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Financial System Review

June 2010

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Preface

The financial system makes an important contribution to the welfare of all Canadians, since the ability of households and firms to 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 resiliency of the financial system to unanticipated adverse shocks, thereby enabling 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 resiliency 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 report, 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.

The Risk Assessment section is a product of the Governing Council of the Bank of Canada: Mark Carney, Pierre Duguay, John Murray, Timothy Lane, and Jean Boivin.

The material in this document is based on information available to 1 June 2010 unless otherwise indicated.

The phrase "major banks" in Canada refers to the six largest Canadian commercial banks by asset size: the Bank of Montreal, CIBC, National Bank, RBC Financial Group, Scotiabank, and TD Bank Financial Group.

Risk Assessment

This section of the *Review* presents the collective judgment of the Bank of Canada's Governing Council on the key risks and vulnerabilities—arising from both international and domestic sources—that would adversely affect the stability of the Canadian financial system. The objective is to raise awareness about these risks and to examine the required policy response.

Introduction

Risks to the stability of both the Canadian and the global financial systems appeared to be diminishing for most of the period since the last *Financial System Review* (FSR), as the recovery in financial conditions and the macroeconomic environment continued to solidify. But mounting concerns over fiscal sustainability in some euro-area member states and the exposure of global banks to sovereign risk erupted into a period of severe stress in international financial markets in early May. With counterparty risk becoming a serious concern, tensions reappeared in European interbank funding markets. In addition, there were dislocations in certain euro-area debt markets, and the prices of a wide range of risky assets declined. Although bold policy actions taken by European governments and central banks, with international support, succeeded in heading off a full-blown crisis of confidence, these events illustrate the continuing risk to financial stability posed by unsustainable public finances. The rapid spread of market stress beyond the affected region—with liquidity drying up in some important funding markets around the world and market behaviour at times suggesting a severe loss of confidence—also demonstrates the continuing fragility of the global financial system.

Mounting concerns over fiscal sustainability in some euro-area member states and the exposure of global banks to sovereign risk erupted into a period of severe stress in international financial markets in early May.

Against this backdrop, the Canadian financial system has strengthened further since last December, owing in part to the somewhat stronger-than-expected economic recovery, both in Canada and abroad. The already comparatively strong capital and liquidity positions of Canada's financial institutions have strengthened further over the past six months, corporate balance sheets have improved, and capital markets have been resilient. However, household balance sheets are still a significant source of risk, since the rapid expansion of consumer and mortgage credit implies that a greater proportion of households are likely to become vulnerable to adverse income and wealth shocks as interest rates rise from their exceptionally low levels.

The Canadian financial system has strengthened further since last December.

The Canadian financial system is vulnerable to renewed stress in the event of a recurrence of severe tensions in global markets.

While the Canadian financial system has continued to function well in the face of adverse spillovers from Europe, it is vulnerable to renewed stress in the event of a recurrence of severe tensions in global markets. For example, heightened concerns over sovereign debt could lead to higher borrowing costs and/or more rapid tightening of fiscal policy in some European countries, potentially hampering the global economic recovery. In turn, increased uncertainty over global economic prospects could trigger a severe worldwide retrenchment from risky investments. This may lead to market turmoil globally, and possibly even to forced asset sales and liquidity shortages for some institutions. These developments could materially impair the asset quality, capital positions, and funding liquidity of financial institutions, and undermine confidence more generally. Through these indirect channels, sovereign risk could have an impact on the global financial system that is disproportionate to the direct exposure of banks to sovereign debt.

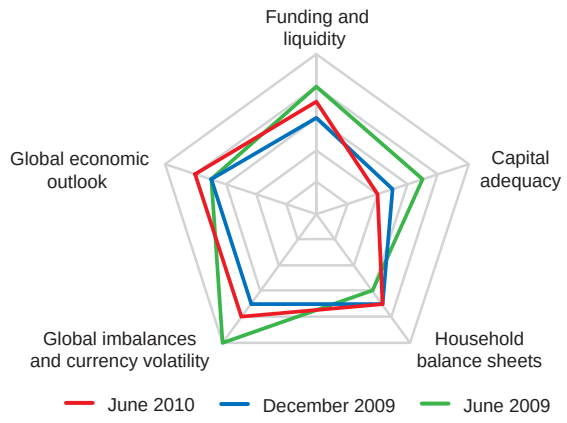
The Governing Council judges that, while financial conditions have broadly improved in Canada since the December 2009 FSR, the overall level of risks to Canadian financial stability has increased.

The Governing Council judges that, while financial conditions have broadly improved in Canada since the December 2009 FSR, the overall level of risks to Canadian financial stability has increased (**Table 1** and **Figure 1**). The purpose of the FSR is to examine these downside risks—including those associated with low-probability "tail events"—and the policy actions required to mitigate them.

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

Risk	Level of risk	Direction over the past six months
1. Funding and liquidity	elevated	increased
2. Capital adequacy	moderate	decreased
3. Household balance sheets	elevated	unchanged
4. Global imbalances and currency volatility	high	increased
5. Global economic outlook	high	increased
Overall risk	**elevated**	**increased**

Figure 1: Risk assessment



Note: Each rung indicates a certain perceived risk level: the farther away from the centre, the more elevated the perceived risk.

Five key sources of risk have been identified in the past three issues of the FSR: funding and liquidity; capital adequacy; household balance sheets; global imbalances and currency volatility; and the global economic outlook. These broad headings continue to capture the primary sources of risk to the stability of Canada's financial system in the near term, although the nature of some of these risks has changed over the past six months. It should be borne in mind that the five identified risks are highly interconnected. For example, growing fiscal strains could trigger tensions in bank funding markets, or a disorderly resolution of global imbalances could possibly hamper the international economic recovery. As well, a weaker-than-projected global economic environment could have an adverse impact on the balance sheets of Canadian households and businesses. This would result in loan losses for financial institutions, which might lead them to curtail credit growth to maintain their capital ratios, reinforcing the downturn in the economy.

Despite forceful policy actions to stabilize the global financial system since 2007, several of the vulnerabilities that contributed to the crisis persist, and, in some cases, may even have been exacerbated. In particular, the precarious funding strategies and duration mismatches that were prevalent in the period leading up to the 2007–09 crisis were again evident in the transmission of market strains in May 2010, suggesting that a number of countries have not made sufficient progress in addressing financial vulnerabilities. Moreover, the extraordinary public sector support provided to financial systems during the crisis has heightened moral hazard. In addition, while bold action by governments was critical in preventing an even deeper global crisis and recession, the resulting accumulation of government debt in many countries and the challenges associated with achieving sustainable fiscal positions now represent an important risk to the international financial system—and reinforce the perception that governments have limited room to manoeuvre in addressing future financial system stress. Although these are, by their nature, medium-term problems, the events of May 2010 serve as reminders that markets—particularly when they are highly developed and globalized—can pull medium-term concerns into the present. Safeguarding financial stability will require strong and appropriately targeted policy actions to reform global financial systems and to establish sustainable fiscal positions. Until this is achieved, the financial system is likely to remain fragile.

Several of the vulnerabilities that contributed to the crisis persist, and, in some cases, may even have been exacerbated.

KEY RISKS

Funding and liquidity

Since December, Canada's major banks have increased their holdings of liquid assets and have extended the maturity of their funding sources. They also continue to receive "top tier" pricing in global wholesale funding markets. Despite their strong and improving fundamentals, the risk of renewed funding pressures for Canadian banks is judged to have increased, owing primarily to the potential for spillover effects from the funding strains in global markets.

The risk of renewed funding pressures for Canadian banks is judged to have increased since December, owing primarily to the potential for spillover effects from the funding strains in global markets.

As demonstrated by recent events in continental Europe, sovereign stress can trigger sharp tensions in bank funding markets. Banks often hold sovereign debt as a riskless source of liquidity, but when the issuing government is itself under stress, it may turn out to be an illiquid credit product. Thus, beginning in May, growing concern about the implications of increasing fiscal problems for the quality of assets at many European financial institutions resulted in heightened counterparty risk. This led to a shortening of maturities and a widening of spreads in interbank markets, particularly in U.S.-dollar funding markets, given the U.S.-dollar maturity mismatches at European institutions.

To date, Canadian bank funding markets have been largely unaffected by pressures in global short-term funding markets.

To date, Canadian bank funding markets have been largely unaffected by pressures in global short-term funding markets. However, there is a risk of renewed tensions in Canadian markets if those pressures become more intense, particularly if they are accompanied by a material deterioration in the international economic outlook and a generalized worldwide retrenchment from risk-taking. In early May, in response to the re-emergence of strains in U.S.-dollar short-term funding markets in Europe, the Bank of Canada—in coordination with other central banks—reinstated its temporary U.S.-dollar swap facility with the Federal Reserve. This precaution was taken in case these strains showed signs of spreading to Canadian markets. At the time of writing, this facility has not been used.[1]

Over the medium term, the capacity of global markets to absorb the potentially elevated refinancing requirements of financial institutions presents an additional concern, particularly in view of the elevated financing needs of governments. There is thus a possibility that some of the riskier categories of issuers could have difficulty accessing markets, especially if the financial system remains fragile. While Canadian issuers would likely be affected by tighter conditions in worldwide funding markets, they appear less vulnerable to this risk than issuers elsewhere, owing to the relative strength of Canada's banking, corporate, and government sectors and their relatively lower refinancing needs.

To enhance the resilience of the financial system in the medium term, financial institutions around the world will have to improve their management of liquidity risk.

To enhance the resilience of the financial system in the medium term, financial institutions around the world will have to improve their management of liquidity risk. For instance, they need to hold enough high-quality liquid assets to withstand idiosyncratic shocks. Banks should also ensure that they raise sufficient funds from longer-term, stable sources of funding to minimize structural mismatches between their core funding and their assets and contingent liabilities. Reforms must be implemented to limit the risks associated with funding and liquidity, even though the transition towards enhanced liquidity standards will pose some challenges for financial institutions.[2]

1 This temporary swap facility was also not drawn upon when it was in effect between September 2008 and January 2010.

2 In December 2009, the Basel Committee on Banking Supervision issued a consultation proposal to strengthen the liquidity regulation of internationally active financial institutions. It will finalize standards by the end of 2010. For more details, see <http://www.bis.org/publ/bcbs165.htm>.

Overall, the level of risk to the stability of the Canadian financial system arising from funding and liquidity issues is judged to have risen since the December FSR, particularly since concerns over global public finances have reawakened tensions in some international bank funding markets.

Capital adequacy

Canadian banks remain profitable, and their capital ratios continue to rise. Although they are still experiencing cyclically elevated loan losses, these have fallen markedly in recent quarters. Overall, it appears less likely than at the time of the last FSR that insufficient capital could undermine financial stability in Canada.

Overall, it appears less likely than at the time of the last FSR that insufficient capital could undermine financial stability in Canada.

Asset quality in the international banking system has also generally improved since last December, although some pockets of fragility remain—for example, with respect to exposures to the U.S. real estate sector and to euro-area government debt. If these vulnerabilities result in a material deterioration in international economic or financial conditions, the overall quality of the assets of Canadian banks could be impaired, even though they have low exposures to these sectors.

Strengthening the resilience of the global banking sector to economic and financial stress is critical for mitigating the risk to financial stability in the medium term. In particular, it is necessary to raise the level, quality, and consistency of the capital base to enhance its ability to absorb unexpected losses. It is also important to promote the buildup of capital buffers in good times that can be drawn upon in periods of stress, and to limit excessive leverage in the banking system. Appropriate reforms to achieve these objectives are essential to mitigate future threats to financial stability. However, implementing these reforms will present challenges for banks, even Canadian banks, during the transition.[3]

Strengthening the resilience of the global banking sector to economic and financial stress is critical for mitigating the risk to financial stability in the medium term.

Overall, the Governing Council judges that the level of immediate risks associated with capital adequacy has declined since the last FSR. In the period ahead, it will be essential to sustain momentum towards enhanced global standards for capital adequacy in order to reduce risks to financial stability.

Household balance sheets

The rapid growth of household debt throughout the crisis is a testament to both the resilience of Canada's financial system and economy and the effectiveness of the domestic and global policy response. At the same time, it is an important source of risk: the proportion of Canadian households that are vulnerable to adverse wealth and income shocks has increased in recent years with the steady rise in aggregate household debt in relation to income. In the event of a significant economic downturn, the credit quality of household loan portfolios could be undermined, prompting banks to tighten credit conditions. Overextended households may also reduce spending, with some sectors—such as retail and housing—likely to be more affected than others.

The proportion of Canadian households that are vulnerable to adverse wealth and income shocks has increased in recent years with the steady rise in aggregate household debt in relation to income.

3 Standards for strengthening the resilience of the banking sector will be finalized by the Basel Committee on Banking Supervision by the end of 2010. The consultation document is available at <http://www.bis.org/publ/bcbs164.pdf>.

As well, households may liquidate assets, with attendant negative implications for a variety of markets, including the real estate market. Ultimately, these reactions could result in mutually reinforcing declines in real economic activity and in the health of the financial sector.

In its December 2009 FSR, the Bank outlined the key results of a partial stress-testing simulation to gauge the financial vulnerability of Canadian households in two scenarios featuring sustained growth in the debt-to-income ratio and an environment of rising interest rates.[4] The results suggested that, under these conditions, the proportion of indebted households with a high debt-service ratio (DSR) could rise considerably.

Since December, household credit has continued to grow at a robust pace.

Since December, household credit has continued to grow at a robust pace, broadly in line with the hypothetical scenarios used for the Bank's simulation. In contrast to these scenarios, which assume that household indebtedness increases at a rate near its recent historical average throughout the entire simulation horizon, recent initiatives of the Government of Canada to strengthen rules for government-backed insured mortgages and the prospects of rising consumer borrowing rates are likely to moderate the pace of debt accumulation by households.

The continued rise in aggregate household debt in relation to income suggests that the vulnerability of the household sector to adverse macroeconomic shocks is growing. An update to the Bank's stress-testing simulation, using the same assumptions as last December, still indicates a buildup in vulnerability over the simulation period. However, its magnitude has been revised down since December. The stress-testing simulation methodology has been refined to better account for the significant contribution of first-time homebuyers to the growth of mortgage credit.[5] This improvement leads to a lower estimate of the increase over the simulation horizon in the proportion of vulnerable households and the share of total mortgage debt that is owed by these households.

Overall, the risk of system-wide stress arising from material losses on loans to Canadian households remains elevated, and is roughly unchanged since the last FSR.

Overall, the Governing Council considers that the risk of system-wide stress arising from material losses on loans to Canadian households remains elevated, and is roughly unchanged since the last FSR. The Bank continues to monitor the evolution of household borrowing to assess the implications of rising indebtedness for the vulnerability of the household sector to adverse macroeconomic shocks. As noted in December, this analysis underscores the need for households to assess their ability to service their debts over the entire period to maturity, taking into account the outlook for their income and for interest rates. It should also serve as a reminder to lenders to carefully consider the aggregate risk of their entire portfolio of household exposures when extending credit to households, even in the form of insured mortgages.

4 For more details, see the December 2009 FSR, beginning on p. 23.
5 The methodology used by the Bank to conduct such simulations is outlined in the report, "The Bank of Canada's Analytic Framework for Assessing the Vulnerability of the Household Sector," on p. 57.

Global imbalances and currency volatility

While the financial crisis had many causes, its intensity and scope reflected an unprecedented level of global disequilibria. Large and unsustainable current account imbalances across major economic areas, and the related imbalances in domestic savings and investment were integral to the buildup of financial vulnerabilities. For instance, large surpluses in some countries contributed to the global search for yield that preceded the crisis.

The resolution of global imbalances requires a sustained rotation of global demand away from excess consumption in the United States and towards internally generated sources of demand in the developing countries of Asia. A disorderly or delayed resolution of these imbalances represents a key source of risk to the stability of the Canadian financial system. In the event of a disorderly adjustment, a sharp spike in currency volatility could materially increase funding risk for financial institutions and other borrowers accessing cross-border markets and cause strains in financial conditions more generally. If the adjustment is delayed or occurs asymmetrically across countries, there could be a further buildup of financial imbalances, which would require a larger adjustment later on, thus heightening the risk of a disorderly resolution.

A disorderly or delayed resolution of global imbalances represents a key source of risk to the stability of the Canadian financial system.

Structural policy adjustments are necessary to ensure a durable and orderly narrowing of global imbalances. A key supporting element should be a transition towards more flexibility in exchange rates, which would improve adjustments to both the current disequilibria and future economic shocks.

Current account imbalances have narrowed during the global recession, as U.S. households reduced their spending and domestic demand in Asian emerging-market economies rose. However, the durability of this adjustment is uncertain, since it results partly from cyclical factors. One such factor is the temporary increase in U.S. household savings rates in response to the loss of housing and other wealth in the financial crisis. A second factor is the stimulus measures to expand demand in China, notably through rapid credit expansion that is now being curtailed. Indeed, current account imbalances have widened again in recent quarters, as U.S. imports and commodity prices have risen in tandem with the economic recovery. The G-20 commitment to promote strong, sustainable, and balanced global economic growth, together with the Mutual Assessment Process established by G-20 finance ministers and central bank governors to evaluate national policies in relation to these objectives, are important steps towards addressing global imbalances in a more lasting fashion.[6]

The mounting fiscal strains in several advanced economies in the euro area and elsewhere pose a risk to a timely and lasting resolution of global imbalances. Rising government dissavings partially offset the increased private savings required in some countries for a durable narrowing of current account imbalances. Credible structural reforms are needed to move fiscal positions to a sustainable path. Concerns over fiscal imbalances could also result in an abrupt increase in risk premiums and volatility for a wide range of assets and currencies. This could potentially make the management of interest rate risk and foreign exchange risk more difficult

The mounting fiscal strains in several advanced economies in the euro area and elsewhere pose a risk to a timely and lasting resolution of global imbalances.

6 For details, see <http://www.g20.org/Documents/201004_communique_WashingtonDC.pdf>.

and increase stress in the banking sector. As recent events have illustrated, a focus by the markets on fiscal challenges can lead to immediate tensions in the financial system, even when the fiscal concerns are for the medium term.

Canada's fiscal position is relatively strong, owing to an improving economic outlook and better fiscal fundamentals than in many other countries. However, as discussed earlier, the Canadian financial system could be adversely affected by growing fiscal strains elsewhere.

The level of risk to the Canadian financial system associated with global imbalances has increased since the last FSR.

The Governing Council judges that the level of risk to the Canadian financial system associated with global imbalances has increased since the last FSR, primarily because of rising concerns over the sustainability of fiscal positions in a number of countries.

Global economic outlook

The global economic recovery has gained momentum since the December FSR, reflecting the exceptional monetary and fiscal stimulus in many countries as well as robust growth in many emerging-market economies. As outlined in the April 2010 *Monetary Policy Report* (MPR), the recovery is still expected to be relatively subdued in the major economies, since private demand remains weak in most of these countries, and fiscal stimulus will start to wind down later this year. The more favourable macroeconomic baseline, if it materializes, will create room for financial institutions in a number of countries to repair their balance sheets, thereby helping to reduce risks to the financial system.

Despite a more favourable global economic outlook, the risks to the Canadian financial system stemming from the global economy have grown since December, owing to escalating worldwide concerns over fiscal imbalances.

Despite a more favourable global economic outlook, the risks to the Canadian financial system stemming from the global economy have grown since December, owing to escalating worldwide concerns over fiscal imbalances. An intensification of sovereign risk would weaken global economic growth by tightening financial conditions and/or by accelerating fiscal consolidation. A slowdown in European economic growth—the most likely risk, given the region's weaker outlook and greater financial strains—could have a material impact on global economic growth through confidence, credit, wealth, and international trade channels. If this risk materializes, a growing number of Canadian households and businesses would experience financial difficulties, which would translate into an increase in loan losses at financial institutions. Writedowns of investments held by those institutions would also likely rise. If banks curtail credit, this could trigger an adverse feedback loop through which declines in economic activity and stress in the financial system mutually reinforce each other.

Emerging-market economies are expected to remain on a high-growth path—and to continue to be a key source of global economic growth—as they reap the benefits of past structural reforms, as well as government fiscal stimulus packages in China. However, there are some concerns that abundant liquidity and a sharp rebound in private sector capital inflows for several emerging-market economies since the peak of the financial crisis may be causing excessive credit growth and the formation of asset-price bubbles in certain countries. Authorities in some of these countries, including China, have taken measures to curtail the growth of credit, and further policy actions are likely if concerns about overheating

remain. If credit conditions are tightened excessively in these economies, the global economic recovery could be weakened.

The Governing Council considers that, while growth projections for the global economy have risen since the last FSR, the downside risk to the stability of the Canadian financial system associated with a renewed downturn in international economic activity has increased, owing to rising fiscal concerns in a number of advanced economies, as well as the risk that some emerging-market economies could cool down abruptly.

POLICY ACTIONS AND ASSESSMENT

While many aspects of the Canadian macrofinancial environment have improved since last December, with the global economic recovery proceeding as expected and conditions in Canada's financial system generally strengthening, the Governing Council considers that, overall, the near-term risks to the Canadian financial system have increased. This view mainly reflects heightened concerns that worldwide fiscal strains have the potential to cause tensions in interbank funding markets, to derail the global economic recovery, or to trigger a disorderly resolution of global imbalances.

