of maximum, minimum and average scores



Sources: Supervisory data, Bloomberg, Bankscope and Bank of Canada calculations (2012 data)

¹ The international guidance that the BCBS provides for identifying domestic systemically important banks does not include measures of global activity. We included global variables because cross-border operations can make institutions more difficult to resolve, since they require resolution efforts to be coordinated across jurisdictions and create legal complexity (i.e., contracts could be subject to dissimilar treatment under different legal regimes).

² Credit unions are highly interconnected through the credit union centrals. Hence, individual risks can spread more easily throughout the credit union system. However, connections to the broader financial system (through counterparty exposures) are more limited than those of banks. While not shown here, even aggregate credit union scores (which require the unrealistic implicit assumption of a synchronized failure of all credit unions) still rank below the smallest of the big six banks.

qualitative information will play a greater role in the assessment of systemically important entities other than banks and insurers. The heterogeneity of these types of institutions and the considerable differences in the availability of data on their balance sheets and on their activities across jurisdictions make it more difficult to develop a common, indicator-based global assessment methodology.

Domestic systemically important banks

The BCBS has developed a framework for identifying banks that, although not of global significance, are systemically important to their domestic financial systems (D-SIBs).⁵ Given the need to customize measures based on differences across jurisdictions, a principles-based approach has been adopted to allow for some discretion and flexibility. The principles articulate that authorities should take into account factors such as size, interconnectedness, complexity and substitutability. The implementation of the D-SIB framework will be subject to a BCBS peer review. No internationally agreed upon framework has been developed to identify domestic systemically important financial institutions other than banks.

Financial market infrastructures

A similar principles-based approach has been adopted for financial market infrastructures (FMIs) that (often by design) may play systemically important roles in the financial system. The CPSS/IOSCO Principles for Financial Market Infrastructures (CPSS-IOSCO 2012) provide guidance on the identification of, and standards for, systemically important FMIs.⁶ While not prescribing an identification methodology per se, the Principles recommend that authorities assume that all securities settlement systems, central securities depositories, central counterparties and trade repositories are systemically important. Payments systems, on the other hand, are of systemic importance only if they can transmit systemic disruptions. Among such payments systems are those that:

- are the sole payments system in a country or the principal system in terms of the aggregate value of payments;
- mainly handle time-critical, high-value payments; and
- settle payments used to effect settlement in other systemically important FMIs.

Assessing the Methodologies for Identifying SIFIs

While the development of methodologies to identify SIFIs is an important step in ending the problem of “too big to fail,” some important issues will need to be addressed in applying them.

First, there are challenges in balancing the use of quantitative analysis versus supervisory discretion. While judgment can take into account additional information that may be difficult to quantify or incorporate into models, it lacks transparency. Quantitative analysis can help to provide analytical rigour and improve transparency, but it cannot make a definitive identification of systemic importance. To balance these concerns, quantitative analysis should be used (as appropriate) to limit the scope for judgment (as is done with G-SIBs and G-SIFIs).

Second, given the latitude in the international guidance for D-SIBs, it will be important to ensure a degree of consistency in the identification methodologies used across jurisdictions. To address this concern, the FSB is planning to conduct a peer review to promote a rigorous application of this guidance in the identification of D-SIBs.

Finally, the role and size of an institution, together with the systemic risk it poses, evolve over time. Supervisors will monitor these institutions on an ongoing basis, and this information will supplement the annual identification exercises.

Systemic Importance of Canada's Financial Institutions

At the domestic level, and in accordance with international guidance, the Office of the Superintendent of Financial Institutions (OSFI) has identified six Canadian banks as D-SIBs,⁷ based on an assessment of such indicators as asset size, intra-financial claims and liabilities, their roles in domestic financial markets and in financial infrastructures, and supervisory knowledge.⁸ The Autorité des marchés financiers (AMF) has also identified Desjardins Group as systemically important for the province of Quebec, basing its assessment on similar factors, as well as on regional concentration.⁹ These designations will result in more intensive supervision, recovery and resolution planning requirements,

⁵ For more information, see BCBS (2012).

⁶ For more information on the application of these principles in Canada, see Bank of Canada (2012).

⁷ The six banks are Bank of Montreal, Bank of Nova Scotia, Canadian Imperial Bank of Commerce, National Bank of Canada, Royal Bank of Canada and Toronto-Dominion Bank.

⁸ OSFI March 2013 Advisory: Domestic Systemic Importance and Capital Targets—DTIs.

⁹ AMF Advisory June 2013: Avis relatif à la désignation du Mouvement Desjardins à titre d'institution financière d'importance systémique intérieure.

Box 4

How the United States Identifies Systemically Important Financial Institutions

The Financial Stability Oversight Council (FSOC), which is charged with coordinating the assessment of system-wide risk in the United States, has developed a set of assessment criteria to identify systemically important financial institutions (SIFIs) and place them under enhanced prudential supervision by the Federal Reserve Board. These assessment criteria make a distinction between bank holding companies (BHCs), non-bank financial companies (NBFCs) and financial market utilities (FMUs).

Bank holding companies

By law, the SIFI designation automatically applies to BHCs with \$50 billion or more in total consolidated assets. Firms with assets below this threshold may also be designated, based on considerations that include:

- the complexity of the institution's business activities (products and services);
- whether there are operations in multiple supervisory jurisdictions; and
- other implications for systemic risk to the financial system or the banking system.

Significant non-bank financial companies

The FSOC uses a three-stage process for assessing NBFCs to determine the systemic importance of firms that have total consolidated assets of \$50 billion or more and exceed at least one of five thresholds.¹ It assesses the loss given

¹ The five quantitative thresholds are: (i) \$30 billion in credit default swaps outstanding; (ii) \$3.5 billion in net derivatives liabilities; (iii) \$20 billion in total debt outstanding; (iv) a 15-to-1 leverage ratio; or (v) a 10 per cent short-term debt ratio.

default and the probability of default using a six-category analytic framework (size, interconnectedness, substitutability, leverage, liquidity risk and mismatch, and existing regulatory scrutiny) that is based on public and supervisory information. The FSOC will then follow up with any non-bank financial companies that are judged to merit further detailed evaluation. The final stage is designation. On 8 July 2013, the FSOC voted to designate two NBFCs as systemically important: American International Group (AIG) and General Electric Capital Corporation. Prudential Financial was designated on 20 September 2013 after it had unsuccessfully contested its potential designation.

Financial market utilities

The FSOC designates an FMU as systemically important if it determines that the FMU's disruption or failure could create significant liquidity or credit problems among financial institutions or markets. Four specific factors are considered:

- (i) the aggregate monetary value of transactions processed by the FMU;
- (ii) the aggregate exposure of the FMU to its counterparties;
- (iii) the relationship, interdependencies or other interactions of the FMU with other FMUs or payment, clearing or settlement activities; and
- (iv) the effect that the failure of or a disruption to the FMU would have on critical markets, financial institutions or the broader financial system.

Other factors that the FSOC deems appropriate may also be considered.

higher capital surcharges, and enhanced disclosure requirements.¹⁰ The 2013 federal budget also included a commitment to implement a bail-in regime for D-SIBs.

For an overview of how U.S. authorities have adapted all of these methodologies to assess the systemic importance of their domestic financial institutions, see **Box 4**.

Conclusion

The identification of systemically important financial institutions is a key step in efforts by regulators to end "too big to fail" and prevent future financial crises.

While regulators take different approaches in assessing systemic importance, all of them look beyond size to evaluate the importance of each institution for the financial system. These efforts can help regulators to develop more effective policy frameworks, which will be aided by future refinements in the techniques for assessing the methodologies.

¹⁰ A 1 per cent common equity surcharge has been applied by the federal and provincial regulators.

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Margining for Non-Centrally Cleared Over-the-Counter Derivatives

Nikil Chande, Stéphane Lavoie and Thomas Thorn

Introduction

Over-the-counter (OTC) derivatives markets are an important area in the reforms launched by the G-20 leaders in response to the global financial crisis.¹ Although the crisis did not originate in these markets, their size and interconnectedness and the opacity of their exposures served to amplify and spread the financial stress. The primary objective of the OTC derivatives reforms is to reduce systemic risk by strengthening these markets so that they can remain open in the face of severe shocks, thus limiting the risk of contagion from the failure of a large financial institution. The reforms also aim to make the network of exposures among participants in these markets more visible to authorities, and to improve transparency and protect against market abuse.

To achieve these objectives, the G-20 agreed that:²

- trades in OTC derivatives should be reported to trade repositories;
- all standardized OTC derivatives should be cleared through central counterparties (CCPs) and traded on organized trading platforms, where appropriate; and
- non-centrally cleared OTC derivatives should be subject to higher capital and margin requirements.

Higher capital and margin requirements for non-centrally cleared derivatives will help to reduce systemic risk while promoting the standardization of OTC derivatives and the use of CCPs.³

This report explains the margin requirements for non-centrally cleared derivatives developed by the Working Group on Margining Requirements (WGMR) and published in September 2013 (BCBS-IOSCO 2013a).⁴ These requirements balance the benefits of mitigating systemic risk against the costs of regulation, including the increased demand for collateral. Achieving this balance is important because, while derivatives are necessary for hedging risk exposures, they also pose risks that need to be properly managed. The report begins by describing the market for non-centrally cleared derivatives. It then discusses the framework for margining these derivatives and the likely effects on Canada and the global financial system. The report concludes by highlighting future work to be done in this area.

