BANK OF CANADA
BANQUE DU CANADA

Financial System Review

December 2012

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

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ISSN 1705-1290 (Print)
ISSN 1705-1304 (Online)

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The Risk Assessment section is a product of the Governing Council of the Bank of Canada:
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This report includes data received up to 30 November 2012.

Contents

Preface

The financial system makes an important contribution to the welfare of all Canadians, since the ability of households and firms to hold and transfer financial assets with confidence is one of the fundamental building blocks of our economy. A stable financial system contributes to broader 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 promoting 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 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 providing an assessment of the downside risks rather than on the most likely future path for the financial system. 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.

Conditions in the international financial system remain challenging. A synchronous slowing in economic activity is taking place in both developed and emerging economies, and the outlook for growth remains modest. Although global financial conditions have improved since June, largely reflecting important announcements by major central banks and European authorities, the level of uncertainty is elevated. This reflects concerns about the underlying strength in the major economies, and whether policy-makers have the resolve to put in place a lasting solution to the crisis in the euro area and to address the impending "fiscal cliff" in the United States.

Despite the challenging global environment, Canada's financial system continues to be robust. The balance sheets of Canadian banks are healthy, and banks have retained access to low-cost funding across the term structure. Financial markets in Canada have been more stable than their global counterparts. Corporate leverage in Canada is at an all-time low and firms have good access to credit from both banks and capital markets. Nevertheless, the Canadian financial system continues to be vulnerable to a number of interrelated and mutually reinforcing risks.

The Governing Council judges that the risks to the stability of Canada's financial system remain high, as they were at the time of the June FSR. The sources of the key risks are similar to those highlighted in June,[1] and emanate primarily from the external environment (**Table 1**).

The most important risk continues to be the reintensification of the crisis in the euro area. This crisis has three interconnected elements: the potentially unsustainable fiscal trajectories of some peripheral countries; the weaknesses of the banking systems in those countries; and the underlying imbalances within the euro area. Modest and uneven global economic growth also represents a risk to the Canadian financial system. The risk is that the deficiency in global demand deepens or becomes more entrenched. This could be triggered in the near term by the fiscal cliff in the United States or, over the medium term, by disorderly fiscal consolidation in advanced economies or a lack of rotation of demand toward consumption in China and other surplus countries. Domestically, the primary financial stability concern relates

1 The scope and characterization of some of the risks have changed relative to June. In particular, the global imbalances risk is no longer included in the key risks in Table 1, but is now incorporated in the risks related to deficient global demand and the low interest rate environment in major advanced economies. More details on these changes are given in the discussion of the various risks.

Table 1: Key risks to the stability of the Canadian financial system

Euro-area crisis	↔
Deficient global demand[a]	
Canadian household finances and the housing market	↔
Low interest rate environment in major advanced economies	↔
Overall level of risk	↔

a. Since this risk has been redefined, it is not comparable to the assessment in the June FSR.

Legend

Level of risk
- Very high
- High
- Elevated
- Moderate

Direction of risk (change since June FSR)
- ↑ Increased
- ↔ Unchanged
- ↓ Decreased

to the high level of household indebtedness and elevated valuations in some segments of the housing market. These household imbalances could themselves be a trigger for financial system stress or they could amplify adverse economic shocks originating elsewhere. Finally, the low interest rate environment in major advanced economies represents another risk to the financial system, both in Canada and globally. This risk involves increased vulnerability for financial institutions with long-duration liabilities (e.g., life insurance companies and pension funds), and increased incentives for excessive risk taking in a search for yield, which could distort the pricing of both real and financial assets.

A realization of any of the key external risks would affect the Canadian financial system through three broad channels: trade, financial and confidence.[2] The **trade channel** would have an impact on the financial system through weaker international trade in goods and services. Shocks that weaken global economic growth would reduce the demand for Canadian exports and dampen economic activity, resulting in a deterioration of Canadian business and household balance sheets and impairing the credit quality of bank loan portfolios. The **financial channel** involves three main effects related to the interconnections between Canadian financial institutions and the global economy. First, these institutions could experience direct and/or indirect losses owing to their exposures in affected regions or sectors. Second, counterparty risks and contagion could drive up the cost of bank funding and create severe disruptions in its availability in some markets. This would weaken the balance sheets of Canadian financial institutions and could lead to tighter lending conditions for businesses and households. Third, financial stresses could trigger a broad-based retrenchment in risk taking, which could exacerbate other adverse impacts through the financial channel. Finally, there is the **confidence channel**, through which adverse shocks could cause a decline in consumer, business and investor confidence, leading to weaker domestic demand and tighter financial conditions. These three transmission channels, like the key risks, are closely linked and could be mutually reinforcing.

2 The impact of the domestic household sector risk on the financial system would be transmitted through the financial and confidence channels.

Important steps have been taken since June to mitigate the key risks identified in **Table 1**. In particular, additional monetary policy stimulus announced by several central banks—including the U.S. Federal Reserve, the European Central Bank (ECB), the Bank of Japan and the Bank of England—will help support global economic growth. The actions taken by European authorities have reduced the near-term risk of a severe adverse event, resulting in a significant easing in financial conditions.

While these steps are important, further measures are needed. In the euro area, plans for establishing a single banking supervisor need to be supplemented with other critical elements of a banking union—namely, a framework for common deposit insurance and cross-border bank resolution. Further structural reforms are also necessary to narrow divergences in competitiveness within the euro area. In addition, work is needed to establish a closer fiscal union, including a fiscal transfer system and some form of mutualization of sovereign debt. In the United States, a clear and credible plan is required to address the fiscal cliff and the medium-term fiscal challenges.

In Canada, changes to the rules for government-backed insured mortgages and the introduction of mortgage underwriting guidelines[3] are expected to support the long-term stability of the Canadian housing market and mitigate the risk of financial excesses. In the past six months, the growth of household credit has continued to moderate, sales of existing homes have declined and the growth in house prices has slowed. Nevertheless, there is a risk that the moderation in the housing market could prove transient, and that imbalances could remain elevated or build up further. To mitigate this risk, households should ensure that their borrowing is in line with their current and prospective ability to service their debt. Financial institutions must ensure that they have rigorous lending practices in place and are actively monitoring their risks, consistent with the mortgage underwriting guidelines from the Office of the Superintendent of Financial Institutions (OSFI). For their part, authorities will continue to carefully monitor the financial situation of the household sector and developments in the housing market.

The current environment should not be taken as an excuse to delay or dilute the global financial reform agenda. In particular, it is imperative that all jurisdictions fully and consistently implement Basel III rules. Canadian banks are expected to meet Basel III capital requirements by the beginning of 2013, which is the start of the phase-in period that extends to 2018. Establishing a resilient financial market infrastructure is also important to reduce the likelihood and consequences of future financial system turmoil. Good progress has been made on this front since June, both in Canada and internationally. In October, Canadian authorities announced that market participants can clear standardized over-the-counter derivatives using any central counterparty recognized by Canadian authorities, including global central counterparties. In addition, the Bank of Canada has adopted new international risk-management standards for its oversight of systemically important financial market infrastructures. At the international level, work has moved forward on ending "too big to fail" and strengthening the oversight and regulation of shadow banking activities.

3 The Office of the Superintendent of Financial Institutions published *Guideline B-20 Residential Mortgage Underwriting Practices and Procedures* in final form on 21 June 2012. These guidelines are available at <www.osfi-bsif.gc.ca/app/DocRepository/1/eng/guidelines/sound/guidelines/b20_e.pdf>. Changes to the rules for government-backed insured mortgages are outlined in Box 2 on page 24.

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 mitigating actions.

Macrofinancial Conditions

The global economic recovery remains fragile and uneven. While the economic expansion in the United States is progressing at a gradual pace, Europe is back in recession. In China and other major emerging economies, growth has slowed, although there are signs of stabilization around current growth rates. In Canada, a moderate expansion is proceeding, with domestic factors offsetting global headwinds.

Most market indexes have moved higher since June

Despite weakening economic activity in advanced and emerging-market economies, global financial conditions have improved since the June FSR. This is due largely to substantial policy actions by major central banks.

In July, the ECB stated its commitment to take all necessary measures to preserve the euro,[4] and on 6 September it announced its Outright Monetary Transactions (OMT) program. The OMT program, through which the ECB can purchase government bonds in the secondary market, is designed to eliminate the risk of euro redenomination and improve the monetary policy transmission mechanism in the euro area.[5] These actions have reduced concerns that a tail event may occur in the region. Measures of redenomination risk derived from foreign exchange options prices have decreased,[6] and there has been a partial reversal of safe-haven flows. As a result, sovereign yields in several peripheral euro-area countries have declined substantially, particularly at shorter horizons, where OMT purchases will take place. The euro has risen by roughly 4 per cent against the U.S. dollar since

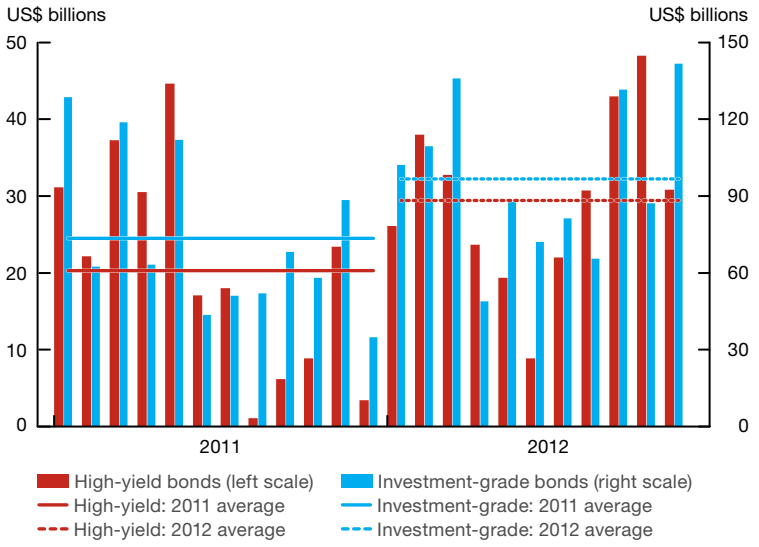
4 The full text of the speech by Mario Draghi, President of the European Central Bank, is available at <www.ecb.int/press/key/date/2012/html/sp120726.en.html>.

5 The ECB has indicated that Outright Monetary Transactions will be considered only if they are warranted from a monetary policy perspective, and as long as the conditions established under the European Financial Stability Facility/European Stability Mechanism program are fully respected.

6 For example, the balance of risk, defined as the difference between the probability of a large depreciation and a large appreciation in the euro (implicit in euro/U.S.-dollar options prices), suggests that the risk of a sharp depreciation in the euro has declined following the announcement of the OMT program.

Chart 1: Recent issuance in U.S. corporate credit markets has been robust

Global corporate securities issuance placed in U.S. dollars



Note: November 2012 numbers are based on data available from 1 November to 29 November.
Source: Bloomberg Last observation: November 2012

the June FSR, and euro-area bank equities have partially recovered. More recently, some peripheral euro-area banks have also been able to access unsecured market funding.

In September, the U.S. Federal Reserve announced that it would continue to purchase additional agency mortgage-backed securities at a pace of US$40 billion per month and undertake additional asset purchases as appropriate until there is substantial improvement in the outlook for the labour market. The Federal Reserve also extended its forward guidance for exceptionally low levels of the federal funds rate through to at least mid-2015, adding that it expects a highly accommodative stance of monetary policy to remain appropriate "for a considerable time after the economic recovery strengthens." Together, these actions (dubbed "QE3")[7] have been an important factor in boosting credit markets in North America and globally. In particular, spreads in the mortgage-backed securities market have narrowed substantially, and U.S. corporate credit issuance, especially in the high-yield sector, has been robust recently (**Chart 1**).

Financial conditions in Canada are also more favourable than at the time of the June FSR. The S&P/TSX Composite Index has risen by roughly 6 per cent over this period. Corporate bond yields are near record lows (**Chart 2**), the volume of corporate bond issuance has remained robust and bank lending to businesses has picked up. In addition, the Bank's *Senior Loan Officer Survey*[8] suggests some further easing in business lending conditions in recent months.

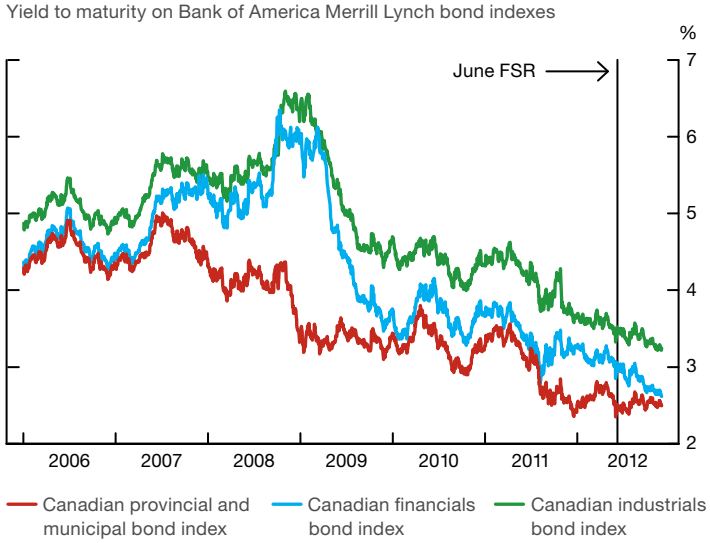
Meanwhile, Canadian banks are in good financial health and continue to have access to low-cost funding across the term structure in both Canadian and foreign currencies. Since the end of 2007, major Canadian banks have increased their common-equity capital by 70 per cent, and capital ratios

7 More details on the U.S. Federal Reserve's QE3 are provided in Box 1 of the Bank of Canada's October 2012 *Monetary Policy Report*, available at <www.bankofcanada.ca/2012/10/publications/periodicals/mpr/mpr-october-2012/>.

8 The latest *Senior Loan Officer Survey* is available on the Bank's website under Publications and Research > Periodicals > SLOS 2012Q3.

Chart 2: Canadian issuers continue to access capital markets at attractive rates

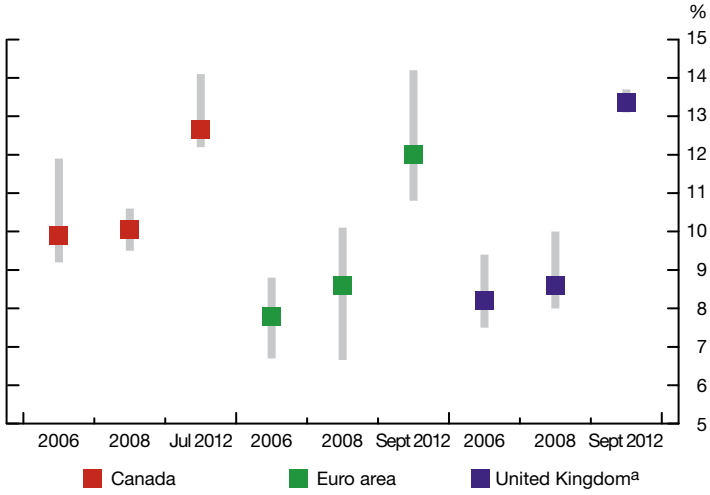
Yield to maturity on Bank of America Merrill Lynch bond indexes



Sources: Bloomberg and Bank of America Merrill Lynch — Last observation: 30 November 2012

Chart 3: Capital levels have improved in Canada and other jurisdictions

Comparison of maximum, minimum and median Tier 1 capital ratios of large banks by region (Basel II.5)



Note: Boxes represent the median Tier 1 capital ratio, while the vertical lines are the maximum and minimum Tier 1 capital ratios for the group of sample banks in each region (6 Canadian banks, 9 euro-area banks and 5 U.K. banks).
a. U.K. data exclude Standard Chartered at September 2012.

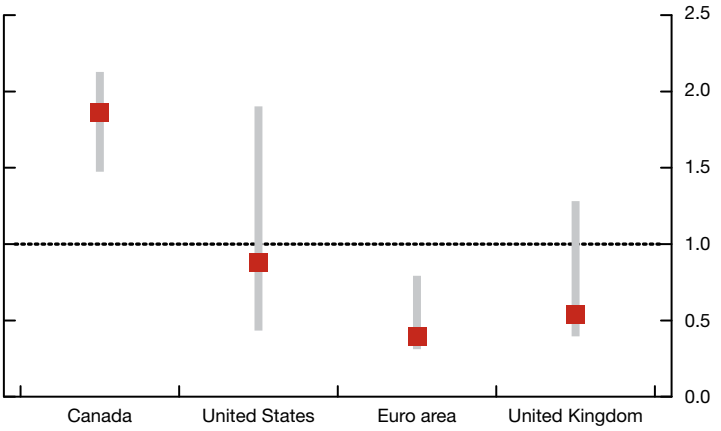
Last observations: Canadian banks, July 2012; euro-area banks, September 2012; U.K. banks, September 2012

Source: Bloomberg

have moved higher by 3 percentage points (**Chart 3**), while loan losses have remained modest. Canadian bank stocks are trading at prices that, on average, are 85 per cent above their book value, markedly higher than in many other countries (**Chart 4**). This indicates that investors continue to believe that Canada's banks are in a better financial position than their global peers.

Chart 4: Canadian banks enjoy higher market valuations relative to their international peers

Comparison of maximum, minimum and median price-to-book ratios of large banks by region



Note: Boxes represent the median price-to-book ratio, while the vertical lines are the maximum and minimum price-to-book ratios for the group of sample banks in each region (6 Canadian banks, 8 U.S. banks, 9 euro-area banks and 5 U.K. banks).

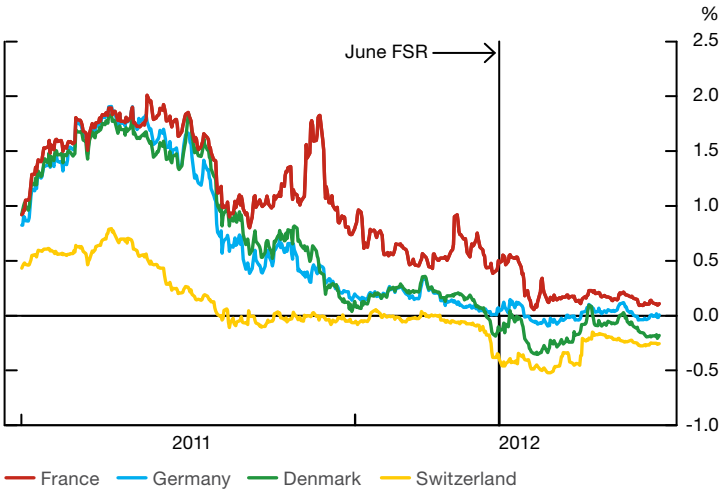
Source: Bloomberg Last observation: 2012Q3

At the same time, however, uncertainty remains elevated

Despite recent gains in the prices of risky assets and low levels of financial market volatility, investor sentiment continues to be fragile. In the current context, traditional measures of financial market volatility (such as the VIX) may not accurately capture uncertainty, since they may be heavily influenced by the extraordinary liquidity provided by central banks. Other indicators suggest that uncertainty is still elevated. Trading volumes across a number of asset classes have been low, and, despite their recent moderation, yields on longer-term bonds in peripheral euro-area countries remain elevated. Furthermore, short-term yields in some European countries are near or below zero, indicating that the demand for safe and liquid assets is still unusually strong (**Chart 5**).

Chart 5: Continued strong demand has kept short-term yields on some European bonds near or below zero

Yields on 2-year sovereign bonds



Source: Bloomberg Last observation: 30 November 2012

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 the key risks are broadly the same as those noted in the June FSR and emanate primarily from the external environment. Although the risks are interrelated and mutually reinforcing, the following discussion focuses on the underlying vulnerabilities that are distinct for each risk.