Attaining fiscal sustainability requires credible plans to achieve viable fiscal balances, consistent with the G-20 commitment to enact macroeconomic policies promoting strong, sustainable, and balanced growth. In early May, a series of measures were adopted to address the tensions in financial markets arising from heightened market concerns over public finances in Europe. First, through the European Stabilization Mechanism, governments from the European Union pledged up to €500 billion in loan guarantees to member states experiencing financial difficulties, conditional on some austerity measures. The International Monetary Fund (IMF) agreed to provide up to €250 billion in additional funding to this program. Second, the European Central Bank (ECB) reinstated the provision of term liquidity under extraordinary conditions. It also initiated the Securities Markets Programme to conduct sterilized purchases of euro-area government debt securities in order to ensure liquidity in dysfunctional segments of fixed-income markets in the euro area. Third, the Bank of Canada, the Bank of Japan, the Bank of England, the Swiss National Bank, and the ECB reinstated temporary bilateral liquidity swap lines with the U.S. Federal Reserve to provide U.S.-dollar liquidity to banks in their respective jurisdictions.

Attaining fiscal sustainability requires credible plans to achieve viable fiscal balances, consistent with the G-20 commitment to enact macroeconomic policies promoting strong, sustainable, and balanced growth.

While these measures have been helpful in tempering the recent stress in financial markets, they fall short of providing a lasting solution to fiscal challenges. Given the tendency of markets to pull medium-term concerns forward, governments with fiscal imbalances need to quickly develop realistic plans for achieving sustainable fiscal positions. They also need to begin taking steps towards implementing these plans. Since these plans could be complicated by a range of economic and political constraints, there is a risk that another period of severe stress in international financial markets and the global banking sector could occur.

Given the tendency of markets to pull medium-term concerns forward, governments with fiscal imbalances need to quickly develop realistic plans for achieving sustainable fiscal positions.

Despite heightened fiscal concerns, there has been a gradual withdrawal, beginning last autumn, of many of the extraordinary liquidity facilities provided by central banks throughout the crisis.

This process is continuing. The U.S. Federal Reserve and the Bank of England, which provided monetary stimulus through large-scale purchases of securities, have stopped acquiring securities and are now facing the prospect of reducing the large quantity of reserves held by their domestic banking systems.

Improved conditions in funding markets have allowed the Bank of Canada to stop providing Canadian-dollar liquidity through the temporary facilities put in place during the crisis.

In Canada, improved conditions in funding markets have allowed the Bank of Canada to stop providing Canadian-dollar liquidity through the temporary facilities put in place during the crisis. Outstanding term liquidity is now being gradually wound down. This process should be completed on 21 July 2010. The principles that guided the Bank of Canada's liquidity measures throughout the crisis, including the introduction of temporary facilities, will be useful in the future. One of these principles is to minimize moral hazard—that is, the potential for policy actions to provide market participants with an incentive to take greater risks than they otherwise would. To mitigate the moral hazard that could result from its interventions, the Bank lends only when a liquidity shortage threatens to propagate throughout the financial system if it is not addressed, and interventions are limited to the shortest time period necessary to address the underlying problem. This issue is discussed in the report, "The Bank of Canada's Extraordinary Liquidity Policies and Moral Hazard," on p. 29.

The Government of Canada has also ended most of its extraordinary measures.[7] Notably, the Insured Mortgage Purchase Program (IMPP), which eased funding pressures at financial institutions by enabling the Canada Mortgage and Housing Corporation to purchase up to $125 billion in qualifying insured mortgages, was terminated at the end of March 2010. Through this program, financial institutions funded outstanding residential mortgages totalling $69 billion.

Given the implications for financial stability of the rising indebtedness of Canadian households, the Government of Canada further adjusted the rules for government-backed insured mortgages. These adjustments included a more stringent qualifying test that requires all borrowers to meet the standards for a 5-year fixed-rate mortgage, even if they choose a mortgage with a variable interest rate and/or a shorter term. In addition, the maximum loan-to-value ratio of refinanced mortgages was lowered to 90 per cent (from 95 per cent), thus reducing the amount of new borrowing that households can obtain against the value of their homes when refinancing. Moreover, the minimum down payment on non-owner-occupied properties was raised to 20 per cent (from 5 per cent). These rules came into effect in April 2010.

A framework should be in place to limit the repercussions on the financial system as a whole—either by strengthening market infrastructure or by maintaining the supply of essential services provided by the failing institution.

While the measures taken by authorities around the world to stabilize the global financial system during the crisis have been broadly effective, they have also heightened expectations of policy support, despite evident public opposition in many countries. To create the proper incentives for effective risk management—and to avoid the excessive risk-taking associated with moral hazard—there should be a clear expectation that the shareholders of a failing firm will bear losses to the fullest extent. This is possible

7 The Business Credit Availability Program (BCAP) continues to address the financing needs of credit-worthy small and medium-sized businesses. As of March 2010, almost 9,000 businesses had received more than $5 billion in financing through the BCAP.

only if authorities have effective tools to wind down failing financial institutions in an orderly manner, even if these institutions are large and complex. This implies that a framework should be in place to limit the repercussions on the financial system as a whole—either by strengthening market infrastructure or by maintaining the supply of essential services provided by the failing institution.

Implementing regulatory reform aimed at addressing the gaps that have been revealed by the recent crisis is thus critical to strengthening the resilience of the financial system to future shocks. Some of the key global initiatives to enhance financial sector regulation that are being developed under the direction of the G-20 leaders are reviewed in **Box 1**. These include actions to strengthen prudential standards for capital and liquidity at financial institutions and to reduce the probability and impact of the failure of a systemically important financial institution. There are also measures to strengthen the infrastructure for some core funding markets and over-the-counter derivatives markets. Given its unprecedented scope, pace, and complexity, there is clearly a risk that regulatory reform could have unintended consequences. There is also a risk that important elements of the reform agenda will be diluted, either because of complacency as economic and financial conditions improve or because of fears that the adjustment required by the reforms could harm a still-fragile recovery. Carrying out reforms will be all the more challenging because of the need for substantial international co-operation to address cross-border spillover effects and to avoid regulatory arbitrage. A balance will have to be struck between implementing the improved global standards consistently across jurisdictions and respecting the unique circumstances of each country.

Implementing regulatory reform aimed at addressing the gaps that have been revealed by the recent crisis is critical to strengthening the resilience of the financial system to future shocks.

Box 1

Progress on the Agenda for Global Regulatory Reform

In the wake of the recent crisis, enhancing financial sector regulation to more effectively safeguard financial stability in the future has become a priority. Given the global nature of the crisis, the G-20 provides a sound international forum to sponsor this process. Canadian authorities are participating in the development of a number of reform initiatives; in particular, the Office of the Superintendent of Financial Institutions and the Bank of Canada are actively involved in several projects that are part of the global effort to develop enhanced standards for strengthening the resilience of the banking sector. Some of the key objectives of the reform agenda and the progress in addressing them are reviewed here.

Reinforcing the prudential regulation of capital and liquidity—The Basel Committee on Banking Supervision (BCBS) has issued a set of proposals for raising the quantity, quality, consistency, and transparency of the capital base; strengthening the risk coverage of the capital framework; introducing a leverage ratio as a supplementary measure to the Basel II risk-based framework; promoting the buildup of capital buffers in good times that can be drawn upon in periods of stress;[1] and introducing a global minimum liquidity standard for internationally active banks that includes a requirement for a 30-day liquidity coverage ratio underpinned by a longer-term structural liquidity ratio.[2] A comprehensive "bottom-up" quantitative impact assessment of the amount by which capital requirements would increase as a result of the reform proposals is

(continued)

1 See "Procyclicality and Bank Capital" on p. 33 of the June 2009 FSR.

2 See "Liquidity Standards in a Macroprudential Context" on p. 35 of the December 2009 FSR.

Box 1 (cont'd)

Progress on the Agenda for Global Regulatory Reform

under way, as well as a detailed "top-down" assessment to calibrate the standards for capital and liquidity. A set of enhanced standards will be developed by the end of 2010 and will then be phased in as financial conditions improve and the economic recovery is assured.

Addressing risks posed by systemically important financial institutions (SIFIs)—The Financial Stability Board (FSB) is working on a set of recommendations for the November 2010 G-20 Summit. Policy measures under consideration for reducing the probability, and potential impact, of the failure of SIFIs include the use of contingent capital; better supervisory practices; and the introduction of more-stringent prudential requirements, such as a limit on leverage or a capital and/or liquidity surcharge calibrated to a measure of systemic importance. Work is also under way at the FSB to improve the ability of authorities to undertake an orderly resolution of a failing SIFI through, for example, improved ex ante preparedness, contingency planning, and cross-border co-operation and information exchange among supervisors. Common principles will be developed by October 2010.

Improving systemically important market infrastructures—Standards for systemically important financial market infrastructures are under review by the Committee on Payment and Settlement Systems (CPSS) and the International Organization of Securities Commissions (IOSCO), with a view to reducing the risk of contagion by strengthening core financial infrastructures and markets. In Canada, the Canadian Derivatives Clearing Corporation (CDCC) is working with the Investment Industry Association of Canada (IIAC) and the Bank of Canada to launch a central clearing counterparty (CCP) for repurchase agreements and fixed-income securities in multiple phases, starting in September 2010.[3]

Improving over-the-counter (OTC) derivatives markets—An FSB working group is developing policy options for promoting increased use of standardized products and for ensuring centralized clearing and trading at the global level. This work is expected to be completed by October 2010. Major derivatives dealers and a number of institutional investors have committed to enhance transparency in the OTC derivatives market and to expand central clearing, standardization, and collateral management. National initiatives are under way in a number of jurisdictions, with CCPs operating in the United States, the United Kingdom, and the European Union. In Canada, research on domestic markets has been undertaken by an interagency working group and the industry itself, and regulatory proposals are being developed.

Strengthening accounting standards—The International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) are working towards harmonizing their respective accounting standards by June 2011. Meanwhile, each group is working on its own to clarify standards for measuring financial instruments, as well as to enhance provisioning standards for financial assets reported at amortized cost. In Canada, publicly accountable enterprises will be required to adopt International Financial Reporting Standards for fiscal years beginning on or after 1 January 2011.

Restarting securitization markets on a sound basis—In April 2010, IOSCO published disclosure principles for asset-backed securities and is considering the viability of post-trade transparency for structured products.[4] The FSB will examine any further actions that could be taken to revive sound securitization markets in such areas as transparency, incentives alignment, and disclosure.[5]

Enhancing oversight of hedge funds—In February 2010, IOSCO published a template for the collection and exchange of comparable and consistent information among authorities to facilitate co-operation in identifying systemic risks posed by the hedge fund industry. Registration requirements for hedge fund managers have been established in Canada and the United States, while the United Kingdom is proposing to impose, in addition to registration, some operational requirements in other areas, including risk management.

3 See "Improving the Resilience of Core Funding Markets," on p. 41 of the December 2009 FSR.

4 See "Securitized Products, Disclosure, and the Reduction of Systemic Risk," on p. 47.

5 See "Reform of Securitization," on p. 47 of the December 2009 FSR.

The Macrofinancial Environment

This section of the *Review* discusses key financial and macroeconomic trends and developments over the past six months to support the assessment of the key risks for Canadian financial stability outlined in the preceding section. It begins by exploring developments in the global economy before focusing on trends and issues in international and Canadian financial markets and institutions, as well as the balance sheets of Canadian households and businesses.

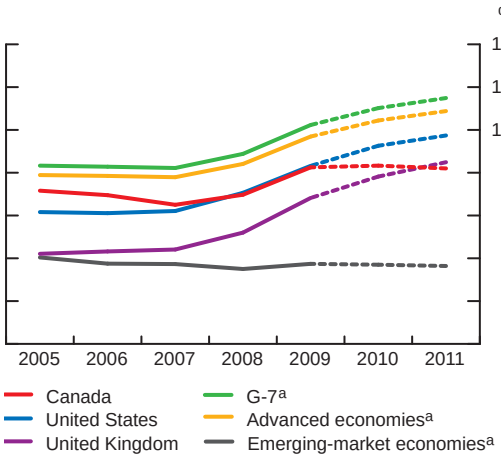
Global Economy

The recovery in international economic activity is continuing, supported by extraordinary monetary and fiscal stimulus in the G-20 countries. As outlined in the Bank's April 2010 *Monetary Policy Report* (MPR), global economic growth has been somewhat stronger than projected. The recovery is, however, expected to be uneven and relatively subdued in most advanced economies, since private demand remains weak in many of these countries and fiscal stimulus will start to wind down later this year.

Even as the global economy improves, downside risks have intensified in recent months, owing to rising fiscal strains in many advanced economies. These strains reflect the deterioration in fiscal positions resulting from the recession, fiscal stimulus, and financial sector support. Moreover, many advanced economies entered the crisis with weak structural fiscal positions and high government indebtedness in relation to GDP **(Chart 1** and **Table 2)**.

According to the International Monetary Fund (IMF), most governments in advanced economies will continue to post sizable fiscal deficits in the medium term, with the gross general government debt-to-GDP ratio projected to rise, on average, from about 91 per cent at the end of 2009 to 110 per cent in 2015 in these economies.[8] The increase in debt is notably large in the United Kingdom and the United States, two countries strongly affected by the crisis. It is also significant in countries where growth prospects are weaker, such as Japan and some countries in Europe—for example, Greece, Spain, Portugal, and Ireland. The IMF projects that fiscal balances will improve by 2015 but will remain above pre-crisis levels: the average deficit in advanced economies is projected to decline to 4.7 per cent (from 8.8 per

Chart 1: Sovereign debt is rising in many jurisdictions
General government gross debt as a percentage of nominal GDP



a. Average
Note: Broken lines indicate IMF projections.
Source: IMF *Fiscal Monitor*, May 2010 Last data point plotted: 2011

8 For more details, see <http://www.imf.org/external/pubs/ft/fm/2010/fm1001.pdf>.

Table 2: General government gross debt and budget balances[a]
As a percentage of nominal GDP

	2007		2009		2015 (IMF projections)	
	Gross financial liabilities	Budget balance[b]	Gross financial liabilities	Budget balance[b]	Gross financial liabilities	Budget balance[b]
Canada	65.0	1.6	82.5	-5.1	71.2	0.0
France	63.8	-2.7	77.4	-7.9	94.8	-4.1
Germany	65.0	0.2	72.5	-3.3	81.5	-1.7
Greece	95.6	-3.7	115.1	-13.6	140.4	-2.0
Ireland	24.9	0.1	64.5	-11.4	94.0	-5.3
Italy	103.4	-1.5	115.8	-5.3	124.7	-4.6
Japan	187.7	-2.4	217.7	-10.3	250.0	-7.3
Portugal	63.6	-2.7	77.1	-9.4	98.4	-4.4
Spain	36.1	1.9	55.2	-11.4	94.4	-7.7
United Kingdom	44.1	-2.7	68.2	-10.9	90.6	-4.3
United States	62.1	-2.7	83.2	-12.5	109.7	-6.5
Advanced economies (average)	**72.9**	**-1.1**	**90.6**	**-8.8**	**110.2**	**-4.7**
Emerging economies (average)	**36.9**	**0.0**	**38.0**	**-4.9**	**34.2**	**-2.3**
G-7 (average)	**82.2**	**-2.1**	**102.3**	**-10.0**	**124.1**	**-5.4**
G-20 (average)	**61.3**	**-0.9**	**72.5**	**-7.5**	**82.5**	**-3.9**

a. Data refer to the general government sector, and consolidate accounts for the central, state, and local governments in addition to social security.
b. Surplus (+) or deficit (-)
Source: IMF *Fiscal Monitor*, May 2010

cent of GDP in 2009). These projections assume no significant additional expenditures to support the financial sector, and some recovery of previous disbursements.

Higher fiscal deficits and public debt levels may cause yields on long-term government bonds to rise in reaction to investors' perceptions of increased threats to debt sustainability. The impact of fiscal imbalances on sovereign bond yields is typically greater for countries with low domestic savings, limited access to global capital markets, and weak financial institutions. Rising yields would, in turn, make the debt burden heavier, exacerbating fiscal strains and dampening real economic growth. As discussed in the following sections, fiscal strains can also cause dislocations in financial markets and stress in the banking sector.

Canadian governments are in a relatively strong fiscal position. At the end of 2009, the total gross government debt and fiscal balances of the federal, provincial, and territorial governments were lower than the global average for advanced economies. Their fiscal situation is also expected to improve considerably faster than the world average, with the IMF projecting that fiscal balance will be restored in 2015.

Financial Markets

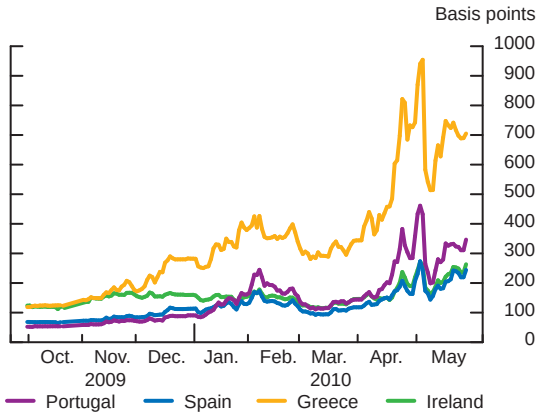
Despite accumulating evidence that the global economic recovery is proceeding well, dislocations in financial markets arising from growing concerns about the deteriorating fiscal positions of some advanced countries have illustrated the precarious state of confidence and the potential for sovereign risk to spread across the financial system. Although spreads on sovereign credit-default swaps have narrowed since the 10 May announcement of the European Stabilization Mechanism and the ECB's Securities Markets Programme, they are significantly wider than in December for some euro-area countries with large fiscal imbalances **(Chart 2)**. Spreads between the sovereign debt of these countries and bonds issued by the German government have also widened. The trigger for this reappraisal of sovereign risk was, to a large extent, the fiscal difficulties in Greece. Government yields have, however, declined for many other countries, including the United States, the United Kingdom, Germany, and Canada, as investors rebalanced their portfolios away from riskier assets and reassessed their expectations for the global economic outlook. Market participants remain focused on sovereign risk as they await credible measures for fiscal consolidation that would address the fiscal challenges faced by the affected countries.

While there are no material dislocations in Canadian financial markets, there are, nonetheless, concerns about the potential for tensions in international markets to spill over to Canada and for growing risks to the global economic outlook to hamper the recovery in aggregate demand in Canada. This is illustrated by the recent increase in a financial stress index developed at the Bank **(Chart 3)**. This index, which is a weighted average of nine indicators of expected loss, risk, and uncertainty from Canadian markets, provides a snapshot of contemporaneous stress in Canada's financial sector.[9] It is not, however, a leading indicator.

Credit markets

Since early May, severe pressures have re-emerged in some short-term bank funding markets, particularly for European banks. Because these banks had access to euro funding from ECB facilities, tensions primarily affected U.S.-dollar markets, as indicated by the behaviour of the cross-currency basis swap rate **(Chart 4)**.[10] At the time of writing, recent policy actions, including

Chart 2: Concerns about sovereign risk in the euro area have increased materially since the last FSR
Spreads on 5-year sovereign credit default swaps

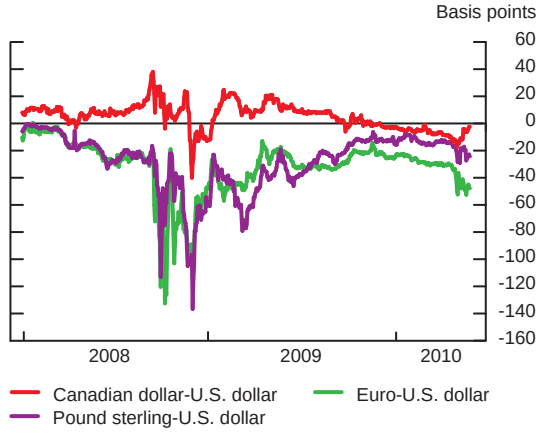


Source: Markit
Last observation: 1 June 2010

Chart 3: Financial stress has increased in Canada in recent months
Financial stress index

Source: Bank of Canada calculations
Last observation: May 2010

Chart 4: Pressures have re-emerged for U.S.-dollar funding, particularly for European banks, but to a more limited extent than at the height of the crisis
One-year cross-currency basis swaps[a]



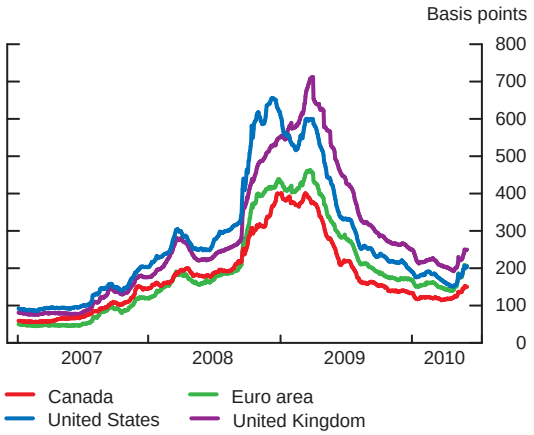
a. See footnote 10.
Source: Bloomberg
Last observation: 1 June 2010

9 Components of the index are: (i) the yield spread for bonds issued by Canadian financial institutions; (ii) the yield spread for bonds issued by Canadian non-financial corporations; (iii) the 90-day treasury bill rate minus the yield on 10-year Government of Canada bonds; (iv) a beta variable derived from the total return index for Canadian financial institutions; (v) a measure of volatility of the trade-weighted Canadian-dollar index estimated with a general autoregressive heteroscedastic (GARCH) model; (vi) a GARCH measure of volatility for the TSX/S&P Composite Index; (vii) the difference between Canadian and U.S. government short-term borrowing rates; (viii) the average bid/ask spread on Canadian treasury bills; and (ix) the spread between rates on Canadian commercial paper and treasury bills. See "Measuring Financial Stress" on p. 43 of the December 2003 FSR for more details on this index.