The Market for Non-Centrally Cleared OTC Derivatives

Although a key objective of the reforms is to encourage the clearing of OTC derivatives through CCPs, this will not always be possible. Some derivatives are not suitable for clearing because they are not sufficiently standardized or liquid enough to enable CCPs to price them reliably and manage their risks. In addition, some market

¹ For a recent update on the progress of the financial reforms, see the September 2013 letter from the Chair of the Financial Stability Board to the G-20 (FSB 2013a).

² The commitment to undertake the OTC derivatives reforms was first made in September 2009 (G-20 2009) and reaffirmed at subsequent G-20 summits. The FSB regularly provides updates on the progress in implementing the reforms (FSB 2013b). Wilkins and Woodman (2010) describe how these reforms can strengthen the infrastructure of OTC derivatives markets in Canada.

³ The benefits of CCPs in mitigating systemic risk are discussed in Chande, Labelle and Tuer (2010).

⁴ The WGMR was formed jointly by the Basel Committee on Banking Supervision and the International Organization of Securities Commissions. The WGMR's proposals were developed in consultation with the Committee on Payment and Settlement Systems and the Committee on the Global Financial System.

Table 1: Centrally cleared and non-centrally cleared over-the-counter derivatives markets for global market participants (notional value outstanding, billions of Canadian dollars, as of 30 June 2012)^a

	Interest rate	Foreign exchange	Credit	Equity	Commodity	Total
Centrally cleared	285,169	32	6,796	197	789	292,984
Non-centrally cleared	268,731	69,575	24,665	6,376	2,608	371,956
Total	553,900	69,608	31,462	6,573	3,396	664,939

a. Values are taken from the Working Group on Margining Requirements' second consultative document and converted using the Bank of Canada's midday euro/Canadian-dollar exchange rate on Friday 29 June 2012. Numbers may not add up to totals owing to rounding.

Table 2: Centrally cleared and non-centrally cleared over-the-counter derivatives markets for the six largest Canadian banks (notional value outstanding, billions of Canadian dollars, as of 30 April 2013)^a

	Interest rate	Foreign exchange and gold	Credit	Equity	Other	Total
Centrally cleared	6,084	2	2	1	2	6,091
Non-centrally cleared	6,857	3,743	145	315	121	11,181
Total	12,942	3,744	146	316	124	17,272

a. Values are calculated using data from major Canadian banks supplied by the Office of the Superintendent of Financial Institutions and adjusted for double counting using October 2010 data from the Canadian Market Infrastructure Committee. Numbers may not add up to totals owing to rounding.

participants (for example, certain corporate end-users) will not be required to clear their transactions, even in standardized instruments. Hence, while there is a strong push to increase central clearing, a portion of OTC derivatives will continue to be bilaterally traded.

The global market for OTC derivatives is enormous, with a total gross notional value outstanding of over Can\$729 trillion, of which approximately Can\$370 trillion is not centrally cleared.⁵ The Canadian OTC derivatives market is also significant, with over Can\$18 trillion in notional value outstanding, of which approximately Can\$11 trillion is not centrally cleared.⁶ The Canadian financial institutions involved in these transactions actively trade derivatives inside and outside of Canada. For instance, nearly 40 per cent of the notional value of OTC derivatives transactions by the six largest Canadian banks is booked outside of Canada, and many of the transactions booked domestically are with a foreign counterparty (Wilkins and Woodman 2010). **Table 1** and **Table 2** break down the notional value of centrally cleared and non-centrally cleared OTC derivatives markets by asset class.

Customized, non-centrally cleared derivatives play an important role in allowing firms to hedge specific risks.⁷ For example, a Canadian firm issuing Canadian-dollar debt to finance a new venture in another country might use a cross-currency swap to simultaneously hedge its

currency risk and interest rate risk. Accordingly, the goal of policy-makers is not to eliminate these products, but to ensure that their risks are properly managed.

The market for non-centrally cleared OTC derivatives is projected to contract as reforms are implemented. For example, based on survey responses, the non-centrally cleared OTC derivatives market is expected to decline to Can\$200 trillion in notional value outstanding globally (a reduction of approximately 45 per cent) and to around Can\$3 trillion in Canada (about a 65 per cent decline).⁸ The contraction will be driven by higher capital and margin requirements and the resulting incentives to centrally clear.⁹

The Margining Standards

Policy objectives

Margin requirements for non-centrally cleared derivatives have two main benefits: (i) a reduction of risk and (ii) the promotion of central clearing.¹⁰ Margin requirements aim to promote central clearing where feasible and, when clearing is not feasible, to reduce contagion and spillover effects by ensuring that collateral is available to offset losses caused by the default of a counterparty. The margining standards require the exchange of two types of margin that address related but distinct risks (**Figure 1**).

⁵ The total global figure as of June 2013 is from the Bank for International Settlements and converted using the Bank of Canada's closing Can\$/US\$ exchange rate for 28 June 2013. The size of the non-centrally cleared market as of April 2012 is based on the WGMR's quantitative impact study (BCBS-IOSCO 2013b).

⁶ Based on data from the Office of the Superintendent of Financial Institutions for major Canadian banks.

⁷ The International Swaps and Derivatives Association (2013) discusses the role played by non-centrally cleared OTC derivatives in the global economy.

⁸ These estimates are derived from Canadian responses to the WGMR's quantitative impact study, a summary of which has been made public in the WGMR's second consultative document (BCBS-IOSCO 2013b).

⁹ The Bank of Canada designated LCH.Clearnet's SwapClear as a systemically important CCP under the Payment Clearing and Settlement Act, effective 2 April 2013, making SwapClear subject to regulatory oversight by the Bank of Canada. The only Canadian clearing service for OTC derivatives is an OTC equity clearing service offered by the Canadian Derivatives Clearing Corporation.

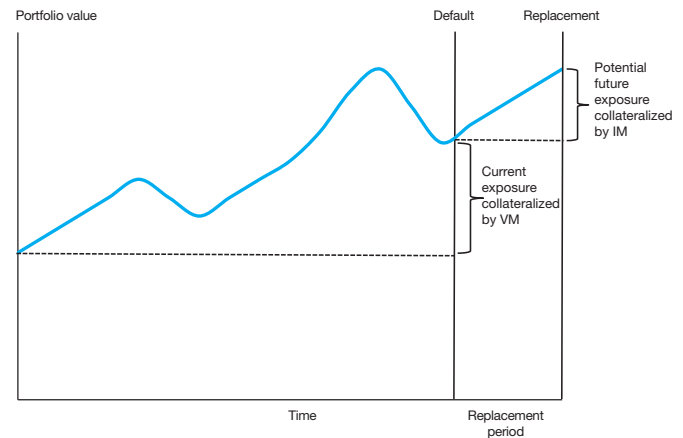
¹⁰ The Committee on the Global Financial System (2010) discusses the role of margin requirements in mitigating procyclicality and other issues pertaining to systemic risk.

(i) **Variation margin (VM).** As the mark-to-market value of a portfolio of derivatives transactions between two counterparties changes over time, one party's obligation to the other increases. As a result, the party whose portfolio has grown in value becomes exposed to potential losses in the event that its counterparty defaults. A regular and full exchange of VM between counterparties will compensate for these changes in net positions so that large uncollateralized exposures will not develop over time. If a default were to occur, the current exposure of the surviving firm would then be limited and would more likely be covered by the initial margin, even if there has been a significant move in the market.

(ii) **Initial margin (IM).** This second form of margin also provides protection against credit risk in the event that a counterparty defaults. Specifically, the surviving firm could face losses resulting from an increase in replacement costs from the time of default to the time when the positions with the defaulted counterparty are replaced or liquidated (Murphy 2013). The exchange of IM to cover this potential future exposure ensures that the defaulting firm has provided at least some collateral to help the surviving firm manage the costs associated with replacing trades.

Under the margining standards, VM will be fully adopted, whereas IM will be adopted with some limits. Requiring both VM and IM represents a shift from the scenario in which surviving firms fully absorbed losses from the default of a counterparty toward a regime in which the defaulter also pays. In a default situation, collateral provided by the defaulting firm is first used to cover losses. Further loss absorbency is then provided by capital from the surviving firm, since margin and capital work in a complementary manner.¹¹ Moving away from a purely “survivor-pay” model should reduce the moral hazard problem that can lead to excessive risk taking by better aligning incentives (Biais, Heider and Hoerova 2012). It also promotes more resilient markets, because a firm that has received collateral from its derivatives counterparties may feel less pressure to withdraw from trading in times of stress.¹² Finally, higher capital and margin requirements for non-centrally cleared derivatives will also provide incentives for the standardization of OTC derivatives and central clearing where possible.

Figure 1: How variation margin and initial margin manage the credit exposures of OTC derivatives



Key elements of the framework

Having covered the broad objectives, we now discuss the margin requirements in greater detail, specifically: (i) the entities that are affected; (ii) the instruments that need to be collateralized; (iii) the types of collateral that are permitted; and (iv) the process to introduce the requirements.

Under the framework, all financial firms and systemically important non-financial firms that trade non-centrally cleared OTC derivatives will be required to exchange VM and IM. Firms with only small amounts of derivatives activity are exempt from the requirements, as are sovereigns (Box 1). During the two public consultations undertaken by the WGMR, there was almost unanimous support for a requirement to exchange VM, but some parties raised concerns about a requirement to exchange IM.¹³ A number of elements in the final margining framework reflect efforts to strike a reasonable balance between safety and efficiency. VM requirements will apply broadly, whereas IM requirements will be phased in over time, will be required only above a minimum exposure and will not be required for certain foreign exchange (FX) derivatives.