Euro-Area Crisis

The principal threat to financial stability in Canada is that the crisis in the euro area could reintensify.[9] This crisis has three interconnected elements: the potentially unsustainable fiscal trajectories of some peripheral countries; the weaknesses of the banking systems in these countries—in the context of the strong linkages between banks and sovereigns; and the underlying imbalances within the euro area. While actions taken by euro-area authorities since June have contained the crisis—countering the financial system stresses that were building up earlier in the summer—there remains a significant risk that such stresses could intensify once again and spread across Europe and beyond. If that were to occur, the adverse spillover effects to the Canadian financial system through trade, financial and confidence channels could be substantial.

The Governing Council judges that the risks from a reintensification of the crisis in the euro area remain very high, broadly unchanged since the June FSR.

Announced policy measures have reduced near-term risks

The OMT program, discussed earlier, has been an important factor in reducing near-term risks in the region (**Chart 6**). The program marked a significant shift in the ECB's asset-purchase strategy. While the central bank's previous asset purchases had been limited in both size and duration, the OMT program does not have these constraints.[10] The program has bought time for other reforms to be implemented.

Progress has also been made in addressing the fragilities in the banking system, particularly in Spain. On 20 July, the European Commission (EC) agreed to provide up to €100 billion to support the recapitalization of Spanish banks.[11] A subsequent bottom-up review of the Spanish banking system identified €53.8 billion in capital needs.[12] These capitalization plans, coupled with the initiative by Spanish authorities to establish a "bad bank" for toxic real estate loans, should strengthen the balance sheets of domestic banks and allow credit to begin flowing more freely in the economy.[13]

On 27 November 2012, the euro-area finance ministers (the Eurogroup) agreed to disburse the next European Financial Stability Facility (EFSF) loan tranche to Greece, subject to the completion of national procedures, such

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9 The name of this risk has been modified, from "Euro-area sovereign debt" in the June FSR to "Euro-area crisis" in this issue, to better reflect the multi-faceted nature of this risk.

10 Bond purchases under OMT would be conditional on the country meeting the European Financial Stability Facility/European Stability Mechanism program requirements.

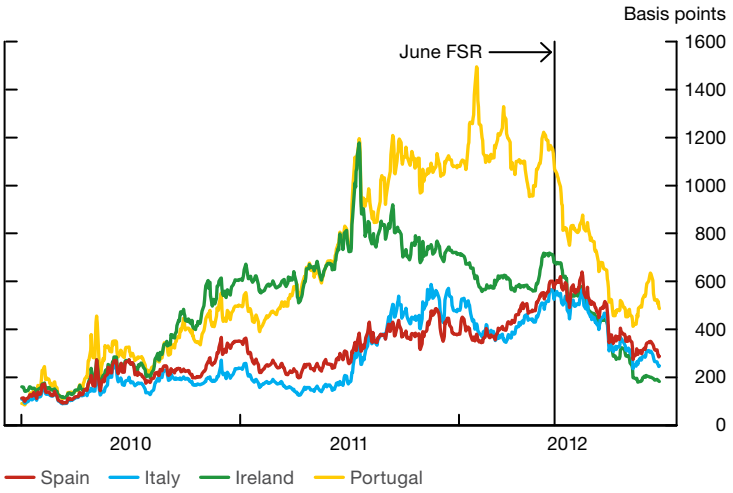
11 The EC press release is available at <www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ecofin/131914.pdf>.

12 The review was based on a stress test that featured significant further deterioration in the Spanish economy and real estate prices. The €53.8 billion in capital needs includes the effects of mergers currently under way and tax implications. More information is available at <www.bde.es/f/webbde/SSICOM/20120928/presbe2012_41e.pdf>.

13 Further information on Spain's "bad bank" and recapitalization plans can be found at <www.frob.es/index_en.html>.

Chart 6: Sovereign debt concerns have decreased in the euro-area periphery since June

Spreads on 5-year sovereign credit default swaps



Source: Markit

Last observation: 30 November 2012

as parliamentary approvals. Furthermore, to address long-term sovereign debt sustainability in Greece, several concrete steps were agreed to by the Eurogroup, including: (i) lowering the interest rate on the bilateral loans by 100 basis points; (ii) extending the maturity of bilateral and EFSF loans by 15 years; (iii) deferring interest payments on EFSF loans by 10 years; and (iv) launching a plan for the buyback of Greek sovereign debt.[14]

In addition to Greece, a number of countries, including Spain and Portugal, have announced measures to improve their fiscal positions.[15] Acknowledging that fiscal austerity should occur at a pace that does not impede the economic recovery unduly, all three countries have extended their timelines for fiscal adjustment, with the support of creditor countries and international organizations.

Significant implementation risks remain

Policy announcements since June have been an important step forward, but, to be fully effective, these measures need to be implemented within a reasonable time frame. Concerns over the ability of the European Stability Mechanism (ESM) to break adverse links between banks and sovereigns have been prompted by continuing disagreement over the coverage of ESM support.[16] In addition, the perceived stigma associated with both the ESM and OMT programs and the related policy conditionality have led to fears that affected countries may not request support under these programs in a timely manner. Furthermore, the establishment of a common

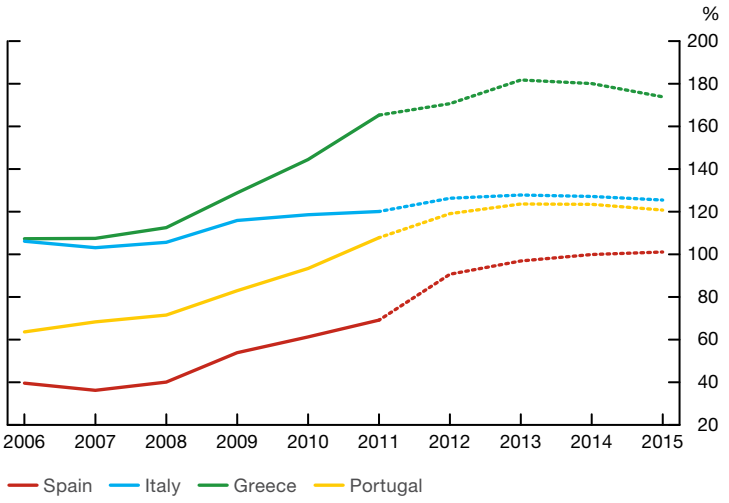
14 See <www.eurozone.europa.eu/media/854890/eurogroup_statement_greece_27_november_2012.pdf>.

15 Greece's 2013 budget, approved by parliament in November, outlined a further €9.4 billion in cuts to salaries, pensions and social benefits, as well as higher taxes and an increase in the retirement age. Spain's 2012–13 budget announced a further €40 billion in budget cuts, including an 8.9 per cent reduction in ministerial spending, as a well as a freeze on public sector pay. In October, Portugal announced another round of tough budget measures that incorporate substantial income tax increases and further cuts to public expenditures.

16 One example is the conflicting statements by European leaders regarding the handling of "legacy assets," i.e., assets that accumulated prior to the crisis.

Chart 7: Sovereign debt levels are projected to remain elevated in a number of euro-area countries

General government gross debt as a percentage of nominal GDP



Notes: General government gross debt includes claims on all levels of government.
Broken lines indicate International Monetary Fund (IMF) projections.
Source: IMF *Fiscal Monitor*, October 2012 Last data point plotted: 2015

euro-area banking supervisor has been delayed by one year (to the end of 2013). While this delay provides more time to resolve key issues related to the framework,[17] it also means that any direct ESM capitalization of banks is unlikely to occur until early 2014, rather than in early 2013 as originally planned. Once fully operational, the common supervisory framework will allow for a more comprehensive assessment of the health of euro-area banks, since system-wide interests could be taken into account more fully.

The very weak economic outlook in Europe makes the task of fiscal consolidation daunting. Sovereign debt levels in Greece, Spain and Portugal are projected to continue rising, despite planned consolidations (**Chart 7**). The stagnation could also decrease the political and public willingness to implement needed reforms to public entitlement programs, such as pensions.

Weak economic activity exacerbates vulnerabilities in the financial system

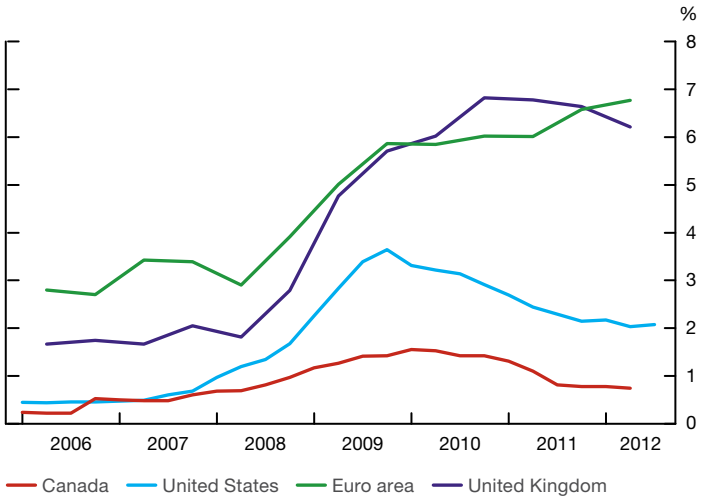
Weak economic activity is one of the factors weighing on the profitability of euro-area banks.[18] In particular, the asset quality of bank loans has been deteriorating (**Chart 8**), especially for banks with significant exposures to peripheral Europe. In Spain, impairment charges at banks have almost doubled over the past three years, owing largely to higher charges on loans involving real estate (**Chart 9**). Despite the substantial number of charge-offs and provisions that have already been booked, further losses are likely as the Spanish economy continues to weaken.

17 Complexities in establishing a common banking supervisor include defining the role of national regulatory authorities versus that of the common supervisor, the applicability of euro-area rules to European financial institutions outside the currency bloc, and the separation of monetary policy and banking supervision roles within the ECB, as well as more practical needs, such as staffing.

18 Other factors include sovereign debt strains, macroeconomic uncertainty and persistently low interest rates. Banks are also facing substantial transition costs associated with restructuring, deleveraging and complying with new regulations (e.g., capital requirements regulations, Capital Requirements Directive IV and the European implementation of Basel III).

Chart 8: Non-performing loans at euro-area banks remain elevated

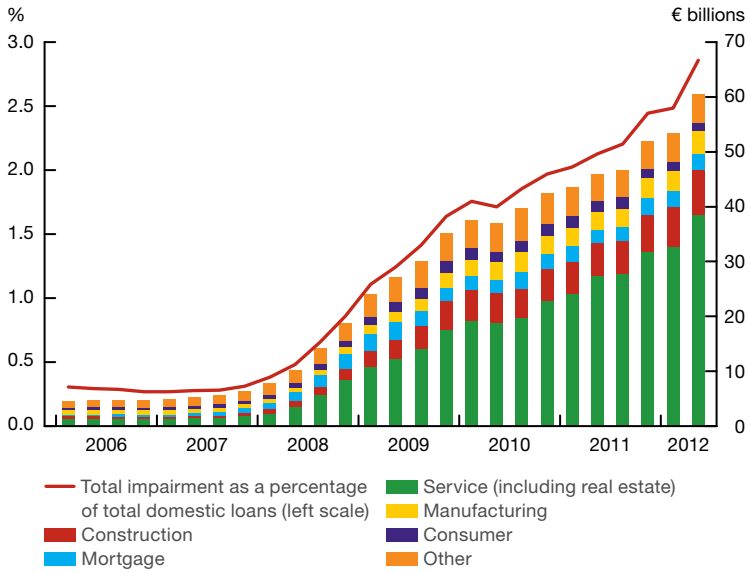
Non-performing loans as a percentage of total loans



Note: The sample includes 6 Canadian banks, 8 U.S. banks, 9 euro-area banks and 5 U.K. banks.
Sources: Regulatory filings of Canadian banks and Bloomberg

Last observations: Canada, July 2012; United States, September 2012; other countries, June 2012

Chart 9: Impairment charges at Spanish banks are growing

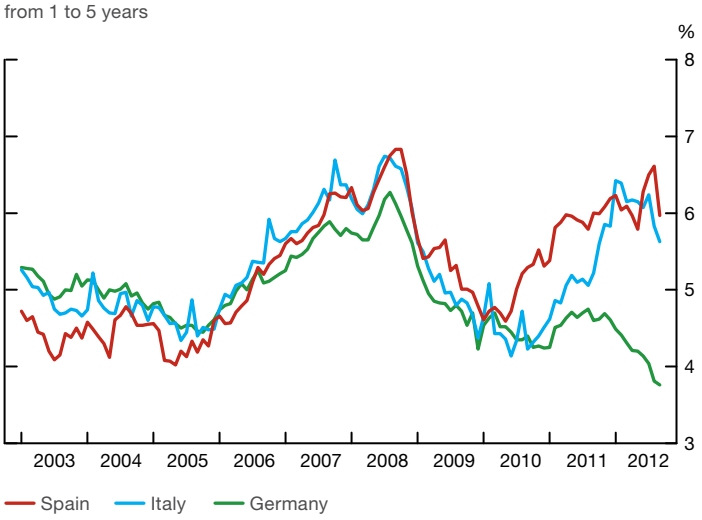


Source: Bank of Spain

Last observation: 2012Q2

Chart 10: Rates on small business loans have become increasingly divergent within the euro area

Annualized agreed rate, nominal size less than €1 million, with maturities from 1 to 5 years



Source: European Central Bank

Last observation: September 2012

The fragmentation in euro-area credit markets has continued. It stems, in part, from deleveraging as the experience of the crisis, together with higher capital-adequacy standards, has prompted financial institutions to hold fewer risky assets and more (own-country) government bonds.[19] Fragmentation is contributing to a divergence in borrowing rates across countries, with rates for small business loans (less than €1 million) considerably higher in the periphery than in the core euro-area countries (**Chart 10**). The most recent lending surveys indicate that banks continued to tighten business lending conditions in the third quarter.

Finally, there are concerns about the capacity of banks to generate sustained future earnings (**Chart 4**). While deleveraging and the reduction of non-core assets have helped to improve capital ratios and liquidity profiles for banks in the near term, these measures could also hamper revenue growth in the future.

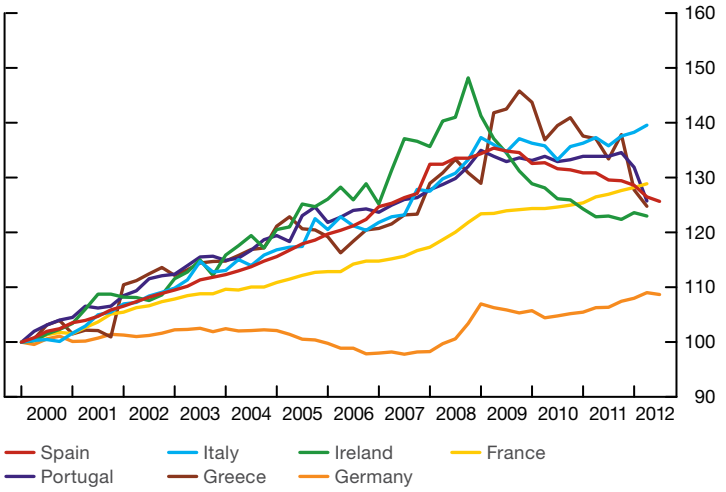
European leaders need to continue pushing forward with reforms

Building on some of the announced measures, a comprehensive policy framework is needed to address the imbalances within the euro area. These imbalances result from the wide competitiveness gaps between peripheral and core countries (especially Germany) that built up before the crisis (**Chart 11**). While some progress has been made, additional structural reforms are required in both debtor and creditor nations, including measures to enhance labour market flexibility and mobility. At the same time, it will be important for vulnerable sovereigns to access funding at reasonable rates over the timeline of these structural reforms. The banking union within the common currency area also needs to be fully developed and implemented. This involves putting into practice current plans for a single

19 Other factors that have contributed to the fragmentation over 2011 and the first half of 2012 include (perceived) risks of redenomination in the euro area and the effects of previous ECB asset-purchase programs.

Chart 11: Competitiveness remains an issue for many euro-area countries

Nominal unit labour cost (2000Q1 = 100)



Sources: Eurostat, Instituto Nacional de Estatistica (Portugal) and Bank of Canada calculations

Last observations: Spain and Germany, 2012Q3; other countries, 2012Q2

banking supervisor and supplementing it with common deposit insurance and cross-border bank resolution. Additional work also needs to be done on constitutional and institutional changes to deal with issues related to fiscal oversight and mutualization of sovereign debt. This policy framework must be credible and clearly communicated in order to mitigate policy uncertainty, which is currently elevated.

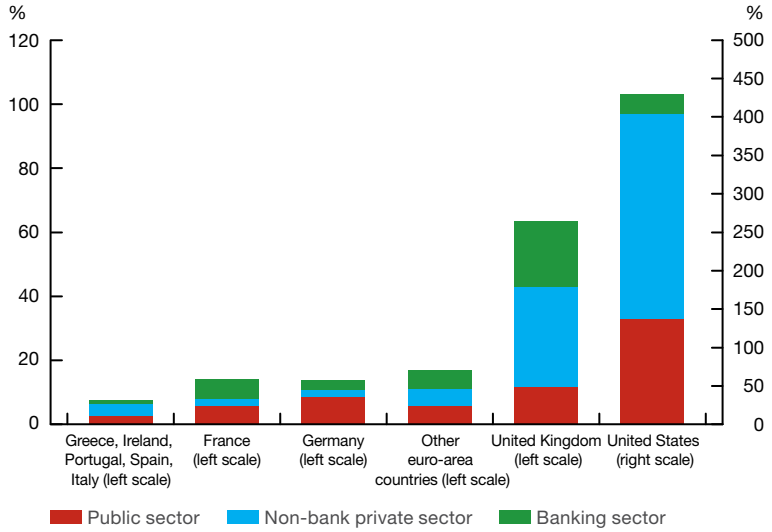
Canadian financial institutions remain vulnerable to a reintensification of the crisis in the euro area

To date, Canada has fared well through the ebbs and flows of the euro-area crisis, mainly because of its relatively sound fiscal position and well-capitalized and healthy banking system (**Chart 3**). However, if euro-area stresses reintensify and spread across Europe and beyond, the impact on the Canadian financial system could be significant. As noted earlier, such stresses would be transmitted through trade, financial and confidence channels, with the impact from the latter two channels dominating.

Direct exposure of the Canadian financial system to the affected euro-area countries remains limited and has been declining since 2009 (**Chart 12**), but exposures to U.S. and U.K. entities are significant and have been increasing. If entities in the United Kingdom or the United States were to be significantly affected by the crisis, the impact on Canadian banks (through losses on exposures) could be large. Concerns related to counterparty risk could also lead to a sharp increase in funding costs for banks, which could result in higher borrowing rates for businesses and households. In an extreme scenario, such effects could lead to a freezing of global credit markets, which would cut off wholesale funding for Canadian banks. These effects could be amplified by the interconnectedness of Canadian banks.

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



Last observations: Cross-border exposures, June 2012 for all banks; Tier 1 capital, June 2012 for December year-end banks and July 2012 for October year-end banks

Source: Regulatory filings of Canadian banks

Deficient Global Demand

The global economy is currently experiencing a period of deficient demand that is, in part, a result of the asymmetric adjustment of global current account imbalances that built up prior to the financial crisis. This asymmetric adjustment reflects deleveraging in a number of economies with current account deficits and the absence of sufficient measures to increase domestic demand in countries with current account surpluses. The risk is that the deficiency in global demand may deepen or become more entrenched. This could further slow the required repair of public and private sector balance sheets in advanced countries and increase the vulnerabilities of financial institutions to other adverse macroeconomic developments. The impact on the Canadian financial system would be through the trade, financial and confidence channels described earlier.