10 A cross-currency basis swap is a contract in which a market participant borrows funds in one currency at a variable interest rate and simultaneously lends the same value to the same counterparty in another currency, also at a variable interest rate. When there is a shortage of funding in one currency, for example, in U.S. dollars, market participants are willing to pay a premium–and therefore to receive lower interest payments on the funds lent in the other currency in the cross-currency swap market. This causes the basis swap rate to turn negative. As shown in Chart 4, the basis swap rate for the Canadian dollar is close to zero, which indicates that there is no imbalance in the Canadian-dollar funding market. See "The Impact of the Financial Crisis on Cross-Border Funding," on p. 33, for more details.

Chart 5: Yield spreads for corporate issuers in major credit markets have increased modestly since early May

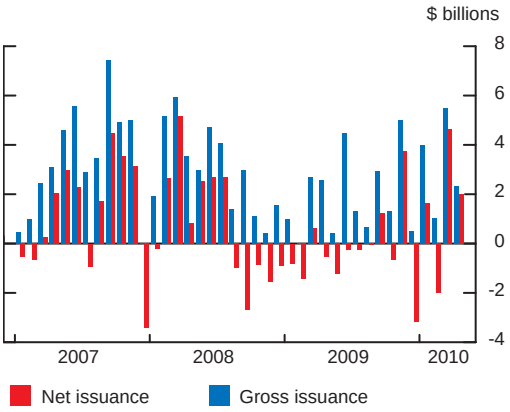
Options-adjusted spreads between investment-grade corporate debt indexes and government bonds



Sources: Bloomberg and Bank of America Merrill Lynch

Last observation: 1 June 2010

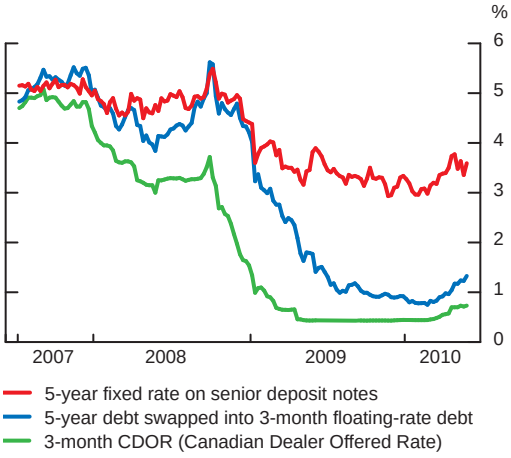
Chart 6: Canadian banks have returned to debt markets



Source: Bank of Canada

Last observation: April 2010

Chart 7: Funding costs have increased modestly for Canadian banks, reflecting expectations of rising policy rates



Sources: Bloomberg and Bank of Canada

Last observation: 1 June 2010

the reopening of the ECB's U.S.-dollar swap arrangement with the Federal Reserve, have helped to contain some of the U.S.-dollar funding pressures experienced by European banks. Nonetheless, tensions in bank funding markets remain, and there are indications that market participants expect funding pressures to persist.[11] Canadian short-term funding markets have been largely unaffected by the recent turmoil in global funding markets, since the perceived riskiness of Canada's financial institutions did not rise, owing to their strong fundamentals. Nevertheless, the risk of contagion remains. As illustrated by the experience during the autumn of 2008, liquidity can disappear very quickly across funding markets.

Prior to these events, global short-term bank funding markets had generally recovered from the stress experienced during the financial crisis, with signs of improvement in banks' access to funding at longer maturities. Conditions in long-term corporate bond markets had also broadly continued to improve around the world, with yield spreads declining for both investment-grade financial and non-financial corporations in most key jurisdictions until early May, despite elevated issuance **(Chart 5)**.[12] However, global corporate debt markets have felt the strains affecting financial markets more generally since then, with volatility increasing and spreads widening modestly.

In Canada, there is evidence that, in recent quarters, corporate debt securities have been acquired by non-traditional purchasers (such as equity investors, retail investors, and leveraged funds), as well as by foreign investors, contributing to the decline in yield spreads on corporate bonds across the credit spectrum.[13] Investor demand for corporate debt instruments is also supported by the improved economic outlook, low policy interest rates, and abundant liquidity in the financial system. All of these factors have contributed to a reallocation of funds from money market instruments and government securities into riskier assets.[14]

Canadian banks have taken advantage of this strong investor demand. Since December, their bond issuance has rebounded from a year-long period of limited issuance **(Chart 6)**.[15] Despite this strong rebound, risk premiums paid by Canadian banks for term funding were relatively stable until mid-April. Recently, however, these risk premiums have increased modestly as a result of the worldwide deterioration in financial conditions. Together with expectations of rising policy rates, this has led to an increase in the cost of term funding for Canadian banks **(Chart 7)**.

11 Forward LIBOR-OIS spreads, which measure the difference between the implied 3-month LIBOR and OIS rates at various dates in the future, have widened since early May.

12 High-yield issuance in particular has been very strong, with a record US$71 billion in debt issued in the United States in the first quarter of 2010.

13 According to Statistics Canada, in the 12-month period ending in February 2010, non-resident investors purchased Can$99 billion in Canadian bonds, compared with Can$24 billion over the same period the previous year.

14 Statistics from the Investment Funds Institute of Canada show that outflows from money market funds over the first quarter of 2010 stood at Can$6.8 billion, while inflows into balanced funds and bond funds stood at Can$9.3 billion and Can$3.1 billion, respectively, over the same period.

15 The limited debt issuance by Canadian banks from October 2008 to October 2009 is partly explained by the fact that banks took advantage of the Insured Mortgage Purchase Program to secure term funding.

Meanwhile, through April, the issuance of long-term debt by Canadian non-financial corporate issuers remained robust **(Chart 8)**. Overall borrowing rates on corporate securities have risen modestly, but they continue to be near multi-year lows **(Chart 9)**.

Global markets have increasingly focused on refinancing risk, since they expect that the sizable fiscal stimulus programs undertaken during the crisis will lead to elevated sovereign debt issuance in coming years, which will coincide with a substantial amount of maturing debt for international banks and non-financial corporations. There is thus a potential for elevated issuance in global debt markets in coming years, and a risk that this could cause an increase in financing costs, and possibly limit access to credit markets for some of the riskier issuers. As discussed in **Box 2**, this risk does not appear to be material for Canadian debt issuers, since their amount of maturing debt over the next five years is broadly in line with past levels of issuance, and Canada's banking, corporate, and government sectors are in better condition than those in many other countries. Overall, this suggests that, while Canadian issuers would probably be affected if global credit conditions tightened, the increase in their financing costs is likely to be more limited than in other jurisdictions. The strong domestic investor base for both corporate and government debt in Canada should help to contain refinancing risk for Canadian issuers.

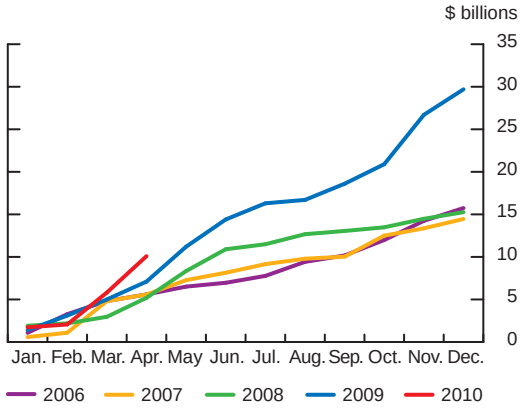
Equity markets

The recovery in global equity markets that began in March 2009 has recently experienced a setback, despite continued improvements in corporate earnings **(Chart 10)**. This is largely due to uncertainty related to the impact of sovereign risk on global economic growth. The overall improvement in equity markets in advanced economies is supported by better-than-expected earnings in the latter part of 2009 and early 2010.[16] While some valuation measures are above their historical averages, they have declined since late 2009. The resurgence of uncertainty has recently prompted a sharp increase in volatility, although to levels well below those experienced in the autumn of 2008 **(Chart 11)**.

Financial Institutions

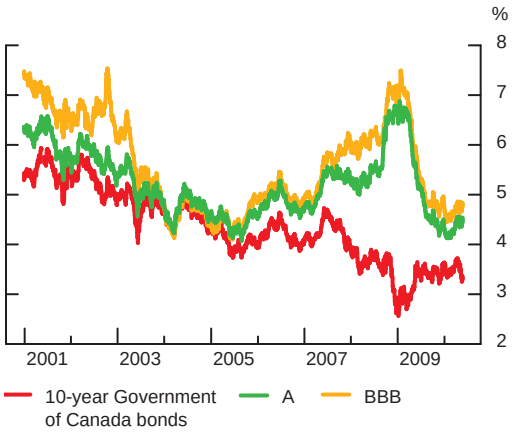
The global banking system has generally strengthened since December, as improved economic and financial conditions have allowed banks to rebuild their capital positions **(Chart 12** and **Chart 13)**. In the April 2010 issue of its *Global Financial Stability Report*, the IMF estimated total writedowns and loan-loss provisions at global banks over 2007–10 at US$2.3 trillion (revised down by approximately 20 per cent compared with six months

Chart 8: Non-financial corporate issuance has remained elevated in Canada . . .
Cumulative gross issuance



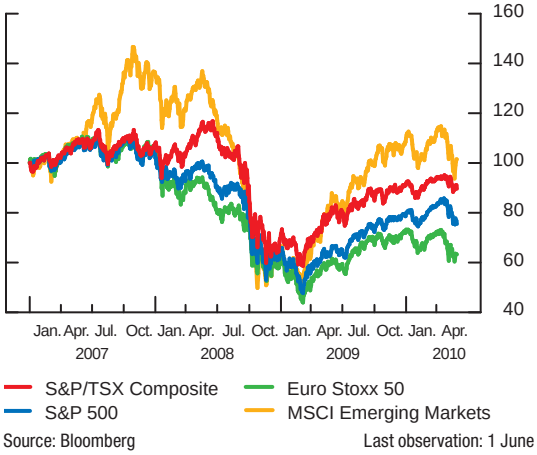
Source: Bank of Canada — Last observation: April 2010

Chart 9: . . . and has been well absorbed by markets
Yields on Canadian corporate bond indexes and Government of Canada bonds



Sources: Bloomberg and Bank of America Merrill Lynch — Last observation: 1 June 2010

Chart 10: The recovery in equity markets is experiencing a setback
Equity indexes (January 2007=100)



Source: Bloomberg — Last observation: 1 June 2010

16 Higher earnings, particularly in the first quarter of 2010, have been supported by strong revenue growth. This suggests that the improvement in equity markets is becoming more sustainable than it was for most of 2009, when better-than-expected earnings were largely the result of cost-cutting measures.

Box 2

Refinancing Needs of Canadian Debt Issuers over the 2010–15 Period

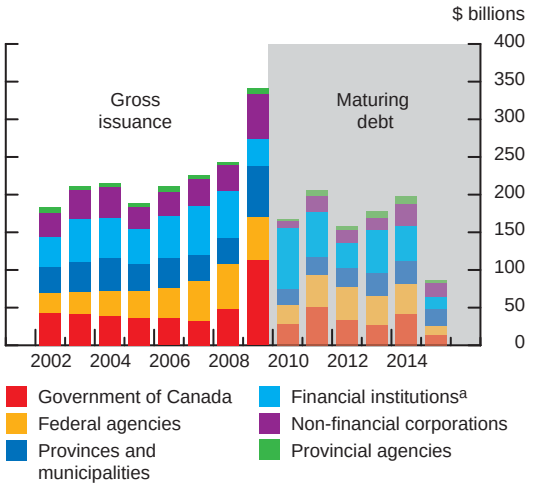
The maturing debt of Canadian issuers over the 2010–15 period stands at close to Can$1 trillion, or approximately 63 per cent of annual GDP.[1] Refinancing requirements will vary across types of issuers, with banks and, to a lesser extent, governments having the highest amount of maturing debt. Overall, upcoming maturities for existing debt are broadly similar to the amount of debt issuance prior to the crisis **(Chart 2–A)**.[2,3]

Financial institutions will have the highest refinancing needs, with the six major banks accounting for 75 per cent of the total amount of maturities in the Canadian financial sector over 2010–15. Canada's major banks have particularly concentrated maturities, with Can$225 billion in debt (i.e., 81 per cent of their total debt outstanding) maturing by 2015 **(Chart 2–B)**.[4] It is typical for banks to issue a large proportion of their debt securities with a short maturity: over the past 10 years, slightly more than 50 per cent of bank debt was issued with maturities of 3 years or less.[5] Since half of the debt of the major banks that is maturing in 2010 and 2011 is denominated in foreign currencies, Canadian banks will be competing for funds with global banks that also have significant refinancing needs over that period and will thus be particularly sensitive to conditions in global markets.[6] While roughly half of the non-financial corporate debt maturing by 2015 is also denominated in foreign currencies, these enterprises face lower amounts of maturing debt (Can$115 billion by 2015).[7]

Federal and provincial governments also face high debt maturities (Can$194 billion and Can$153 billion by 2015, respectively), but, compared with banks, these amounts represent a much lower proportion of their total debt outstanding. Given the increased reliance of some provincial governments on foreign markets in recent years, the share of their maturing debt that is denominated in foreign currencies is higher than in the past, thus making them potentially more sensitive to changes in global refinancing conditions.

Chart 2–A: The maturing debt of Canadian issuers over 2010–15 does not exceed recent issuance

Gross issuance and maturing debt of Canadian entities in world markets

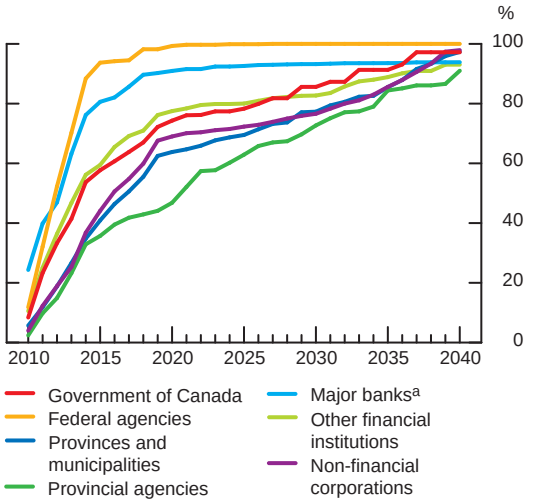


a. Includes loans obtained through the Insured Mortgage Purchase Program.

Sources: Bloomberg and Bank of Canada

Chart 2–B: The maturity profiles of outstanding bonds vary across categories of issuers

Cumulative debt maturities of Canadian issuers in world markets



a. Includes loans obtained through the Insured Mortgage Purchase Program

Sources: Bloomberg and Bank of Canada

1 This figure includes maturing debt only. Future issuance is not taken into account.

2 It should be noted that debt issuance in 2009 was particularly elevated as a result of the rising financing needs of the various levels of government to support fiscal stimulus programs.

3 Owing to the limited availability of data, the current maturity profile could not be compared with past maturity profiles.

4 Maturing loans from term purchase and resale agreements and the Insured Mortgage Purchase Program are included in those of the six major banks, since they will have to replace this funding with other sources, including capital markets, now that those programs have been terminated.

5 The maturities of other financial institutions, such as life insurance companies, are more widely dispersed over time.

6 Moody's estimates that U.S. banks face US$680 billion in debt maturities by 2011, while U.K. banks have US$340 billion maturing, and euro-area banks, US$1,649 billion.

7 Canadian non-financial corporations will be competing for funds with U.S. non-financial corporate issuers, which, according to Moody's, have maturities coming due of around US$550 billion for investment-grade bonds and US$250 billion for high-yield bonds over the next five years.

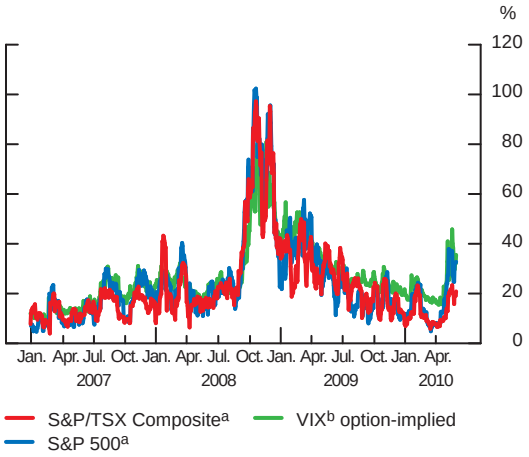
earlier).[17] About one-third of these losses had not yet been recognized at the end of 2009. The IMF estimates that progress in addressing impaired assets has been uneven across major regions, and projects significant additional writedowns for banks in Japan and the euro area. In other jurisdictions, projected further writedowns are expected to be largely covered by expected earnings.

Despite recent improvements, global banks face significant challenges. First, as noted in the preceding section on financial markets, there are concerns that, over the coming years, global banks could face funding pressures associated with large refinancing needs. While most of these funding needs will be met by rolling over maturing long-term debt, many banks will also be seeking to replace loans obtained under government guarantees.

Second, some segments of the global banking sector remain fragile and poorly capitalized. In the United States, real estate exposures still represent a significant downside risk; some mid-sized U.S. banks are heavily exposed to the commercial real estate sector, which remains under stress. Residential real estate loans, particularly second-lien mortgages and home equity lines of credit (HELOCs), are also a concern for U.S. banks. Since significant amounts of residential mortgages that were contracted just before the crisis will be renegotiated in coming years, prolonged stress in U.S. housing markets could result in larger-than-expected losses for banks. These strains may also affect mortgage-backed debt securities through lower revenues.

Legacy assets also present a problem for European banks, some of which still face substantial writedowns on both their loan books and securities holdings. Furthermore, as already discussed, there are rising concerns that fiscal strains in several euro-area countries could undermine the improved stability of the global banking sector. In addition to the risk of losses on holdings of sovereign debt securities, there could be a deterioration in the credit quality of banks' loan portfolios in countries with weak fiscal positions and in those of their trading partners if fiscal strains worsen their economic prospects. Regional banks may experience relatively more pressure than major banks, owing to their larger exposures to cyclical industries. As discussed in the preceding section on financial markets, concerns over the exposure of European banks to sovereign risk have caused some tensions in bank funding markets. European banks also continue to have significant exposures to maturity mismatches in U.S. dollars, with holdings of long-dated U.S.-dollar assets funded in euros and then swapped into U.S. dollars. While the currency risk is typically hedged, the crisis has shown that rolling over such positions can become increasingly difficult when tensions arise in cross-border funding markets. The report, "The Impact of the Financial Crisis on Cross-Border Funding," on p. 33, explores this issue in greater depth.

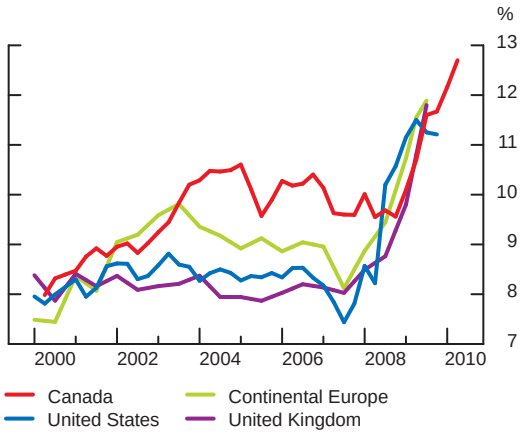
Chart 11: Volatility has risen in global equity markets since early May



a. The S&P 500 Index and the S&P/TSX Composite Index are based on 10-day historical volatility.
b. The VIX is a measure of the implied volatility obtained from option contracts on the S&P 500 Index.

Source: Bloomberg — Last observation: 1 June 2010

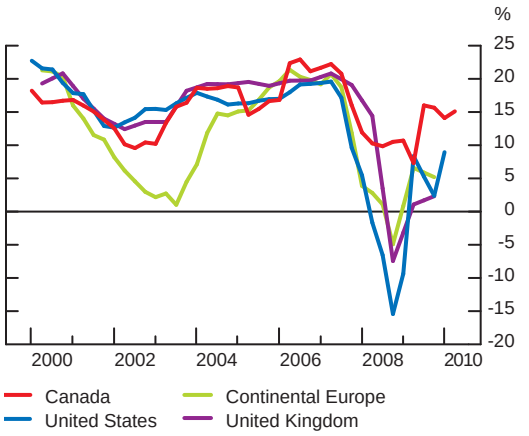
Chart 12: Tier 1 capital ratios are rising around the world



Source: Bloomberg
Last observation: Canada: 2010Q2
United States: 2010Q1
Other countries: 2009Q4

Chart 13: Most global banks are no longer incurring losses

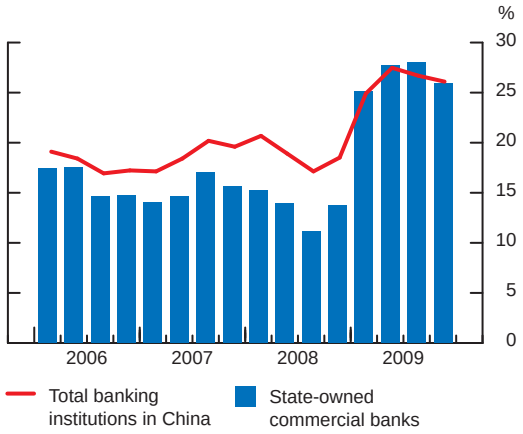
Return on equity



Source: Bloomberg
Last observation: Canada: 2010Q2
United States: 2010Q1
Other countries: 2009Q4

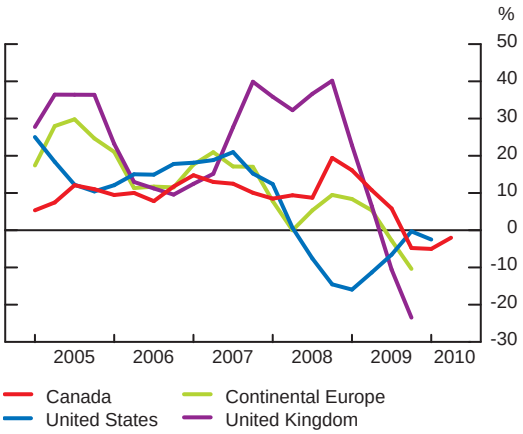
17 As noted by the IMF, these estimates are subject to considerable uncertainty arising from a number of factors, including data limitations, measurement errors from consolidation, uncertainty regarding the future path of delinquencies, and the pace of loss recognition. Box 1.1 of the October 2009 issue of the *Global Financial Stability Report* highlights sources of uncertainty surrounding the IMF's loan-loss estimates and discusses checks for robustness.