Treatment of foreign exchange. Physically settled FX swaps and forwards, as well as the physically settled FX transactions associated with the exchange of principal for cross-currency swaps, have been exempted from IM requirements, although they are subject to VM requirements. This special treatment is motivated by a number of factors:

- **Replacement risk:** The risk that a counterparty defaults and leaves the surviving party to face replacement losses would typically be addressed by IM. However,

¹¹ Although not the subject of this report, the capitalization of OTC derivatives counterparty credit exposures is an important aspect of the reform. There are higher capital requirements for non-centrally cleared OTC derivatives transactions under Basel III; for centrally cleared transactions, the BCBS (2013a) is finalizing an approach to capitalizing exposures to CCPs. In related work, the BCBS (2013b) is developing a new methodology for capitalizing counterparty credit risk associated with derivatives transactions.

¹² The flip side is that, in times of stress, the party providing the collateral may be more hesitant to continue trading with a counterparty if it has concerns over that entity's creditworthiness and the strength of the collateral-segregation arrangements.

¹³ See, for example, a joint letter from the International Swaps and Derivatives Association, the Institute of International Finance, the Association for Financial Markets in Europe, and the Securities Industry and Financial Markets Association (2013).

Box 1

Margining and Sovereigns

Under the internationally agreed margining framework, central banks and sovereigns do not face mandatory margining requirements. Rather, these entities have the autonomy to decide the extent to which they will margin their over-the-counter (OTC) derivatives transactions. Historically, the agreements in place between sovereigns and their derivatives counterparties required either no exchange of margin or dealers to post variation margin (VM) to sovereigns, but not the reverse (i.e., “one-way” agreements) (OECD 2011). For both cost and risk considerations, a number of sovereigns, including the United Kingdom, Denmark and Sweden, have decided to move to a two-way exchange of VM.

The cost considerations arise from the dealer’s cost of funding collateral and the regulatory capital charges for uncollateralized OTC derivatives, both of which may be passed on to sovereigns through higher pricing. Under one-way agreements, if the value of a derivatives contract moves in favour of the dealer, the dealer receives no VM from the sovereign. However, the dealer would typically

have entered into an offsetting contract under a two-way collateral agreement with another counterparty. Since the offsetting contract would have moved in favour of the hedging counterparty, the dealer would need to provide collateral. The dealer’s cost of posting this collateral would typically be passed on to the sovereign. By entering into two-way agreements, sovereigns can eliminate this charge. Instead, the sovereign will have to fund the collateral it posts to the dealer, but it can typically do so at a lower cost. Similarly, the dealer’s regulatory capital charges are also significantly lower for two-way agreements.

Sovereigns and derivatives dealers that had previously not exchanged any VM could also realize risk-reduction benefits by moving to two-way agreements through lowering their uncollateralized exposures. Some sovereigns have also required dealers to post initial margin to mitigate the replacement costs they could face in the event of the default of a derivative’s counterparty.

since FX swaps and forwards tend to have short terms, the time frame for a potential default is also short. In addition, the market for FX swaps and forwards tends to be highly liquid, particularly for major currency pairs and shorter durations. Thus, if there were a default, the surviving entity would likely have access to a liquid market, enabling it to quickly enter into replacement contracts.

- **Cross-border funding:** Because FX swaps and forwards are important for foreign currency funding, the impact of imposing IM requirements on this core funding market is a consideration. This issue is particularly significant for small, open-market economies such as Canada.
- **Settlement risk:** Since these transactions involve the delivery of large payments in multiple currencies, they pose a high degree of settlement risk (the risk that one party will fail to deliver its currency after delivery by the other). Most FX swaps and forwards are already settled through the CLS Bank, an important global financial market infrastructure that mitigates FX settlement risk.
- **Regulatory arbitrage:** The margining framework does not require IM to cover the exchange of principal in cross-currency swaps. This exemption was also motivated by the important role played by cross-currency swaps in foreign currency funding and by the need

to be consistent with the exemption for physically settled FX forwards and swaps. To do otherwise would create incentives for regulatory arbitrage.

IM thresholds. IM will not have to be exchanged for potential future exposures below €50 million. This focuses margin exchange on larger exposures and reduces both the burden associated with margining small exposures and the number of firms that are subject to IM requirements. Globally, the IM threshold is expected to reduce the demand for collateral resulting from IM requirements by approximately 60 per cent.

IM rehypothecation. Under strict conditions that protect the customer’s rights in the collateral, the margining framework allows a one-time reuse of IM collateral, provided that it is segregated from other assets and is intended only for purposes of hedging a dealer’s derivatives position resulting from transactions with customers. There are no restrictions on the reuse of VM, since the exchange of VM essentially represents the settlement of the current profit or loss on derivatives positions between the parties.

Eligible collateral. Assets collected as collateral to cover VM and IM requirements must be liquid so that they can be sold reasonably quickly, if needed, and an appropriate haircut must be applied to reflect the potential decline in market value upon liquidation. Subject to these principles, the margining framework provides a broad, non-exhaustive list of eligible collateral, which includes cash, high-quality government and corporate

Box 2

The Macroeconomic Assessment Group on Derivatives

In February 2013, the chairs of the Financial Stability Board, the Committee on Payment and Settlement Systems, the International Organization of Securities Commissions, the Basel Committee on Banking Supervision, and the Committee on the Global Financial System commissioned a quantitative assessment of the macroeconomic impact of the proposed over-the-counter (OTC) derivatives reforms. The Macroeconomic Assessment Group on Derivatives (MAGD) sought to quantify the benefits and costs of the move to central clearing, the increased capital charges under Basel III and the minimum margin requirements established by the Working Group on Margin Requirements.

The MAGD concluded that improved management of counterparty risk would reduce the probability that derivatives markets would act as a propagation channel for financial shocks and trigger a financial crisis. The resulting reduction in the probability of a crisis would lead to an increase in

expected global GDP. This effect on GDP is partially offset by the costs of increased capital and collateral requirements and other costs of reform, which will increase funding and hedging costs. These costs vary considerably, depending on the amount of central clearing achieved, the netting efficiency obtained, and the costs of funding capital and collateral. Considering all of these factors, the estimated net benefit of the OTC derivatives reforms was between 0.09 per cent and 0.13 per cent of global GDP, with a central estimate of 0.12 per cent (equivalent to approximately US\$85 billion). A number of issues that the group could not quantitatively address (e.g., the effects of reforms on hedging practices, the size of the OTC derivatives market post-reform and the costs of indirect clearing) were discussed qualitatively in its report.

For further information, see BCBS (2013c).

securities, equities included in major stock indexes, and gold. The standards do not stipulate where this collateral must be held, but do require that it be readily available in the event of a default.

Phase-in period. IM requirements will be phased in gradually between 2015 and 2019, based on firms' notional exposures.¹⁴ This gives market participants time to access central clearing services, seek regulatory approval of their IM models for non-centrally cleared trades, renegotiate agreements with counterparties, and develop processes to post and collect margin. Only new trades with other phased-in counterparties will require IM, thus reducing the potential for a sudden large increase in the demand for collateral. Based on the WGMR's quantitative impact study, major Canadian banks are not expected to be captured in the first wave of the phase-in. The exchange of VM will be required for all trades entered into after 1 December 2015.

Quantitative Impact of the Margin Requirements

The WGMR worked with financial institutions around the world to perform a quantitative impact study (QIS) to estimate the demand for collateral stemming from the new margin requirements. The results were used to inform and calibrate a number of the elements in the margining framework. For example, the QIS results suggest that by exempting FX swaps and forwards from IM

requirements and introducing a €50 million IM threshold, the total amount of IM required globally would fall from approximately €1.7 trillion to €0.7 trillion.^{15,16}

While the margining framework includes measures that will reduce the impact on the demand for collateral, there will still be a significant need for more collateral, in addition to the increased demand arising from other regulatory initiatives. Nonetheless, studies suggest that, in aggregate, the expected rise in demand for collateral should be manageable. For further information, see Cruz Lopez, Mendes and Vikstedt (2013) and Committee on the Global Financial System (2013).

While a global shortage of collateral is not expected, market participants will have to bear the higher costs of funding the necessary collateral, as well as capital and other costs associated with the reforms. To develop additional insights into the overall impact of the derivatives reforms, a cost-benefit analysis was undertaken by the Macroeconomic Assessment Group on Derivatives (MAGD), which was asked to determine the net effect of the complete set of derivatives reforms on the global economy (Box 2). As part of its analysis, the MAGD estimated that the net increase in VM for OTC derivatives will be about €212 billion.¹⁷

¹⁴ When the average of a firm's aggregate month-end notional exposures for June, July and August exceed a "trigger" amount, the firm will be phased in as of 1 December that year. These triggers decline from €3 trillion in 2015 to €8 billion in 2019 and afterward.

¹⁵ The QIS suggests that IM requirements for Canadian institutions will total Can\$50 billion.

¹⁶ This estimate assumes that all firms receive approval to use an internal model to calculate IM requirements. The totals are substantially higher under the standardized IM requirements.

¹⁷ This estimate includes both centrally cleared and non-centrally cleared OTC derivatives. It assumes that 60 per cent of pre-reform bilateral transactions had VM, and is calculated using a 1-day, 99th-percentile value at risk.

Future Work

Now that there is global agreement on the framework for margining non-centrally cleared derivatives, authorities need to implement the rules in their own jurisdictions. In Canada, the Office of the Superintendent of Financial Institutions is planning to update its guidance for federally regulated financial institutions. Members of the Canadian Securities Administrators are also planning to draft a set of rules to bring provincial regulation into line with the new international norms.