In this setting, a central issue underlying the deleveraging process is the high level and unsustainable path of public debt in a number of advanced economies. Over the near term, the most important risk is the fiscal cliff in the United States, which, if not averted, would lead to a recession in the United States and stall global economic growth. Even if the fiscal cliff is avoided, the required fiscal adjustments to bring sovereign debt-to-GDP ratios in some major economies to sustainable levels will exert a significant drag on global growth over the medium term.

The effects of deleveraging on world demand could be mitigated by a pickup in domestic demand growth in surplus countries. Indeed, in the wake of the global financial crisis, China's massive domestic stimulus program provided important support for global growth. This time, because of concerns about worsening financial imbalances, the fiscal policy response has been relatively restrained. Without structural reforms, growth in China may slow further, exacerbating the deficiency in global demand.

The risk to the Canadian financial system from an increasing deficiency in global demand is judged to be elevated.[20]

The fiscal cliff is a major risk to the near-term outlook for the U.S. and global economies

Considerable uncertainty persists regarding the size and timing of near-term fiscal consolidation in the United States. The Bank's base-case scenario assumes that the fiscal drag will amount to roughly 1.5 percentage points in both 2013 and 2014. However, based on current legislation, there is the possibility of a very severe tightening in U.S. fiscal policy at the beginning of 2013, since some tax cuts and extensions of unemployment insurance benefits are set to expire at the same time as the scheduled implementation of automatic spending cuts associated with sequestration. The fiscal drag in 2013 that would be associated with such an event—widely characterized as the "fiscal cliff"—would reduce U.S. real GDP growth next year by approximately 4 percentage points.[21] Such an outcome would undermine the still-fragile state of private domestic demand and push the U.S. economy into recession.

A recession would in turn both exacerbate and be amplified by existing fragilities in the U.S. banking and household sectors. Despite improvements in the balance sheets of large U.S. banks (for example, the ratio of common equity to total assets has increased by 25 per cent since the fourth quarter of 2007), they continue to face a number of challenges. First, U.S. banks still hold a sizable number of real-estate-owned properties,[22] which are part of the so-called "shadow" housing inventory. If the fiscal cliff materializes, loan losses would rise significantly, and the shadow inventory problem would become more acute. Second, there is considerable uncertainty about further legal actions against U.S. banks, which could have an impact on future earnings, and on the ability and willingness of these institutions to provide credit to businesses and households.[23] The subsequent tightening of lending standards by financial institutions would intensify the headwinds weighing on real activity.

Although the U.S. household debt-to-income ratio has fallen significantly from its peak, household indebtedness remains elevated by historical standards, and steady further deleveraging will be required to mitigate the vulnerability of this sector to adverse macroeconomic shocks. However, given current debt levels, a recession induced by the fiscal cliff could lead to rapid and disorderly deleveraging, with more households defaulting on their debt and others scaling back their spending. Such an outcome would exacerbate the downturn in real activity.

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20 The scope of this risk has been redefined since the June FSR to include concerns related to both global current account imbalances and economic weakness in other advanced economies. Hence, it is not directly comparable to either the "Economic weakness in other advanced economies" or the "Global imbalances" risks in the June FSR. The main reason for the change is that the risks from a disorderly resolution of current account imbalances (i.e., weak and uneven global economic growth) overlapped with concerns related to further economic weakness in advanced economies.

21 See the Bank's October 2012 *Monetary Policy Report*, available at <www.bankofcanada.ca/2012/10/publications/periodicals/mpr/mpr-october-2012/>.

22 Real-estate-owned properties are associated with defaulted mortgages that have not been disposed of following foreclosure proceedings.

23 These legal actions would add to the litigations currently under way against some U.S. banks, including lawsuits that allege questionable lending practices and underwriting standards for mortgage loans, fraud in issuing mortgage-backed securities, and manipulation of the London Interbank Offered Rate.

Considering the important contribution of the U.S. economy to global economic growth, a significant and sharp slowing in U.S. economic activity could stall growth in the rest of the world, with adverse effects on the global financial system.

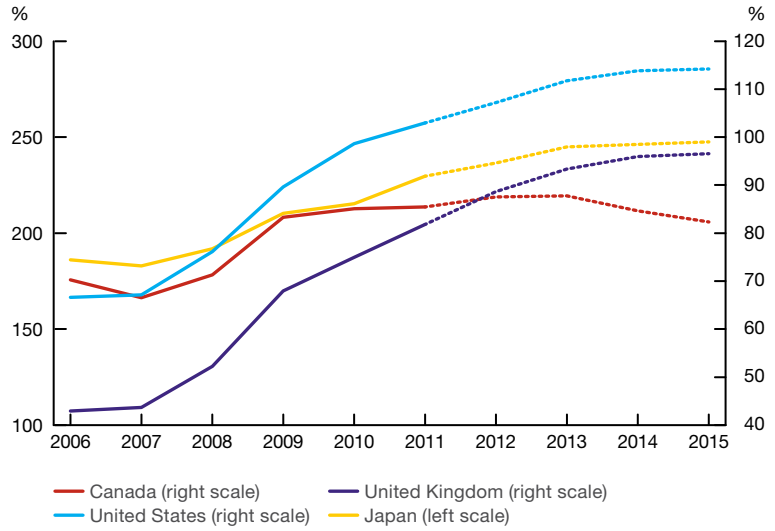
The required medium-term fiscal consolidation in a number of advanced economies poses significant macroeconomic risks

Government indebtedness is high and on an unsustainable upward trajectory in a number of major advanced economies—including the United States and especially Japan (**Chart 13**). According to International Monetary Fund (IMF) estimates, the medium-term adjustments necessary for major advanced economies to achieve a sustainable debt ratio will be substantial.[24]

If this adjustment were to take place in a disorderly fashion—as exemplified by the fiscal cliff just discussed—it would amplify the deficiency in global demand. Disorderly adjustment could be precipitated by a change in market perception of sovereign risk for one or more advanced economies, leading to higher debt-servicing costs and reduced economic activity. In this scenario, the eventual fiscal deleveraging would be larger and more painful for the global economy and the financial system.

Chart 13: Fiscal positions are expected to remain strained in a number of advanced economies

General government gross debt as a percentage of nominal GDP



Notes: General government gross debt includes claims on all levels of government.
Broken lines indicate International Monetary Fund (IMF) projections.
Source: IMF *Fiscal Monitor*, October 2012 Last data point plotted: 2015

24 See IMF *Fiscal Monitor*, October 2012.

Without a rotation of demand toward consumption, medium-term growth prospects in China could weaken and accentuate fragilities in the financial system

During the financial crisis, robust growth in China—supported by a massive domestic stimulus program—and other emerging economies helped to temper the downturn in global activity. In contrast, the current moderation in GDP growth in China has not been countered by a similar government stimulus program. In part, this reflects worries about the recurrence of imbalances in housing and local government finances that resulted from the earlier stimulus. In this context, there is a risk that current growth rates cannot be sustained over the medium term.

Given the weak external outlook, and an already high level of investment, structural changes are required in China to rotate demand toward consumption in order to achieve sustainable growth. The share of consumption in China's output is much lower than in other emerging economies, and also lower than in advanced economies with current account surpluses (**Chart 14**). In part, this reflects the inflexibility of nominal exchange rates in China, as well as high levels of precautionary savings. A timely rotation of demand will require greater nominal exchange rate flexibility and structural reforms to speed real adjustments.

Domestic financial fragilities, including housing market imbalances, could exacerbate a slowdown in economic activity in China. Recent additional unconventional monetary policy actions in advanced economies could amplify any asset-price imbalances by bolstering capital flows to China (and other emerging markets) as investors search for higher-yielding assets.

China's financial system is showing some signs of strain: the amount of non-performing loans at banks is increasing, especially for small and mid-sized banks. If the pace of real activity decelerated quickly, it could prompt a sharp correction in house prices and a corresponding rapid deterioration in the credit quality of loans, especially for local government infrastructure loans, which are largely backed by real estate assets. Subsequent credit tightening by banks would amplify the slowdown in activity, given the strong dependence of China's economic growth on credit expansion over the past decade.

Another area of financial fragility is the growing shadow banking sector, which has been fostered by the slow pace or lack of reforms in some areas of the financial system. Regulations that have kept deposit rates artificially low and restrictions on cross-border capital flows have fuelled demand for alternative financial products, which tend to offer higher rates of return.[25] The main concern is the lack of transparency and regulation regarding counterparties in this segment of the shadow banking sector. In addition, liquidity in this market segment could prove fleeting if the economic outlook weakens.

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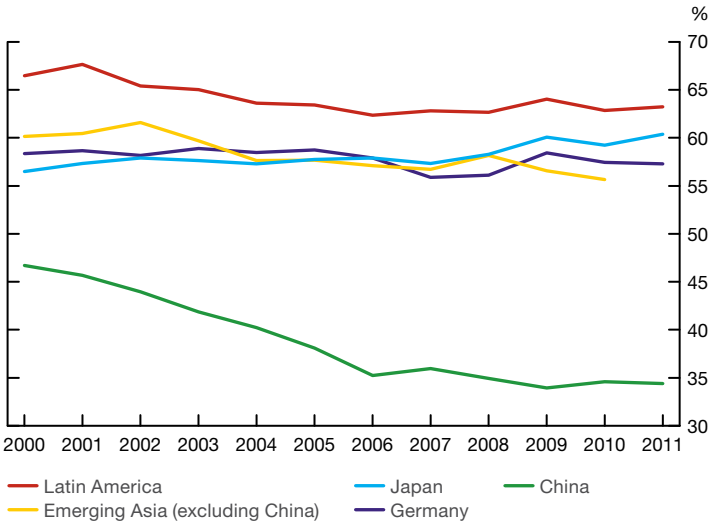
25 Of particular relevance is the growth of "entrusted" loans and "trust" loans. With entrusted loans, the banking sector acts as an agent between a lender and a targeted borrower. A significant portion of these loans involve real estate developers and are kept off bank balance sheets. Trust loans are typically loans that are repackaged into wealth-management products and sold to high-net-worth retail investors.

Chart 14: The share of consumption in China's GDP is very low

Nominal household consumption expenditures as a percentage of GDP



Note: The group "Emerging Asia" is a weighted average composed of India, Indonesia, South Korea, Malaysia, the Philippines and Thailand. The country weights are determined by their 2011 GDP levels.
Sources: World Bank Development Indicators and the Cabinet Office of Japan
Last observations: Emerging Asia, 2010; other countries, 2011

Further weakening in global demand could lead to a deterioration in the balance sheets of Canadian banks

As discussed earlier, Canadian banks have increased their resilience to adverse shocks in recent years by boosting the level and quality of their capital. Weaker global economic growth would nonetheless affect the financial system in Canada in several ways. First, trade linkages with affected regions would dampen economic activity in Canada, increase unemployment and lead to higher loan losses for banks. The trade channel would be especially important if the United States experiences a significant downturn. If growth slows in China, the impact on the real economy from lower commodity prices could be substantial. Second, weaker global economic growth may lead to a retreat of risk taking in markets, lowering capital-market-related revenues for Canadian banks and increasing their funding costs. These effects could, in turn, lead to rising costs for loans and tighter lending conditions for Canadian households and businesses, as well as creating an adverse feedback loop between the decline in economic activity and stress in the financial system.

Canadian Household Finances and the Housing Market

The most important domestic risk to financial stability in Canada continues to stem from the elevated level of household indebtedness and stretched valuations in some segments of the housing market. These fragilities could themselves trigger financial stress or significantly amplify the adverse effects of other shocks on the financial system.

In the past six months, the growth of household credit has continued to moderate, although credit still increased at a faster pace than disposable income. As a result, the aggregate debt-to-disposable-income ratio has risen further. The Bank's stress-test simulations continue to suggest that households are vulnerable to adverse economic shocks. In the housing market, sales of existing homes have declined, owing in part to changes

in mortgage insurance rules, and the growth in house prices has slowed. However, the ongoing strong rates of construction, particularly of multiple-unit dwellings in some regions, have increased concerns about future stock imbalances. In this context, there are two dimensions to this risk: on the one hand, a rebound in housing-market momentum may cause a further buildup of imbalances, while on the other hand, the current moderation in the housing market may turn into a more severe correction.

Overall, the Governing Council judges that the risks associated with high levels of household debt and housing market imbalances are elevated and broadly unchanged since June.

Household indebtedness continues to rise

Revised National Balance Sheet Accounts (NBSA) data from Statistics Canada show higher household indebtedness in recent years—as measured by the debt-to-disposable-income ratio—than in the previous series. For the reasons outlined in **Box 1**, this information suggests that vulnerabilities in the household sector are marginally higher than estimated earlier.

Data for the second quarter show that the household debt-to-disposable-income ratio increased by another 1 1/2 percentage points to 163 per cent,[26] while the aggregate credit-to-GDP gap remained high (**Chart 15**).[27]

The latest monthly data on total household credit published by the Bank[28] show that the 3-month annualized growth rate has slowed from 5.5 per cent at the time of the June FSR to about 4 per cent in October (**Chart 16**), owing to a moderation in the growth of mortgage credit and continued low growth in consumer credit. While the underlying trend may be somewhat higher than the recent growth rate, the new information shows a continuation of the downward tendency since 2010. The trend decrease in credit growth reflects a number of factors, including the pulling forward of housing activity to earlier periods because of greater affordability, as well as the cumulative effects of changes to mortgage insurance rules (**Box 2**) and the tightening of mortgage underwriting guidelines.

Looking ahead, the Bank expects the underlying trend in credit growth to moderate further, since housing activity is projected to move back in line with demographic demand. This view is consistent with the debt-to-disposable-income ratio stabilizing over the next couple of years.

In terms of loan performance, mortgage and consumer loans in arrears declined in the second quarter of 2012, although they remain above pre-crisis levels (**Chart 17**).

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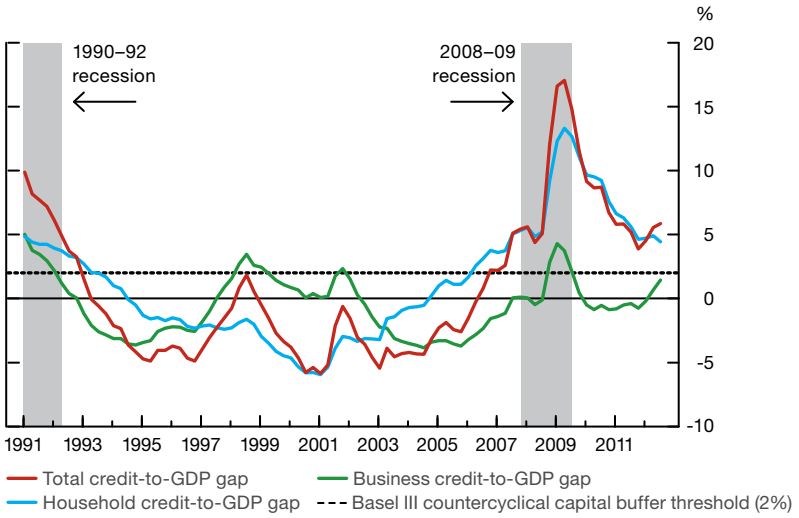
26 Starting with this publication, the Bank will use the household credit market debt-to-disposable-income ratio (CANSIM series: V62698064) without any adjustments.

27 International evidence has shown that the credit-to-GDP gap is a useful guide for identifying a potential buildup of imbalances in the banking sector. This indicator has been proposed by the Basel Committee on Banking Supervision as a guide for activating a countercyclical capital buffer. For more information on the construction of the credit-to-GDP gap and its relevance, see Box 3 in the June 2011 FSR, p. 22.

28 Available at <www.bankofcanada.ca/publications-research/periodicals/bfs/>.

Chart 15: The aggregate credit-to-GDP gap remains high

Percentage deviation from trend

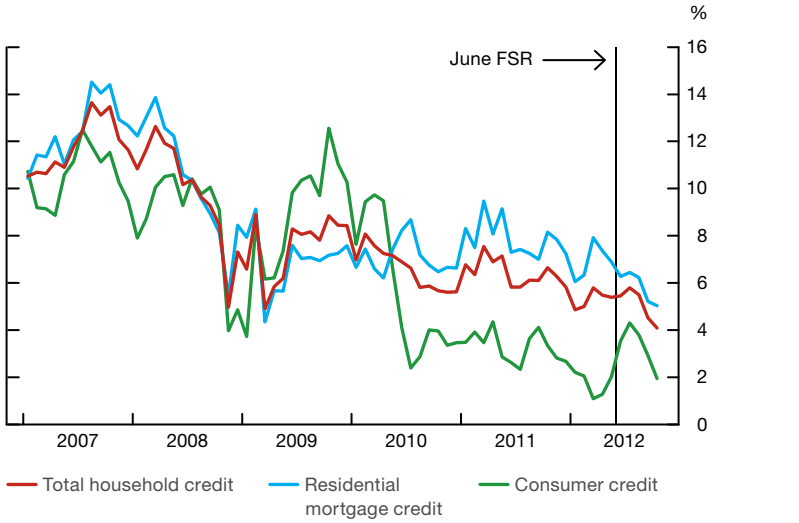


Sources: Statistics Canada and Bank of Canada calculations

Last observation: 2012Q3

Chart 16: The growth of household credit has moderated since the last FSR

Annualized 3-month growth rates



Source: Bank of Canada

Last observation: October 2012

Box 1

Revisions to Statistics Canada's National Balance Sheet Accounts

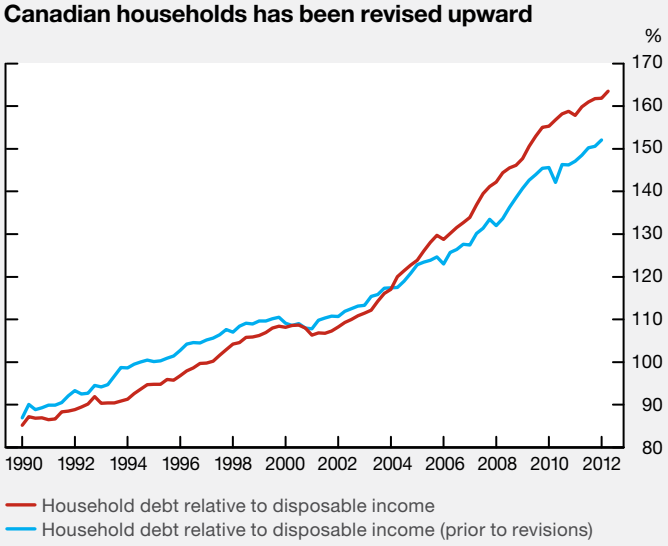
In October 2012, Statistics Canada published revisions to the National Balance Sheet Accounts (NBSA) covering the period from 1990Q1 to 2012Q2. The new data reflect the implementation of revised international accounting standards, as well as sectoral classification changes, new source data and improved methodologies.[1]

A number of the changes are relevant for the analysis of household vulnerabilities. First, the definition of the household sector now excludes Aboriginal governments and non-profit institutions serving households. This allows for a more precise assessment of household sector income and the state of its balance sheet.[2] Second, personal disposable income has been redefined to exclude, among other things, interest payments on consumer debt.[3] Third, a more accurate allocation of mortgages between the household and corporate sectors has resulted in a slight increase in the level of household debt at the end of the sample.

These changes have led to a noticeably higher debt-to-disposable-income ratio for Canadian households in 2012Q1 (**Chart 1-A**) and a faster growth rate of debt over the past decade than was calculated before the revisions occurred.[4] Changes to household disposable income account for most of the upward revision to this ratio. Some of the changes to disposable income are conceptual (i.e., the exclusion of interest payments on consumer debt) and do not provide additional insights into household vulnerabilities,[5] while others represent a more accurate measurement of household income (for example, owing to the more focused household sector classification).