Chart 14: Asset growth at Chinese banks has been particularly strong since the beginning of 2009
Year-over-year growth rate of total assets



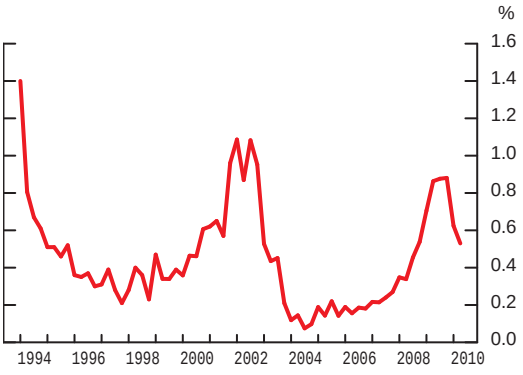
Source: People's Bank of China
Last observation: 2009Q4

Chart 15: Canadian banks did not deleverage drastically during the crisis
Year-over-year growth rate of total assets



Sources: OSFI and Bloomberg
Last observation: Canada: 2010Q2
United States: 2010Q1
Other countries: 2009Q4

Chart 16: Provisions for loan losses have declined in Canada
Annualized charge for impairment as a percentage of gross loans



Source: OSFI
Last observation: 2010Q2

Third, there are concerns about overheating in some significant emerging-market economies, which may lead to a material increase in non-performing loans in the banking systems of those countries. Banking systems in emerging-market economies were at first little affected by the global financial crisis, because of their limited exposure to U.S. subprime mortgages. However, decreased external demand had an adverse effect on credit quality, especially for banks heavily exposed to export-oriented industries. The return of risk appetite in 2009 revived capital flows into emerging markets, albeit at lower levels than in previous years. Coupled with large fiscal stimulus programs, this influx of capital has raised concerns about overheating, especially in countries with managed exchange rates. For example, beginning in 2009, new loans have risen at a very rapid pace in China **(Chart 14)**. Chinese banks have steadily improved their capital and liquidity positions, as well as their risk-management practices, following a government-driven restructuring over the earlier part of the past decade. However, lending booms are often accompanied by a deterioration in underwriting practices.[18] There is thus a risk of a sharp increase in non-performing loans if the Chinese economy cools down abruptly. While the Chinese government has substantial financial resources that could be used, if needed, to recapitalize the financial sector, some policy actions to materially curtail the expansion of bank balance sheets could have an adverse effect on the global economic recovery.

Finally, while it is clearly essential to strengthen the resilience of the international banking sector against future shocks, the transition towards enhanced global standards for capital adequacy and liquidity will be challenging.

Canadian banking sector

Capital

As in other jurisdictions, the capital ratios of Canadian banks have increased substantially since the onset of the crisis. Canada's banks did not need capital injections from the public sector, nor did they have to significantly deleverage by shedding assets **(Chart 15)**. As a group, Canada's major banks also remained profitable throughout the crisis, which allowed them to generate capital internally from earnings.

While Canadian banks continue to experience elevated loan losses, loss rates have declined materially in recent quarters **(Chart 16)**.[19] Canadian banks have continued to fare well compared with both U.S. banks and past cycles, although certain segments of their loan portfolios have exhibited some weakness. For example, the retail and commercial banking operations of Canadian banks in the United States have incurred higher loss

18 See Giovanni Dell'Ariccia, Deniz Igan, and Luc Laeven, "Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market," for evidence. Available at <http://www.imf.org/external/pubs/ft/wp/2008/wp08106.pdf>.

19 We follow the convention of using the income statement expense, *Provision for Credit Losses*, as the measure of loan losses.

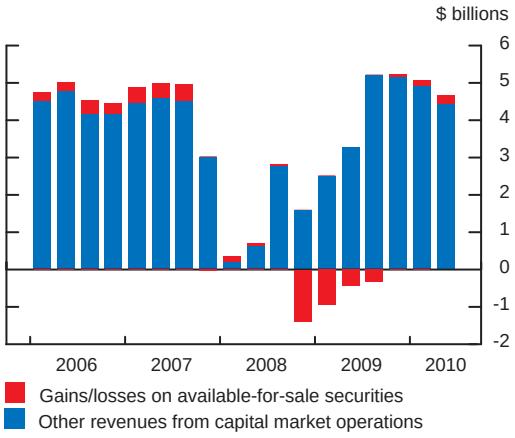
rates than their Canadian operations.[20] Losses on Canadian credit card loans have also risen, but their effect on the overall loan portfolios of banks has not been material, given that this sector accounts for only a small share of Canadian bank lending. In contrast, business loan portfolios have performed relatively well, reflecting the improvement in the liquidity and leverage of the non-financial corporate sector over the past decade. Loans secured by Canadian residential real estate have also performed well, partly because Canada did not undergo a housing correction of the magnitude experienced by other countries[21] and because of the low level of subprime lending in Canada.

Notwithstanding a brief spike early in the crisis, bank lending to businesses has declined steadily in recent years, and the loan portfolios of the major banks are becoming more concentrated in household lending.[22] Given the rising indebtedness of Canadian households, the increasing share of lending to households in the banks' loan portfolios could be a risk to the banking system over the medium term. This is discussed in more detail in the section on the household sector on p. 24. Banks have mitigated the potential impact of household defaults by securing much of the lending with residential real estate, which makes up the majority of the household portfolio. All mortgages with loan-to-value ratios in excess of 80 per cent are insured against default, and banks have purchased significant amounts of portfolio insurance on low-ratio mortgages. While this insurance comes at a cost, it allows banks to securitize these mortgages through the Canada Mortgage and Housing Corporation. It also reduces banks' exposure to credit risk, as well as the amount of capital that is required to be held against these mortgages.

The revenues of major Canadian banks originate from a wide range of business lines. Like many of their international peers, some banks incurred significant trading losses early in the financial crisis. Revenues related to capital markets rebounded sharply in 2009, although they have declined modestly in 2010 **(Chart 17)**. Strong trading revenues have helped the large banks to maintain healthy profitability by offsetting credit losses in their loan portfolios. Part of the rise in trading revenues can be explained by increased revenue from market-making activities, since volatility remained high and bid/ask spreads also stayed relatively wide. The exit of key players in various foreign markets and the strong reputation of Canadian banks allowed them to gain market share. As discussed in **Box 3**, it also appears that both Canadian and international banks earned a portion of their profits by taking on larger exposures to interest rate risk, given a trading environment characterized by low interest rates and steep yield curves.

The risk of stress at Canadian banks resulting from direct losses on holdings of sovereign debt appears to be relatively limited **(Chart 18)**. This is due partly to the strong fiscal situation of Canadian governments, as discussed in the preceding section

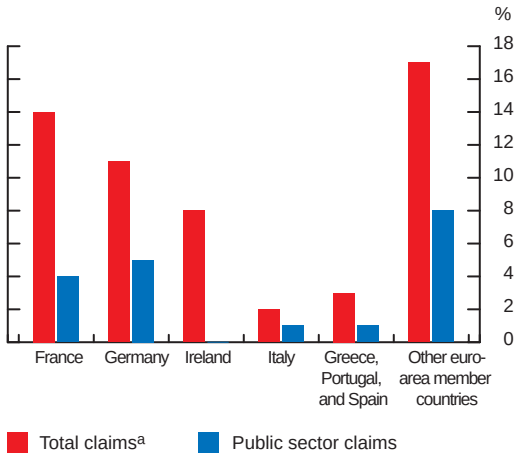
Chart 17: Revenues from capital market operations rebounded during 2009



Source: Banks' quarterly financial statements Last observation: 2010Q2

Chart 18: Canadian banks have few direct claims on the public sectors of euro-area countries

Foreign claims of Canadian banks as a percentage of Tier 1 capital, 2010Q1



a. Total claims comprise those on the banking, public, and non-bank private sectors.
Source: Bank of Canada

20 Canadian banks operating in the United States with a regional bank model have incurred losses on loans to the U.S. commercial real estate sector that are comparable with those of their U.S. peers.

21 In fact, average housing prices in Canada are now slightly above their pre-crisis peak.

22 The reduced exposure to businesses in the banks' loan portfolios, however, is partly offset by increased holdings of corporate debt in their securities portfolios.

Box 3

Interest Rate Risk in the Financial System

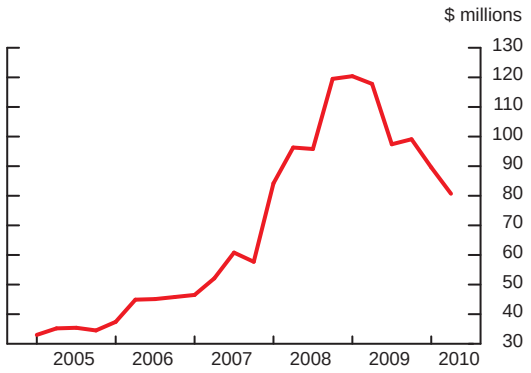
As maturity transformers, banks typically borrow short-term funds and invest them in longer-term illiquid assets, such as loans and securities. This leaves them exposed to the risk of unexpected losses resulting from increases in interest rates or changes in the slope of the yield curve. Banks can quickly and easily take on interest rate exposure in their trading operations as well, by taking positions in either debt securities or interest rate derivatives.

A steep yield curve, such as in the current environment, typically provides incentives for financial institutions to assume higher-than-normal levels of interest rate exposure. For example, carry strategies, where short-term funds are borrowed to buy longer-term interest-bearing securities, become particularly attractive in such an environment. Given the lower cost of funds, a steep yield curve also tilts funding profiles towards shorter maturities, possibly adding to any maturity mismatches. There have been concerns worldwide that banks may be more exposed to sharp movements in the level or slope of the yield curve than in other phases of the economic cycle.[1]

The size and direction of the interest rate exposures of financial institutions are difficult to assess with current levels of public disclosure. The interest rate Value-at-Risk (VaR) reported by major Canadian banks was rising until early 2009.[2] Interest rate VaR covers both on- and off-balance-sheet exposures held in the trading book. The VaR measure has declined recently, but remains above pre-crisis levels **(Chart 3–A)**. Reported measures of exposure in the banking book—the sensitivity of net interest income and the net present value of equity to changes in interest rates[3]—are broadly in line with their level from 2006 to 2007 **(Chart 3–B)**.[4]

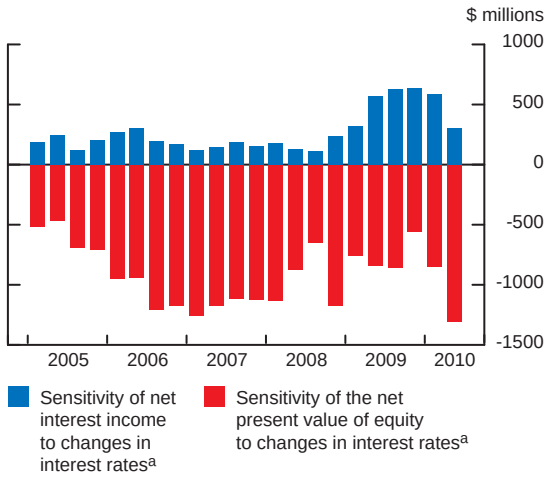
The exposures of Canadian banks to interest rate risk are likely manageable, since their capital position is strong. However, in the current environment, the management of interest rate risk could be complicated by the possibility of a sharp and/or unexpected change in the slope of the yield curve, in light of heightened concerns over sovereign risk. Interest rate movements could also be accompanied by sharp shifts in exchange rates, causing further losses on carry trades involving cross-currency exposures. If these changes cause market participants to unwind their positions, this could reinforce the initial movements, potentially increasing losses further. Since the effectiveness of traditional approaches to risk management (i.e., VaR for the trading book and sensitivity to parallel shifts in the yield curve for the banking book) is limited in this type of environment, they should be supplemented by stress testing and scenario analysis.

Chart 3–A: Interest rate Value-at-Risk remains above pre-crisis levels in the trading book



Sources: Quarterly financial reports for the Bank of Montreal, the Canadian Imperial Bank of Commerce, Royal Bank of Canada, Scotiabank, and TD Canada Trust Last observation: 2010Q2

Chart 3–B: Interest rate risk in the banking book is in line with 2006–07 levels



a. See footnote 3.

Source: Quarterly financial reports for the Bank of Montreal, the Canadian Imperial Bank of Commerce, National Bank of Canada, Royal Bank of Canada, and Scotiabank. Last observation: 2010Q2

1 For example, see "Focusing on Bank Interest Rate Risk Exposure." Speech by Donald L. Kohn, Vice Chairman of the Board of Governors of the U.S. Federal Reserve System, 29 January 2010. Available at <http://www.federalreserve.gov/newsevents/speech/kohn20100129a.htm>.

2 Value-at-Risk is a statistical estimate of the maximum loss over a given time horizon with a predetermined degree of confidence. Here, we use VaR estimates provided by banks at a 99 per cent confidence level, over a 10-day holding period. Assumptions and models vary across institutions.

3 These are estimates of the impact of a hypothetical parallel shift in interest rates on net interest income and the net present value of equity in the banking book.

4 Measures of interest rate risk in the banking book are net of off-balance-sheet hedges (e.g., interest rate swaps).

on the global economy. Moreover, Canadian banks have little direct exposure to Greece and other euro-area countries for which market indicators of fiscal strains are the highest. However, their exposures to other European counterparties, such as banks in Germany, France, and the United Kingdom, may represent potential sources of contagion in the event of further distress.

Liquidity

Since the onset of the crisis, Canadian banks have increased their holdings of liquid assets **(Chart 19)**. They have also shifted their funding away from wholesale markets, which tend to be a less-stable source of funding than retail deposits, particularly in times of stress **(Chart 20)**. Banks continued to increase their holdings of liquid assets after the Bank of Canada and the Government of Canada stopped providing new liquidity through the extraordinary facilities put in place to ease liquidity strains **(Chart 21)**. At the same time, Canadian banks have not been materially affected by the renewed tensions in funding markets resulting from concerns over sovereign debt in Europe.

Canadian life insurance sector

Because of the nature of their activities, insurers are important players in the financial system. They pool, manage, and transfer financial risks. Moreover, the products that they offer, such as annuities and segregated funds and the high level of assets under management, make them significant long-term investors and participants in financial intermediation and capital accumulation.

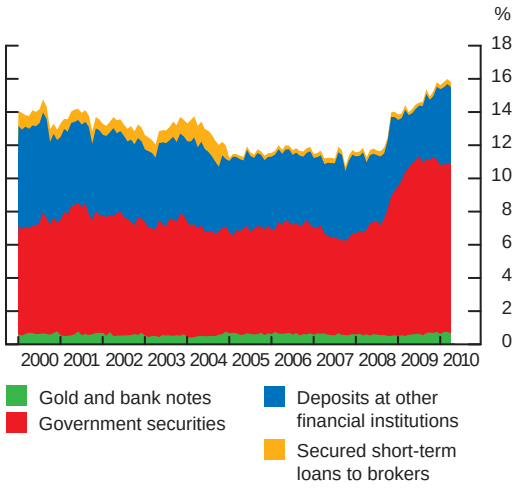
Life insurers were also affected by the financial crisis, albeit through different channels than banks. They incurred losses because of deteriorating credit quality, declining equity markets, and lower reinvestment rates. The deterioration in credit quality affected the valuation of their investment portfolios, while the sharp drop in equity prices caused losses on insurers' segregated-fund and variable-annuity business lines.[23] The resulting low level of internal capital generation prompted some Canadian insurers to raise new capital in markets and to cut dividends. However, insurers were less affected than banks by the liquidity crisis. Their lower reliance on wholesale deposits as a source of funding, tighter asset-liability management, as well as the longer-term liabilities from traditional life and annuity products make them less vulnerable to sudden freezes in short-term funding markets.

In recent quarters, insurers have improved their profitability, owing to the rebound in equity prices, some increase in market yields, and the strong performance of their large portfolios of corporate bonds. In addition, capital ratios remain above the regulatory minimum. However, insurers' earnings continue to be sensitive to financial market factors and would likely come under renewed pressure in the event of a sharp increase in risk spreads.

The financial crisis has led to a reassessment of risk-management practices and regulatory requirements for life insurance companies. The Office of the Superintendent of Financial Institutions (OSFI)

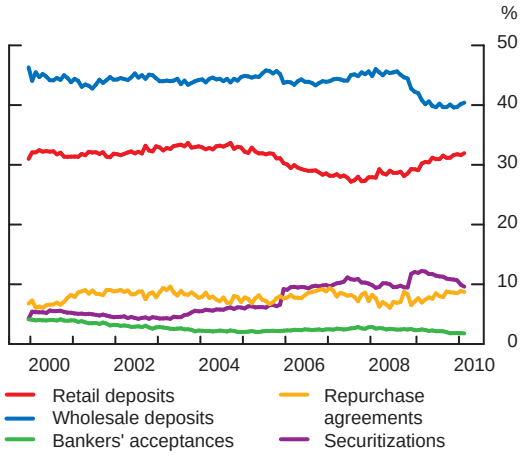
Chart 19: Canadian banks hold more liquid assets than before the crisis

Liquid assets as a percentage of total assets



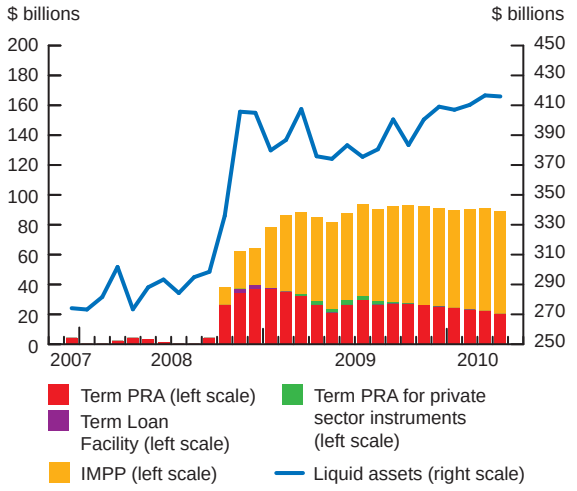
Source: OSFI — Last observation: 2010Q2

Chart 20: Major banks have reduced their reliance on wholesale funding



Source: OSFI — Last observation: 2010Q2

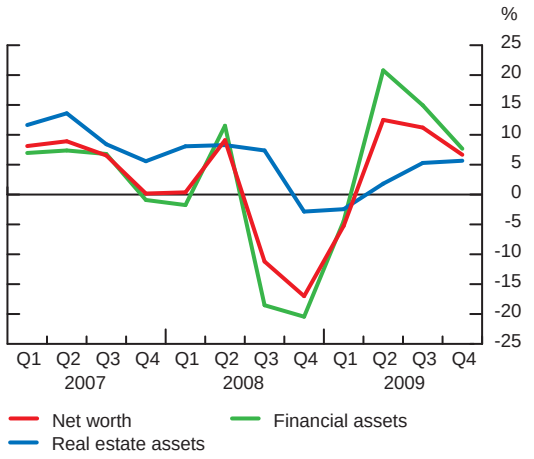
Chart 21: Canadian bank holdings of liquid assets are rising, despite the unwinding of the public sector's extraordinary facilities



Source: Bank of Canada — Last observation: April 2010

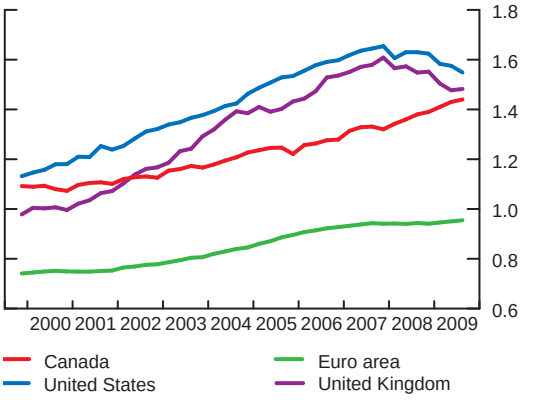
23 Segregated-fund and variable-annuity policyholders are guaranteed a minimum value on a broad equity portfolio or index. When equity prices decline, insurers incur a loss in earnings associated with future payments resulting from the rise in value of this guarantee.