Work will also continue at the international level. The Basel Committee on Banking Supervision and the International Organization of Securities Commissions will establish a group to monitor and evaluate (and potentially review) a number of aspects of the margining standards. The group will:

- examine the internal IM models used by firms, since a failure to properly calibrate the models could contribute to the procyclicality of margin requirements;
- evaluate whether the models permitted by different jurisdictions differ substantially;
- determine whether related work on capital requirements that is currently under way could have a bearing on the margining standards; and
- monitor the impact of specific aspects of the requirements, such as the exemption for physically settled FX transactions and the limited allowance for IM rehypothecation.

Work is also being undertaken by the industry to develop a standard internal model for determining IM requirements.

Conclusion

In response to the financial crisis, the G-20 committed to fundamentally reform the global financial system. Much progress has been made, including efforts to make derivatives markets more resilient to stress and reduce the potential for systemic risk. To accomplish these goals, authorities are promoting the use of central counterparties and trade repositories and setting minimum margin and capital requirements for OTC derivatives.

Both capital requirements and margin requirements for non-centrally cleared OTC derivatives play an important role because they create incentives to centrally clear trades and mitigate the systemic risks associated with those derivatives that do not migrate to CCPs. These risk-reduction benefits come at a cost, however, since margin requirements make transactions more expensive. In order to strike an appropriate balance, the global regulatory community consulted with industry in developing the margining requirements described in this report. These standards represent an important milestone in the reform of derivatives markets that will promote a balanced and consistent approach to the collateralization of risks in non-centrally cleared OTC derivatives exposures in Canada and abroad.

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The Residential Mortgage Market in Canada: A Primer

Allan Crawford, Césaire Meh and Jie Zhou

Introduction

The recent financial crisis illustrated how vulnerabilities emanating from residential mortgage markets can lead to financial instability and severe contractions in economic activity. These vulnerabilities built up in a number of countries before the crisis, with stretched housing valuations, an overbuild of housing and increasing household indebtedness. These imbalances were fuelled by mortgage-financing arrangements that permitted lending standards to become more lax and financing structures more fragile. When the ensuing growth in household debt proved to be unsustainable, losses on mortgages and securitized mortgage assets resulted in a marked deterioration in the condition of banks and the broader financial system.

In contrast, the Canadian household sector did not build up similar imbalances before the financial crisis, and Canada's mortgage market continued to function well through the crisis and the ensuing recession. Although the number of mortgages in arrears increased as the global economic slowdown spread to Canada, losses among Canadian lenders were relatively low compared with those of many of their international counterparts, and the flow of mortgages to creditworthy borrowers was sustained with the assistance of public liquidity support.

Since the crisis, the low interest rate environment has contributed to significant increases in mortgage debt in Canada. Because vulnerabilities are constantly evolving, authorities continue to closely monitor the financial situation of the household sector and the housing market, as well as the exposure of financial institutions to vulnerabilities in these areas.¹ Ongoing review of the arrangements for housing finance is also essential to ensure that they continue to support financial stability.

This report assesses how the Canadian regulatory and supervisory framework has helped to shape lending practices and contributed to the resilience of Canada's system of housing finance. Lessons from the crisis—and how they have guided changes in the policy framework to mitigate the risk of future instability—are also examined.

An Overview of Lenders and the Policy Framework

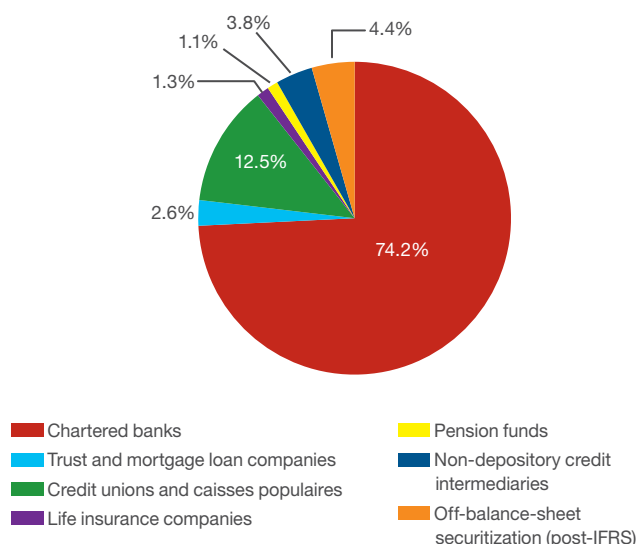
The system of housing finance in Canada is composed of three sets of institutions: mortgage originators, mortgage insurers and the suppliers of funding. We begin by discussing the interactions among these groups, as well as the role of the policy framework.²

The Canadian residential mortgage market is dominated by banks, which together hold approximately 75 per cent of the value of outstanding mortgages (Chart 1). In turn, bank lending is dominated by the five largest banks, which account for about 65 per cent of the total market. These large banks have diversified their lending across all the major regions of Canada. Non-bank holders of mortgage assets include trust and mortgage loan companies, credit unions and caisses populaires, life insurance companies, pension funds, and non-depository credit intermediaries. While these non-bank institutions have a lower market share than banks, some credit unions and caisses populaires account for a sizable proportion of the mortgages in regional markets.³

¹ An in-depth assessment of current vulnerabilities is beyond the scope of this article. The Bank's updated view is presented in each issue of the *Financial System Review*.

² See Traclet (2010) and Kiff, Mennill and Paulin (2010) for previous discussions of Canada's housing finance system.

³ For example, caisses populaires accounted for about 40 per cent of Quebec's mortgage market in 2012.

Chart 1: Residential mortgages outstanding, by funder, as of 2013Q2

Note: Off-balance-sheet securitization represents National Housing Act Mortgage-Backed Securities and private securitization that are considered to be off the balance sheet under the International Financial Reporting Standards.

Source: Bank of Canada

Impact of the policy framework on residential mortgage lending

The regulatory and supervisory framework has a strong impact on the underwriting standards of lenders and the types of mortgage products available in Canada. About 80 per cent of mortgages are originated by lenders that are federally regulated by the Office of the Superintendent of Financial Institutions (OSFI). This total includes all banks and some non-banks.⁴ Many of the other institutions that issue mortgages—including credit unions and caisses populaires—are provincially regulated. Over the past decade, the market share of the remaining unregulated mortgage lenders is estimated to have been relatively stable at almost 5 per cent. The unregulated sector includes a number of non-depository credit intermediaries and some of the off-balance-sheet securitization shown in **Chart 1**.

The federal policy framework has two major components. First, in addition to capital and other regulatory requirements, all federally regulated lenders are subject to OSFI's principles-based supervision, which focuses on the institution's risks and the quality of its risk management. A critical element of this approach is the use of supervisory "guidelines," which establish principles that are to be applied by financial institutions. The principles-based strategy is more adaptable to changes

in market conditions and is less susceptible to regulatory arbitrage than a rules-based approach.⁵

In June 2012, OSFI issued "Guideline B-20," which outlines fundamental principles that federally regulated lenders are expected to follow for their mortgage-underwriting activities.⁶ The new guideline complements previous supervisory arrangements and provisions in the formal legislation governing the activities of lenders. Rather than relying unduly on the collateral value of the housing asset, the guideline indicates that the primary basis for a loan decision should be the borrower's demonstrated willingness and capacity to make debt payments on a timely basis (OSFI 2012). It incorporates a number of other principles as well, including the requirement for each lender to adopt practices ensuring effective risk management and oversight.

The second key feature of the federal policy framework is the legal requirement for federally regulated lenders to insure "high-ratio" mortgages, defined as mortgages with a loan-to-value (LTV) ratio that is over 80 per cent. This insurance is backed by an explicit guarantee provided by the federal government (**Box 1**). In addition to offering protection to the lender in the event of borrower default, the insurance program acts as an important policy lever for controlling risk, since characteristics of the mortgage and of the borrower must satisfy minimum underwriting standards to qualify for the insurance. Between 2008 and 2012, the government tightened these qualifying rules on four occasions to support the long-term stability of the mortgage and housing markets. With these changes, the current insurance rules for new high-ratio mortgages:⁷

- (i) set a maximum amortization period of 25 years and a maximum LTV ratio of 95 per cent for new purchases;^{8, 9}
- (ii) restrict the maximum LTV ratio for mortgage refinancing and purchases of investment (non-owner-occupied) properties to 80 per cent (compared with 95 per cent previously);

⁵ See Northcott, Paulin and White (2009) for further discussion of OSFI's approach to supervision and regulation.

⁶ Guideline B-20 builds on the Financial Stability Board's Principles for Sound Residential Mortgage Underwriting Practices, which were published in 2012. It applies to all loans secured by residential property (including home-equity lines of credit) and to all activities related to both mortgage underwriting and the acquisition of residential mortgage loan assets.

⁷ See Bank of Canada (2012, Box 2) for a complete list of the changes and their timing.

⁸ In these cases, the tightening of qualifying rules reversed changes that had been introduced by mortgage insurers in 2006, which (i) lengthened the maximum amortization period from 25 to 40 years and (ii) raised the maximum LTV ratio to 100 per cent for some borrowers. For a mortgage with a 25-year amortization, a credit score of at least 680 was needed to qualify for a 100 per cent LTV ratio.

⁹ Some uninsured (low-ratio) mortgages have a 30-year amortization period.

⁴ Federally regulated non-bank institutions include most trust and mortgage loan companies and life insurance companies, as well as some non-depository credit intermediaries.