Statistics Canada has provided information on how to construct an adjusted series for the Canadian

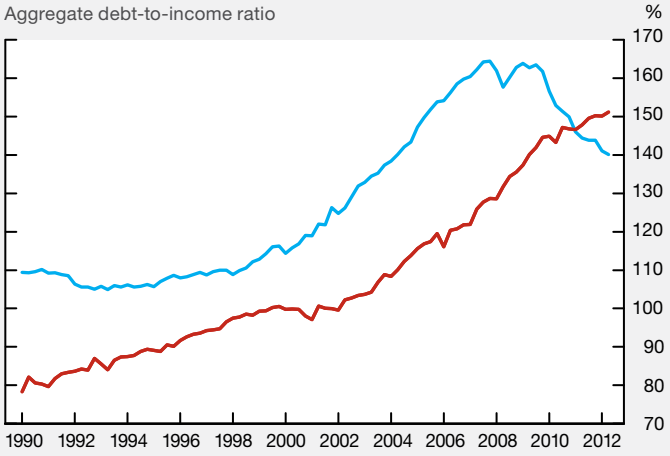
Chart 1-A: The debt-to-disposable-income ratio for Canadian households has been revised upward



Source: Statistics Canada — Last observation: 2012Q2

Chart 1-B: Using comparable definitions, household indebtedness in Canada is currently above U.S. levels, but remains below the 2007 U.S. peak

Aggregate debt-to-income ratio



Note: U.S. calculations include the unincorporated business sector.

Sources: Statistics Canada, U.S. Federal Reserve and Bank of Canada calculations — Last observation: 2012Q2

1 Some of these revisions and those to the National Accounts are discussed in Box 3 of the October 2012 *Monetary Policy Report*, available at <www.bankofcanada.ca/2012/10/publications/periodicals/mpr/mpr-october-2012/>.

2 However, the household sector still includes unincorporated businesses.

3 Interest payments on mortgage debt have always been netted out from disposable income.

4 The dynamics of household debt (based on the revised National Balance Sheet Accounts series) are now more consistent with the Bank of Canada series for the growth of total household credit. The Bank series is based largely on regulatory filings by banks.

5 The disposable income series used by Statistics Canada to calculate its revised debt-service ratio (DSR) does not exclude the income used to make interest payments on consumer debt; hence, the upward revision to the DSR is relatively small.

(continued)

Box 1 *(continued)*

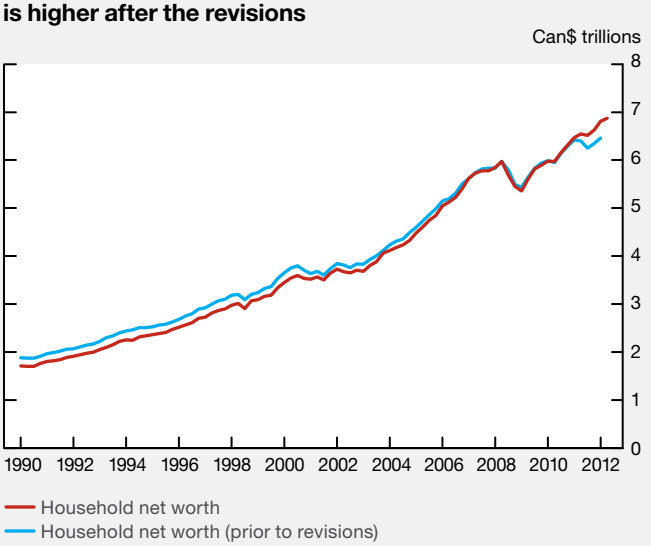
debt-to-disposable-income ratio that uses concepts and definitions that are comparable with the U.S. measure.[6] Based on this series, the current value for Canada is 151 versus 140 for the United States, and it is about 13 percentage points below the U.S. peak in the fourth quarter of 2007 (**Chart 1-B**).

Other NBSA revisions have pushed up the level of household net worth (**Chart 1-C**). This reflects a methodological change to valuing unlisted shares and housing wealth at market prices. While higher household net worth is a positive development from the perspective of financial stability, these assets may be difficult to liquidate in times of market stress.

The revised NBSA data suggest a marginally more vulnerable household sector than previously thought. However, these data represent only one of the sources of information (including micro-level household data) that the Bank uses in its overall assessment of risks related to household finances.

6 The adjusted Canadian series comparable with the U.S. ratio is lower than Statistics Canada's headline household sector debt-to-disposable-income ratio for two main reasons: (i) disposable income used in the adjusted series does not exclude interest payments on consumer debt; and (ii) the debt and income for non-profit institutions serving households are included in the adjusted measure. The information required to construct this series is available at <www.statcan.gc.ca/pub/13-605-x/2012005/article/11748-eng.htm>.

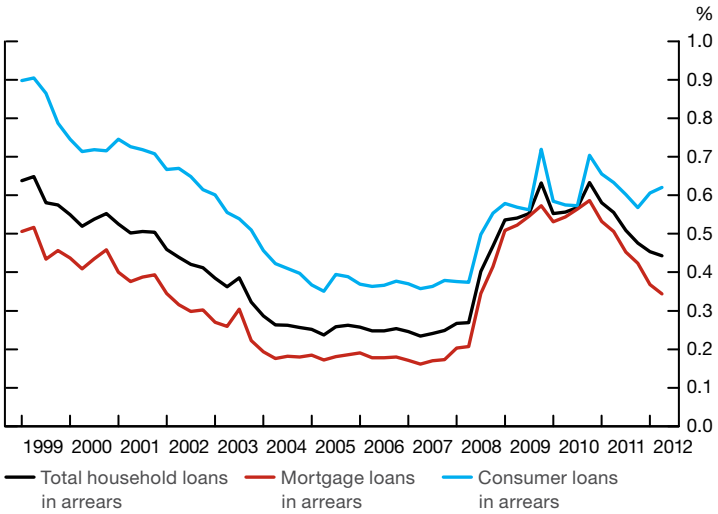
Chart 1-C: Estimated household net worth in Canada is higher after the revisions



Source: Statistics Canada Last observation: 2012Q2

Chart 17: Household loans in arrears are moderating, but remain above pre-crisis levels

Loans more than 90 days in arrears, as a percentage of loans outstanding



Sources: Regulatory filings of Canadian banks and Bank of Canada calculations Last observation: 2012Q2

Box 2

Mortgage Insurance Rules in Canada

Since 2008, the Government of Canada has taken prudent and measured steps to strengthen the minimum standards for government-backed insured mortgages in order to support the long-term stability of the housing market. **Table 2-A** highlights the key changes made to the rules. The most recent round of changes came into effect in July 2012.

Table 2-A: Key changes in government-backed mortgage insurance rules: 2008–2012

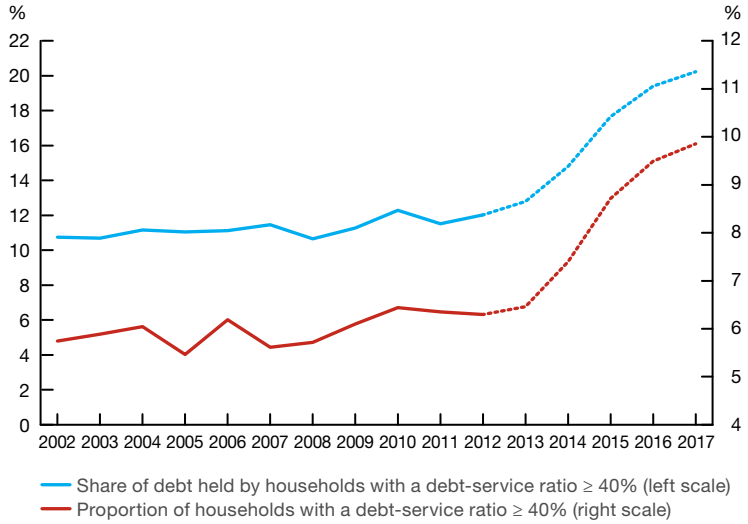
	2008	2010	2011	2012
Announcement date	9 July	16 February	17 January	21 June
Implementation date	15 October	19 April	18 March	9 July
Maximum amortization period	From: 40 to 35 years		From: 35 to 30 years	From: 30 to 25 years
Loan-to-value (LTV) limit for new mortgages	From: 100% to 95%			
LTV limit for mortgage refinancing		From: 95% to 90%	From: 90% to 85%	From: 85% to 80%
LTV limit for investment properties		From: 95% to 80%		
Debt-service criteria	Total-debt-service (TDS) ratio capped at 45%	Required that all borrowers qualify for their mortgage amount using the greater of the contract rate or the interest rate for a 5-year fixed-rate mortgage in the case of variable-rate mortgages or mortgages with terms less than 5 years		Gross-debt-service (GDS) ratio capped at 39% and TDS ratio at 44%
Other selected changes	(i) Established a requirement for a consistent minimum credit score, with limited exceptions (ii) Strengthened loan documentation standards to ensure reasonableness of property value and of the borrower's sources and level of income		As of 18 April 2011, mortgage insurance is no longer available for non-amortizing home-equity lines of credit	Mortgage insurance limited to homes with a purchase price less than $1 million

Household balance sheets remain exposed to interest rate risk

Reflecting the combination of attractively priced fixed-rate mortgages and the tightening bias of the Bank of Canada, the share of new mortgage loans with fixed interest rates has been close to 90 per cent since the beginning of 2012. This is significantly higher than its 55 per cent average over the 2010–11 period. Nevertheless, given that roughly one-third of the stock of total debt is currently at variable rates, the household sector remains exposed to interest rate risk. Under a hypothetical scenario, where the policy rate rises by 325 basis points by mid-2015, and households do not pro-actively manage their exposures to interest rate variability,[29] the proportion of total household sector debt held by households with a debt-service ratio equal to or above 40 per cent would rise from 12 per cent in 2011 to roughly 20 per cent by 2017 (**Chart 18**). This would heighten the sensitivity of the sector to adverse shocks to income.

29 For example, it is assumed that households with variable-rate mortgages do not switch to fixed rates prior to regular renewal dates and that they maintain the same rate of principal repayment.

Chart 18: Vulnerability measures would increase as interest rates rise



Note: The broken lines indicate simulation results.
Sources: Ipsos Reid and Bank of Canada calculations Last data point plotted: 2017

The momentum in house-price growth and resale activity has moderated, but housing starts remain strong

Housing activity has been elevated relative to historical norms for close to a decade, supported in particular by strong resale and renovation activity (**Chart 19**). Sales of existing homes have softened recently, falling below their 10-year average in the third quarter. In part, this reflects the effect of the tightening in mortgage rules. It is too early to tell whether this moderation in resale activity will be sustained.

Meanwhile, housing starts have remained high, and recent data on building permits suggest that this strength will persist in the near term. Housing starts, which have exceeded the estimated levels of demographic demand[30] since the second quarter of 2011, have been particularly strong for the multiple-unit segment of the market.

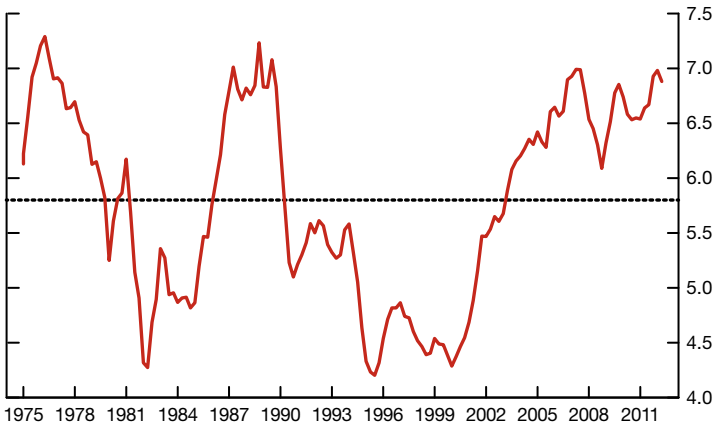
While the growth in house prices has moderated since late 2011 (**Chart 20**), prices in Canada are currently about 16 per cent higher than the previous peak in August 2008.[31] Measures of housing affordability are broadly unchanged since the June FSR and continue to suggest some overvaluation: house prices are high relative to both rent (**Chart 21**) and disposable income (**Chart 22**). Housing affordability could also become a concern as interest rates start to normalize (**Chart 23**).

30 The demographic demand for housing is estimated to be roughly 185,000 units in 2012. These estimates are calculated using an extrapolative headship-rate method, as explained in the United Nations Manual VII report (1973) "Methods of Projecting Households and Families."

31 Based on the Teranet-National Bank Composite 11-City House-Price Index.

Chart 19: The share of residential investment in GDP is elevated

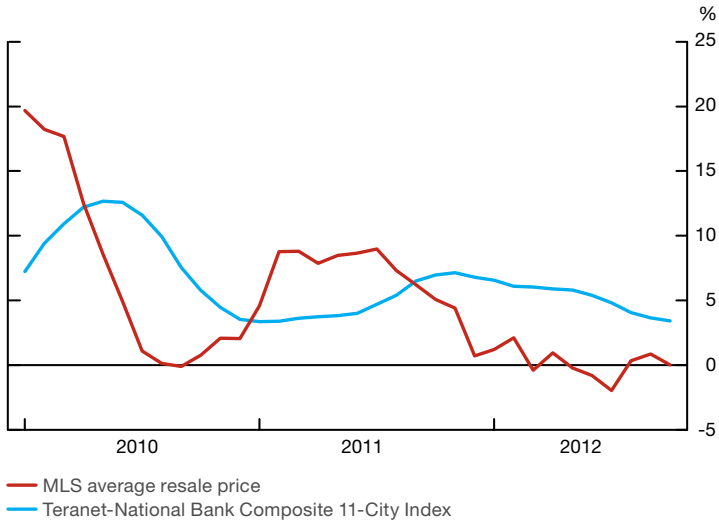
Ratio of nominal residential investment to nominal GDP



Note: The broken line indicates the historical average from 1975 to the present.
Sources: Statistics Canada and Bank of Canada calculations Last observation: 2012Q3

Chart 20: The growth of resale house prices has moderated since late 2011

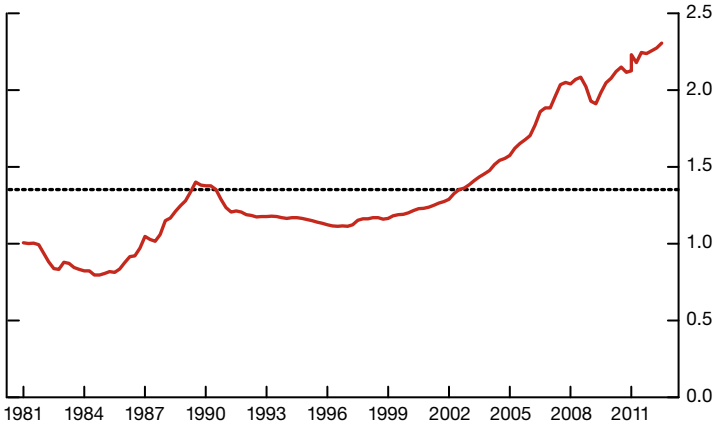
Year-over-year growth rate



Sources: Canadian Real Estate Association and Teranet-National Bank Last observation: October 2012

Chart 21: The ratio of house prices to rent is significantly above its historical average

House-price-to-rent ratio



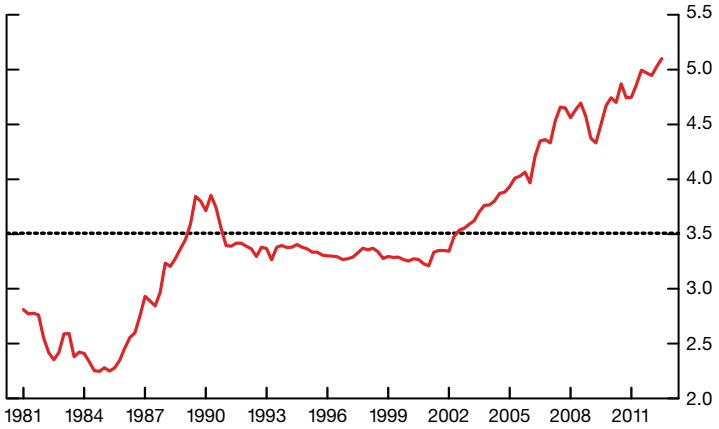
Note: The broken line indicates the historical average from 1981 to the present.

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

Last observation: 2012Q3

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

House-price-to-income ratio

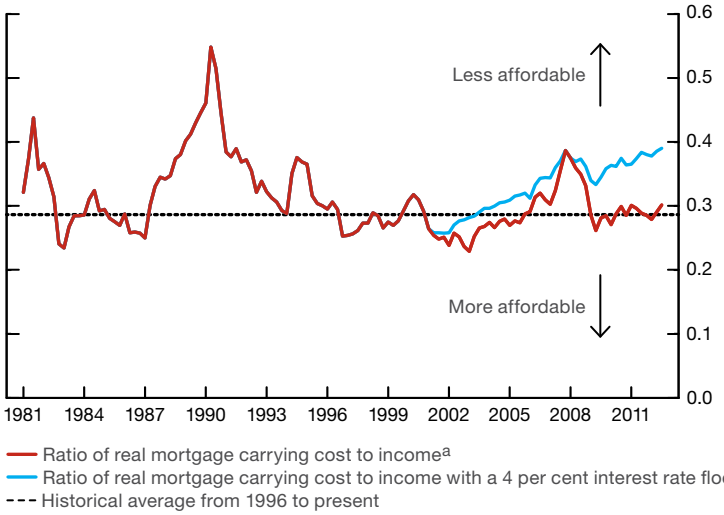


Note: The broken line indicates the historical average from 1981 to the present.

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

Last observation: 2012Q3

Chart 23: … and 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 on (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: 2012Q3

Households are vulnerable to adverse economic shocks

Canadian households are vulnerable to two interrelated shocks: a significant decline in house prices and a sharp deterioration in labour market conditions. The vulnerabilities will increase the longer imbalances persist (or grow) in the housing market and the more household indebtedness rises.

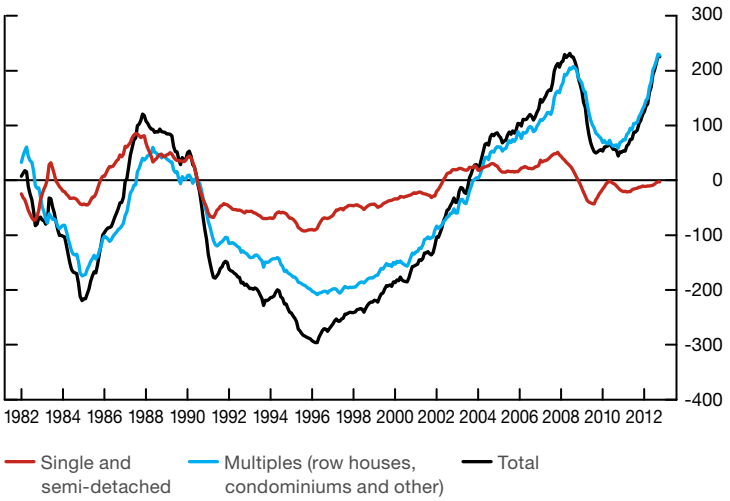
In the current context, a specific concern is that the total number of housing units under construction has been increasing and is now well above its historical average relative to the population (**Chart 24**). This development is entirely accounted for by multiple-unit dwellings (which include condominium units), especially in major metropolitan areas.[32] **Box 3** provides some further insight into the Toronto condominium market, which has experienced particularly strong growth in recent years. If investor demand has helped spur levels of construction in the condominium market that are above those consistent with demographics, this market will be more susceptible to changes in buyer sentiment. If the upcoming supply of units is not absorbed by demand as they are completed over the next 18 to 36 months, the supply-demand imbalance will become more pronounced, increasing the risk of a sudden correction in prices.