Chart 22: Household assets and net worth continued to recover in the fourth quarter of 2009
Quarter-over-quarter growth rate



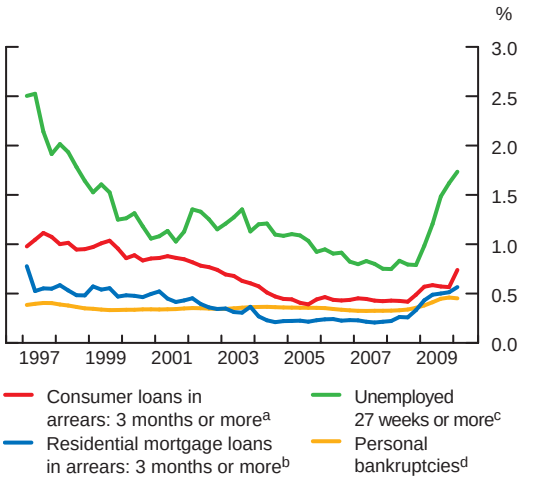
Source: Statistics Canada — Last observation: 2009Q4

Chart 23: The debt-to-income ratio of Canadian households is still rising
Ratio of household debt to disposable income



Sources: Statistics Canada, U.S. Federal Reserve, European Central Bank, and U.K. Office for National Statistics — Last observation: 2009Q4

Chart 24: Indicators of financial stress are trending upwards for Canadian households



a. As a percentage of consumer credit
b. As a percentage of total residential mortgage loans outstanding
c. As a percentage of the labour force population
d. As a percentage of population aged 20 and over

Sources: Office of the Superintendent of Bankruptcy Canada, OSFI, and Statistics Canada — Last observation: 2010Q1

has announced that it is re-evaluating the internal models used to calculate capital requirements for segregated-fund guarantees. It is also reviewing capital requirements for insurers.

Canadian Non-Financial Sector

Household sector

Despite some improvements in household balance sheets, the vulnerability of Canadian households to adverse economic shocks over the medium term has been increasing in recent years, owing to the steady rise of indebtedness in relation to income.

Household balance sheets

The net worth of Canadian households continued to grow in the fourth quarter of 2009, reflecting the strong performance of global bond and equity markets and the Canadian housing market **(Chart 22)**. Thus far in 2010, housing prices have continued to trend upwards, suggesting further improvement in household net worth.

The Canadian housing market has fared well through the recession, buoyed by low mortgage rates, resilient consumer confidence, and a ready supply of mortgage credit from financial institutions. However, support from favourable consumer lending conditions is expected to recede as interest rates rise from their exceptionally low levels. In addition, tighter standards for government-backed insured mortgages have come into effect.[24] As noted in the April 2010 MPR, housing activity is expected to moderate as mortgage affordability declines through the remainder of 2010 and well into 2011. The anticipated moderation also reflects the significant amount of activity that was pulled forward in late 2009 and early 2010 by very low mortgage rates and the recently expired home renovation tax credit. As rising housing values have contributed significantly to recent gains in net worth, a slowdown in the rate of house price increases, let alone a market correction, would significantly temper the growth in household net worth.

Although household assets have increased, so have household debts. The household debt-to-income ratio has remained on an upward trend in Canada, as debt accumulation continues to outpace the growth of disposable income. In contrast, this ratio has either stabilized or declined in several other developed countries since the onset of the U.S.-subprime mortgage crisis **(Chart 23)**.

Recent data on household credit show that both consumer and mortgage debt have risen at a brisk pace since the start of 2010 **(Table 3)**. While recent government initiatives to tighten mortgage-lending criteria and rising consumer borrowing rates should help to temper future debt accumulation by households, developments in household finances continue to require close monitoring.

Vulnerability indicators

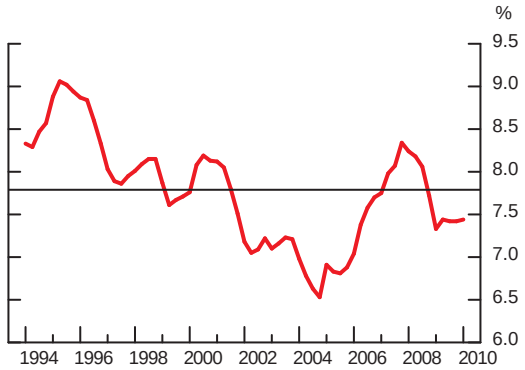
Mortgage arrears, consumer loan delinquencies, personal bankruptcies, and the share of the labour force that has been unemployed for 27 weeks or more have all been trending up in recent quarters **(Chart 24)**. This suggests that stress continues to build in the household sector, which is typical following a recession.

24 See <http://www.fin.gc.ca/n10/10-011-eng.asp> for details.

The current low interest rate environment has kept the aggregate debt-service ratio (DSR) for the Canadian household sector essentially unchanged, despite the continued strong increase in debt accumulation since December **(Chart 25)**.[25] This environment has also increased the attractiveness of variable-rate financing: microdata show that, as of the second half of 2009, roughly 40 per cent of household debt was at variable interest rates, which could increase household vulnerability as interest rates rise.[26]

The December FSR included a stress-testing simulation to gauge the evolution of the DSR of Canadian households under two hypothetical scenarios incorporating continued strong debt accumulation in an environment of rising interest rates.[27] The results suggested that, over the medium term, the proportion of households with a DSR exceeding 40 per cent—a threshold above which households are considered to be financially vulnerable—would rise markedly. An update to this analysis using an improved methodology suggests that the buildup in vulnerability would be somewhat less acute than reported in December.[28] This analysis

Chart 25: The debt-service ratio[a] for the Canadian household sector remains at a cyclical low



a. See footnote 25.
Source: Statistics Canada
Last observation: 2010Q1

Table 3: Credit—annualized growth rates (%)

	Distribution	10-year average[a]	Pre-crisis trend[b]	2008	2009	2010 (up to April)
Total Household Credit[c]	**100.0**	**9.0**	**10.5**	**9.5**	**7.5[d]**	**7.6[d]**
Residential mortgage credit[c]	**68.0**	**8.6**	**10.8**	**10.2**	**6.6[d]**	**7.1[d]**
NHA MBS program	20.5	28.7	19.9	65.6	19.4	2.2
Other securitized	0.9	-1.8	19.5	-15.8	-28.3	-21.9[d]
Chartered bank	33.1	7.0	9.7	-0.6	3.6	6.6
Non-bank[e]	13.2	4.2	7.1	4.4	3.3[d]	-0.9[d]
Consumer credit[c]	**32.0**	**9.7**	**9.7**	**8.0**	**9.6**	**8.7[d]**
Securitized	3.0	10.2	17.1	-10.5	-15.7	-14.7[d]
Chartered bank[c]	24.2	12.8	9.1	13.9	15.0	11.7
Non-bank[e]	4.7	5.1	6.4	2.4	6.3	7.2[d]
Total Business Credit[c]	**100.0**	**4.6**	**6.8**	**4.0**	**-0.1**	**1.9[d]**
Securitized	2.4	8.4	20.3	-17.5	-24.3	-23.6[d]
Chartered bank[c]	22.9	3.4	13.0	10.9	-15.1	-5.5
Non-bank[e]	11.5	5.0	5.0	5.5	-0.9	-0.4[d]
Commercial paper	0.9	0.0	7.5	19.2	11.0	-0.2[d]
Market[f]	62.1	5.7	4.1	2.5	9.1	5.8

a. Average of the annualized quarterly growth rates for 2000Q2 to 2010Q1
b. Average of the annualized quarterly growth rates for the four pre-crisis quarters (2006Q3–2007Q2)
c. These values have been adjusted for seasonal factors.
d. These values contain estimates.
e. Non-bank includes trust and mortgage loan companies, credit unions and caisses populaires, life insurance companies, and non-depository credit intermediaries and other institutions (e.g., auto leasing and sales finance companies).
f. This refers to the issuance of bonds and debentures, equities and warrants, as well as trust units. Includes both domestic and foreign issues.
Source: Bank of Canada

25 This measure of the debt-service ratio includes interest payments only.

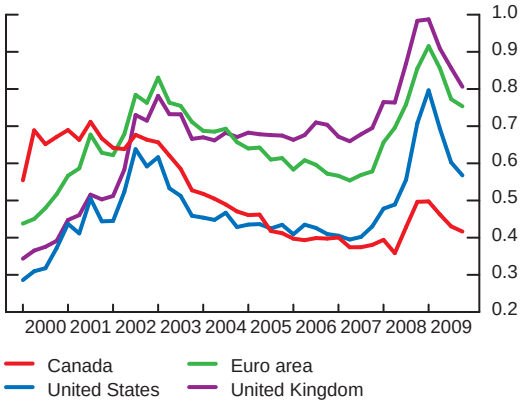
26 This analysis has been conducted with data from the *Canadian Financial Monitor* survey by Ipsos Reid Canada. Credit card debt is not taken into account.

27 See "The Bank of Canada's Analytic Framework for Assessing the Vulnerability of the Household Sector" on p. 57 for a discussion of this methodology and recent changes.

28 The main change since December is to explicitly model the growth in mortgage credit of first-time homebuyers. Since the improved methodology allocates less new credit to households that already had elevated DSRs, a smaller proportion of households see their DSR rise above the 40 per cent threshold associated with financial vulnerability.

Chart 26: Canadian corporate leverage is substantially below that of other major countries

Non-financial corporate sector: Debt-to-equity ratio[a]



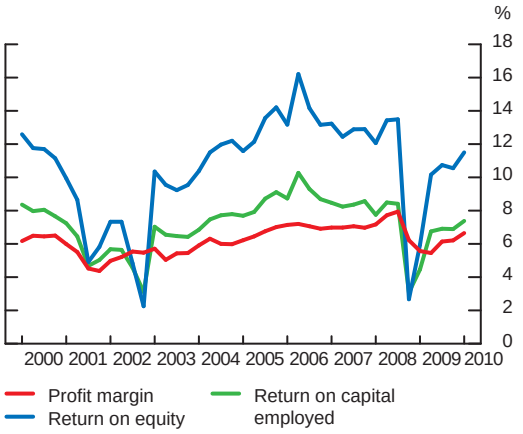
a. For international comparability, data for Canada are measured at market value rather than at book value.

Sources: Statistics Canada, U.S. Federal Reserve, European Central Bank, and U.K. Office for National Statistics

Last observation: 2009Q4

Chart 27: Profitability in the Canadian non-financial corporate sector has increased

At book value



Source: Statistics Canada

Last observation: 2010Q1

suggests that, in the most severe of our scenarios, the proportion of vulnerable households could rise from 6.1 per cent in 2009 to 7.5 per cent in the second quarter of 2012. This percentage rose to 9.6 per cent in the simulation conducted in December. The share of household debt that is owed by these households would increase from 11.3 per cent in 2009 to 14.3 per cent over the same period, compared with 18.9 per cent in the December simulation. Notwithstanding these downward revisions, the level of risk to financial stability arising from household balance sheets remains elevated, owing to the continued rise in household debt.

Corporate sector

Through the end of April of this year, the growth rate of business credit in Canada has risen, owing primarily to robust growth in the issuance of marketable debt and equity, and also to a slower rate of contraction in chartered bank credit **(Table 3)**. According to the spring issues of the Bank of Canada's *Senior Loan Officer Survey* and *Business Outlook Survey*, the continued contraction of bank business credit is largely due to a net decline in loan demand. Lending conditions have continued to ease for large firms and have generally stabilized for small business and commercial borrowers. Improved access to capital markets and increased business liquidity likely played a role in the decline in demand for bank credit.

The aggregate financial position of the Canadian non-financial corporate sector has strengthened further since the last FSR, which implies an improved ability to withstand the financial consequences of adverse shocks. For example, corporate leverage continued to decline in the fourth quarter of 2009 in Canada, and remains well below that of the United States, the United Kingdom, and the euro area **(Chart 26)**. In addition, liquidity in the Canadian non-financial corporate sector—as measured by the ratio of short-term assets (less inventories) to short-term liabilities—is still on the upward trend that began in 2006.

Operating profit margins increased in the first quarter of 2010 for a third consecutive quarter, helping to sustain the continued improvement in the rate of return on both book-value equity and book-value capital **(Chart 27)**. This improvement in profitability results from an increase in operating revenues and from continued tight control by corporations over their operating expenses. The improvement in operating revenues since mid-2009 is consistent with the recovery in the global economy over the same period. Earnings reports so far this year generally point to a further increase in corporate profits in 2010.

Certain companies in the motor vehicle and parts and the wood and paper products industries remain under financial stress despite the favourable outlook for the corporate sector as a whole, although there are indications that the profitability of the wood and paper products industry has improved. The financial stress experienced by these industries is unlikely to have an adverse impact on the overall Canadian financial system, given the marked reduction in the exposure of Canadian banks to companies from these sectors since 2002.

Reports

Reports examine, in greater depth, selected issues of relevance to the financial system.

Introduction

As illustrated by the recent crisis, safeguarding financial stability requires that financial institutions and market-makers have access to resilient sources of funding, even in times of system-wide stress. Strengthening the regulations and infrastructure supporting funding markets in order to reduce the risk of contagion associated with future liquidity shocks is a key priority for authorities worldwide. This section of the *Financial System Review* (FSR) includes four reports exploring issues relevant to this work. A fifth report outlines the Bank of Canada's framework for evaluating, through stress-test simulations using microdata, the vulnerability of the financial system arising from household balance sheets.

In the early stages of the crisis, the Bank of Canada established a set of principles that guided its interventions to mitigate the risk of serious system-wide financial disturbances. These have proved useful in developing and using new liquidity facilities to address tensions in funding markets. Jack Selody and Carolyn Wilkins discuss how these principles can be used to lessen moral hazard in **The Bank of Canada's Extraordinary Liquidity Policies and Moral Hazard**.

In hindsight, a key vulnerability that contributed to the propagation, across jurisdictions and currencies, of tensions in U.S. funding markets during the crisis was a buildup of cross-currency maturity mismatches in U.S. dollars, primarily at European financial institutions. In **The Impact of the Financial Crisis on Cross-Border Funding,** Yaz Terajima, Harri Vikstedt, and Jonathan Witmer explore the dislocations that occurred in cross-border funding markets, particularly in foreign exchange swap markets, and the response of both the industry and policy-makers to alleviate these strains. Efforts under way to improve the resilience of these markets under stress and the implications for cross-border funding markets of the liquidity standards proposed by the Basel Committee on Banking Supervision are also discussed.

In the report, **The Role of Securities Lending in Market Liquidity**, Nadja Dreff provides an overview of the securities-lending market and of certain practices in this market that played a role in amplifying tensions in funding markets during the crisis. As discussed in the December 2009 FSR, this market provides essential funding liquidity to financial institutions and market-makers which, in turn, are the key providers of liquidity to the financial system. It may therefore be a source of contagion during times of stress. The report presents recommendations for strengthening the resilience of the securities-lending market.

One of the key lessons of the recent crisis is that liquidity depends on information. Market participants may be reluctant to trade in assets if their underlying characteristics are not well known, because their performance may be difficult to assess under changing macrofinancial conditions. In times of stress, when uncertainty increases, market liquidity can dry up if information is insufficient. **Securitized Products, Disclosure, and the Reduction of Systemic Risk**, by Scott Hendry, Stéphane Lavoie, and Carolyn Wilkins, discusses issues related to disclosure for asset-backed commercial paper and publicly issued term asset-backed securities in Canada. It argues that disclosure standards that are tailored to the particular features of these markets would provide a more solid basis for restarting them.

For years, the Bank of Canada has been using microdata on the balance sheets of Canadian households to complement its analysis based on aggregate data. In the report, **The Bank of Canada's Analytic Framework for Assessing the Vulnerability of the Household Sector**, Ramdane Djoudad presents the Bank's methodology for conducting stress-testing simulations to evaluate the effect of hypothetical macroeconomic scenarios on the distribution of the debt-service ratio across households and, ultimately, on their solvency. The report also describes recent methodological advances made by the Bank in using these data.

The Bank of Canada's Extraordinary Liquidity Policies and Moral Hazard

Jack Selody and Carolyn Wilkins

Current Framework

In the June 2008 issue of the *Financial System Review*, the Bank of Canada published a report establishing a set of principles to guide the extraordinary liquidity interventions it was making in response to the systemic shocks buffeting the Canadian financial system (Engert, Selody, and Wilkins 2008). These principles provided a framework for maintaining consistency between the Bank's actions and its responsibilities as lender of last resort to the financial system, while allowing sufficient flexibility to respond to the unique challenges of the crisis. The principles were guided by the view that "a central bank should intervene only when there is a clear market failure and when significant financial instability can be avoided or mitigated without distorting the pricing of credit risk" (Engert, Selody, and Wilkins 2008, p. 76).

The following principles were established. First, intervention should be targeted, aimed at mitigating only market failures of system-wide importance and whose macroeconomic consequences can be rectified only by an injection of liquidity. Second, intervention should be graduated, in a manner commensurate with the severity of the problem. Third, intervention should be well designed, using the right tools for the job. Fourth, intervention should be at market-determined prices to minimize distortions and under conditions aligned with those in the market to limit the possibility of crowding out the return of markets. Finally, the Bank should mitigate the moral hazard that could result from its intervention.

In the autumn of 2009, the Bank assessed the success of these principles and whether they needed to be adjusted in light of the experience provided by the crisis (Zorn, Wilkins, and Engert 2009). The review established that the principles had provided a successful basis for developing and using new tools to deal with the financial crisis, as well as for using existing tools in new ways. The purpose of the current report is to show how the principles were used to guide the extraordinary liquidity interventions by the Bank in ways that mitigated moral hazard.[1]

The Framework for Extraordinary Liquidity Provision

The Bank's goal in providing extraordinary liquidity is to maintain the appropriate amount of liquidity in the financial system without distorting the economically efficient allocation of credit.[2] This type of distortion can occur when the Bank takes on liquidity risk that would otherwise be faced by market participants. Because extraordinary liquidity cannot always be provided without assuming some credit risk, and although the premium for this credit risk can be distorted by factors beyond the shortage of liquidity, it is possible for the Bank to assume credit risk at a yield below the fundamental value (i.e., the yield that would just compensate for expected losses based on the true probability of default).

The possibility of transferring risk to the central bank—at a yield below what would otherwise prevail—generates moral hazard because it reduces the incentive for financial entities to protect themselves against risky outcomes. There are two aspects to this potential for moral hazard. First, financial institutions may not hold sufficient liquid assets to protect against idiosyncratic shocks in the expectation that the central bank will provide inexpensive liquidity on demand. Second, the ready availability of inexpensive liquidity from the central bank may encourage financial institutions to take on excess risk, including duration mismatches and credit

1 See Longworth (2010) for an earlier discussion of this issue.

2 In a crisis, a central bank is especially concerned about funding liquidity and market liquidity.

risk. It is impossible to eliminate all moral hazard, because effective extraordinary intervention means that liquidity will be provided at a yield below what would prevail without the intervention. It is also impossible to rule out extraordinary interventions, since system participants cannot protect themselves against all types of shocks—specifically, systemic shocks that affect all system participants in a similar way. The central bank can, however, act to minimize moral hazard.

The Bank of Canada normally mitigates the moral hazard associated with its extraordinary interventions by lending to regulated, solvent institutions only when they can no longer obtain liquidity from other sources.[3] This borrowing comes with a penalty, not only because the Bank Rate is set above the overnight rate, but also because it invites a stronger degree of regulatory scrutiny of the institution's liquidity and risk-management practices. In an abnormal situation, where a large systemic event creates a widespread shortage of liquidity that disrupts a wide range of institutions and markets, distorting asset prices more generally, the Bank is most effective when it provides liquidity to a variety of institutions. Moral hazard is minimized by limiting such interventions to the shortest time period possible—specifically, to periods when the liquidity premium is significantly distorted across the system, leaving market participants fully exposed to risks associated with idiosyncratic shocks and small systemic shocks.[4] A credible commitment to intervene only in response to threatened or realized large systemic events is consistent with the Bank's objective of reducing the likelihood that core financial markets will freeze, while reinforcing incentives for private agents to self-insure against idiosyncratic and smaller systemic shocks.[5] Such a policy is consistent with the Bank's lender-of-last-resort responsibilities and contributes to the robustness and efficiency of the financial system.

In addition, when dealing with major systemic events, the Bank maintains a flexible intervention strategy that acknowledges the inherent uncertainty surrounding the timing and magnitude of systemic events. As a result, individual system participants are less able to transfer risk to the Bank at artificially low prices, and their incentives for aggressive risk-taking in advance of the Bank's intervention are reduced. The Bank further reduces incentives for aggressive risk-taking in the lead up to a large systemic shock by intervening at prices or with premiums that are not predictable. This obliges individual system participants to guard against the risk that they might suffer a loss despite the Bank's intervention. The Bank does this by using auctions to price and distribute the liquidity it injects into the system.

Finally, the Bank supports the development, implementation, and ongoing functioning of the core infrastructure for generating liquidity in the Canadian financial system. This includes promoting greater use of central clearing counterparties for core funding markets, such as repos, as well as other mechanisms that help market participants to self-insure against idiosyncratic liquidity shocks.

The prudential supervisor in Canada, the Office of the Superintendent of Financial Institutions (OSFI), can also help to reduce the moral hazard associated with crisis intervention by enforcing various regulations, including: (i) liquidity regulations that require financial institutions to maintain sufficient liquidity to deal with institution-specific shocks and most adverse market shocks;[6] (ii) capital regulations to ensure that risk is appropriately mitigated without imposing a cumbersome regulatory burden on financial institutions or generating additional moral hazard from "not allowed to fail" public policies;[7] and (iii) enforcement regulations to ensure that, when mitigation strategies fail, there are meaningful consequences for stakeholders who are responsible for mitigating risk.[8] Canada has clear and transparent resolution mechanisms for federally regulated, deposit-taking financial institutions, which are periodically reviewed and enhanced as needed.[9] For example, the Canada Deposit Insurance Corporation (CDIC) has long had powers to restructure and resolve troubled deposit-taking institutions.[10] The prudential supervisor could also implement a scheme for converting subordinated debt into equity, contingent on a credit-risk event that depletes capital by an unacceptable amount.[11] In addition, the "not allowed to fail" concept, which feeds moral hazard, can be mitigated by putting in place adequate powers and

3 See "Bank of Canada Lender-of-Last Resort Policies," in the December 2004 issue of the *Financial System Review* for more details.