Box 1

Residential Mortgage Insurance in Canada

Federally regulated lenders and most provincially regulated financial institutions are required by law to purchase insurance for mortgages that exceed 80 per cent of the value of the residential property (i.e., with a down payment that is less than 20 per cent of the purchase price). Premiums are determined by the insurers and vary with the LTV ratio of the mortgage. The cost of the premium is typically passed on to the borrower. Subject to allocation limits, lenders can also purchase insurance for portfolios of previously uninsured low-ratio mortgages.

Approved mortgage insurers are designated by the Minister of Finance after consulting with the Office of the Superintendent of Financial Institutions (OSFI). The largest insurer, Canada Mortgage and Housing Corporation (CMHC), is a federal government agency that is operated on a commercial basis. Under legislation enacted in 2012, OSFI is responsible for supervising CMHC's mortgage-insurance and

securitization programs.¹ CMHC-insured mortgages have an explicit government guarantee that provides 100 per cent coverage on net claims by the lender in the event of the insurer's insolvency. Two private insurers, which account for about 25 per cent of outstanding mortgage insurance, are regulated and supervised by OSFI. Since a lender holding government-backed insured mortgages benefits from the zero risk weight of these mortgages for bank capital purposes, the obligations of private insurers also have a government guarantee (covering 90 per cent of the original mortgage) to enable them to compete with CMHC. Private insurers pay a premium to the government for these guarantees.

The total value of mortgage insurance from both public and private insurers must not exceed maximum amounts set by the federal government. Currently, the limits are \$600 billion for CMHC-insured mortgages and \$300 billion for private mortgage insurers.

¹ Previously, OSFI monitored CMHC activities under less formal arrangements.

- (iii) establish maximum gross and total debt-service ratios (DSRs) of 39 per cent and 44 per cent, respectively;¹⁰ and
- (iv) require borrowers to satisfy these debt-service criteria using the greater of the contract rate or the posted rate for a 5-year fixed-rate mortgage if they select a variable-rate mortgage or a term that is less than five years.

In addition, borrowers must have a credit score that is above a specified minimum level to qualify for insurance. Loan-documentation standards for property valuations and income were also strengthened as part of the rule changes in 2008.

The supervisory framework and minimum qualifying standards for mortgage insurance have supported the resilience of the Canadian mortgage market. Depending on their underwriting policies, mortgage insurers may also apply more-stringent requirements than the minimum standards.¹¹ The effectiveness of the policy framework is explored further in a later section.

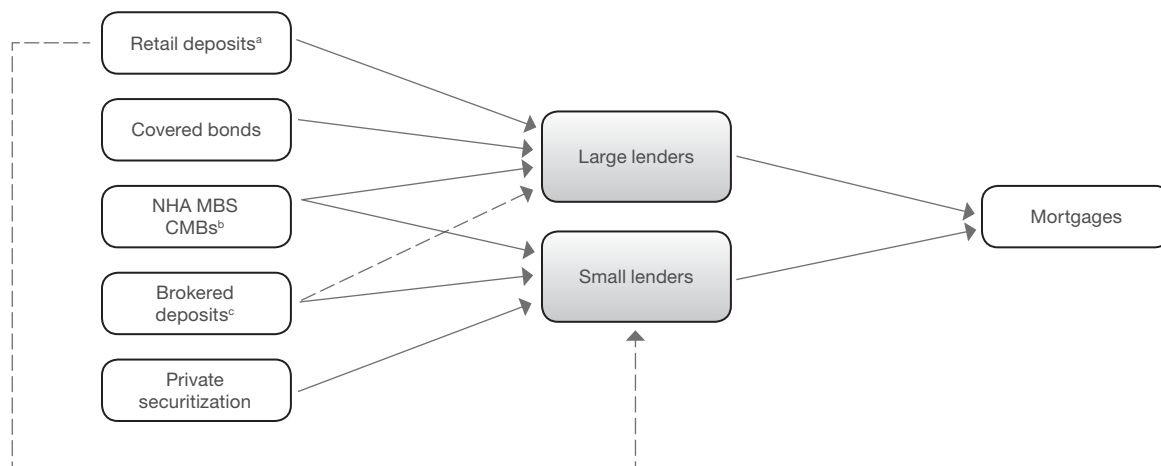
Other characteristics of mortgage products

The most common mortgage in Canada has a fixed interest rate for a 5-year term, although there is a range of alternative mortgage products. Over 95 per cent of mortgages have a term of between six months and five years, and approximately one-third of outstanding mortgages have a variable interest rate. Since the standard amortization period is 25 years, borrowers are exposed to the risk of higher interest rates at renewal.

Kiff, Mennill and Paulin (2010) suggest that the infrequency of mortgages with terms beyond five years reflects a number of factors. Retail deposits are an important funding source for many lenders, and only deposits with maturities of up to five years qualify for deposit insurance. To secure deposits at longer horizons, lenders must offer higher rates, and the higher funding costs are passed on as higher borrowing rates for longer-term mortgages. Mortgage rates at terms longer than five years will also be higher to compensate lenders for prepayment risk, since federal law allows borrowers to prepay these mortgages after five years with a penalty of only three months of interest. The frequency of longer-term mortgages is also constrained by the desire of lenders to limit maturity mismatches between assets and liabilities.

¹⁰ The gross DSR is the ratio of the carrying costs of the home (mortgage payments, property taxes and heating costs) to the borrower's income. The total DSR includes these housing-related expenses and all other debt obligations.

¹¹ For example, the Canada Mortgage and Housing Corporation imposes a lower maximum DSR for borrowers with credit scores below 680 (CMHC 2012a, Figure 2-3).

Figure 1: Funding of mortgages, by lender type

a. Small lenders with branch networks may also rely on retail deposits.

b. NHA MBS = National Housing Act Mortgage-Backed Securities; CMBs = Canada Mortgage Bonds

c. Large lenders rely on brokered deposits much less than small lenders.

Financing Mortgage Lending

Mortgage lenders rely on a variety of funding sources, including conventional retail deposits and capital market instruments, such as covered bonds and securitizations (Figure 1).¹² Mortgage securitization is the process by which financial institutions package mortgages and sell them to investors as mortgage-backed securities (MBS), thereby allowing lenders to access funding for new loans.

Traditionally, Canadian deposit-taking institutions have relied primarily on retail deposits to fund mortgages. Many of these deposits are insured by the Canada Deposit Insurance Corporation, making them a stable and cost-effective source of funding.¹³

Mortgage securitization has nonetheless grown in importance in Canada over the past two decades, primarily through two programs offered by the Canada Mortgage and Housing Corporation (CMHC): National Housing Act Mortgage-Backed Securities (NHA MBS) and Canada Mortgage Bonds (CMBs) (Box 2).¹⁴ NHA MBS funding reached 20 per cent of outstanding residential mortgages just before the global financial crisis (Chart 2). Issuance grew strongly between 2008 and 2010, partly in response to the Insured Mortgage Purchase Program (IMPP), which provided mortgage lenders with an addi-

tional source of liquidity during the crisis.¹⁵ Although the IMPP was discontinued in 2010, the stock of NHA MBS has continued to grow in absolute size and currently accounts for about 34 per cent of residential mortgages.

Small lenders generally have fewer options for funding mortgages than large banks and have increasingly relied on CMHC's securitization programs (see Box 2 in the "Key Risks" section on page 22). According to CMHC, the share of CMB issuance by participants other than the six largest banks increased from 19 per cent to 51 per cent between 2006 and 2013Q1–Q3. In addition to NHA MBS and CMBs, many smaller lenders obtain significant funding from brokered deposits.¹⁶ While this source of financing has increased competition in the mortgage market, the business model is potentially vulnerable to shifts in the availability of brokered deposits, which are a less-stable source of funding than retail deposits.

Some lenders also obtain funding through private mortgage securitization (e.g., MBS and asset-backed commercial paper (ABCP)). Private securitization peaked at 5 per cent of outstanding mortgages in 2000, but largely disappeared following the crisis (Chart 2).

¹² Covered bonds currently represent only 5.5 per cent of total residential mortgages outstanding.

¹³ Indeed, rates on 5-year guaranteed investment certificates (GICs) have generally been lower than the rates on 5-year Government of Canada bonds.

¹⁴ See Gravelle, Grieder and Lavoie (2013) for further discussion of mortgage securitization in Canada.

¹⁵ Under the IMPP, the federal government purchased NHA MBS from Canadian financial institutions.

¹⁶ Brokered deposits are acquired by deposit-taking institutions through broker-dealers and wealth managers that represent investment clients seeking a higher return on their deposits.