Price corrections in particular segments of the housing market may put downward pressure on house prices more generally. This would likely lead to a decline in housing activity, adversely affecting household incomes and employment, as well as confidence and household net worth, which would in turn reduce household spending. As the declines in incomes and employment impair households' ability to service their debt, loan losses

32 While the line for multiple-unit dwellings under construction in Chart 24 controls for population growth, it does not control for all the factors that could affect the balance of supply and demand in the condominium market. These other factors include shifts in preference over time toward condominiums, constraints on land supply and greater use of condominiums in the rental market. However, it is unlikely that these omitted factors could explain the majority of the deviation of multiple units from its historical average.

Chart 24: The supply of multiple-unit dwellings under construction is significantly above its historical average

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 2012

at financial institutions would likely rise. These effects may be amplified by tighter borrowing conditions as lenders come under increased stress. These interrelated factors would further dampen economic activity and add to the strains on household and bank balance sheets. They may also cause house prices to fall below the level required to correct any initial overvaluation.

In the case of a direct shock to the labour market, a sharp rise in the unemployment rate would have adverse macrofinancial effects similar to those described for the house-price shock. The effects of weaker labour market conditions are examined below in an update of the household stress test reported in the June 2012 FSR.

Box 3

The Toronto Condominium Market

The supply of high-rise units in the Toronto market—mostly apartment condominiums—has been increasing in recent years. This box provides an additional perspective on potential future supply imbalances in this market by analyzing data on new home sales and units in the pre-construction stage, supplementing the monitoring of multiples already under construction (see **Chart 24**).

Data used here are from RealNet Canada Inc.,[1] which surveys approximately 95 per cent of the builders in the Greater Toronto Area on a monthly basis, collecting information on sales and unsold units, project type (i.e., high- or low-rise), unit type (i.e., number of bedrooms and square footage), and construction status. The data set also includes a new home-price index. While data are typically available for most residential transactions from 2007 onward, some series go back as far as 2000.

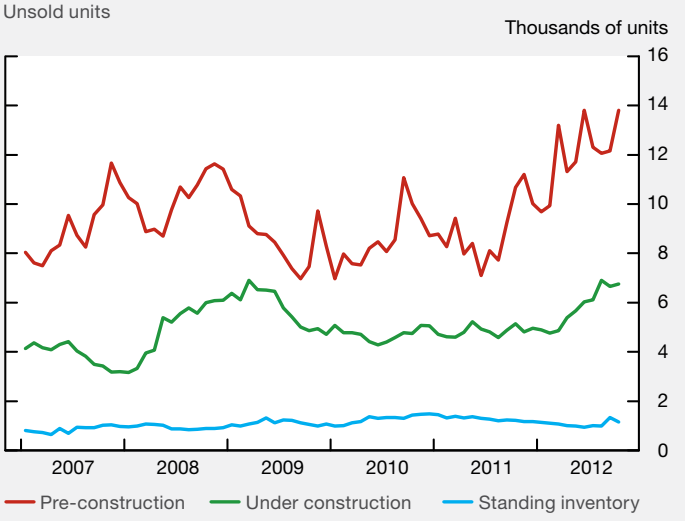
Three developments within the past few years merit continued monitoring. First, since June 2011 the number of unsold high-rise units in the pre-construction stage has risen from around 7,000 to 14,000 (**Chart 3-A**).[2] Unsold units under construction have also increased from fewer than 5,000 at the beginning of 2012 to almost 7,000. Standing inventory—completed but unsold units—has been small relative to the two other categories and fairly stable, although there has been an increase in recent months.

Second, over the past year, the prices of high-rise units have flattened[3] while their sales have declined (**Chart 3-B**). This suggests that demand is slowing at a time when the potential supply of unsold units (including those in pre-construction) is still strong.[4] Discussions with developers indicate that they are seeking to mitigate the risk of overbuilding by phasing projects and adjusting new supply to reflect the evolution of demand. Delays (or cancellations) of projects, however, can be costly. For example, in Ontario, once a contract is signed, condominium builders are liable to buyers for up to

(continued)

Chart 3-A: There is an increasing number of unsold high-rise units in the pre-construction stage and under construction…

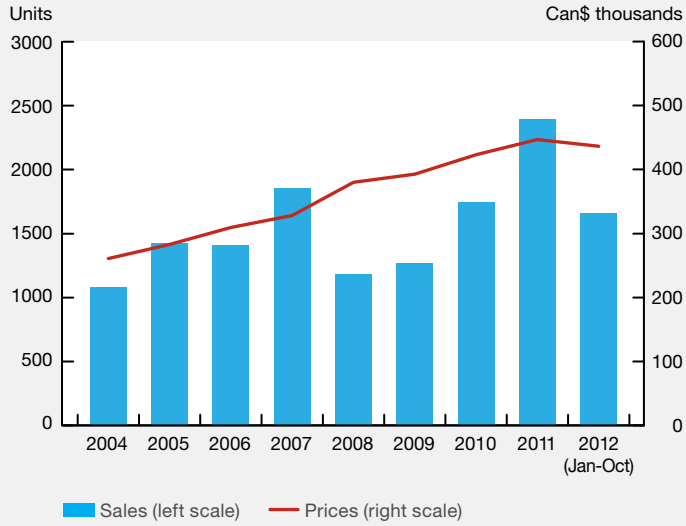
Unsold units



Source: RealNet Canada Inc. Last observation: October 2012

Chart 3-B: …while prices for high-rise units are flattening and sales are declining

Home sales and prices (monthly average)



Source: RealNet Canada Inc. Last observation: October 2012

1 RealNet Canada Inc. is an independent real estate information service provider and the official source of information for both the Building Industry and Land Development Association for the Greater Toronto Area and the Canadian Home Builders' Association—Calgary Region.

2 The total number of unsold units (i.e., the sum of high-rise and low-rise units) has also been rising since 2011Q3, despite a drop in unsold low-rise units.

3 The growth in the price per square foot of high-rise units has slowed noticeably since 2010.

4 In the past, periods in which unsold units in the pre-construction and construction stages were near current levels did not lead to higher inventories of unsold completed units since demand remained strong.

Box 3 *(continued)*

$7,500 of expenses incurred because of a delay in completion beyond confirmed occupancy dates.[5] It will be important to continue monitoring the capacity of builders to postpone construction further if future demand is weaker than expected.

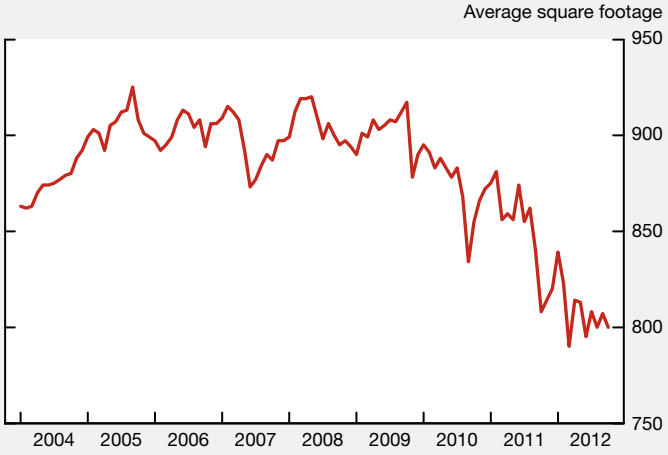
Finally, the average square footage of sold high-rise units has been decreasing since 2010 (**Chart 3-C**). One explanation consistent with anecdotal evidence is that the demand from condominium investors[6]—who tend to prefer smaller units—has risen.[7] Greater involvement by investors could potentially increase the volatility of housing prices and sales, under stressed conditions.

5 Substantial delays in a project may also cause a builder to lose its development rights to the site. Cancellation of a project would involve the loss of the developer's fixed initial investment (e.g., architecture and marketing expenditures).

6 Investors buy a unit for the purpose of renting it out or reselling it at a future date.

7 Other explanations include a shift to smaller unit sizes by builders to increase affordability, a change in residential land restrictions (e.g., the Greenbelt Plan) and a change in demand due to demographics.

Chart 3-C: The average size of sold high-rise units has decreased



Source: RealNet Canada Inc. Last observation: October 2012

Household loans in arrears would rise markedly under a stress test involving a hypothetical labour market shock

As in previous stress tests, the shock scenario entails a 3-percentage-point rise in the unemployment rate and a six-week increase in the average duration of unemployment from current levels. The scenario also includes corresponding declines in credit growth, income growth and financial asset prices, as well as a 220-basis-point increase in risk premiums for household borrowing (**Table 2**). The policy interest rate is held constant to illustrate what would happen in the absence of mitigating policy action.

Table 2: Main shock scenario assumptions

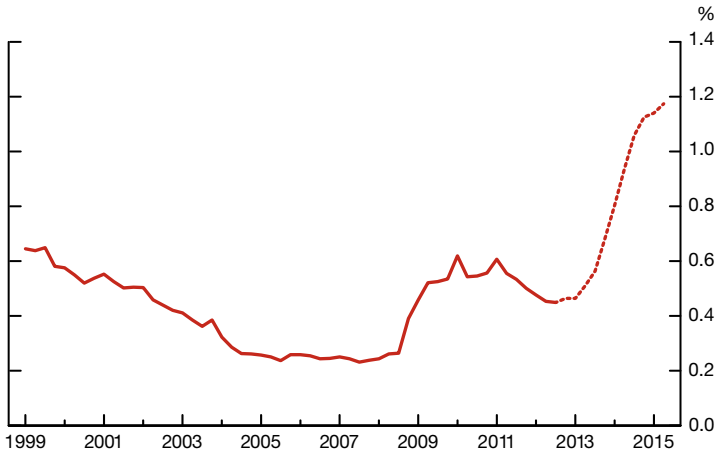
	Credit and income (quarter-over-quarter annualized growth, per cent)		Interest rates (basis points)		Unemployment (per cent)
	Growth of total household credit	Growth of disposable income	Overnight rate	Effective household borrowing rate	Rate
2012Q3	4.5	3.0	100	491	7.3
2012Q4	4.8	4.0	100	474	7.3
2013Q1	5.0	4.0	100	459	7.3
2013Q2	1.0	0.0	100	492	8.1
2013Q3	1.0	0.0	100	528	8.8
2013Q4	1.0	0.0	100	562	9.6
2014Q1	1.0	0.0	100	597	10.3
2014Q2	2.5	2.0	100	598	10.3
2014Q3	2.5	2.0	100	599	10.3
2014Q4	2.5	2.0	100	598	10.3
2015Q1	2.5	2.0	100	599	10.3
2015Q2	2.5	2.0	100	599	10.3

When subjected to a persistent unemployment shock that reaches its peak in early 2014, the proportion of household loans in arrears at domestic financial institutions is projected to rise to 1.2 per cent, compared with roughly 0.4 per cent in the second quarter of 2012 (**Chart 25**).[33] These results are consistent with those from the exercise reported in the June FSR, given that the distribution of household vulnerabilities (as measured by the debt-service ratio) and the starting-point level of loan arrears are little changed since June.

Since a number of simplifying assumptions were necessary to conduct the simulation, the results indicate possible outcomes only and do not represent a comprehensive assessment of all possible risk channels. Nevertheless, the results underscore the need for banks to carefully consider the aggregate risk associated with their household exposures. In addition, households need to assess their ability to service their debt over the entire maturity of their loans, especially as borrowing rates will eventually return to a more normal level. The Bank is co-operating closely with other federal authorities to assess on a continuous basis the risks arising from the financial situation of the household sector.

Chart 25: Household loans in arrears would rise markedly if unemployment rose by 3 percentage points

Household loans in arrears 90 days or more as a percentage of total outstanding loans



Note: The broken line indicates the stress-test result.
Sources: Regulatory filings of Canadian banks, Statistics Canada and Bank of Canada calculations

Last data point plotted: 2015Q2

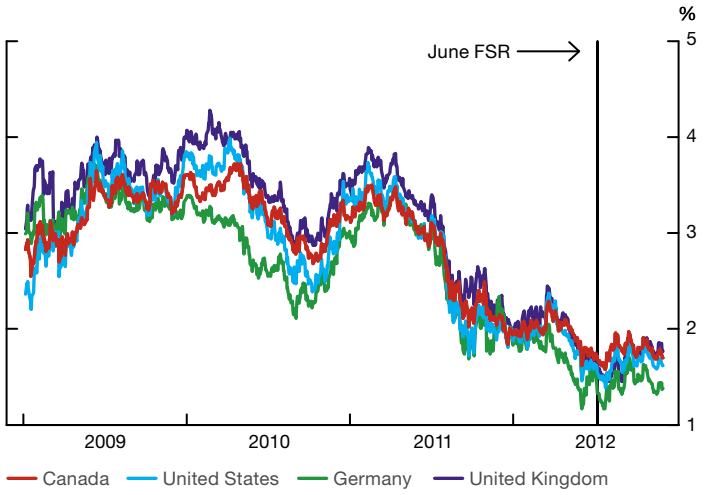
Low Interest Rate Environment in Major Advanced Economies

Interest rates in a number of advanced economies are near historic lows, partly reflecting the monetary policy response to protracted economic weakness following the global financial crisis (**Chart 26**). This low interest rate environment, while necessary to support the global economic recovery, can create risks to the stability of the financial system over time. There are two dimensions to these risks. First, low interest rates put pressure on the balance sheets of institutional investors that hold long-duration liabilities (such as life insurance companies and defined-benefit pension plans), weakening their financial

33 Data for the value of loan arrears (including off-balance-sheet arrears) are not available before 1997. However, the *number* of on-balance-sheet mortgages in arrears—which show a level and trend similar to the *value* of mortgage loan arrears and total arrears—is available back to the early 1990s. These data indicate that the number of mortgages in arrears peaked at 0.7 per cent in 1992, compared with 1.2 per cent in our stress-test simulation. Total household loans in arrears in the United States peaked at almost 9 per cent in early 2010.

Chart 26: Long-term yields on sovereign bonds remain low in advanced economies

Yields on 10-year sovereign bonds



Source: Reuters

Last observation: 30 November 2012

positions and making them more vulnerable to adverse shocks. Second, low interest rates increase the incentives for excessive risk taking in a search for yield, which can distort the pricing of both real and financial assets. These two dimensions of risk are interrelated, since the drive for yield may be more intense for institutions facing balance-sheet pressures. Since June, the exceptional monetary policy stimulus provided by some central banks has kept long-term yields low and exerted upward pressure on the prices of various risky assets, both by reinforcing market expectations that interest rates will stay low for an even longer period of time than previously expected and through the portfolio effects of the operations themselves.

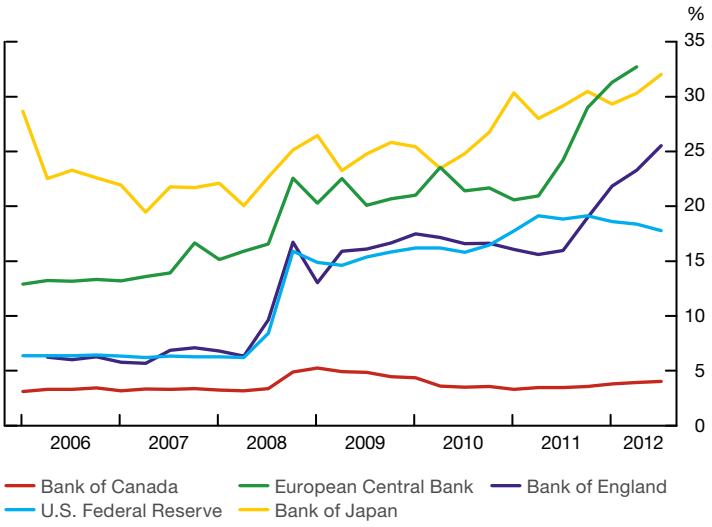
Evidence of excessive risk-taking behaviour by pension funds and life insurance companies, and in global financial markets more generally, remains limited, although there have been some indications that investor tolerance for risk is increasing. Overall, the risks to financial stability from an extended period of low interest rates are judged to be moderate, although concerns have increased slightly relative to June.

Interest rates in major advanced economies are expected to stay low for an extended period

Central bank balance sheets have expanded considerably in the wake of the financial crisis (**Chart 27**). In particular, central banks in a number of advanced economies have taken measures to strengthen their accommodative monetary policy stance. The U.S. Federal Reserve announced that it would lengthen the duration of its maturity-extension program until the end of 2012, and that it would conditionally keep the federal funds rate at an exceptionally low level at least through mid-2015—approximately half a year longer than its previous conditional commitment. To increase policy accommodation further, the Federal Reserve also announced plans to purchase agency mortgage-backed securities (discussed earlier on page 6). In addition, in July, the European Central Bank lowered its main refinancing rate by 25 basis points to 0.75 per cent, and the Bank of England increased the total size of its gilt

Chart 27: Some central banks have expanded their balance sheets substantially in recent years

Central bank assets relative to GDP



Last observations: European Central Bank, 2012Q2; other countries, 2012Q3

Sources: Bank of Canada, Statistics Canada; U.S. Federal Reserve, U.S. Bureau of Economic Analysis; European Central Bank, Statistical Office of the European Communities; Bank of England, U.K. Office for National Statistics; and Bank of Japan and Cabinet Office of Japan

Chart 28: Co-movements in asset prices may partly reflect ample liquidity in the financial system

Contribution of the first common factor to the variation in asset returns, estimated through principal-component analysis (52-week rolling window)

Note: Principal-component analysis is based on a statistical methodology that describes co-movements among variables in terms of a small number of uncorrelated common factors. If all of the data under consideration are perfectly correlated, the first common factor would explain all of the variation in the data; conversely, if all of the data are uncorrelated, the first factor would explain little of the variation. Data used include most major asset classes such as equities, bonds, commodities and foreign exchange.

Sources: Bloomberg, Bank of America Merrill Lynch and Bank of Canada calculations

Last observation: 30 November 2012

purchase program by £50 billion to £375 billion. Finally, the Bank of Japan increased the size of its Asset Purchase Program from ¥70 trillion to ¥80 trillion in September and then to approximately ¥91 trillion in October.

While appropriate, these measures have contributed to increased liquidity in the global financial system and may lead to distortions in asset prices as agents search for yield. The extraordinary liquidity provided by central banks may be pushing down measures of financial market volatility and increasing correlations across a wide range of asset classes (**Chart 28**). High correlations could increase the likelihood of shocks being transmitted from one class to another, generating increased volatility across markets.

In Canada, long-term interest rates have declined over much of the past two years, even though policy rates have remained unchanged. This decline largely reflects external factors, including spillover effects from accommodative U.S. monetary policy and lower prospects for global economic growth. Furthermore, Canada's growing status as a safe haven, reflecting its sound fiscal situation and strong financial system, is attracting inflows of foreign capital.

The balance sheets of life insurance companies are under pressure in the low interest rate environment

Financial results for the third quarter of 2012 indicate that core earnings at the large Canadian life insurance companies remain subdued, in large part reflecting a combination of direct and indirect effects of the extended period of low interest rates.[34] The direct effects are transmitted through the impact of low interest rates on profitability, since life insurance companies are forced to reinvest cash flows at a lower yield than assumed when policies were first issued. Similarly, the existing longer-term liabilities would need to be discounted at an ultimate reinvestment rate, which would be declining over time. These direct effects become larger the longer the low interest rate environment persists. Indirect effects are transmitted through management actions taken in response to low interest rates.

Life insurers have generally been proactive in managing their business risks. In Canada, life insurance companies have exited some product lines, redesigned and broadly repriced products with guaranteed features, and implemented extensive hedging programs. They have also aggressively promoted products that carry less financial risk to themselves.