4 The justification for having the central bank as the lender of last resort, capable of mitigating system-wide shocks, is that it can provide liquidity at zero resource cost, with widespread benefits. The justification for not having the central bank mitigate idiosyncratic shocks is that doing so would be inefficient, since the private sector is better placed to identify and design mechanisms to deal with such shocks, and the benefits accrue to specific stakeholders.

5 Allen, Carletti, and Gale (2009) show that market freezes are possible if there is sufficient uncertainty about the demand for aggregate liquidity relative to the idiosyncratic demand for liquidity.

6 The Basel Committee on Banking Supervision's press release of 17 December 2009 (BCBS 2009a) covers the introduction of "a global minimum liquidity standard for internationally active banks." See also Northcott and Zelmer (2009) and BCBS (2009b).

7 BCBS (2009a) covers "raising the quality, consistency and transparency of the capital base" and "strengthening the risk coverage of the capital framework."

8 The Financial Stability Board (FSB 2010) is working on "a package of measures to address the 'too big to fail' problems associated with systemically important financial institutions." Among the measures proposed is a plan for "improving the capacity to undertake an orderly resolution of a failing firm," including one that operates cross-border.

9 See OSFI (2008), "Guide to Intervention for Federally Regulated Deposit-Taking Institutions." Available at <http://www.osfi-bsif.gc.ca/osfi/index_e.aspx?DetailID=522>.

10 As well, in 1996, federal legislation was amended to give the Superintendent of Financial Institutions the authority to temporarily take control of an institution and, if necessary, request a winding-up order, subject to certain prescribed conditions and the approval of the Minister of Finance. In 2009, the CDIC was granted the authority to establish bridge banks to facilitate the restructuring of federally regulated deposit-taking institutions.

11 See J. Dickson, "Protecting banks is best done by market discipline," U.K. *Financial Times,* "Comment," 8 April 2010.

mechanisms to control institutions that are failing but whose stakeholders refuse to act in a timely manner because they do not sufficiently bear the consequences of their refusal.[12]

These policies will minimize moral hazard while retaining their efficacy because they confine Bank of Canada distortion-producing actions to short-lived extraordinary events. Further, while they do not insulate individual system participants from idiosyncratic liquidity risk, they insulate the system as a whole from aggregate liquidity risk. Finally, they make it difficult for individual system participants to determine in advance how to profit from Bank of Canada extraordinary liquidity interventions. However, once a crisis begins, the Bank should minimize uncertainty about its actions because such uncertainty could result in liquidity hoarding that propagates the shock and worsens the crisis.

Extraordinary liquidity facilities in normal times

Extraordinary liquidity facilities offered by the Bank in normal times are designed to prevent idiosyncratic shocks from becoming systemic events. To mitigate the moral hazard associated with these facilities, they are available only after other sources of funding have been exhausted.

The Bank of Canada offers two liquidity facilities in normal times. The Standing Liquidity Facility (SLF) is designed to deal with frictions that occur when direct clearers in the Large Value Transfer System (LVTS) face shortfalls in their end-of-day settlement balances.[13] The SLF provides overnight, collateralized loans at a penalty rate (i.e., at the Bank Rate, set above the overnight rate, which reflects the market rate for similar market funding). Emergency Lending Assistance (ELA) is used on rare occasions to provide temporary, collateralized loans to individual institutions that are solvent, but are facing serious and persistent liquidity problems. While usually priced at the Bank Rate (and thus not at a penalty rate, since these are term loans and the term premium is usually greater than the 25 basis points by which the Bank Rate exceeds the overnight rate), interventions from the ELA invite stronger scrutiny and may result in stigma, as they confirm to market participants that the borrowing institution does not have ready access to alternative sources of funds.

Extraordinary liquidity facilities in times of crisis

A common characteristic of a financial crisis is a generalized shortage of liquidity. The Bank's extraordinary liquidity facilities are thus designed to kick-start the endogenous liquidity-generation mechanisms at the core of the financial system. During a crisis, the Bank needs a range of facilities to reflect the diversity of the liquidity-generating mechanisms in the financial system. Since liquidity premiums rise in a crisis because of the shortage of liquidity, the Bank provides liquidity at premiums below those prevailing in the market.

The primary facilities used during the recent crisis—term purchase and resale agreements (PRAs) and the Term Loan Facility (TLF)—will continue to be a part of the Bank's toolkit, to be used only as necessary in major systemic events. These tools have proven to be effective in getting liquidity to core funding markets (see Fontaine, Selody, and Wilkins 2009, for a description of core funding markets). For example, term PRA provides funding liquidity to participants in core financial markets (Zorn, Wilkins, and Engert 2009), while the TLF is a backstop source of collateralized loans for LVTS participants. Both of these facilities are designed to offer the flexibility necessary for a graduated approach to liquidity provision in a crisis. For example, it is possible to alter the number of eligible participants, the tenor of the operation, the list of eligible securities, or the pricing mechanism to respond to the unique features of a crisis and then to exit from the intervention.

The Bank of Canada has the legal authority to implement facilities other than the ones used to date; thus, the appropriate tools can be designed to meet the particular features of any future crisis events. For instance, in a crisis where there was a shortage of good-quality collateral, the Bank could also consider a securities-lending program that would exchange highly desirable collateral for less-desirable collateral, at the appropriate price and for terms longer than one day, to support the functioning of core funding markets. Because the infrastructure of core markets is evolving in the wake of the crisis (e.g., by implementing central clearing counterparties), the development of tools to address liquidity issues will be ongoing.

Conclusion

It is important that financial system participants do not believe that Bank of Canada intervention in times of crisis implies a willingness to intervene in normal times. The Bank retains considerable flexibility as to when and how it will intervene to fulfill its mandate as liquidity lender of last resort to the financial system in the event of a systemic shock. This means using its tools in a principled way, as it did in the most recent crisis.

12 Ben Bernanke (2008) has suggested that the absence of well-defined procedures and authorities to deal with the potential failure of a systemically important non-bank financial institution represented a serious weakness in U.S. financial regulation.

13 For more details, see "A Primer on Canada's Large Value Transfer System," at <http://bankofcanada.ca/en/financial/lvts_neville.pdf>.

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The Impact of the Financial Crisis on Cross-Border Funding

Yaz Terajima, Harri Vikstedt, and Jonathan Witmer

Introduction

The financial crisis has demonstrated both the importance of, and the interrelationships among, core funding markets and, in particular, the importance of cross-border funding markets.[1] In normal times, cross-border funding provides an alternative, diversified, and readily available source of funding to financial institutions.[2] Cross-border funding markets may be deeper than the local funding sources and may provide an opportunity to borrow funds at a lower cost than in local funding markets.

During the crisis, however, two issues became clear: (i) how closely cross-border and local funding markets are interlinked, and (ii) how quickly disruptions in one core funding market can spill over into other core funding markets. Global financial institutions that had difficulty raising U.S. dollars directly (i.e., in the United States) also encountered similar problems raising U.S. funds indirectly through cross-border funding markets, because of imbalances in the supply of and demand for U.S. dollars and heightened concerns over counterparty credit risk.

This report focuses primarily on the impact of the crisis on the foreign exchange (FX) swap market. It draws on the Bank's involvement in several working groups, including the Committee on the Global Financial System (CGFS) working group on the funding and liquidity management of international banks (CGFS 2010b) and the joint CGFS and Markets Committee (MC) working group on cross-border funding (CGFS 2010a), as well as the Canadian Foreign Exchange Committee (CFEC) working group that is assessing the performance of the Canadian FX market during the crisis and potential areas for its improvement (CFEC 2010a). In addition, a recent regulatory proposal for new liquidity standards that could affect the way Canadian banks manage their cross-border funding and liquidity is discussed.

Cross-Border Funding and Access by Financial Institutions

Cross-border funding provides an alternative source of wholesale funding for financial institutions to fund either domestic or foreign currency assets or to provide intra-company funding among foreign subsidiaries. In general, financial institutions minimize their FX risk in cross-border funding by either sourcing funds directly in the currency of the asset, or by using derivatives to transform the liability into the currency of the asset. Financial institutions can use either unsecured or secured funding markets for cross-border funding. These include intra-company transfers, offshore wholesale-debt markets, and repos. FX swaps are an integral component of the cross-border funding market and are used to convert funding from one currency to another.[3]

FX swaps involve the simultaneous borrowing and lending of one currency for another for a specified period of time.[4] Since these swaps are subject to counterparty credit risk, changes in the perceived credit risk of an institution may have an impact on the availability of cross-border funding through FX swaps. FX swaps account for more than 50 per cent of global FX trading and more than 68 per cent of FX trading in Canada (BIS 2007; CFEC 2010b). They are used

1 For a discussion of core funding markets, see Fontaine, Selody, and Wilkins (2009).

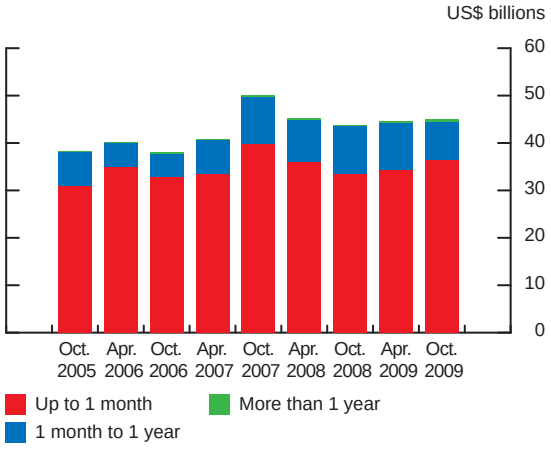
2 Cross-border funding is broadly defined here to include borrowing in a jurisdiction other than that in which an entity is located and/or in a different currency than the one in which most of its operations are denominated.

3 Foreign exchange swaps can also be used as a hedging mechanism to transform longer-dated funding in one currency to another currency.

4 An FX swap is typically executed through simultaneous FX spot and forward transactions.

Chart 1: The vast majority of Canadian FX swap volume is executed for terms under 1 month

Canadian average daily FX swap volume, by transaction term



Source: CFEC

Last observation: 31 October 2009

primarily to address short-term cross-border funding needs, with the vast majority executed for terms under 7 days.[5] Fewer than 1 per cent of FX swaps, both in Canada and globally, are for terms longer than one year **(Chart 1)**. In contrast with other currencies, a relatively large portion of Canadian FX swaps are settled on a same-day basis to obtain overnight funding.

The organizational structure of an institution influences how it manages its funding and liquidity risk. Funding relates to how the institution's liabilities are sourced, while liquidity refers to how its balance sheet is managed. Funding and liquidity risk can be managed on a centralized or decentralized basis, or a combination of both, depending on the firm's business model. With a centralized approach, the majority of decisions are taken at the global or head-office level; in a decentralized structure, decisions are made at the regional or country level. Hence, banks in a centralized structure tend to rely more on cross-border transfers of funds between the head office and foreign subsidiaries than do those in a decentralized structure.

The extent to which global financial institutions access cross-border funding is driven by several factors: (i) the institution's organizational structure and asset-liability mix (e.g., a bank holding primarily retail mortgages and deposits would be less likely to use cross-border funding markets than one involved in wholesale lending in a developed market); (ii) the availability and depth of cross-border funding instruments; and (iii) the costs and benefits of accessing cross-border markets.

5 BIS (2007). According to the October 2009 CFEC survey, more than 80 per cent of FX swaps in Canada were for terms of less than one month.

Cross-Border Funding during the Recent Crisis

Before the start of the financial crisis, a number of financial institutions, primarily European-based, had acquired relatively large quantities of U.S.-dollar assets, which they had financed using both onshore and offshore short-term wholesale U.S.-dollar funding (McGuire and von Peter 2009). The beginning of the subprime crisis in the autumn of 2007 left these banks exposed to a large funding maturity gap, because the credit deterioration in their holdings of structured assets made them illiquid and very difficult, if not impossible, to sell. Liquidity dried up from the two large sources of U.S.-dollar funding for these European banks: short-term repo markets and money market mutual funds.[6] This put substantial pressure on U.S.-dollar funding markets as banks scrambled to secure U.S.-dollar funding. It also forced banks to rely further on FX swap markets to obtain U.S. dollars. These pressures were further exacerbated for the European banks by time-zone differences.[7]

Canadian banks, on the other hand, did not have large exposures to U.S. structured credit, including subprime mortgage-backed securities. In the fourth quarter of 2008, the global U.S.-dollar assets at Canadian banks, which make up the majority of their foreign assets, increased by almost Can$100 billion **(Chart 2)**.[8] This rise corresponds primarily to an increase in the value of foreign currency derivatives-related exposures at these banks, reflecting an increase in underlying market volatility and/or potentially wider use of FX swaps and other derivatives **(Chart 3)**.

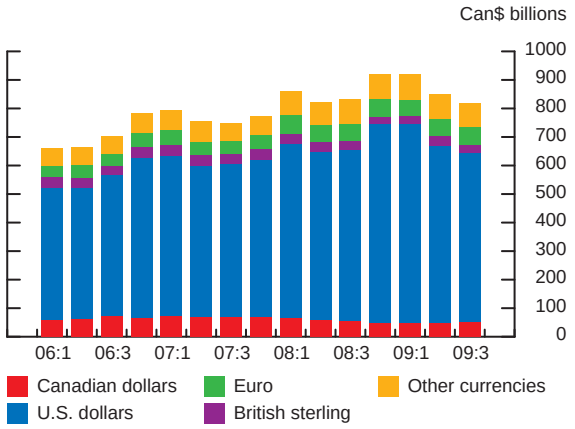
Within the guidelines set by the Office of the Superintendent of Financial Institutions (OSFI), the big six banks typically have internal limits, by currency, on the size of their wholesale funding and maturity mismatches, in order to control domestic and cross-border refunding risk. Furthermore, several Canadian banks have a stable U.S. retail deposit base providing U.S.-dollar funding for their U.S.-dollar assets, and therefore did not have to rely, to the same extent as some European-based financial institutions, on cross-border funding to access U.S. dollars. Canadian banks also benefited, to some extent, from an increased inflow of U.S.-dollar retail and wholesale deposits following the collapse of Lehman Brothers **(Chart 3)**. Concerns over

6 According to Baba, McCauley, and Ramaswamy (2009), on 17 and 18 September 2008, institutional investors liquidated $142 billion in prime institutional funds, while retail investors liquidated $27 billion. See also McGuire and von Peter (2009); Gorton and Metrick (2009); and Baba, Packer, and Nagano (2008).

7 According to Goldberg, Kennedy, and Miu (2010), a premium was paid for U.S. federal funds obtained during morning trading hours in the United States, likely reflecting the difficulty that European banks faced when borrowing late in the European day (U.S. morning).

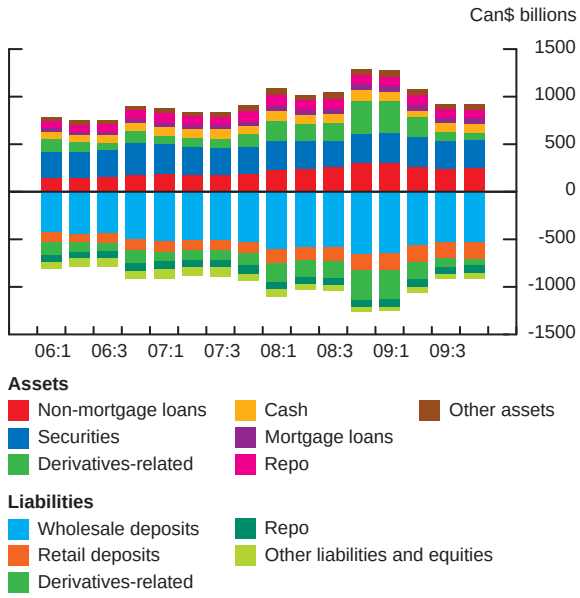
8 In Canada, because of nationwide branch banking, the banking sector is dominated by a few very large banks. In January 2010, about 90 per cent of all banking-sector assets were held by the six largest domestic banks, known as the "big six." On average, 30 per cent of their total global assets were non-Canadian-dollar claims, and these claims accounted for 97 per cent of the non-Canadian-dollar claims of the Canadian banking sector.

Chart 2: U.S.-dollar assets at Canadian banks increased following the Lehman collapse



Note: The chart shows the total assets of the big six banks by currency, excluding assets booked in Canada to Canadian residents in Canadian dollars.
Source: OSFI
Last observation: 2009Q3

Chart 3: Foreign currency deposits at Canadian banks also increased in 2008Q4

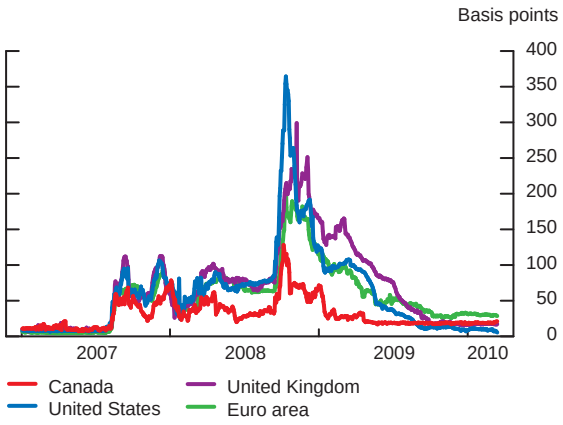


Note: The chart shows the category breakdown of the foreign currency assets and liabilities of the big six banks, with categories above zero on the y axis representing assets, and those below representing liabilities.
Source: OSFI
Last observation: 2009Q4

counterparty credit risk during the crisis were less pronounced in Canada than in Europe, the United Kingdom, and the United States, as evidenced by lower spreads between unsecured wholesale bank funding rates and expected policy rates **(Chart 4)**.

Because of these structural differences, dislocations in the US$/Can$ FX swap market were less pronounced than for other currencies. During the crisis, owing to the difficulty in borrowing funds in U.S. wholesale funding markets, borrowers wanting U.S. dollars turned to their home markets and any other jurisdiction where they could borrow in the local currency and swap the proceeds into U.S. dollars. As a result, global FX swap markets experienced large deviations from covered interest rate parity, and FX swap-implied U.S.-dollar borrowing rates increased well above U.S. LIBOR **(Chart 5)**.[9,10] At their peak, FX swap-implied U.S.-dollar borrowing rates obtained through the euro and pound sterling were more than 250 basis points above U.S. LIBOR. FX swap-implied U.S.-dollar borrowing rates obtained through Canadian dollars increased as well, but by much less, and they fell more quickly.

Chart 4: Spreads remained consistently lower in Canada than in Europe, the United States, and the United Kingdom
3-month LIBOR-OIS spreads[a]

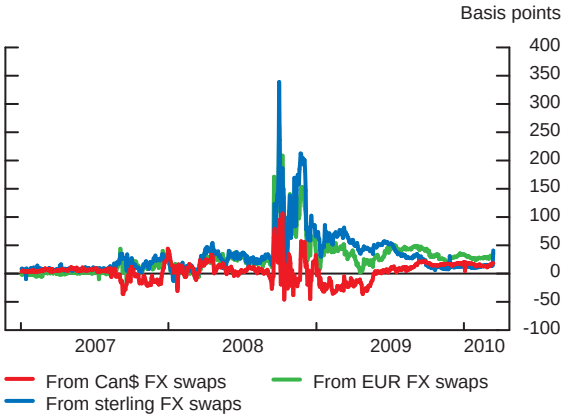


a. For the United States and the United Kingdom, LIBOR; for the Euro area, EURIBOR; and for Canada, CDOR
Source: Bloomberg
Last observation: 15 March 2010

9 It can be argued that part of the difference between the FX swap-implied rate and LIBOR resulted from the latter being lower than actual funding costs at the time. However, Coffey, Hrung, and Sarkar (2009) provide evidence that this could not have been responsible for the full difference.

10 Under covered interest rate parity, the FX swap-implied U.S.-dollar borrowing rate (i.e., the cost of borrowing in the domestic currency and swapping it into U.S. dollars) should equal the cost of borrowing directly in U.S. dollars; otherwise, arbitrageurs would be able to make a risk-free profit by transacting in FX and money markets. This assumes that transactions costs, measurement error, credit risk, and liquidity risk are all negligible (Aliber 1973). A lack of arbitrageur capital may also impede the ability to arbitrage any deviations in this condition. See Coffey, Hrung, and Sarkar (2009) for an evaluation of the impact of capital constraints on covered interest rate parity during the crisis.

Chart 5: Deviations from covered interest rate parity remained consistently lower in Canada than in Europe
Spread over 3-month U.S. LIBOR



Note: The chart shows the difference between the U.S. equivalent 3-month interest rate derived from FX swaps and the domestic unsecured market, and the unsecured 3-month U.S.-dollar LIBOR. The FX swap-implied U.S.-dollar interest rates were obtained from US$/Can$ forward points and CDOR, as well as from Eur/US$ forward points and EURIBOR, and sterling/US$ forward points and sterling LIBOR, respectively.
Source: Bloomberg Last observation: 15 March 2010

Responses to the dislocations in funding markets

The crisis does not seem to have fundamentally changed the funding and liquidity-management models at financial institutions. However, many global banks (i) tightened their risk-management limits on wholesale funding by maturity and domicile; (ii) increased their liquidity buffers; (iii) improved communications about liquidity within their institutions; (iv) improved pricing on cross-currency funds transfers to encourage more reliance on stable funding sources (e.g., retail funding), resulting in a more decentralized funding model; and (v) strengthened stress tests by increasing their frequency and basing them on more realistic scenarios (Senior Supervisors Group 2009). Some financial institutions that had not already done so also centralized their liquidity management and put more emphasis on the management of collateral and contingent liabilities. Since the Canadian financial sector fared relatively better than those in other major countries, Canadian banks made fewer adjustments. For example, their funding models were highly centralized before the crisis and continue to remain so.