Box 2

Canada Mortgage and Housing Corporation Securitization

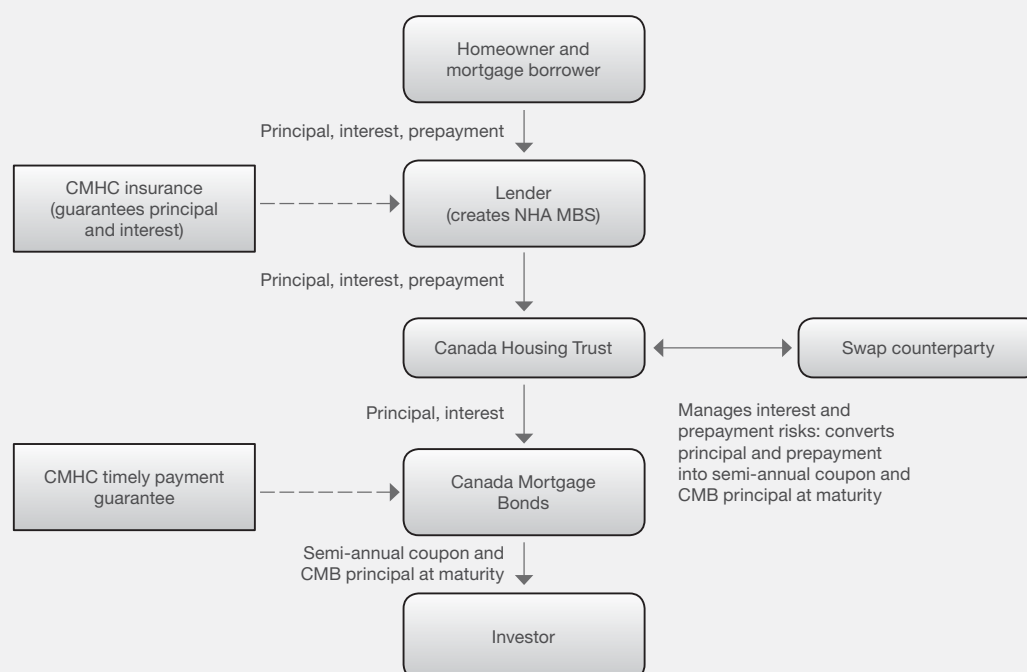
The Canada Mortgage and Housing Corporation (CMHC) has two securitization programs to provide cost-efficient funding sources to Canadian mortgage lenders: National Housing Act Mortgage-Backed Securities (NHA MBS), introduced in 1986, and Canada Mortgage Bonds (CMBs), introduced in 2001 (**Figure 2-A**).

NHA MBS are securities backed by pools of residential mortgages insured either by CMHC or private insurers. High-ratio mortgages and low-ratio mortgages (insured through either portfolio insurance or on a transactional basis) are eligible for the pools. NHA MBS investors benefit from an explicit guarantee (through CMHC) by the Government of Canada, since the underlying mortgages are insured against default by the borrower. There is also a government guarantee of timely payment of interest and principal for NHA MBS pools. Despite these protections, NHA MBS investors are subject to prepayment risk, since their cash flows are reduced if borrowers make full or partial prepayments on their mortgages. Under the CMB program, financial institutions may sell the NHA MBS to capital market investors or to the Canada Housing Trust.

Canada Mortgage Bonds (CMBs) are issued by the Canada Housing Trust, a special-purpose trust created by CMHC to sell these bonds to investors and use the proceeds to buy NHA MBS. The CMB program enhances the NHA MBS program because CMBs are structured to eliminate prepayment risk. Specifically, the interest rate risk and prepayment risk inherent in the underlying mortgages are managed through swap transactions and investments in permitted securities. The low risk and investor-friendly structure of CMBs attract a broad investor base in Canada and abroad. More than 70 per cent of CMBs have been held by banks, insurance companies and pension funds in recent years.

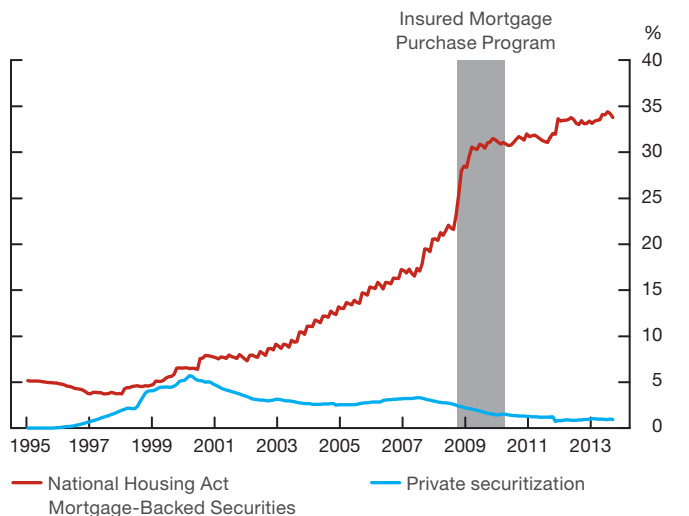
Portfolio insurance was used extensively by mortgage lenders during the financial crisis to obtain funding through CMHC programs. It has also been used for other purposes, such as liquidity and capital management. To restore government-backed mortgage insurance to its original purpose of funding mortgages, the 2013 federal budget announced plans to limit the use of portfolio insurance to mortgages that will be used in CMHC securitization programs, and to eliminate the use of any government-backed insured mortgages as collateral in securitization vehicles that are not sponsored by CMHC.

Figure 2-A: The NHA MBS and CMB securitization process



Note: NHA MBS = National Housing Act Mortgage-Backed Securities; CMB = Canada Mortgage Bond
Source: Adapted from Chapman, Lavoie and Schembri (2011)

Chart 2: Mortgage securitization in Canada as a percentage of total residential mortgages



Sources: Bank of Canada and CMHC Last observation: September 2013

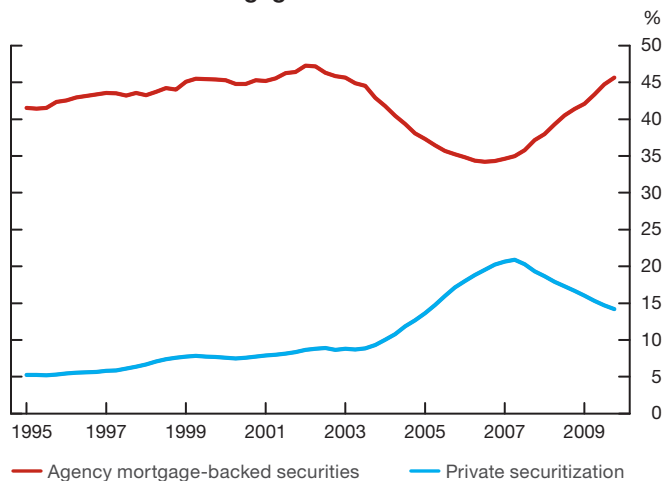
Although total mortgage securitization in Canada has risen to 35 per cent of outstanding residential mortgages since the crisis, it remains below the 60 per cent rate of securitization in the United States.¹⁷

Incentives and underwriting standards

The deterioration of underwriting standards in the United States in the years preceding its housing crisis, which occurred partly in response to incentives created by the type of securitization that was permitted, contributed significantly to the onset and spread of the housing crisis.¹⁸ It is thus useful to compare these features of the pre-crisis United States to those in Canada. While government guarantees in both countries help to channel financing into the housing market, there are important differences in the institutional arrangements surrounding those guarantees.

Government-sponsored enterprises (GSEs, such as Fannie Mae and Freddie Mac) have traditionally accounted for the majority of U.S. mortgage securitization (Chart 3). Until they came under government conservatorship during the crisis, GSEs were operated

Chart 3: U.S. mortgage securitization as a percentage of total residential mortgages



Note: Agency MBS in the United States refers to MBS insured or guaranteed by Fannie Mae, Freddie Mac and Ginnie Mae.

Source: U.S. Federal Reserve Board Last observation: December 2009

for private profit but benefited from an implicit guarantee by the U.S. government. However, since it was only an implicit guarantee, GSEs faced little supervision, and could therefore engage in riskier activities and operate with lower screening standards. Moreover, consistent with the goal of U.S. federal policy to increase the rate of home ownership, Fannie Mae and Freddie Mac were required to support mortgages to low-income borrowers in specific geographic areas, as well as to other high-risk groups (CMHC 2013; Rajan 2010). According to Calabria (2011), about 30 per cent of the loans purchased by GSEs were categorized as subprime in 2006, and GSEs purchased almost 40 per cent of the newly issued subprime MBS. In contrast, CMHC benefits from an explicit guarantee and is therefore subject to a stronger supervisory framework, which promotes prudent business practices.¹⁹ For example, all NHA MBS issuers must be approved by CMHC based on eligibility criteria. This additional level of scrutiny of the risk-management practices of issuers complements the supervision of prudential regulators. Moreover, since NHA MBS issuers continue to be responsible for servicing the mortgages backing NHA MBS, they have an incentive to engage in prudent lending.

The differences in incentives were even greater in private (sometimes referred to as “private-label”) securitization markets. Between 2003 and 2007, the market share of private securitization in the United States increased from around 10 per cent of outstanding residential mortgages to nearly 21 per cent (Chart 3), whereas private

¹⁷ Bordo, Redish and Rockoff (2011) argue that the regionally fragmented U.S. banking system—including the lack of national branch-banking networks with a stable deposit base—has traditionally made U.S. mortgage lenders more reliant on capital market funding (including securitization) than on retail deposits. The depth of the long-term capital market and the involvement of the U.S. government in the housing market help to explain the existence of 30-year fixed-rate mortgages in the United States. Government-sponsored enterprises (GSEs) purchase these mortgages and provide a guarantee to the MBS that they issue. The terms of securitization in the United States can be as long as 30 years, while most NHA MBS in Canada are issued for a term of five years or less. Deeper capital markets and government guarantees allow GSEs to fund these long-term mortgages.

¹⁸ See Traclet (2010), BCBS (2011) and Keys et al. (2010) for further discussion of the contribution of securitization to the global financial crisis.

¹⁹ As privately owned companies, Fannie Mae and Freddie Mac strive to maximize shareholder returns. In contrast, CMHC does not seek to maximize profit through its activities, but rather to generate a return that is consistent with its overall mandate. All of these returns accrue to the Government of Canada.

securitization in Canada was small both before and after the crisis. Lightly regulated U.S. originators, such as mortgage brokers, accounted for a large share of private securitization. Since these lightly regulated lenders followed an “originate-to-distribute” model, in which the securitized assets were moved off their balance sheets, the incentives for rigorous screening and monitoring practices were reduced (BCBS 2011). These brokers contributed much of the growth in U.S. subprime mortgages.²⁰ However, mortgages arranged through the broker channel in Canada are generally insured and/or issued by federally regulated financial institutions, which ensures that most of these mortgages are subject to the underwriting standards for mortgage insurance and OSFI’s Guideline B-20.