Although these strategies contribute to the rebalancing of business models and dilute the negative effect of interest-rate-sensitive products, long-term risks remain a significant challenge for the industry. Profitability could be constrained over the medium term by the extensive hedging programs that have been implemented to reduce tail risks. Furthermore, although sales have remained relatively resilient despite changes in products, a persistent low interest rate environment could eventually affect the overall attractiveness of insurance products. Finally, while some of the changes pursued by life insurance companies may result in reduced sensitivity to interest rate risk, they could generate other risks (**Box 4**).

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34 Under Canadian accounting and actuarial standards, Canadian insurers have had to respond to low interest rates much sooner than many foreign insurers. This means that the low interest rate environment is affecting current earnings for Canadian insurers more than their international peers (especially those in the United States). As a result, Canadian institutions have been quicker than their foreign peers to adjust their business models and strategies to the low interest rate environment.

Box 4

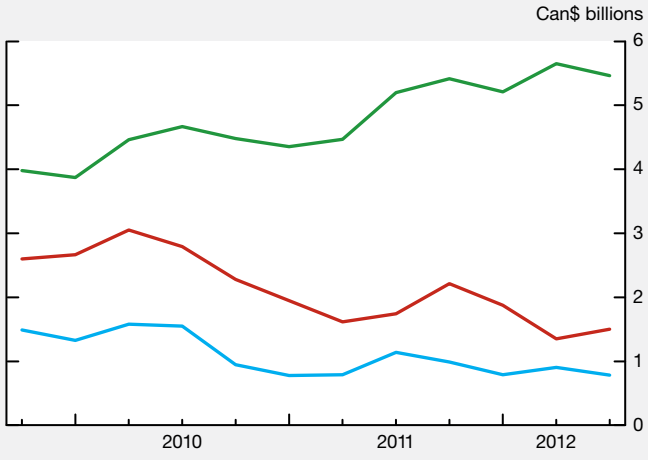
The Impact of Market Risk Factors on the Canadian Life Insurance Sector

To meet their liabilities, life insurers hold large amounts of assets, the current value of which can be affected by various factors. For example, since invested assets often mature before the liabilities they support, financial reporting by life insurers must use assumptions regarding the rates of return at which cash flows will be reinvested. These assumptions are updated quarterly to reflect changes in the investment universe. Life insurers also conduct stress tests to assess their exposure to (i) interest rate risk; (ii) equity risk; and (iii) assumptions about future expected returns on non-fixed-income (NFI) assets.[1]

Life insurers report the impact of shocks to these market risk factors on earnings. **Chart 4-A** shows the aggregate impact on earnings for the three major Canadian life insurers.[2] Sensitivity to interest rate risk is measured by the effect of a 100-basis-point parallel shift in the yield curve; sensitivity to equity risk is measured by the impact of a 10 per cent decline in equity markets; and sensitivity to the assumptions for NFI returns is measured by the effect of a 1 per cent decline in the return projected for NFI assets.

The impact of declining interest rates has decreased over the past two years (**Chart 4-A**). This can be explained in part by the reduction in asset-liability mismatches obtained by lengthening the duration of investment portfolios. However, this trend has also been accompanied by a corresponding increase in the sensitivity to NFI assets, which likely reflects management actions taken by life insurers to offset the impact of low interest rates. This raises two concerns. First, the assumptions regarding returns on NFI assets may be overly optimistic.[3] Second, if assumed returns on NFI assets are too high, there is an incentive for insurers to increase the share of these assets in their investment portfolios, which exposes them to risks that are potentially less well understood.

Chart 4-A: Impact of market risk factors on earnings of life insurers



Sources: Quarterly returns of Great-West Life, Manulife Financial Corporation and Sun Life Financial — Last observation: 2012Q3

1 Non-fixed-income assets include alternative assets such as private equity, timber, land, real estate and infrastructure.

2 The three companies used in our sample are Great-West Life, Manulife Financial Corporation and Sun Life Financial. Caution must be used when interpreting the sensitivities, owing to changes in methodology over time and the fact that individual companies use different methodologies.

3 There is no explicit rule guiding these assumptions. Moreover, there is limited disclosure regarding expected returns on non-fixed-income assets, which makes it difficult to assess the assumptions about valuation used by insurers.

Strategies used by pension funds to address interest rate risk can pose other risks

The low interest rate environment is also continuing to pose challenges for the solvency of defined-benefit pension funds. By their nature, these plans have liabilities that extend over the long term—in some cases, further out into the future than most traditional investible assets. This asset and liability mismatch exposes pension plans to interest rate risk. As long-term interest rates decline, the present value of the plans' future liabilities increases by more than that of their assets, creating a funding deficit.

To shield the funding status of their plans from changes in interest rates, many plan sponsors have adopted liability-driven investment (LDI) strategies, which enable them to better match the sensitivity of liabilities and assets to changes in interest rates. The LDI framework can encompass a wide range of strategies that most often involve lengthening the average

Box 5

Tools Used for Leveraged Liability-Driven Investment Strategies

Liability-driven investment (LDI) strategies range from simple investment solutions to more sophisticated strategies that employ leverage. Some of the main types of leveraged LDI strategies pursued by pension funds are bond forwards, term repos, interest rate swaps and other derivatives, including overlay portfolios. Each of these strategies is described below.[1]

Bond forwards and term repos, which are regarded as close substitutes, involve the purchase of bonds using short-term financing provided to the pension fund by a bank or securities dealer. These transactions are often used to add leverage to a portfolio of typically long-term bonds. The levered positions are rolled over at maturity (usually 1 to 3 months), enabling the pension fund to achieve a greater interest rate hedge by increasing its exposure to long-term fixed-income products without increasing the cash allocation or reducing the exposure to other asset classes (e.g., equities). The level of leverage depends on the fund's mandate and risk appetite, and will be restrained by the willingness of lenders to extend credit. Since liquidity risk is a concern for both the lender and borrower of cash, in general, only highly liquid securities such as federal and provincial government bonds are used. Financing government bonds in the repo market introduces rollover risk for the pension fund, since the banks or dealers that provide financing have no obligation to renew it when the transactions mature. If a market event caused the counterparties to suddenly contract their balance sheets and not renew the repos, the pension funds could be forced to sell the underlying bonds or other liquid assets to deleverage the portfolios, subjecting the market to further stress.

Long-term **interest rate swaps**, often as long as 30 years, are contracts where the pension fund receives a fixed rate of interest from its counterparty and pays a variable interest rate in exchange. The intent is to structure the swap in a way that fluctuations in its value largely offset fluctuations in the fund's liabilities. Interest rate swaps are used as a way to hedge the long-term interest rate risk for the term of the swap, but introduce other sources of risk such as counterparty risk and basis risk.[2] Various agreements can be set up with counterparties to mitigate this counterparty risk, and at the same time, avoid large cash flows during the life of the transaction.[3]

Other derivatives, such as total return swaps, options and futures contracts on interest rates and global equity indexes, can also be used to add leverage to the fund, depending on the targeted return and risk profile. The leveraged strategies can also be combined in complex actively managed **overlay portfolios** to expose the pension plan to one or more asset classes or risk factors, in a hedge-fund-like manner. The cash generated through leverage can be deployed by purchasing additional assets with a view to enhancing the fund's return.

Leveraged LDI strategies are designed to reduce the interest rate risk of the pension fund. However, they introduce other risks such as refinancing, liquidity, counterparty and basis risks that may exacerbate a pre-existing market disruption.

1 Regulatory changes such as the new capital and liquidity rules for banks and broker dealers may raise the costs of repos and swaps, which could limit the use of leveraged LDI strategies in the future.

2 Basis risk is the risk that the hedge will not exactly offset the risk that the fund is intending to protect itself against, because of imperfect correlation between the original risk and the hedging strategy implemented. In this example, the basis risk would be the risk that the swap rate does not fluctuate in line with the discount rate used to assess the present value of the pension fund's future liabilities (which is typically based on a AA corporate bond rate). During the financial crisis, for example, swap rates declined while corporate bond spreads increased substantially.

3 More commonly, International Swaps and Derivatives Association documentation has credit support annexes.

duration of fixed-income securities and allocating more of the portfolio to fixed-income investments rather than equities, to provide a better hedge against interest rate risk. Some of the more sophisticated Canadian pension funds are using leverage to further reduce their exposure to interest rate risk while preserving a certain desired exposure to other asset classes (notably equities) to increase returns.[35]

Typically, leveraged LDI strategies include the use of term repurchase agreements and derivatives contracts, such as interest rate swaps and bond forwards (**Box 5**). While effective in reducing the interest rate exposure of the fund, leveraged LDI strategies expose pension plans to additional risks, including refinancing, liquidity, counterparty credit and basis risks

35 This is mostly being done by the larger pension funds, although some smaller funds are also implementing leveraged LDI strategies through external managers.

that need to be well understood and properly managed. While the use of leveraged LDI strategies is not yet the norm in the Canadian pension industry, anecdotal evidence suggests that a large number of funds are planning to implement them as interest rates rise and their funding ratios improve.

There are indications that investor risk tolerance is increasing, albeit from low levels

Indicators of risk appetite remain below longer-term averages. For example, surveys suggest that investors' willingness to take on risk has been subdued, in part reflecting the uncertain macroeconomic outlook. However, there have been signs of a moderate increase in risk-taking behaviour by some investors in recent months.

In particular, supported by robust investor demand, including from non-traditional investors searching for higher returns (through mutual funds and exchange-traded funds), issuance in the U.S. high-yield market has been robust (**Chart 1**), and yields are near all-time lows. It is uncertain whether new investors fully understand and have the ability to adequately manage the risks associated with these securities. For example, high-yield securities tend to exhibit lower levels of secondary-market liquidity. In addition, the recent decline in dealer inventories of corporate bonds (including high-yield securities) resulting from balance-sheet pressures and the adjustment of banks to new regulatory requirements has further reduced secondary-market liquidity for all grades of corporate bonds, which could lead to higher market volatility and losses in the case of a shock. This may be further exacerbated if a large number of investors attempt to exit their positions simultaneously. Furthermore, periods of robust investor demand may be associated with declining covenant standards, which can leave investors more susceptible to losses. There are indications that this might be occurring in the United States.

The incentive to search for higher returns stemming from the low interest rate environment in advanced economies has also increased flows into fixed-income, and to a lesser extent, equity securities within emerging-market economies (EMEs). Authorities in some EMEs have reacted with policy interventions to limit the upward pressure exerted on their currencies by these capital inflows. These policy actions may prevent or delay the process of real exchange rate adjustment that is necessary to correct global imbalances.

Despite this evidence of a moderate rise in risk taking, there are no obvious signs of overvaluation in financial markets. For example, price-to-earnings ratios for major equity indexes are generally below their longer-run averages, and corporate credit spreads (including high-yield spreads) are well above the levels seen prior to the crisis.

Policy-makers need to closely monitor changes in investors' risk-taking behaviour and business strategies

As the economic outlook improves, interest rates in major advanced economies will return to more normal levels. Failure to factor this eventuality into business and investment strategies could lead to losses for some investors. Alternatively, interest rates may remain low for an even longer period than some entities currently anticipate, requiring further changes to their business models, which may become more costly to implement the longer they are delayed. In addition, significant volatility and losses may result if investors try to exit from some asset classes en masse in response to a change in perception regarding the interest rate environment.

For policy-makers, the timing and manner of the unwinding of the extraordinary liquidity in the financial system will be an important challenge. In the interim, risk-taking behaviour in financial markets (including that related to financial innovation) needs to be closely monitored to identify the early emergence of excessive concentrations of risk and to mitigate their potentially destabilizing consequences in a timely manner. This task is complicated by the fact that excessive risk-taking behaviour in the financial system can manifest itself in new ways.

Safeguarding Financial Stability

While the financial system in Canada is in good condition, the Governing Council judges that the overall level of risk to the system remains high. Concerns arise from the combination of sovereign debt, banking strains and underlying imbalances in the euro area; deficient global demand; the vulnerability of Canadian households to adverse house-price and labour market shocks; and the potential effects of low interest rates on the profitability of some financial institutions and on risk-taking behaviour in the major advanced economies.

This issue of the FSR outlines a number of policy priorities that would help to mitigate these risks. In the euro area, a comprehensive, clear and credible policy framework is needed. The framework needs to include the full development and implementation of the banking union within the common currency area. This would involve carrying out current plans for a single banking supervisor and supplementing it with common deposit insurance and cross-border bank resolution. Further structural reforms will be required in both debtor and creditor euro-area countries to narrow divergences in competitiveness, including measures to enhance labour market flexibility and mobility. It will be important to ensure that vulnerable sovereigns have access to funding at reasonable rates over the timeline of these structural reforms. Additional work also needs to be done on constitutional and institutional changes to deal with issues related to fiscal oversight and mutualization of sovereign debt. In the United States, a clear and credible plan is required to address the fiscal cliff and the medium-term fiscal challenges. Meanwhile, in China, financial sector and other structural reforms, as well as greater flexibility in nominal exchange rates, will be needed to shift its demand toward consumption and to help foster sustainable and balanced economic growth, both in China itself and globally.

In Canada, the strained financial position of households and signs of stresses in the housing market require vigilance. Since the June FSR, a number of measures have been announced that should help to improve the resilience of Canada's mortgage market. In June, rules for government-backed mortgages were changed (**Box 2**, **Table 2-A**). In addition, full implementation of the Office of the Superintendent of Financial Institutions' (OSFI) mortgage underwriting guidelines by federally regulated financial institutions is expected to take place no later than fiscal year-end 2012. To further mitigate risks, households should make sure that their borrowing is in line with their ability to service their debt over the duration of their loans. Financial institutions must ensure that they have rigorous lending practices in place and are actively monitoring their risks, consistent with OSFI's guidelines for mortgage underwriting. For their part, authorities in Canada will continue to carefully monitor the financial situation of the household sector and developments in the housing market.

The risks highlighted in this FSR also underscore the need to strengthen the domestic and global financial market infrastructure in order to improve the resilience of the financial system to adverse shocks. Good progress has been made on this front since June, both in Canada and internationally. In October, Canadian authorities announced that market participants will be able to clear standardized over-the-counter derivatives using any central counterparty recognized by Canadian authorities, including global central counterparties. A report describing this decision is included in this issue of the FSR on page 43. The Bank has also adopted new international risk-management standards for systemically important financial market infrastructures, which will further improve the robustness of Canada's financial infrastructure. These new standards are outlined in a report on page 51.

At the international level, there has been progress toward ending "too big to fail," by subjecting systemically important financial institutions to higher loss-absorbency requirements, greater supervisory scrutiny, and a credible and effective resolution regime in the event of their failure. The Financial Stability Board (FSB) has proposed an initial set of recommendations to monitor the evolution of the shadow banking system, and a policy framework for identifying and, where needed, responding to potential systemic risks arising from shadow banking. The Basel Committee on Banking Supervision and the FSB have also completed the framework for dealing with domestic systemically important banks, and the FSB has proposed policy measures for global systemically important insurers.

Notwithstanding this progress, more needs to be done in other areas of the international financial reform agenda. In particular, it is imperative that all jurisdictions fully and consistently implement the Basel III rules. Canadian banks are expected to meet Basel III capital requirements by the beginning of 2013, which is the start of the phase-in period that extends to 2018.

Reports

Reports examine selected issues of relevance to the financial system.

Introduction

This section of the *Financial System Review* contains two reports that discuss recent measures taken by Canadian authorities in the over-the-counter (OTC) derivatives market and with respect to the oversight of financial market infrastructures. These measures are aimed at strengthening the resilience of the Canadian financial system.

In response to the economic and financial crisis of 2007–09, leaders of the G-20 countries agreed to a series of reforms to OTC derivatives markets, including a commitment that all standardized OTC derivatives be cleared through central counterparties (CCPs). This meant that Canadian authorities had to decide whether a global approach to clearing, which relies on large foreign-domiciled CCPs, is appropriate for Canadian market participants or whether they should be required to pursue a local approach and clear at a CCP located in Canada. In **The Canadian Approach to Central Clearing for Over-the-Counter Derivatives**, Nikil Chande, Jean-Philippe Dion, Darcey McVanel and Joshua Slive discuss the trade-offs between the global and local approaches to clearing and explain why Canadian authorities decided that Canadian market participants may clear OTC derivatives using any CCP recognized by Canadian authorities, including global CCPs. The report reviews the financial stability, efficiency and market-development considerations relevant to the decision, as well as international work led by the Financial Stability Board to establish four safeguards that provide authorities with the tools to protect local markets when OTC derivatives are cleared through global CCPs.

The Bank of Canada oversees financial market infrastructures that are of systemic importance to Canada, with the primary objective of ensuring that systemic risk is adequately controlled. In **The Bank of Canada's Approach to Adopting the Principles for Financial Market Infrastructures**, Darcey McVanel and Joey Murray discuss the new Principles related to risk management, efficiency and transparency that have been introduced for systemically important payment systems, securities settlement systems, central securities depositories, central counterparties and trade repositories (collectively referred to as "financial market infrastructures"). The authors describe how the Bank applies the Principles as part of its oversight of financial market infrastructures. These Principles represent a significant development in further improving the robustness of financial market infrastructures and the financial system, directly supporting the Bank's oversight objective.

The Canadian Approach to Central Clearing for Over-the-Counter Derivatives

Nikil Chande, Jean-Philippe Dion, Darcey McVanel and Joshua Slive[1]

Introduction

The financial crisis revealed important weaknesses in the infrastructure of over-the-counter (OTC) derivatives markets. As a result, leaders of the Group of 20 (G-20) agreed to reform these markets to improve their transparency, protect against market abuse and, ultimately, to mitigate systemic risk.[2] This report focuses on Canada's approach to implementing one key element of the reform agenda: the commitment that all standardized OTC derivatives should be cleared through central counterparties (CCPs).

A CCP is a financial market infrastructure that stands between buyers and sellers in financial transactions, ensuring that obligations will be met on all contracts cleared through the CCP. By managing and mitigating counterparty credit risk, CCPs have the potential to reduce systemic risk, thereby reducing the potential for financial shocks to be transmitted throughout the financial system and supporting the ability of markets to remain continuously open, even in times of stress (Chande, Labelle and Tuer 2010).

For OTC derivatives markets that are currently centrally cleared, a small number of large global CCPs offer clearing across multiple jurisdictions and currencies.[3] Canadian authorities (as well as those in most other G-20 jurisdictions) have had to decide whether they could adequately protect the stability of local financial markets under a global approach to clearing that allows the use of global CCPs recognized by Canadian authorities. The alternative would be a local approach, where authorities would require Canadian market participants to do some of their clearing through a CCP located in Canada.[4] Because of the international nature of OTC derivatives markets, a local approach would not likely rely solely on a local CCP, and some trades would continue to be cleared through global CCPs.

This report reviews the financial stability, efficiency and market-development considerations that create trade-offs between the global and local approaches to clearing, as well as the reasons why authorities in Canada have decided that Canadian market participants may clear OTC derivatives using any CCP recognized by Canadian authorities, including global CCPs.[5] While a local CCP would provide the most straightforward oversight and the best capacity for Canadian authorities to intervene and control risks, a global approach that makes use of large global CCPs has the potential to be more efficient and more robust to certain types of shocks.

In response to these trade-offs, the Financial Stability Board (FSB) has worked with other international standard-setting bodies to establish four safeguards for clearing OTC derivatives through a global framework of CCPs (FSB 2012). The safeguards, together with international standards for CCPs, protect the stability of local markets and, in particular, address concerns that may arise when locally important markets are cleared through offshore CCPs. The Bank of Canada and other Canadian authorities are satisfied with the pace and

1 The authors thank the members of the Bank of Canada's OTC Derivatives Task Force and the interagency OTC Derivatives Working Group for contributing to the analysis on which this report is based.

2 These commitments were made in September 2009 at the G-20's Pittsburgh Summit (G-20 2009) and reaffirmed at the Toronto Summit in 2010 and the summits in Cannes (2011) and Los Cabos (2012). Wilkins and Woodman (2010) describe how these reforms can strengthen the infrastructure of OTC derivatives markets in Canada.