Banks, both globally and in Canada, have tapped capital markets to raise additional capital and longer-term funding. Canadian banks that had access to U.S.-dollar funding were also able to swap these U.S.-dollar funds into a cheap source of Canadian-dollar funding through the Northbound FX swap (U.S. dollars swapped into Canadian dollars) in the autumn of 2008 following the collapse of Lehman Brothers.

Several policy responses were introduced, in Canada and globally, after the onset of the financial crisis. While many of these facilities were not specifically targeted at the pressures in cross-border funding markets, they did help to alleviate them, given the interlinkage with core domestic funding markets. These policy responses became more global and more coordinated as the crisis spread. Liquidity facilities for local currency, such as the Bank of Canada's term purchase and resale agreements (PRAs), helped to address tensions in domestic funding markets,[11] with funding spreads in money markets declining after the expansion of these facilities in the post-Lehman period, including the spreads between CDOR and overnight index swaps (OIS) **(Chart 4)**. The introduction of the government's Insured Mortgage Purchase Program also helped to provide substantial liquidity to the domestic banking sector.

Similarly, U.S.-dollar liquidity facilities addressed tensions in both domestic and cross-border U.S.-dollar funding markets. The U.S. Federal Reserve's Term Auction Facility (TAF), which provided U.S.-dollar term funds through an auction process to depository institutions in the United States, helped to reduce U.S. funding pressures, as measured by LIBOR-OIS spreads.[12] Foreign financial institutions with branches or subsidiaries in the United States, including large European and all the large Canadian banks, had access to this facility.

In addition, the Federal Reserve also established reciprocal swap lines with 14 other central banks, including the Bank of Canada, to provide U.S.-dollar liquidity to international markets **(Chart 6)**. Some of these central banks, such as the European Central Bank, the Swiss National Bank, and the Bank of England, used these swap lines to conduct their own U.S.-dollar term auctions early in the trading day, which helped to reduce frictions caused by differences in time zones, as well as frictions that were present when mobilizing collateral for use in the TAF.[13] The provision of U.S.-dollar funding by these other central banks helped to reduce deviations in covered interest rate parity (**Chart 5** and **Chart 6**).[14,15]

The reciprocal swap agreement between the Bank of Canada and the Federal Reserve was not used because the major Canadian banks have direct access to the Federal Reserve's

11 See Zorn, Wilkins, and Engert (2009) for a discussion of Canadian facilities and CGFS (2008) for a discussion of global central bank responses.

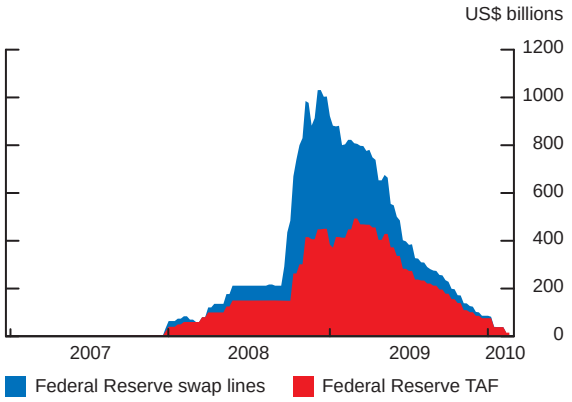
12 See Wu (2008); McAndrews, Sarkar, and Wang (2008); Abbassi and Schnabel (2009); Christensen, Lopez, and Rudebusch (2009); and Taylor and Williams (2009) for further examination of the evidence.

13 These U.S.-dollar auctions had different requirements, since they were set by the central bank providing the funding. See Goldberg, Kennedy, and Miu (2010).

14 See Baba and Packer (2009) for further examination of the evidence.

15 In response to the re-emergence of strains in U.S.-dollar short-term bank funding markets in Europe, the Bank of Canada, the Bank of Japan, the Bank of England, the European Central Bank, the U.S. Federal Reserve, and the Swiss National Bank announced in early May the re-establishment of temporary U.S.-dollar liquidity swap facilities. This was intended to help improve liquidity conditions in U.S.-dollar funding markets and to prevent the spread of strains to other markets and financial centres. Central banks will continue to work together closely as needed to address pressures in funding markets.

Chart 6: U.S.-dollar liquidity was provided through the U.S. Federal Reserve and other central banks
U.S.-dollar liquidity



Source: Federal Reserve H.4.1 Last observation: 28 February 2010

liquidity facilities, do not face time-zone differences and, importantly, were able to raise U.S.-dollar funds directly.

Recent Developments in Cross-Border Funding Markets

Infrastructure developments and initiatives in FX swap markets

Although the FX swap markets functioned relatively well throughout the crisis, as discussed above, dislocations did occur. As a result, efforts are currently under way at the industry level to further improve the resilience of market infrastructure and to further reduce the risk in FX swap transactions.

While FX swaps have lower credit risk than unsecured borrowing, since they are effectively collateralized by the currency underlying the transaction, they are still subject to two main counterparty credit risks. The primary risk involves the settlement of the two legs of the transaction. Each leg of the FX swap requires cash payment of the full notional amount specified in the contract, with the risk that one party will default after receiving a payment but before it has sent its corresponding payment to the other counterparty.[16] The other risk is that the counterparty will default before the end of the contract, requiring the holder of the contract to replace a position that has a positive marked-to-market value to the non-defaulting counterparty (see, for example, Duffie and Huang 1996).

A number of industry-led foreign exchange committees, including the CFEC, the U.K. Foreign Exchange Joint Standing Committee, and the U.S. Foreign Exchange Committee, are working on initiatives to improve the infrastructure of the FX market and to further reduce counterparty risk (Bank of England 2009; Foreign Exchange Committee 2009; CFEC 2010a). These initiatives include broadening the use of the CLS (Continuous Linked Settlement) Bank across products and participants, increasing and standardizing the use of structures for mitigating credit risk, and increasing the use of straight-through processing for foreign exchange transactions through increased standardization and automation.

Broadening the use of CLS Bank

CLS Bank was created in 2002 to eliminate Herstatt risk in foreign exchange transactions. CLS Bank addresses this risk by eliminating, at settlement, the time gap between the payment in one currency and the receipt of payment in another currency, matching the two corresponding payments before simultaneously releasing them to each party.[17] During the crisis, transactions through CLS Bank continued uninterrupted.

The majority of the global interbank foreign exchange volume, including FX swaps, settles through CLS Bank, which currently covers 17 currencies and more than 7,500 participants.[18] Since the Lehman crisis, the number of counterparties using CLS Bank has increased by over 120 per cent, and the last of the big six Canadian banks has decided to join CLS Bank.

CFEC is supporting efforts to include same-day-settled US$/Can$ trades in CLS Bank, given the significant use of same-day settlement for overnight FX swaps in Canada. Same-day settlement is currently not possible in CLS Bank and is one of the main reasons that Canadian use of CLS Bank has remained low by international comparison.

Expanding the use and standardization of structures for mitigating credit risk

Counterparty credit risk is mitigated bilaterally through the International Swaps and Derivatives Association (ISDA) Master Agreements and Credit Support Annexes, which provide a framework for collateralizing marked-to-market exposures between counterparties. These agreements also allow counterparties to net their exposures to each other across both FX and non-FX product markets.[19] Some weaknesses in the use of these agreements were exposed following the Lehman bankruptcy, such as a lack of a negotiated Master Agreement and Schedule, increasing the need to further improve the use and standardization of

16 This is known as "settlement" or "Herstatt" risk, after the 1974 failure of the Herstatt Bank of Germany.

17 See Miller and Northcott (2002a, b) for a more in-depth discussion of CLS Bank.

18 For a list of currencies covered by CLS Bank, see <http://www.cls-group.com/About/Pages/default.aspx>.

19 Data from the *BIS Quarterly Review* (March 2010) show that cross-product netting has a significant effect on reducing cross-product exposures.

ISDA's Master Agreements and Credit Support Annexes.[20,21] This may also partially explain why deviations from covered interest rate parity persisted despite the presence of these types of credit-mitigation mechanisms.

The development of a central clearing counterparty (CCP) for FX swaps could also help to mitigate counterparty credit risk, especially for longer-dated products, although it could increase transactions costs and concentration risks. CFEC (2010a) notes that the multilateral netting benefit of CCPs, including efficient collateral requirements and potentially lower capital requirements, are most likely to materialize if these CCPs are global and cover a wide variety of over-the-counter products.[22]

Increasing the automation of FX transactions

The bulk of interbank FX trading is automated, using straight-through processing, which minimizes the risk of operational errors and facilitates accurate real-time risk management. Automation continues to improve for non-bank counterparties, and the industry supports broadening the use of straight-through processing, including increased electronic confirmation and settlement and continued standardization of trade documentation to further reduce the risks associated with FX transactions.

Regulatory developments and cross-border funding liquidity

In December 2009, the Basel Committee on Banking Supervision (BCBS) introduced a proposal for new liquidity standards for internationally active banks, aimed at improving the resilience of financial institutions.[23,24] These standards will be applied to international banks on a consolidated global-enterprise basis. In addition, regulators in each jurisdiction can decide to apply them "locally" on a legal-entity basis. If the standards are applied locally, banks in each jurisdiction would be required to be "self-sufficient," holding a minimum level of liquid assets in each jurisdiction and having maturity mismatches restricted on a local balance-sheet basis, rather than on a global-enterprise basis. The impact of this proposal on cross-border funding liquidity will depend on whether the standards are applied globally or locally.

Globally applied liquidity standards are more consistent with the current business model of large Canadian banks, which currently manage both liquidity and funding globally, rather than with large international non-Canadian banks, which already manage their liquidity in a more decentralized fashion. Local liquidity requirements may force Canadian banks to decentralize their liquidity-management operations by setting up a treasury function in each jurisdiction, with the result that they will lose the benefit of economies of scale and the flexibility of global liquidity management.

However, locally applied standards offer better protection for local creditors in the event of the failure of a global financial institution, since they assure a minimum pool of liquid assets within the local jurisdiction.[25,26] Under locally applied standards, the volume and importance of cross-border funding would likely be lower, which would reduce cross-border funding risks and might thus improve the resilience of the global financial system in the presence of a worldwide systemic shock to liquidity. However, banks would likely need to hold a larger aggregate pool of liquidity under locally applied standards, which could reduce bank profitability. Ultimately, this loss of efficiency would be transferred to consumers and firms in the form of higher fees or higher intermediation spreads.

This trade-off between an improvement in the resilience of the financial system under a systemic liquidity shock and a need to hold a larger pool of liquidity could vary, depending on how stringent the local standards are in relation to the global consolidated standards. As well, the protection afforded to local creditors in the case of an institution's failure will also depend on the stringency of the local standards. For example, banks could be required to adhere to a global standard on a global consolidated basis, but also to a local standard that is less stringent than the global standard. This scenario would ensure some protection for local creditors in the event of an institution's failure, while allowing some flexibility for banks to reallocate liquidity across the group in the presence of a jurisdiction-specific liquidity shock. In the end, any combination of the two approaches will require close coordination between the home and host regulators (a waiver process to reduce local liquidity requirements for banks that globally satisfy certain conditions could be one method to facilitate this coordination).

A concern with strict locally applied standards is that they could create "trapped liquidity" in each jurisdiction without the benefit of funding economies of scale or global diversification of the associated risks. Conceptually, it is possible that trapped liquidity could make the financial system less resilient to jurisdiction-specific shocks. When a large idiosyncratic and adverse liquidity shock hits a legal entity (e.g., a subsidiary or a branch) in one of the jurisdictions in which a global bank operates, the bank may not be

20 For example, a Lehman subsidiary did not file for bankruptcy until three weeks after the parent company declared bankruptcy, and several counterparties could not trigger a default until the subsidiary declared bankruptcy, which further aggravated the situation.

21 See Parker and McGarry (2009).

22 See Duffie and Zhu (2009) for a discussion of the trade-offs between a CCP and bilateral netting agreements.

23 See BCBS (2009) for details.

24 See Northcott and Zelmer (2009) for a review of these liquidity standards.

25 Efforts to improve cross-border bank-resolution mechanisms could also help to manage the need for locally held liquidity. See BCBS (2010).

26 The U.K. Financial Services Authority (FSA) is in favour of locally applied liquidity requirements, owing to a concern over recent events that "demonstrate that when a group gets into difficulty, liquidity which was believed to be available to the whole group can be 'hoarded' by the parent or, in some cases, seized by local authorities intervening to protect their own depositors" (FSA 2008).

able to reallocate liquidity from another jurisdiction, which would leave the local entity at greater risk. Furthermore, if the shock were jurisdiction-specific (and not institution- or entity-specific), all financial institutions in that jurisdiction would be at greater risk, and restrictions on obtaining liquidity from outside the jurisdiction could result in a greater need for central bank liquidity.

Conclusions

Cross-border funding is an important source of wholesale funding for international financial institutions, and its resilience is important for financial stability. During the financial crisis, the stresses in U.S. funding markets quickly spread to all cross-border funding markets, but had the greatest impact on those financial institutions that had been using short-term wholesale U.S.-dollar funding markets to fund illiquid U.S.-dollar assets.

Several policy responses—from the industry and from the public sector—helped to alleviate the funding stresses caused by the crisis. Banks raised additional capital and funding through both local and cross-border markets and began to place greater importance on their management of liquidity. Central banks around the world provided both local and U.S.-dollar liquidity to address the stresses in domestic and cross-border funding markets, respectively.

Efforts are under way to further improve the resilience of cross-border funding markets. Although the infrastructure of the FX swap market performed well during the crisis, more can be done to make the market more resilient to crisis, including greater use of CLS Bank, increased use of structures for mitigating credit risk, and more straight-through processing of transactions.

Furthermore, the Basel Committee on Banking Supervision is proposing new liquidity standards to improve the stability of the financial system. The application of these new standards could have a major impact on cross-border funding markets and, more specifically, could affect how international banks manage their global liquidity and funding requirements.

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The Role of Securities Lending in Market Liquidity

Nadja Dreff

Introduction

The securities-lending market facilitates an increase in overall market liquidity and in the flexibility of financing. It promotes market efficiency by enhancing the price-discovery mechanism in cash securities markets. For these reasons, and because of its role in supporting market-making activities, the securities-lending market has been identified by the Bank of Canada as one of the five core funding markets.[1] Owing to significant linkages with other important markets, the securities-lending market may be a potential source of contagion during times of stress. Therefore, supporting improvements in the functioning and efficiency of this market and ensuring its continuous operation are essential to promoting financial system stability. This report describes the role of securities lending in a broader market context and provides an overview of the market structure, focusing on the demand and supply factors, the choice of collateral, and the relevant risks. Certain aspects of market practices, some of which played a role in exacerbating the recent financial market crisis, are also discussed, followed by recommendations for improvement and the outlook for the future.

General Market Overview

Securities lending in a broader market context

Securities lending involves the temporary exchange of securities for collateral, which may consist of securities or cash. The usual term of the loan is overnight and open, meaning that it can be rolled over daily until the security is returned or recalled by the lender. Legal ownership is transferred from the securities lender to the borrower for the duration of the loan. Borrowed securities may thus be transferred to a third party as part of another securities-lending transaction or as a means of trade settlement, including the covering of short positions. The lender collects coupon payments or dividends that accrue on lent securities, while the borrower retains the rights to coupon payments or dividends on collateral securities.

Securities lending contributes to effective market-making, increases overall market liquidity, and enhances the efficiency of price-discovery mechanisms in cash markets by allowing market-makers and investors to take on and cover short positions as part of their market-making activity, their investment and trading strategy, or for hedging purposes. Securities lending also increases the flexibility of financing for various market participants by facilitating the exchange of a broad range of securities, such as corporate bonds, convertible securities, and deposit notes for securities of higher quality that can be used in repurchase (repo) financing transactions. Alternatively, securities may be borrowed in exchange for cash, which can then be invested in the repo market or in other short-term assets. Securities lending and repo transactions are both secured financing transactions and are similar in many respects. But while the majority of repo transactions are motivated by a need to borrow or to invest cash, securities-lending transactions usually result from a need to borrow specific securities or to upgrade collateral.[2]

Lending agents and supply and demand

A typical transaction is carried out between the borrower of a security and a securities-lending agent that lends the securities on behalf of the owner. Securities-lending agents

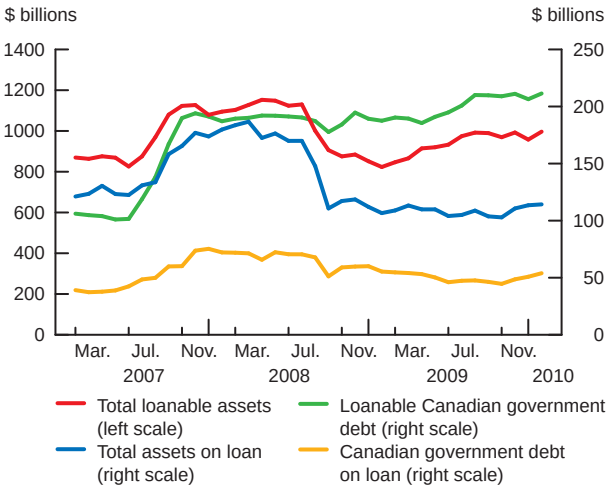
1 The other core funding markets are: (i) the market for Government of Canada treasury bills and bonds; (ii) the repo market; (iii) the market for bankers' acceptances; and (iv) spot and swap foreign exchange markets. For more information on the core funding markets, see Fontaine, Selody, and Wilkins (2009).

2 Morrow (1994–95) discusses the evolution of the repo and securities-lending markets in Canada, as well as their similarities and differences.

are most often custodian banks. The largest custodian banks, representing about 90 per cent of the total securities-lending market in Canada, are RBC Dexia, State Street, CIBC Mellon, and Northern Trust.

According to data on transactions at custodian banks provided by Data Explorers Ltd., total loanable[3] assets in February 2010 amounted to $997 billion, of which $114 billion was on loan **(Chart 1)**. As illustrated in the chart, the supply of loanable assets grew rapidly in mid-to-late 2007. It reached a peak in May of 2008, but dropped significantly around the time of the Lehman Brothers bankruptcy in September 2008.[4] A similar pattern can be seen in terms of the value of the securities on loan. Since early 2009, the market has begun to stabilize; however, borrowing activity has not returned to pre-crisis levels.

Chart 1: The securities-lending market in Canada has begun to stabilize



Source: Data Explorers Ltd. Last observation: February 2010

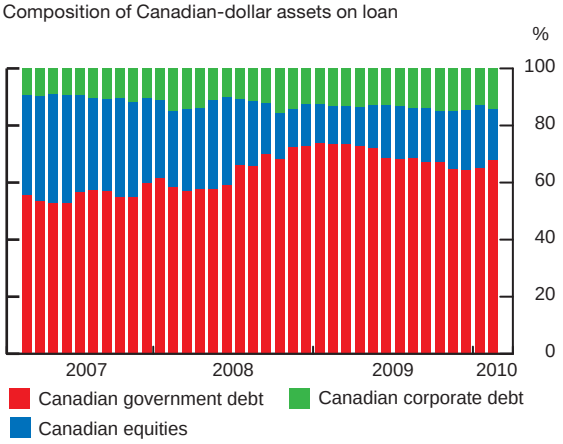
Securities-lending transactions are executed on behalf of the owners of securities, known as "beneficial owners," who are, in most cases, custodial-services clients of custodian banks. Beneficial owners are typically institutional investors, such as pension funds, mutual funds, endowment funds, and insurance companies. Participation in a securities-lending program allows beneficial owners to generate incremental income on their securities held in custody.

Prime brokerages are also involved in securities lending, mostly to service the borrowing needs of hedge funds and other professional investors. Prime brokerages might lend securities out of their inventory or borrow them from custodian banks or other prime brokerages. Traditionally, most of their activity revolves around the borrowing and lending of equities, but is not limited to these transactions.

Securities borrowers are most often investment dealers, banks, hedge funds, and asset managers or, more generally, those entities involved in executing various hedging and trading strategies. Demand is often driven by a need to raise financing by exchanging the available collateral for fixed-income securities eligible to be used in repo transactions. Other important sources of demand are the covering of short positions and, more generally, the settlement of financial contracts requiring the delivery of a security. **Chart 2** shows that, for assets denominated in Canadian dollars, the share of borrowed Canadian government debt (including agency and provincial bonds) is much greater than that of equity securities. This is also the case globally, where the majority of securities loans are fixed-income loans that can be used as collateral in other financing transactions (Spitalfields Advisors 2009).

Chart 2: The majority of Canadian assets on loan are government debt securities

Composition of Canadian-dollar assets on loan



Source: Data Explorers Ltd. Last observation: February 2010

Cash versus non-cash collateral

Many aspects of collateralization can be customized according to the risk appetite of the program's beneficial owner. Examples include the list of eligible collateral (which may or may not include cash), eligible counterparties, cash-reinvestment guidelines, the segregated or commingled nature of reinvestment accounts, and revenue-splitting arrangements. Currently, approximately 80 per cent of the securities-lending transactions executed by custodian banks in Canada are against non-cash collateral.[5] The list of securities acceptable as collateral is usually quite broad, most commonly consisting of Government of Canada bonds, U.S. Treasuries, Government of Canada-guaranteed

3 Loanable assets are assets that the beneficial owners have agreed to make available for lending by their custodian, subject to the terms and conditions of the negotiated securities-lending agreement.