In summary, compared with the United States, Canada’s securitization market was subject to a stronger policy framework that underpinned the quality of the underlying mortgage assets.

Mortgage Outcomes

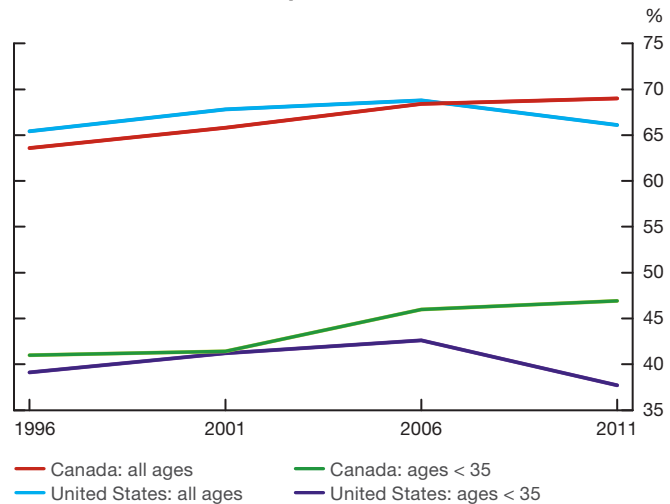
The discussion so far has considered how minimum lending standards and funding conditions are affected by public sector policies. To provide a broader perspective, this section examines actual mortgage outcomes, including the types of households that are able to access mortgage credit. Stylized facts on the balance sheets of mortgage holders provide additional insight as to how the policy and legal frameworks affect mortgage outcomes and the vulnerability of these households to adverse shocks.

Access to mortgage credit

The rate of home ownership in Canada has risen since the early 1990s and, by 2006, was approaching the level in the United States (Chart 4). More recently, the Canadian rate continued to edge up, while the U.S. rate declined as the household sector experienced significant stress following the onset of the crisis.

The high rate of home ownership suggests that Canadian households have relatively broad-based access to mortgage credit. Indeed, aggregate measures of household indebtedness have risen to levels that are relatively close to the U.S. peak before the crisis.²¹ These observations raise the question of whether the gains in home ownership were obtained at the cost of an easing in underwriting standards that increased the riskiness of borrowers. To address this issue, it is par-

Chart 4: Home-ownership rates



Sources: U.S. Census Bureau, CPS/HVS and Statistics Canada

Last observation: 2011

ticularly informative to consider the situation of households headed by individuals younger than 35 years old, since this group accounts for a sizable share of first-time homebuyers. Home ownership has risen noticeably for this age group since 2001 (Chart 4), but most of the increase occurred among higher-income households, which tend to be less risky.^{22, 23}

Another indicator of riskiness is the distribution of credit scores for new borrowers.²⁴ According to CMHC data for insured high-ratio mortgages, the distribution was stable until 2008 and then shifted toward households with higher credit scores (Chart 5). Relatively few borrowers had scores below 600, and insured loans in this range were eliminated following the tightening of mortgage insurance rules in 2008. Equifax data, which cover both insured and uninsured mortgages, show that 4 per cent of mortgage holders had a current credit score of 600 or less in 2013. While credit scores and loan performance will deteriorate for some borrowers in the event of worsening economic conditions, the distribution of

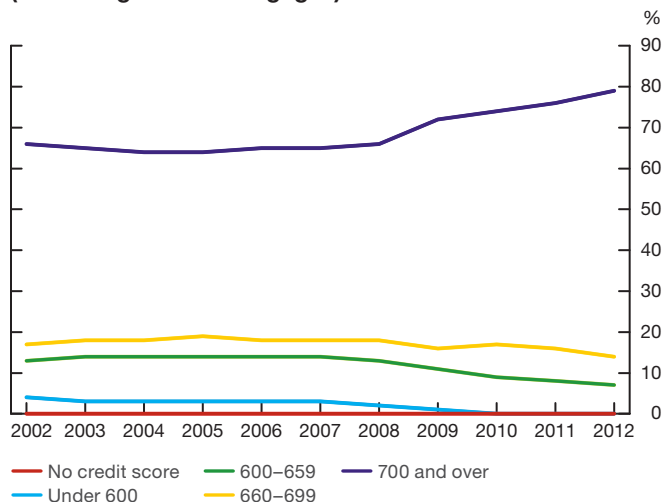
²⁰ In 2005, approximately 65 per cent of U.S. subprime mortgages were originated by independent mortgage brokers (Berndt, Hollifield and Sandås 2010).

²¹ Measured on a comparable basis, the ratio of household debt to disposable income is currently 152 per cent in Canada, compared with a peak of about 165 per cent in the United States. See Bank of Canada (2012, Box 1) for an explanation of the adjustments required to construct comparable series.

²² Between 2001 and 2011, the increase in the home-ownership rate for the top two income quintiles was double the increase for the bottom two quintiles.

²³ In the United States, the rate of home ownership was supported by laws promoting mortgage lending to low-income households (Rajan 2010).

²⁴ Credit-reporting agencies in Canada use a scale from 300 to 900 to represent the distribution of credit scores across different households. The distribution is constructed by identifying how the likelihood of delinquency varies with the characteristics of borrowers and then assigning 3-digit credit scores to the various levels of delinquency. Higher credit scores indicate lower credit risk. U.S. credit-rating agencies follow a similar procedure. However, since the mapping between expected delinquency rates and the credit score is different in the two countries, specific numerical levels of Canadian and U.S. credit scores are not directly comparable.

Chart 5: Distribution of credit scores at origination (CMHC high-ratio mortgages)

Sources: CMHC (2012a, b)

Last observation: December 2012

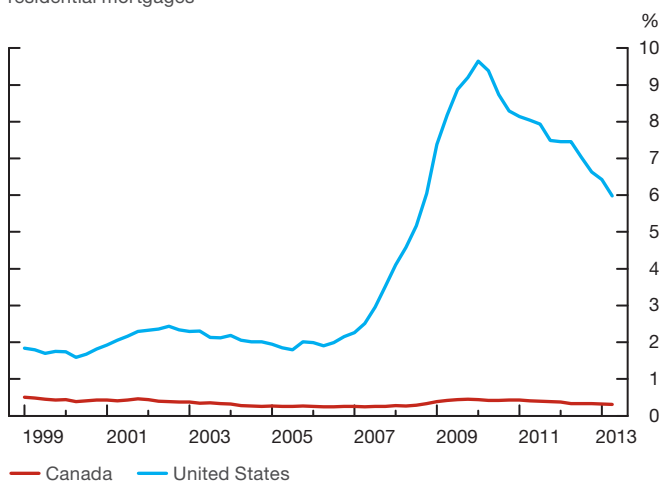
scores at origination tends to be an important predictor of the overall performance of mortgage portfolios under such conditions.²⁵

A third set of indicators focuses more closely on households that are riskier than “prime” borrowers. Although no standard international definition exists, “non-prime” or “non-conforming” borrowers are generally characterized as having weaker documentation of income (i.e., are classified as Alt-A), less capacity to make debt payments or an imperfect credit history. There is a continuum of risk for non-prime loans, ranging from Alt-A and near-prime to the highest-risk subprime segment. CIBC (2012) estimates that total non-prime loans represented about 7 per cent of outstanding mortgages in Canada in 2012. This share is up marginally from 5 per cent in 2005, but it is significantly below the estimated pre-crisis level of about 20 per cent in the United States. In addition to the non-prime market being smaller in Canada, the risky non-traditional products offered in the United States (e.g., negative amortization and interest-only mortgages) are either unavailable or are very limited in Canada.

The expansion in the U.S. subprime market was a significant factor underlying the sharp increase in mortgage arrears in the United States since 2007.²⁶ However, the overall arrears rate has also been consistently lower in Canada than in the United States before, during and

Chart 6: Mortgage arrears

Mortgages in arrears 90 days or more, as a percentage of total residential mortgages



Sources: U.S. Mortgage Bankers Association and Canadian Bankers Association

Last observation: 2013Q2

after the financial crisis (Chart 6), suggesting that a broader set of institutional features has contributed to historical differences in mortgage loan performance.

Overall, these measures suggest that underwriting standards were higher in Canada than in the United States before the crisis. In more recent years, standards have strengthened in both countries.²⁷

Balance sheets of households with mortgages

Increases in mortgage arrears are closely related to loss of employment and income, which leaves households unable to meet debt payments. All else being equal, the higher the debt-service burden of households, the more vulnerable they are to adverse shocks (such as a period of unemployment). As shown in Chart 7, most homeowners with an outstanding mortgage have a debt-service ratio (DSR) for their mortgage payments that is well below the maximum gross DSR for new high-ratio mortgages. The distribution of the DSR (and therefore the vulnerability of the household sector to shocks) is also affected by other institutional and behavioural factors that determine how quickly households pay down their debt.