3 The only current Canadian clearing service for OTC derivatives is an OTC equity clearing service offered by the Canadian Derivatives Clearing Corporation.

4 Clearing requirements would be subject to appropriate exemptions.

5 This decision was announced in the "Statement by Canadian Authorities on Clearing of Standardized OTC Derivatives Contracts" on 1 October 2012, available at <www.bankofcanada.ca/2012/10/notices/statement-by-canadian-authorities/>.

direction of international efforts to implement the four safeguards at CCPs of interest to the Canadian market and are therefore comfortable with the global approach to clearing. They will continue to monitor the market for clearing services and work with authorities in other jurisdictions toward the full achievement of the four safeguards and compliance with international standards for CCPs.

A Framework for Choosing Between the Global Approach and the Local Approach

When choosing an approach to clearing, Canadian authorities considered the potential effect of the two options on the stability, efficiency and development of Canadian markets. These three considerations are interrelated on many levels. For example, efficient markets are important both for promoting a resilient and robust financial system and for developing Canadian financial markets and infrastructures.

The international nature of OTC derivatives markets plays an important role in this framework. Transactions in OTC derivatives frequently involve counterparties in different jurisdictions, and market participants regularly trade in several currencies and across various types of OTC derivatives. For example, the majority of trades in Canadian-dollar OTC interest rate derivatives (measured in notional amount outstanding) involve at least one offshore counterparty, and Canadian dealers have large portfolios of derivatives that are not denominated in Canadian dollars. Thus, a CCP located in Canada would likely capture only a portion of the market, which limits the potential benefits of the local approach.[6]

Financial stability

CCPs concentrate counterparty risk and are critical to the functioning of cleared markets. If they incorporate appropriate risk controls, they can enhance financial stability; otherwise, they can be a source of financial stress. Authorities in Canada have considered the extent to which instability at a global CCP could affect Canadian markets and participants. Critical elements of this analysis are (i) the capacity of Canadian authorities to oversee the CCP's activities during the normal course of business and to intervene to mitigate shocks during a crisis, if necessary; and (ii) how the structure of both the CCP and the cleared market affect the CCP's ability to mitigate financial shocks.

(i) Capacity to oversee

Domestic authorities, including the Bank of Canada and provincial securities commissions, have oversight responsibility for CCPs.[7] Authorities would be particularly interested in the Canadian-dollar activities of a global CCP and the risks to Canadian participants through their use of that CCP. The main oversight objective of the authorities is to make sure that risk is being appropriately controlled. This would include, among other things, ensuring that CCPs meet the applicable risk-management standards—the Principles for Financial Market Infrastructures developed by the Committee on Payment and Settlement Systems and the Technical Committee of the International Organization of Securities Commissions (the CPSS-IOSCO Principles).[8]

Overseeing a CCP located in Canada is more straightforward than overseeing a CCP located in another jurisdiction, because Canadian authorities would typically take the lead in regulating the CCP and have a full set of legal mechanisms for enforcing their requirements. However, the oversight benefits would accrue only to the portion of the market being served by the local CCP.

It is more complicated for Canadian authorities to oversee a global CCP, since Canadian authorities would not be the primary regulator and would generally have less direct influence. Authorities would therefore look for mechanisms to facilitate their oversight. Participation in a formal co-operative oversight framework—in which the home regulator takes the lead and works with other participating authorities—would be one way for Canadian authorities to effectively oversee a global CCP. The Bank of Canada considers co-operative oversight to be an effective mechanism to fulfill its oversight responsibilities for a global CCP.

(ii) Ability to mitigate shocks

CCPs promote financial stability by having clear and robust processes in place to manage member defaults in an orderly fashion. In the event of a default, the CCP takes on the obligations of the defaulting member's portfolio and manages this risk with the technical and—in some cases—financial assistance of other members. The effective

6 A CCP located in Canada is unlikely to capture a large share of OTC derivatives clearing in foreign currencies. For Canadian-dollar trades, a local clearing requirement could not capture trades that involve two foreign counterparties, and a CCP located in Canada would not be able to attract all market participants, for reasons discussed in the "Efficiency" section on page 45.

7 The Bank of Canada is responsible for the oversight of CCPs that it has designated under the Payment Clearing and Settlement Act. Provincial securities regulators oversee all CCPs carrying on business in their province.

8 The CPSS-IOSCO Principles are a harmonized set of risk-management standards that are applicable to all systemically important financial market infrastructures, including CCPs (CPSS-IOSCO 2012a). McVanel and Murray (this issue) describe how the Bank of Canada is implementing the Principles.

management of a default thus requires a strong membership and access to liquid and efficient markets. Because participants play an important role in this respect, even CCPs that meet harmonized risk-management standards, including the CPSS-IOSCO Principles, may differ in their ability to manage severe shocks, such as the simultaneous default of multiple clearing members.

All else being equal, a global CCP will generally have a greater capacity to manage member defaults than a local CCP, since the membership of a global CCP will be larger and more diverse, consisting of market participants from many different jurisdictions. This means that if a member defaulted, a global CCP would have a larger pool of surviving members to help hedge and replace the defaulted portfolio. Moreover, a global CCP is also likely to have greater financial capacity to absorb losses in the event of a default.

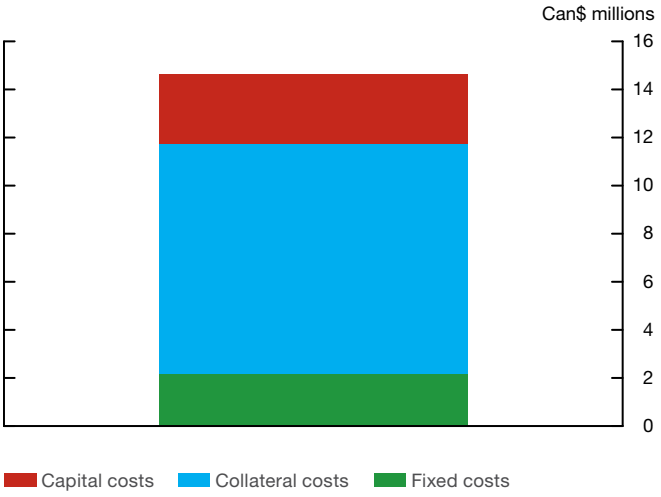
Participating in a global CCP could, however, expose Canadian participants to shocks arising from the default of participants based in other jurisdictions, since stress might be transmitted to markets in Canada through the default-management mechanism of the global CCP. The local approach might insulate markets in Canada from some international shocks if Canadian participants cleared *only* at their local CCP. Unfortunately, this benefit would be limited, since Canadian dealers would still need to be members of global CCPs to clear non-Canadian products, and some global dealers would probably be members of a CCP located in Canada. As a result, even under the local approach to clearing, Canadian participants could suffer financial losses stemming from the default of CCP members based in other jurisdictions.

Efficiency

The local approach would be more costly than the global approach for Canadian market participants and would adversely affect market efficiency. A CCP located in Canada would clear primarily Canadian-dollar derivatives, likely forcing its users to split their cleared portfolios between the local and global CCPs. This would increase costs in three ways. First, to recover the fixed costs of building and operating a local CCP, its users would need to pay membership and clearing fees to the local CCP in addition to fees paid to global CCPs. Second, the amount of collateral required would increase, since users would benefit from less cross-currency diversification and netting of risk exposures in their cleared portfolios. Users would also be required to contribute to the default fund of a local CCP, as well as to the default funds of other CCPs. Third, regulatory capital costs for users would rise, owing to reduced netting of risk exposures and the additional default-fund contributions.

Chart 1: Increased annual costs of local vs. global clearing for a hypothetical Canadian dealer

Illustrative estimates for the interest rate swap market



Source: Bank of Canada

The higher costs associated with using a local CCP would likely lead to market fragmentation and decreased market liquidity in Canadian-dollar OTC derivatives. Market participants not obligated to clear in Canada would have an incentive to concentrate their clearing through global CCPs. Since trading can occur only when both counterparties clear through the same CCP, Canadian market participants would consequently have fewer trading opportunities and would face decreased market liquidity. Reduced liquidity would further raise the costs of clearing and trading for Canadian market participants.

Reform of OTC derivatives markets will substantially increase capital, collateral and fixed costs for all market participants. Clearing Canadian-dollar interest rate swaps in a local CCP would add approximately $15 million per year in costs above the costs of the global approach for a hypothetical Canadian dealer, according to our estimates. This could represent more than 20 per cent of the dealer's profits related to these trades and a total cost of $150 million per year to market participants in Canada. **Chart 1** highlights the relative importance of the three factors that render local clearing more costly. [9]

9 Estimated costs are based on the portfolio of a hypothetical mid-sized dealer, as well as specific assumptions about future market and regulatory changes. They are provided only to illustrate the different efficiency considerations.

The higher costs associated with clearing locally would reduce incentives to use standardized and clearable derivatives products, possibly reducing the adoption of central clearing. They could also discourage the use of derivatives to manage risk and might put Canadian market participants at a competitive disadvantage relative to their global peers. Most importantly, perhaps, decreased liquidity in a fragmented market could reduce the ability of the local CCP to effectively manage risk and handle participant defaults. In contrast, a global CCP with access to a liquid and efficient market can quickly replace defaulted portfolios, minimizing the impact on surviving members and protecting the stability of the financial system.

Costs related to the fragmentation of clearing could be reduced if links were established between local and global CCPs. Links allow each counterparty to a trade to clear at a different CCP, with an inter-CCP contract arising to offset the exposures. This could also restore some of the netting and diversification benefits of having a portfolio cleared at a single CCP. There are currently no links in place between CCPs for OTC derivatives, however, and such links would be challenging to configure. Authorities would need to carefully evaluate any proposed linking arrangement because of the risk of contagion in times of market stress.

Market development

The approach chosen for central clearing might affect the development of Canadian financial markets and infrastructure. However, considerations related to market development do not clearly favour either the local or the global approach. On one hand, the creation of local infrastructure to clear OTC derivatives markets could have beneficial spinoff effects. For example, the use of a local CCP might facilitate cross-product netting with listed derivatives, which could promote local trading. A local CCP might also be in the best position to structure its rules and clear products to meet the needs of local market participants, although the latitude for local specialization may be small for OTC derivatives products that are standardized across currencies. As well, building local infrastructure for clearing could arguably stimulate the creation of legal, economic and operational expertise that might facilitate the development of local financial centres.

On the other hand, these potential benefits might be small in absolute terms, and would need to be weighed against the disadvantage of imposing higher costs on local financial activities that use clearing services. Building a CCP to clear particular classes of trades in OTC derivatives would also create important implementation risks. These risks could be reduced through a joint venture with an existing global CCP that clears OTC derivatives, but such an arrangement could also reduce some of the market-development benefits of a local CCP.

Overall assessment

For the portion of the market cleared in Canada, the local approach offers the most straightforward oversight and gives local authorities more direct control in managing systemic events. A key advantage of global CCPs, however, is that they promote liquidity and efficiency in a largely global OTC derivatives market, which helps make them generally more robust to financial shocks and allows derivatives users to appropriately manage their risk. Other factors, such as market development, do not appear to clearly favour either approach. Overall, the preferred solution is one that maximizes the benefits of the global approach while preserving the ability of Canadian authorities to oversee the CCP and intervene to mitigate risks, if needed. The next section discusses international initiatives to make this preferred solution possible.

Four Safeguards for More Secure Global Clearing

To strengthen the global approach, Canadian authorities have been working with other members of the FSB and international standard-setting bodies to establish four safeguards for global clearing (FSB 2012). Together with the CPSS-IOSCO Principles, the safeguards give authorities the tools they need to protect local markets that are cleared through global CCPs by addressing the issues of (i) fair and open access, (ii) oversight and regulation, (iii) recovery and resolution, and (iv) access to emergency liquidity.

(i) Fair and open access

To realize the full benefits of central clearing, a range of market participants should have access to CCPs, either directly or as clients of clearing members. Access rules are an important component of a CCP's risk controls, since they ensure that members have the ability to manage the risk introduced to the CCP. Unnecessary limitations on access could, however, lead to the concentration of risk in a small number of global dealers and work against the broader goal of reducing the systemic importance of large financial institutions. This limited access and dependence on large dealers could make dealers from smaller jurisdictions more vulnerable to financial shocks, reduce competition and increase clearing costs.[10]

10 The challenges related to limited access are explained by Slive, Wilkins and Witmer (2011); CGFS (2011); and Fontaine, Pérez Saiz and Slive (2012).

In the past, the leading global CCPs for clearing OTC derivatives restricted direct membership to the largest dealers and also provided only limited indirect access. The fair and open access safeguard requires that global CCPs provide access based on transparent and objective criteria, building on the CPSS-IOSCO Principles, which require that access to CCPs be fair, open and risk-based. National regulators are implementing these requirements, and several global CCPs now allow broader participation.

(ii) Oversight and regulation

Authorities will be comfortable relying on foreign-domiciled CCPs to clear locally important products only if they can fulfill their oversight responsibilities with respect to these CCPs. For some authorities, this will mean relying on co-operative oversight arrangements.[11] To be effective, such arrangements should allow participating authorities to actively take part in the oversight of the CCP by (i) receiving comprehensive information regarding the CCP, (ii) ensuring that the CCP is held to applicable risk-control standards (the CPSS-IOSCO Principles), and (iii) fostering discussion of the CCP's operations and proposed changes to operations. In addition, participating authorities should retain their ability to set tighter standards for the CCP in their own jurisdictions. Considerable progress has been made in establishing effective co-operative oversight arrangements for a number of global CCPs.

(iii) Recovery and resolution

CCPs perform a critical function, and the disorderly failure of a CCP could severely disrupt the markets that it supports, especially if there is no alternative CCP that could continue clearing the market. While adherence to appropriate risk controls should make it highly unlikely that a CCP will fail, it is nonetheless possible. As a result, under this safeguard, all jurisdictions in which systemically important CCPs are located should put in place robust recovery and resolution regimes and provide assurance that the regimes will take appropriate account of the interests of all jurisdictions served by the CCP. This safeguard is consistent with the broader FSB requirement that jurisdictions establish recovery and resolution regimes for all systemically important financial institutions and financial market infrastructures. CPSS-IOSCO has published draft guidance on recovery and resolution (CPSS-IOSCO 2012b), and major jurisdictions have committed to establishing regimes for systemically important CCPs.

11 Other authorities may rely on bilateral memoranda of understanding.

(iv) Access to emergency liquidity

A CCP must have access to adequate liquidity to withstand a default by any of its members. CCPs regularly collect collateral from their members, but a forced sale of collateral assets to manage a member default could disrupt the markets for the collateral instruments. In extreme circumstances, a CCP could require that members provide liquidity support, but this would put the liquidity position of surviving members under stress. The CPSS-IOSCO Principles therefore require that CCPs have adequate private sector liquidity available for all currencies in which they clear, to enable them to handle a default of the participant and its affiliates that could create the largest liquidity exposures for the CCP, even in stressed market conditions.

In extreme circumstances, however, private sector liquidity arrangements may be insufficient or unavailable, and central banks might wish to exchange the collateral of a solvent CCP for emergency liquidity. To this end, work is under way at the international level to remove any technical obstacles that would prevent central banks from working through the central bank of the CCP's home country to provide emergency liquidity in all relevant currencies. It is important to note, however, that removing technical obstacles in no way commits central banks to providing emergency liquidity to CCPs.

A Decision for Canada

Canadian authorities have been studying both the local and global approaches to clearing through an interagency working group chaired by the Bank of Canada, which is composed of representatives of the Department of Finance, the Office of the Superintendent of Financial Institutions, Quebec's Autorité des marchés financiers, the Ontario Securities Commission, the Alberta Securities Commission and the British Columbia Securities Commission. The working group initially outlined the relevant issues in its October 2010 report (OTC Derivatives Working Group 2010). Since then, Canadian authorities have been examining options for clearing OTC derivatives—in particular, whether to require Canadian market participants to use a local CCP—and have been working internationally to promote the development of the four safeguards. Canadian authorities have also consulted with the Canadian Market Infrastructure Committee to take industry viewpoints into account in their decision-making process.[12]

12 The Committee consists of representatives of the Bank of America Merrill Lynch, Bank of Montreal, Caisse de dépôt et placement du Québec, Canada Pension Plan Investment Board, Canadian Imperial Bank of Commerce, Healthcare of Ontario Pension Plan, National Bank of Canada, Ontario Teachers' Pension Plan Board, Royal Bank of Canada, The Bank of Nova Scotia, and The Toronto-Dominion Bank.

Box 1

Why Focus on OTC Interest Rate Derivatives Denominated in Canadian Dollars?

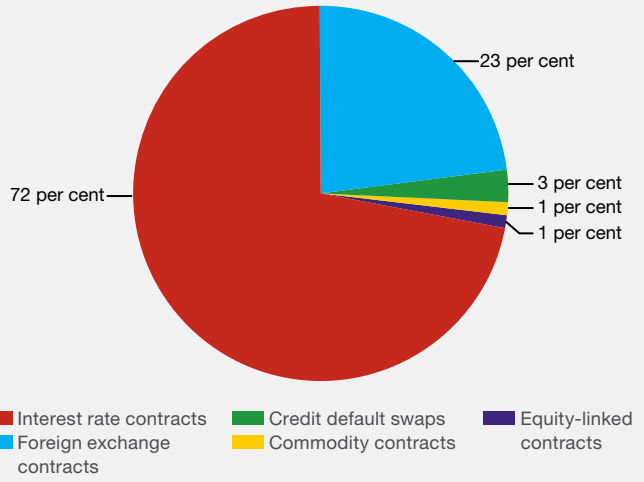
The G-20 commitment to centrally clear standardized over-the-counter (OTC) derivatives extends to all five major asset classes (interest rates, credit, foreign exchange, equities and commodities). But some asset classes play a more important role than others in the Canadian financial system, and central counterparties (CCPs) are not yet capable of safely clearing all types of OTC derivatives.

Central clearing has the greatest potential to generate financial stability benefits in markets that are systemically important for Canada. The Bank of Canada considers the markets for both OTC interest rate derivatives and foreign exchange derivatives to be systemically important, owing to their size and centrality in Canadian financial markets and the risk exposures they create for market participants. These markets make up the largest share of the OTC derivatives portfolios of Canadian banks (**Chart 1-A**). Both markets are also central to Canadian financial markets, since they allow participants to hedge risks in their activities. For example, banks use interest rate swaps to manage the risks created by the maturity mismatch between funding through deposits and lending at longer maturities. Corporations use OTC derivatives to hedge risks from foreign currency cash flows originating at foreign subsidiaries, while financial institutions, corporations and governments manage their interest rate and foreign exchange risks through OTC derivatives markets when borrowing in local and foreign markets.

Most foreign exchange derivatives are poor candidates for central clearing at this time, however, because they are subject to a high degree of settlement risk that cannot yet be fully managed by a CCP. There is currently no international consensus on whether foreign exchange derivatives should be centrally cleared. The market for interest rate derivatives denominated in Canadian dollars is therefore the focus of analysis for choosing the best approach to clearing for Canada.

Chart 1-A: Over-the-counter derivatives portfolios of Canadian banks, notional amounts outstanding

Total = US$ 10.1 trillion



Source: OTC Derivatives Working Group (2010) Last observation: June 2010

The Canadian decision has focused on OTC interest rate derivatives denominated in Canadian dollars, since the Bank of Canada considers this market both systemically important and largely clearable (**Box 1**). There is currently no CCP located in Canada that clears OTC interest rate derivatives; hence, a local approach would require building domestic clearing capability. Internationally, LCH.Clearnet's SwapClear service is the dominant CCP for OTC interest rate derivatives, clearing contracts in 17 currencies, including Canadian dollars, and representing over 99 per cent of outstanding cleared interest rate derivatives.[13]

Canadian authorities judge that global CCPs will provide a safe, robust and resilient environment for clearing OTC derivatives, provided they comply with the CPSS-IOSCO Principles, meet the four safeguards and comply with specific recognition requirements imposed by Canadian regulators. While work on the safeguards is ongoing, Canadian authorities are satisfied with the direction and pace of the international efforts, including their implementation at global CCPs serving the Canadian market. SwapClear, in particular, has established:

- *Fair and open access:* SwapClear's access criteria have been revised and are in line with the CPSS-IOSCO Principles and the access safeguard.[14] Five major Canadian banks have direct clearing access to SwapClear, while another is in the process of obtaining membership.

13 As of September 2012, four internationally active CCPs clear OTC interest rate derivatives: SwapClear (US$340 trillion gross notional amount outstanding), CME Group (US$0.4 trillion), Singapore Exchange (US$0.3 trillion) and Eurex Clearing (undisclosed volume).

14 For example, SwapClear has reduced the minimum net capital requirement for clearing members from $5 billion to $50 million, scaled according to the risk assumed by a member. The requirement that SwapClear members hold a swap book with $1 trillion in notional amount outstanding has also been removed.

- *Oversight and regulation:* SwapClear's lead regulator, the U.K. Financial Services Authority, has established bilateral and multilateral co-operation and information-sharing frameworks. The Bank of Canada participates in the multilateral regulatory co-operation arrangement, which will assist the Bank in monitoring the risk associated with SwapClear and fulfilling the oversight responsibilities that would come with designation.[15] Canadian securities regulators typically fulfill their regulatory role through a recognition process where information is shared through bilateral memoranda of understanding, which they have started to put in place.
- *Recovery and resolution:* Major jurisdictions, including the United Kingdom, have committed to putting in place recovery and resolution regimes for systemically important CCPs. In addition, the United Kingdom has published a consultative document explaining how it proposes to resolve failing CCPs (HM Treasury 2012).
- *Access to emergency liquidity:* Canadian and U.K. regulators will require SwapClear to meet, at a minimum, the liquidity requirements of the CPSS-IOSCO Principles, and work is under way to remove technical obstacles to providing multi-currency emergency liquidity to CCPs, including SwapClear.

15 The multilateral co-operation arrangement facilitates the reciprocal exchange of regulatory information, perspectives and opinions between the participating authorities.

With this progress in implementing the four safeguards, Canadian authorities are confident that they will have tools to protect the financial stability of Canada's OTC interest rate derivatives market under the global approach to clearing. Hence, authorities announced in October 2012 that Canadian market participants may use any CCP recognized by Canadian authorities, including global CCPs. This does not preclude the development and use of a local CCP in the future.

The Bank of Canada and other authorities in Canada will continue to work with authorities in other jurisdictions toward achieving the four safeguards at global CCPs, including SwapClear. In addition, they will monitor the evolution of OTC derivatives markets and the market for clearing services, both in Canada and abroad. Authorities in Canada will also need to monitor the implementation of the four safeguards at any CCP that becomes important to the stability of Canadian OTC interest rate derivatives markets or other systemically important financial markets.

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The Bank of Canada's Approach to Adopting the Principles for Financial Market Infrastructures

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Introduction

Financial market infrastructures (FMIs) are the channel through which virtually all financial transactions are cleared, settled and recorded. They allow consumers and firms to safely and efficiently purchase goods and services, make financial investments, and transfer funds.

FMIs themselves can pose certain risks or be a major channel through which these risks can be transmitted. Some FMIs (referred to as "systemically important FMIs") have the potential to pose systemic risk, in that the inability of one participant to meet its obligations to the FMI could, by transmitting financial problems through the system, cause other participants to be unable to meet their obligations. It is therefore essential that FMIs incorporate appropriate risk-control mechanisms so that systemic risk is adequately controlled.

At the same time, FMIs can play an important part in enhancing financial stability. During the financial crisis of 2007–09, FMIs were generally successful in performing their roles, and thus helped the financial system to function continuously during a time of heightened stress. This result can largely be attributed to the crucial work completed by international standard-setting bodies in the early 2000s to develop risk-management standards for FMIs and apply them.[2]

In 2010, the international bodies responsible for these risk-management standards—the Committee on Payment and Settlement Systems (CPSS) and the Technical Committee of the International Organization of Securities Commissions (IOSCO)—undertook to update the previous standards to make them consistent with current best practices in risk management and to reflect the experience of authorities in applying the previous standards. The resulting Principles for Financial Market Infrastructures (the Principles), which are considerably stronger than the previous standards, constitute a single set of harmonized standards related to risk management, efficiency and transparency that apply to all systemically important FMIs (CPSS-IOSCO 2012a). To facilitate consistent and effective oversight and regulation of FMIs, the Principles include a set of responsibilities for authorities, which will ensure that the FMIs they oversee take the necessary actions to meet the Principles.

Some of the lessons learned from the financial crisis are that effective risk management needs to start at the level of the Board of Directors, that risks are interrelated and that contagion in the interbank market could expose FMIs to multiple defaults. By putting a stronger emphasis on governance, requiring FMIs to have a comprehensive risk-management framework and to hold substantially more financial resources, the Principles reflect these important lessons and make FMIs significantly more resilient to shocks.

The Bank of Canada is responsible for overseeing FMIs that have been designated by the Governor as systemically important to the Canadian financial system. The four designated FMIs are:

- the **Large Value Transfer System (LVTS)**, a Canadian electronic funds-transfer system that settles large-value and time-critical Canadian-dollar payments;

1 The authors thank Carolyn Wilkins for her helpful comments on this report.

2 These standards include the "Core Principles for Systemically Important Payment Systems" (CPSS 2001), the "Recommendations for Securities Settlement Systems" (CPSS-IOSCO 2001) and the "Recommendations for Central Counterparties" (CPSS-IOSCO 2004). The Bank of Canada contributed to the development of these standards.

- **CDSX**, a Canadian system that consists of a securities settlement system, a central securities depository and central counterparty services for eligible Canadian exchange-traded and over-the-counter equity, debt and money market transactions;
- **Canadian Derivatives Clearing Service (CDCS)**, a Canadian central counterparty that clears transactions in certain fixed-income securities, repurchase agreements (repos), equity derivatives and all derivatives traded on the Montréal Exchange; and
- **CLS Bank**, a global payment system for the settlement of foreign exchange transactions, including those involving the Canadian dollar.

The Bank's oversight is focused on verifying that risks are being appropriately controlled in these systemically important FMIs, and it is the Bank's practice to require that these FMIs meet international standards. The Bank has adopted the new Principles and will apply them to all designated FMIs in co-operation with other regulators that oversee systemically important Canadian FMIs. This report provides a summary of the Principles and describes the approach that the Bank is taking to adopt them.

The Principles Strengthen and Harmonize Existing Standards

FMIs are a broad set of entities that facilitate the clearing, settling and recording of payments, securities, derivatives and other financial transactions among participating entities.[3] FMIs covered by the Principles are:

- **payment systems (PSs)**, which facilitate the transfer of funds;
- **securities settlement systems (SSSs)**, which facilitate the transfer of securities and other financial assets;
- **central securities depositories (CSDs)**, which provide securities accounts, central safekeeping and asset services;
- **central counterparties (CCPs)**, which become the buyer to every seller and the seller to every buyer of a financial contract to ensure that, even if a buyer or a seller fails to meet its obligation to the CCP, obligations will be met on all contracts; and
- **trade repositories (TRs)**, which maintain centralized electronic databases of transactions data.[4]

As shown in **Table 1**, risks can be incurred through all FMIs. Certain risks, such as operational, legal and business risk, are common to all types of FMIs, and the principles governing those risks establish common standards for every category of FMI. Other risks, however, such as credit and liquidity risk, are only faced by some types of FMIs. The principles governing those risks clearly state the types of FMIs to which they must be applied. This approach allowed the CPSS and IOSCO to develop a single set of harmonized standards that could be used by a diverse group of FMIs, providing a more consistent benchmark for risk management across different types of FMIs than that achieved by the previous standards.

FMIs are expected to identify and understand all of the risks that could arise within their systems and to develop ways to manage these risks efficiently and effectively. While the Principles generally allow some flexibility as to how individual FMIs meet them, most include minimum requirements to ensure that an appropriate risk-management benchmark is maintained. Here we summarize the 24 principles into 10 broad requirements that work together to promote the safety and efficiency of FMIs:

(i) **FMIs should have a strong foundation for their risk-management practices.** FMIs must operate under robust governance arrangements that focus on the safety and efficiency of the FMI and the stability of the financial system more broadly. In addition to having strong frameworks in place to help them identify and monitor the individual risks to which they are exposed, FMIs are required by a new principle to have a sound framework for comprehensively managing these risks.

(ii) **FMIs should collect adequate high-quality financial assets from participants to manage credit risk.** The credit-risk principle now requires FMIs that are exposed to credit risk to maintain sufficient financial resources from their participants to cover all current and potential future credit exposures of *each participant fully and simultaneously* with a high degree of confidence.[5] This is a significant strengthening compared with the previous standards, which required FMIs to cover only the exposure of the *single largest* participant. Financial resources pledged to cover credit exposures should have low credit, liquidity and market risk.

(iii) **FMIs should have robust sources of liquidity.** The liquidity-risk principle has been strengthened to require FMIs that incur liquidity risk to have sufficient liquid resources in all relevant currencies to effect same-day settlement under a wide range of stress

3 CPSS-IOSCO (2012a) defines an FMI as a multilateral system, including its participants, and not simply as the legal or functional entity that performs the clearing, settlement or recording function.

4 Trading venues are not included in the definition of FMIs used in the Principles.

5 In addition, central counterparties are required to maintain supplementary financial resources to cover the potential future credit exposures that could arise in extreme but plausible circumstances.

Table 1: Main risks that can arise through financial market infrastructures

Risk	Definition[a]	FMIs through which this type of risk is typically incurred				
		Payment systems	Securities settlement systems	Central securities depositories	Central counterparties	Trade repositories
Credit risk	The risk that a counterparty will be unable to fully meet its obligations when due, or at any time in the future.[b]	•	•		•	
General business risk	Any potential impairment of an FMI's financial position (as a business concern) that results in expenses exceeding revenues and a loss that must be charged against capital.	•	•	•	•	•
Legal risk	The risk of the unexpected application of law, usually resulting in a loss.	•	•	•	•	•
Liquidity risk	The risk that a counterparty will have insufficient funds to meet its financial obligations as and when expected, although it may be able to do so in the future.	•	•		•	
Operational risk	The risk that external events or deficiencies in internal processes or systems will result in the reduction, deterioration or breakdown of services provided by an FMI.	•	•	•	•	•
Systemic risk	The risk that the inability of a participant to meet its obligations could cause other participants to be unable to meet their obligations when due. Systemic risk is normally the culmination of other risks.	•	•		•	

a. These definitions are based on those used in the Principles.

b. There are generally two main types of credit risk: (i) replacement-cost risk (usually applicable only to central counterparties, or CCPs), which is the risk of loss of unrealized gains on unsettled transactions with a counterparty (for example, the unsettled transactions of a CCP); the resulting exposure is the cost of replacing the original transaction at current market prices; and (ii) principal risk, the risk that a counterparty will lose the full value involved in a transaction (for example, the risk that a seller of a financial asset will irrevocably deliver the asset but not receive payment).

scenarios. These include, but are not limited to, the default of at least the participant and its affiliates that would create the largest liquidity exposure for the FMI.

(iv) **FMIs should take appropriate actions to ensure that they are able to complete settlement as expected.** The settlement principles are similar to the previous standards, and require FMIs conducting settlement to (i) provide final settlement at the end of the day or intraday, and (ii) either settle payment obligations on accounts at a central bank or manage the risks from commercial bank settlement.

(v) **FMIs should minimize disruptions associated with the failure of one or more of their participants.** The participant-default principle requires FMIs that are exposed to the potential default of a participant to establish effective and clearly defined rules and procedures to manage a participant default while continuing to meet their obligations. In addition, a new principle requires certain types of CCPs to have rules and procedures that separately account for the positions and collateral of participants and their clients. This requirement is intended to protect clients and minimize disruption to them in the event of a participant default.

(vi) **FMIs should be able to continue providing critical services in all circumstances.** Consistent with the previous standard governing operational risk, FMIs are required to have reliable and resilient operations to mitigate the possibility of a market disruption caused by operational issues. In addition, a new principle requires FMIs to hold sufficient financial resources funded by equity to enable them to recover from general business losses they have incurred and to replenish their resources in order to continue providing critical services or be resolved in an orderly manner. Regulators and standard-setters are developing additional guidance regarding effective recovery and resolution regimes for FMIs.[6]

6 In July 2012, CPSS-IOSCO (2012b) published a consultative report, "Recovery and Resolution of Financial Market Infrastructures," to outline the features of effective recovery and resolution regimes for FMIs in accordance with the Financial Stability Board's (2011) "Key Attributes of Effective Resolution Regimes for Financial Institutions" and consistent with the principles of supervision and oversight that apply to them.

(vii) **FMIs should set fair, open and risk-based access requirements and manage the risks that arise from participation.** The participation-requirements principle is similar to the previous standard. It requires FMIs to set objective participation requirements that do not discriminate against particular classes of participants and that have the least restrictive impact on access, subject to maintaining acceptable risk-management controls. In addition, a new principle requires FMIs to monitor and manage the material risks associated with indirect participation, whereby some parties transact with the FMI as customers of direct participants.

(viii) **FMIs should mitigate the risks associated with interdependencies that can amplify disruptions within the financial system.** The Principles have strengthened the previous standard to require FMIs to develop appropriate risk-management tools to address the risks related to their interdependencies with other entities, including participants, service providers and other FMIs.

(ix) **FMIs should provide their services and manage their risks in an efficient manner.** The Principles require FMIs to consider the practicality and cost-effectiveness of their system for users. FMIs should be sufficiently flexible to be able to respond to changing demands and new technologies that will affect them.

(x) **FMIs, especially trade repositories, should provide relevant information to participants, authorities and the public to improve transparency in markets.** The transparency principles have been strengthened to require FMIs to disclose relevant information to the public. As well, sufficient information should be provided to participants to allow them to understand and manage the risks they face through their participation in the FMI.

The Principles will achieve the objective of strengthening the financial system only if FMIs apply them fully and consistently. While the FMI itself is ultimately responsible for managing its risks, the Principles also incorporate responsibilities for authorities to facilitate consistent and effective oversight and regulation of FMIs, including assessing the adequacy of FMIs' risk-management practices. These responsibilities require that authorities have the appropriate powers and resources to oversee FMIs, that they clearly disclose their oversight policies, that they apply the Principles to applicable FMIs, and that they co-operate with each other to promote the safety and efficiency of FMIs. The Principles do not impose any particular framework on authorities, recognizing the diversity of their powers and responsibilities.

The Bank Has Adopted the Principles as Its Standards for Designated FMIs

Under the Payment Clearing and Settlement Act (the Act), the Bank of Canada is responsible for the regulatory oversight of clearing and settlement systems for the purpose of controlling systemic risk.[7] The Bank exercises its oversight in a manner that is consistent with the responsibilities that are assigned to authorities under the Principles, which the Bank has adopted as its standards. Its primary oversight objective is to ensure that systemic risk is adequately controlled in designated FMIs. To support this objective, the Bank requires designated FMIs to comply with the Principles to ensure that a benchmark level of risk control is achieved in Canada. In this section, we describe the Bank's application of the Principles to designated systems.[8]

The Bank is working with other regulators that oversee systemically important Canadian FMIs to apply the Principles in a consistent manner. In particular, the Bank is working with the Autorité des marchés financiers (AMF) (Québec), the British Columbia Securities Commission (BCSC) and the Ontario Securities Commission (OSC) regarding the application of the Principles to CDCS and CDSX, and with the federal Department of Finance regarding the LVTS.[9]

The risk-management practices of FMIs in Canada that have been designated as systemically important are consistent with the previous international standards. As noted above, however, the CPSS-IOSCO Principles are more stringent and incorporate new standards that FMIs are required to meet. Thus, it will be necessary for FMIs, including those located in Canada, to make some improvements to comply with the revised standards. For example, Canadian FMIs will generally have to enhance their mechanisms for managing credit risk. In addition, changes may be necessary to make their governance arrangements consistent with the new standards and to enable FMIs to monitor and manage risks on a more comprehensive basis.

Designated FMIs in Canada have begun the transition to the new standards by conducting detailed self-assessments against the Principles and identifying their current gaps in observance. They will then develop plans to address those gaps. It will take some time for

7 More information regarding the Act and the Bank's oversight responsibilities is available on the Bank's website at <www.bankofcanada.ca/financial-system/payments/oversight-and-legislation/>.

8 The Bank's oversight objectives, framework and activities are described further in the Bank's "Guideline Related to Bank of Canada Oversight Activities under the Payment Clearing and Settlement Act" (Oversight Guideline) (Bank of Canada 2012).

9 The Bank is also a member of the CLS Oversight Committee, which is chaired by the Federal Reserve, CLS Bank's lead overseer. The Federal Reserve will coordinate with the CLS Oversight Committee to apply the Principles to CLS Bank.

FMIs to close every gap and fully observe the Principles. The Bank will therefore work with other regulators that oversee these FMIs to closely monitor the implementation of the plans to ensure their timely execution and to ensure that systemically important Canadian FMIs continue to observe the Principles. Canada's adoption of the Principles will also be regularly monitored and evaluated through international forums.

Conclusion

Because they support core markets and activities, FMIs are critical to a properly functioning economy. Ensuring that FMIs continue to function, even in times of stress, is a high priority of the Bank of Canada. By setting higher standards for risk management, efficiency and transparency, the CPSS-IOSCO Principles for Financial Market Infrastructures directly support the initiatives adopted by the G-20 and the Financial Stability Board to strengthen FMIs and promote continuously open markets.

The Bank of Canada supports the Principles for FMIs and has incorporated them into its oversight framework to improve the resilience of systemically important FMIs in Canada. It may take time for FMIs to implement some of the changes that would allow them to observe all of the Principles, so the Bank will closely monitor Canadian FMIs as they plan for and implement these changes. The Bank will require FMIs to satisfy the Principles on an ongoing basis and will assess their compliance at least every two years. The Bank will also work with other regulators that oversee systemically important Canadian FMIs to ensure that the Principles are applied in a consistent manner.

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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>.

AMF: Autorité des marchés financiers

BCSC: British Columbia Securities Commission

CCP: central counterparty

CDCS: Canadian Derivatives Clearing Service

CDSX: Canada's central securities depository and securities settlement service

CGFS: Committee on the Global Financial System

CLS Bank: a global payment system for the settlement of foreign exchange transactions (supporting trades across 17 major currencies) designed to address foreign exchange settlement risk

CPSS: Committee on Payment and Settlement Systems

CSD: central securities depository

DSR: debt-service ratio

EC: European Commission

ECB: European Central Bank

EFSF: European Financial Stability Facility

EME: emerging-market economy

ESM: European Stability Mechanism

FMI: financial market infrastructure

FSB: Financial Stability Board

G-20: Group of 20

GDP: gross domestic product

IMF: International Monetary Fund

IOSCO: International Organization of Securities Commissions

LDI: liability-driven investment

LVTS: Large Value Transfer System

MLS: Multiple Listing Service

NBSA: National Balance Sheet Accounts

NFI: non-fixed-income

OMT: Outright Monetary Transactions

OSC: Ontario Securities Commission

OSFI: Office of the Superintendent of Financial Institutions

OTC: over-the-counter

PS: payment system

S&P: Standard & Poor's

SSS: securities settlement system

TR: trade repository

TSX: Toronto Stock Exchange

VIX: ticker symbol for the Chicago Board Options Exchange Market Volatility Index