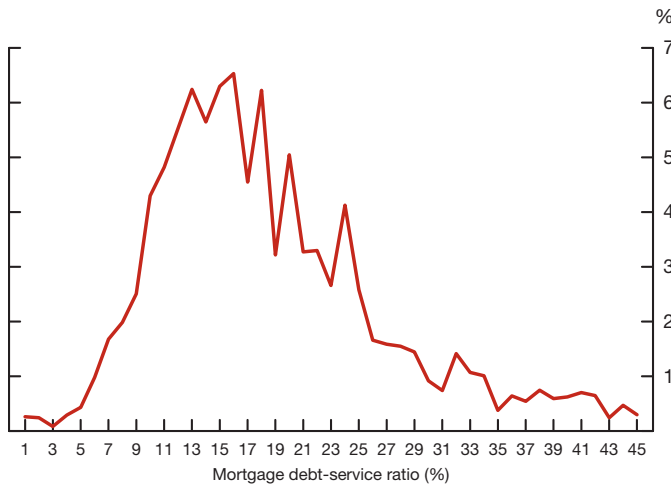
In this respect, it is interesting to note that the percentage of homeowners with a mortgage decreases more rapidly with age in Canada than in the United States (Chart 8), which suggests that the incentive to pay down debt is stronger in Canada. A common explanation is that mortgage interest payments are not tax deductible in Canada, unlike in the United States. Another potential factor is that

²⁵ Elul et al. (2010) show that U.S. mortgage defaults depend on a range of factors, including the credit score at origination, the LTV ratio, the credit card utilization rate and the change in the unemployment rate.

²⁶ Mayer, Pence and Sherlund (2009) document the rapid increase in originations of U.S. subprime and Alt-A loans between 2003 and 2006.

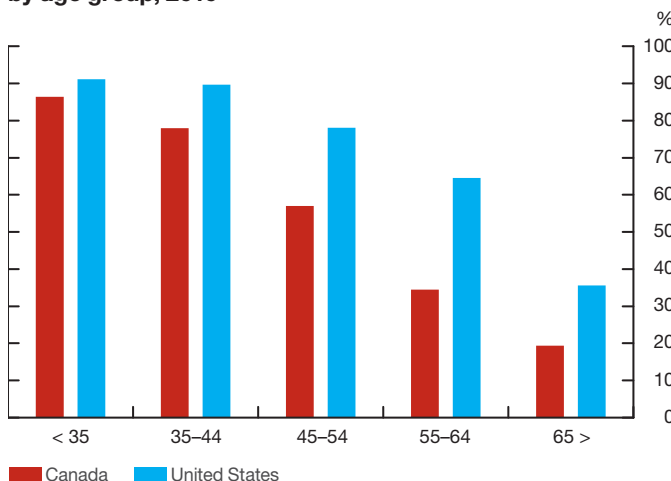
²⁷ Since 2008, there has been a sharp decline in the proportion of U.S. first-time mortgage borrowers with low credit scores (Duke 2013).

Chart 7: Distribution of mortgage debt-service ratio for mortgage holders, 2012



Source: Canadian Financial Monitor

Chart 8: Percentage of homeowners with a mortgage, by age group, 2010



Sources: Survey of Consumer Finances and Canadian Financial Monitor

almost all mortgages in Canada have recourse provisions, whereas some U.S. states have non-recourse laws.²⁸ This legal difference provides a greater incentive for Canadian households to reduce their mortgage principal. Consistent with these incentives, the effective

amortization period in Canada is often shortened by households making additional payments.²⁹

An elevated DSR also heightens the risk that a sharp increase in interest rates will impair the ability of some households to service their mortgages. Mortgage insurance rules mitigate this risk, since borrowers selecting a variable-rate mortgage (or a fixed term that is shorter than five years) must satisfy the qualifying limits for DSRs using the greater of the contract rate and the posted 5-year fixed rate. This requirement provides a significant cushion, since the qualifying rate has averaged between 200 and 250 basis points above the prevailing variable rate in recent years.³⁰ Nonetheless, during this period of historically low interest rates, these qualifying limits likely understate the interest cost over the full amortization period. Interest rate risk is also mitigated by adjustments in borrower behaviour. As the spread between the cost of variable-rate and 5-year fixed-term mortgages narrows (e.g., owing to expectations of future increases in rates and changes in the slope of the yield curve), Canadian households tend to lock in their borrowing costs by switching from variable to fixed interest rates or by lengthening the term of fixed-rate mortgages at renewal.³¹

The LTV ratio is another important balance-sheet measure, since a decrease in house prices may cause some households to enter a negative equity position. The most vulnerable households would be recent homebuyers with high LTV ratios at origination, since they have had little time to pay down the mortgage principal.³² Legal conditions also affect the vulnerability of the financial system to changes in house prices. Non-recourse laws in some U.S. states have led to “strategic defaults” by households, even though they had the income to make payments (Ghent and Kudlyak 2011). In contrast, the standard full recourse provision for Canadian mortgages significantly reduces the incentive for households with negative housing equity to default, which implies lower direct risk to the financial system from a potential correction in house prices. However, such a correction could still have indirect effects on

²⁸ Recourse allows lenders to seek repayment from income and non-housing assets of the defaulting borrower if proceeds from the sale of the house do not cover the outstanding mortgage balance and interest payments. Other than the revenue from the sale of the property, there is generally no legal recourse for mortgages with either high or low LTV ratios in Saskatchewan, or for mortgages with low LTV ratios in Alberta.

²⁹ According to a survey reported in CAAMP (2013), about one-third of mortgage holders either voluntarily increased their regular payments or made additional lump-sum payments during the previous year. The shorter amortization period in Canada (25 years, compared with 30 years in the United States) will also contribute to faster repayment of the mortgage principal.

³⁰ This difference reflects two factors: (i) interest rates typically increase for longer terms; and (ii) the qualifying interest rate is based on the posted 5-year rate, rather than the actual 5-year rate, which often includes a significant discount from the posted rate.

³¹ Since households are generally unable to lock into a fixed-rate mortgage for more than five years, this behaviour does not eliminate interest rate risk for later renewals.

³² In 2012, 13 per cent of outstanding insured high-ratio mortgages had an LTV ratio greater than 90 per cent, based on current house prices (CMHC 2012b).

lenders, since economic conditions could deteriorate if a significant percentage of households reduce their spending in an attempt to restore their wealth positions.

Conclusion

Canada's policy framework for the residential mortgage market, which includes an effective regulatory and supervisory regime that applies to most lenders, contributed to the relatively good performance of Canada's system of housing finance during the recent financial crisis. Underwriting standards were maintained for loan originations, and incentives affecting mortgage securitization were better structured than in some other countries. Other provisions, such as recourse laws and the non-deductibility of mortgage interest payments, also reduced financial system vulnerabilities by providing incentives for households to pay down their debt and build equity. Looking forward, these factors will increase the resilience of both the financial system and the housing market in Canada in the face of adverse economic or financial shocks.

Nevertheless, the global financial crisis revealed the high economic costs that can arise from instability in the mortgage and housing markets, and highlighted

the importance of maintaining well-designed lending practices and policy frameworks to mitigate this risk. These lessons have led Canadian authorities to take a number of steps to enhance the resilience of these markets. The minimum standards for government-backed mortgage insurance have been progressively tightened, and OSFI's new B-20 supervisory guideline will help to ensure that lenders follow effective underwriting and risk-management practices. Legislative changes in 2012 enhanced the governance and oversight of CMHC in various areas, including through the addition of the formal objective of ensuring that its insurance and securitization activities contribute to the stability of the financial system and the housing market (CMHC 2012a).

The global financial crisis also demonstrated the need for ongoing monitoring by authorities to ensure that the housing finance system is not itself a source of instability, and to assess how elevated household indebtedness affects the vulnerability of the financial system to an adverse macroeconomic shock. The Bank of Canada's updated assessments of potential imbalances in the housing and mortgage markets are reported regularly in the *Financial System Review*.

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Abbreviations

A more comprehensive list of financial and economic terms, as well as information on Canada's payment clearing and settlement systems, is available at www.bankofcanada.ca.

ABCP: asset-backed commercial paper	G-SIFI: global systemically important financial institution
AFC: Asian financial crisis	G-SII: global systemically important insurer
AIG: American International Group	IAIS: International Organization of Insurance Supervisors
AMF: Autorité des marchés financiers	IM: initial margin
BCBS: Basel Committee on Banking Supervision	IMPP: Insured Mortgage Purchase Program
BHC: bank holding company	IOSCO: International Organization of Securities Commissions
CAAMP: Canadian Association of Accredited Mortgage Professionals	JORM: Joint Operational Resilience Management
CCP: central counterparty	LBO: leveraged buyout
CGFS: Committee on the Global Financial System	LDC: Latin American crisis
CMB: Canada Mortgage Bond	LGFV: local government financing vehicle
CMHC: Canada Mortgage and Housing Corporation	LTRO: long-term refinancing operation
CPSS: Committee on Payment and Settlement Systems	LTV: loan-to-value
D-SIBs: domestic systemically important banks	MAGD: Macroeconomic Assessment Group on Derivatives
DSR: debt-service ratio	MBS: mortgage-backed securities
EBA: European Banking Authority	NBFC: non-bank financial company
ECB: European Central Bank	NHA MBS: National Housing Act Mortgage-Backed Securities
EME: emerging-market economy	OECD: Organisation for Economic Co-operation and Development
ESM: European Stability Mechanism	OSFI: Office of the Superintendent of Financial Institutions
FMI: financial market infrastructure	OTC: over-the-counter
FMU: financial market utility	QIS: quantitative impact study
FSB: Financial Stability Board	REIT: real estate investment trust
FSOC: Financial Stability Oversight Council	SIFI: systemically important financial institution
FX: foreign exchange	VM: variation margin
G-20: Group of 20	WGMR: Working Group on Margining Requirements
GDP: gross domestic product	WMP: wealth-management product
GIC: guaranteed investment certificate	
GSE: government-sponsored enterprise	
G-SIB: global systemically important bank	