4 Note that a part of this drop is attributable to depressed equity prices during this period.

5 Source: Custodian bank data from Data Explorers Ltd.

bonds, U.S. agency bonds and certain other sovereign debt, bankers' acceptances and bank deposit notes from certain issuers, convertible corporate securities, and, in some cases, equities. Some collateral is subject to additional limits and/or other conditions specific to each program or borrower. An overcollateralization[6] rate of between 102 per cent and 105 per cent is required for high-quality fixed-income collateral (such as Government of Canada bonds). Overcollateralization rates on more volatile or riskier collateral are higher (110 per cent for equity securities, for example) to provide an additional credit cushion in case the collateral needs to be liquidated. In addition to overcollateralization, the borrower is charged a fee that is specific to the type and availability of the borrowed security (as well as a number of other transaction-specific factors). The fee ranges from a few to several hundred basis points. Fees of 200 basis points are not uncommon in the case of equity securities that are in high demand and not widely available.

In Canada, the share of cash-collateral transactions by custodian banks has risen steadily, from being virtually non-existent about 10 years ago to an average of 20 per cent over the past several years. In contrast, cash transactions constitute an overwhelming majority of the securities-lending business in the United States and are also somewhat more popular in some European markets. Depending on the negotiated terms of the securities-lending program, cash collateral could be used as a source of funding for repo transactions or it could be invested in assets ranging from very conservative to more risky. Common investment choices include treasury bills, unsecured and asset-backed commercial paper, floating-rate notes, and term asset-backed securities. Longer-term assets and structured securities are also potential choices. These investments may be made by pooling cash from transactions on behalf of different beneficial owners and holding it separately, or in commingled accounts, depending on the terms negotiated between the custodian bank and the beneficial owner. In cash-collateral securities-lending transactions, the borrower is usually paid a rebate rate related to the overnight rate. Thus, in this case, the profitability of the transaction is related to the difference between the returns earned on the cash-reinvestment portfolio and the rebate rate paid to the borrower.

The collateralized nature of securities-lending transactions provides a degree of credit-risk protection in that it allows the security lender (beneficial owner or their lending agent) to liquidate the collateral if the borrower fails to return the borrowed security. The degree of credit-risk protection depends on the credit quality and liquidity of the collateral and the administered haircut. The presence of the haircut, if properly calculated and charged, should be sufficient to cover the downside risk to the collateral value for non-cash collateral programs. Upon liquidating the collateral securities, the lender should be able to repurchase the original (or equivalent) securities without incurring any losses.

To further mitigate credit risk, almost all large custodian banks offer their clients (beneficial owners) an indemnity against counterparty default. The scope of indemnities varies across institutions. In some cases, beneficial owners are indemnified against losses resulting from a borrower's failure to return the loaned securities, for any reason, within the specified time period. In other cases, beneficial owners are indemnified only against losses incurred as a result of an insolvency-related failure to return securities. The contractual wording of the indemnity provides the specifics.

The degree of credit protection in cash-collateral programs depends on the credit quality and liquidity of the assets in the cash-reinvestment portfolio. A highly conservative reinvestment portfolio (i.e., a heavy concentration of overnight repos or treasury bills) is more likely to be liquidated without incurring losses than a portfolio consisting of less-liquid, longer-term assets, or assets with lower credit quality. Likewise, in a situation where a security is unexpectedly returned to the lender within a cash-lending program, the lender must liquidate the reinvestment securities in order to return the cash to the borrower.[7] If the liquidation is done under unfavourable market conditions, the securities lender (i.e., the beneficial owner) may incur losses. Loan recalls in non-cash collateral programs run a much lower risk of potential loss, because the lender would simply return the collateral securities in exchange for the original loaned securities.

Market Functioning During the Financial Crisis

Following the failure of Lehman Brothers, a significant number of securities-lending programs were suspended, both in Canada and in other major markets (Oliver 2009). At the height of the financial crisis—between September and November 2008—the amount of assets available for lending was reduced by more than 20 per cent in Canada and by about the same percentage globally. There was a sizable reduction in the value of securities-lending transactions as well. To a certain extent, the problems that arose in the securities-lending market were a direct result of the widespread market stress. However, the impact of suspensions in securities-lending programs, and the large-scale recalls of security loans that followed, further exacerbated the crisis by contributing to deleveraging pressures and decreasing the supply of loanable assets (Senior Supervisors Group 2009).

Certain cash-collateral programs proved more problematic than non-cash programs for some of the same reasons discussed in the previous section. These cash-collateral programs added to deleveraging pressures by liquidating

6 An overcollateralization rate of 105 per cent means that the borrower must pledge collateral worth 105 per cent of the value of the borrowed securities. Another way to present this information is to quote haircut levels, which are stated as a percentage discount on the value of the collateral. In this example, the haircut would amount to a little less than 5 per cent (i.e., 5/105).

7 This oversimplified version of what actually happens is used to illustrate the point.

investments (to meet security loan recalls) at a time when markets were highly illiquid and the demand for investment assets was extremely low. This had a negative impact on asset prices and contributed to their downward spiral. As asset prices continued to decline, leading to losses in cash-reinvestment pools, many beneficial owners decided to suspend their securities-lending programs to re-examine the risks. A decrease in the amount of cash generated through cash-collateral programs reduced the availability of financing (offered through the repo market or via the reinvestment of cash to purchase credit instruments). This exacerbated the already difficult funding conditions. The reduction in the supply of loanable assets (particularly U.S. Treasuries) made it more difficult to cover short positions, thus contributing to an increased number of "fails" in the U.S. market (Senior Supervisors Group 2009, p. 12).

To further explain the actions of beneficial owners that suspended their securities-lending programs, it is important to note that, for many years, participation in these programs was viewed by some fund managers as a low-risk activity that did not warrant careful monitoring or risk assessment. Indemnities provided by custodian banks, which were not all of the same quality or type, were sometimes misunderstood to mean that the programs could not incur losses, thus justifying their perceived low-risk status. However, as reinvestment into less-liquid, longer-term, and more risky assets lost value, and beneficial owners incurred losses (which, in most cases, were not covered by indemnities), they suspended their programs to reassess those risks. To further complicate matters, the commingled nature of some reinvestment accounts made the claims on assets much more difficult to determine. It wasn't clear how losses that were incurred on some short-term investments (such as Lehman Brothers commercial paper), as well as losses on investments in long-term securities that became illiquid, would be distributed. To avoid recognizing immediate losses, beneficial owners had to hold these investments to maturity or until the markets returned to more normal levels.

In markets and programs where cash wasn't widely accepted as collateral, as in Canada, for example, heightened counterparty risk following the Lehman Brothers bankruptcy created conditions that changed the perceived risk-to-return trade-off of securities-lending programs. Under these stressed market conditions, some beneficial owners found it prudent to suspend their programs, even if only temporarily.

Hedge funds began to question the viability of their prime brokers' operations and the legal status of their assets in the event of the prime broker's default. Related concerns arose regarding the practice of collateral rehypothecation by prime brokers.[8] Rehypothecation allows prime brokers to "on-lend," or post as collateral their clients' securities to another counterparty, unknown to the client. Clients were concerned that their assets could be held up in the event that the counterparty that came into possession of those assets went bankrupt. This was of particular concern during the period of heightened counterparty risk, prompting a re-examination of the associated risks. Those who considered forbidding or restricting rehypothecation had to weigh the risk-reduction benefit against an increase in transactions costs.

Anecdotal evidence suggests that, since early-to-mid 2009, many programs have been reinstated—some with revised terms to better match acceptable levels of risk. For example, according to the transactions data of custodian banks, the share of cash transactions declined from more than 25 per cent in early 2007 to an average of 16 per cent since mid-2009. Nonetheless, to prevent similar issues from arising in the future, some improvements are needed in the securities-lending market.

Regulatory Structure and the Outlook for the Future

Among the lessons learned from the financial crisis has been the need for increased transparency in securities-lending programs, improved disclosure, and information-sharing by agent lenders, as well as a better understanding of the risks and benefits of these programs by beneficial owners. The particular areas requiring improvements in disclosure and understanding relate to collateral eligibility, cash-reinvestment guidelines and the corresponding exposure to maturity mismatch, segregation of funds, and counterparty risk. One way to achieve these improvements is by developing a set of best-practice guidelines (CGFS 2010). The guidelines may be most effectively drawn up and implemented through the collaborative efforts of participants in the securities-lending market, including agent lenders, beneficial owners, and borrowers. Discussions among market participants brought together through various securities-lending associations would provide a good starting point.[9] However, enforcing and monitoring the implementation of such best-practice guidelines may be challenging.

Another possible reform could be the creation of a central clearing counterparty (CCP) for the clearing and settlement of securities-lending transactions. The CCP would help to mitigate counterparty risk, which was one of the underlying concerns leading to the suspension of securities-lending programs by beneficial owners. One such CCP, although limited to clearing equities-lending transactions against cash collateral, was launched in France in June 2009 as a joint venture by SecFinex (trading platform) and LCH.Clearnet (clearing house). Upgrades to accept non-cash collateral

8 Note that concerns about rehypothecation were specific to prime brokers, since custodian banks do not rehypothecate the collateral securities or other securities in their custody.

9 One such association is the recently formed Canadian Securities Lending Association. Available at <www.canseclend.com>.

are forthcoming, and the success of the CCP will be better judged once those are implemented. The feedback so far has been positive, and the volumes of cleared transactions are growing steadily (Ferguson 2010). Nevertheless, there is considerable debate among market participants on the relative pros and cons associated with a CCP for securities-lending transactions.[10] Some pros include reduced counterparty risk, fewer resources devoted to credit-risk evaluations, and savings (for some lenders) on regulatory capital charges. Market players who oppose this idea don't see a benefit to well-capitalized institutions in a predominantly relationship-based business where transaction flows are one-sided and program terms are not standardized.

Any future policy proposals and recommendations may have to address cash-collateral programs. During boom times, these programs increased the amount of leverage in the economy by investing cash into various credit instruments or the repo market. Under stressed market conditions, as described in the previous section, cash-collateral programs contributed to financial instability by reducing the demand for credit assets, leading to rapid deleveraging and negative asset-price spirals. To ensure financial market stability, such procyclical behaviour may need to be addressed, where required, and the efforts to do this effectively will likely continue in the future.

Changes in the regulatory regime as a means of improving the structure and functioning of markets may be somewhat challenging, since participants in the securities-lending market are subject to a diverse set of regulations and, in many cases, are governed by different regulatory bodies. For example, in Canada, federally regulated pension funds, provincially regulated pension funds, and mutual funds are all subject to different sets of regulations. Securities borrowers, such as banks, investment dealers, and hedge funds, all face different sets of rules and regulations (or none at all). Custodian banks, some of which are owned or co-owned by foreign financial institutions, are subject to Basel II regulatory capital rules that apply to the Canadian banks, and/or to other rules that apply to their foreign-parent institutions. Hence, in order to implement any changes, the fragmented nature of the regulatory structure requires collaboration and coordination among the regulatory bodies within Canada and internationally.

10 For more on this debate, see *Global Securities Lending* (2009) and ISLA (2009).

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Securitized Products, Disclosure, and the Reduction of Systemic Risk

*Scott Hendry, Stéphane Lavoie, and Carolyn Wilkins**

Introduction

Securitization represents an important source of credit to the economy. By converting non-tradable financial assets into tradable instruments, securitization has the potential to expand the supply of credit beyond what would be available solely through banks and other financial intermediaries.[1] The revival and reform of global securitization markets are key elements in supporting future economic growth and, importantly, in limiting the risk that these markets could again be a source of financial instability.

Much has been said about what went wrong with securitized products and what should be done to put securitization markets on a stable footing.[2] The way forward includes several elements: (i) a better alignment of economic interests in the securitization process;[3] (ii) appropriate prudential regulation and accounting standards;[4] (iii) simplified and standardized structures based on high-quality real-economy assets;[5] and (iv) greater standardization of documentation and increased transparency and disclosure to facilitate investors' efforts to understand and manage the risks inherent in securitized products. Enhanced disclosure is only one necessary element of a comprehensive policy and industry response to the recent financial crisis.

This report focuses on issues related to disclosure for asset-backed commercial paper (ABCP) and publicly issued term asset-backed securities (ABS) in Canada. "Disclosure" here refers to the release of product information that is pertinent to investment decisions, including access to that information and the manner in which it is revealed. It does not refer to other important forms of transparency, such as information about bank holdings of securitized products or the publication of pre- or post-trade prices.

The full range of benefits associated with disclosure includes:

- *Enhanced investor protection*—Improved information supports informed investment decisions and a more level playing field for investors.
- *Improved market efficiency*—Improved and more readily available information reduces informational asymmetry, facilitates the valuation process, and supports market efficiency.
- *Reduced systemic risk*—Less uncertainty about asset values translates into greater market confidence; a lower probability of unwarranted price volatility; and a reduced risk of contagion, liquidity spirals,[6] and market freezes.

* Without implication, we thank Anita Anand, Donna Howard, and Elizabeth Woodman for useful comments and discussions.

1 See Selody and Woodman (2009) for a discussion of the economic benefits of securitization.

2 The Financial Stability Board (FSB 2009) has made a commitment to have supervisors and regulators undertake the following during 2010: implement the Basel Committee's measures to strengthen the capital treatment of securitization and establish clear rules for banks' management and disclosure; implement IOSCO's proposals to strengthen practices in securitization markets; examine other ways to align the incentives of issuers with those of investors; encourage greater use of the contractual form used in covered bonds, which tie issuers to the instruments; and support the implementation of industry initiatives to standardize terms and structures, reduce complexity, and enhance transparency. See also Selody and Woodman (2009) for an examination of the shortcomings in the securitization process and a range of options for addressing them. One possible area for attention is enhanced risk management by investors.

3 See Paligorova (2009) for a review of the conflicts of interest between participants in the securitization process and potential solutions for ameliorating these agency issues.

4 The Basel Committee on Banking Supervision has identified a number of measures to strengthen the capital treatment of securitization.

5 Real-economy assets refer to claims on consumer or business loans or leases, such as credit card receivables and mortgages.

6 See Brunnermeier (2009) for a discussion of liquidity spirals as they relate to funding liquidity.

The first two benefits are stated explicitly in the mandates of most securities regulators.[7] Considerations regarding systemic risk or financial stability, which are particularly important for securitized products, are not explicitly part of some mandates, although such considerations are central to regulatory reform initiatives in many jurisdictions.[8] All three benefits, however, are the stated objectives of the thirty principles of securities regulation, first published in 1998 by the International Organization of Securities Commissions (IOSCO) and updated in 2003 (IOSCO 1998, 2003). While these principles cover a wide range of securities regulations, one of the fundamental messages is that achieving the desired benefits requires that investors have adequate access to information. Any regulatory changes to achieve these benefits should take into account the costs associated with compliance with disclosure requirements.

The first section of this report discusses why the disclosure of information is important, especially in terms of mitigating systemic risk, and particularly with regard to securitized products. The second section reviews the Canadian experience during the recent crisis, as well as the role played by inadequate disclosure of information. The third section summarizes current disclosure requirements and practices for ABCP and ABS issued in Canada, while the fourth section outlines principles of disclosure for securitized products, and discusses areas for potential improvement in Canada.

Disclosure and Systemic Risk

Mitigating systemic risk[9] involves reducing the risk of contagion—that is, the risk that shocks in one institution or market segment are transmitted to other institutions or market segments. One important cause of contagion and financial crisis is the presence of asymmetric information between borrowers and lenders, or between investors in securities and sellers.[10] Increased uncertainty makes it difficult for investors to separate the good assets from the bad and can lead to a sharp decline in confidence and investment. Hence, an important policy response is to make more information available to investors to reduce the probability of a sudden loss of confidence that could trigger a financial crisis. This is especially important for securitized products such as ABS and ABCP. Investors need to have enough information about the product and its inherent risks to properly assess its underlying value.[11] They also need to feel confident that they are not at a significant informational disadvantage relative to other investors or market participants, particularly other entities involved in the securitization chain. While adequate disclosure of information cannot by itself prevent a crisis from occurring, non-disclosure of important information can increase the probability and intensity of a crisis.[12]

Many factors contributed to the recent credit crisis, and no single one can be identified as the main cause. Still, it is clear that inadequate disclosure of information was one of those factors. Gorton (2008a,b) describes how the panic of 2007 largely stemmed from a lack of readily available information about the source and magnitude of the losses due to default. He argues that even sophisticated investors relied too heavily on agency relationships (e.g., bankers, credit-rating agencies) and did not make full use of available information because the AAA-rated tranches of securitized products were viewed as being too far from default to make it worth the cost of more intensive due diligence. Even though all investors may not have read and used the information disclosed about securitized products when making investment decisions prior to the crisis, the fact that the information was not transparent enough when markets became stressed contributed to the market freeze. Gorton (2009) describes how, in normal times, because of the overcollateralization and seniority associated with highly rated tranches of securitized debt, these securities can be perceived to have a very low probability of default and thus be insensitive to information. They can, however, become sensitive to information when shocks create sufficient uncertainty as to the true distance to default. In this case, there is a risk of contagious adverse-selection bias that can feed financial instability, creating a situation where a lack of market confidence leads traders to withdraw from the market because they fear that the only traders still in the market are those with more information and an ability to exploit it.[13] Financial stability can therefore be enhanced by ensuring that all participants have equal access to sufficient information.[14]

The Canadian Experience during the Crisis

During the financial crisis that began in August 2007, ABS issuance in Canada—and abroad—fell dramatically and essentially came to a halt for several months. The amount of

7 For example, see Section 1.1 of the Securities Act (Ontario).

8 See Anand (2010) for a discussion of the securities regulator's mandate and the implications of systemic risk considerations for the regulation of exempt markets, hedge funds, and derivatives trading.

9 While there is no single definition of systemic risk, in this paper, it refers to a risk that is not limited to specific individual institutions but, rather, has the potential to affect the financial system as a whole and to have macroeconomic consequences.

10 See, for example, Mishkin (1991) and Dornbusch, Park, and Claessens (2000).

11 Providing the information does not guarantee that it will be used by investors; but it is a necessary step. Moreover, at times of stress, information is at a premium.

12 Dudley (2009) argues that a lack of transparency contributed to a loss of confidence that intensified the financial crisis.

13 See, for example, Akerlof (1970) and Morris and Shin (2009).

14 It could also potentially be enhanced by other measures, such as the dissemination of the values at which trades take place, although a discussion of the benefits and costs of post-trade price transparency is outside the scope of this report.

ABCP outstanding in Canada also fell from about $120 billion at its peak[15] to about $30 billion as of March 2010, which is similar to the amount that was outstanding in 1998, prior to the period of rapid growth that preceded the recent crisis. The panic that originated in the U.S. subprime-mortgage market began affecting associated securitization markets and then spread to other markets, in part because investors had difficulty understanding and managing the risks inherent in the instruments they held, partly because of inadequate disclosure of information.[16]

The Canadian third-party ABCP market is a clear example of how insufficient disclosure undermined investor protection, contributed to systemic risk, and left investors and regulators without the necessary information to fully assess the risks inherent in those securities. The information provided voluntarily by some ABCP sponsors was often incomplete, untimely, opaque, and complicated. Thus, for some time, it was not widely understood that some of the riskiest, most highly complex, and leveraged structured finance products in the Canadian market were in the form of ABCP—securities that were seen as very low risk and often bought solely on the basis of their credit rating.[17] The fact that most ABCP originated from banks probably contributed to this perception of low risk, and investors may not have properly differentiated across types of ABCP over time.[18] Thus, when concerns first emerged about U.S. subprime mortgages, the lack of detail on the underlying assets and their performance meant that investors were at first unsure as to how much exposure they had to U.S. subprime mortgages, leading them to try to sell their holdings. Combined with the lack of disclosure and understanding about important contingencies, this situation led to a massive loss of confidence in all ABCP,[19] contributing to the system-wide crisis and to considerable losses for many investors.

Problems with securitized products linked to U.S. subprime mortgages also spilled over to other ABS markets, partly because of the perception that the information necessary to assess the value of these products was insufficient, as well as a general loss of investor confidence and appetite for all securitized products. An additional factor was the uncertainty as to how these structures would perform in a severe economic downturn.

15 This includes third-party ABCP. The amount of bank-sponsored ABCP has declined from a peak of approximately $80 billion.

16 Overreliance on credit ratings, insufficient due diligence by investors, and worries about the ability of issuers to roll over maturing paper were also contributing factors.

17 See, for example, Kamhi and Tuer (2007a,b) for a discussion of the Canadian ABCP market prior to and during the crisis.

18 Since ABCP are very short-term securities, less due diligence was done in assessing the associated risk than for investments in longer-term securities, such as ABS.

19 The opaqueness of the contingencies embedded in some contracts for liquidity provision, many of which included a Canadian-specific clause for a "general market disruption" (see Kamhi and Tuer 2007a), is an example. Also, while the lion's share of the assets in Canadian bank-sponsored ABCP was unrelated to U.S. subprime mortgages, market participants could not at first be sure of this.

Current Requirements and Practices

Canadian requirements for public market disclosure are based on a materiality standard. That is, reporting issuers must make "full, true, and plain" disclosure of all material facts in primary offering documents and then keep markets abreast of material changes in the business, operations, and capital of the issuer. In practice, the application of this legal threshold is often a question of judgment as to just what information is material at the time disclosure is made. In the case of securitized products, for which timely and detailed information on the assets underlying the securities is most needed, this standard does not necessarily fully support the requirements of investors and regulators for the ongoing up-to-date information essential for risk monitoring and management purposes. Below is a brief description of the current disclosure requirements for ABCP (offered in the exempt market) and ABS (offered in the public market) in Canada, which have not changed since the financial crisis.[20]

Current practice for ABCP

Currently, in Canada, ABCP can be issued in the exempt market under the short-term debt securities exemption if it receives an "approved credit rating from an approved credit-rating organization," or under other possible exemptions, including the accredited investor exemption.[21] This means that sufficiently highly rated ABCP (and commercial paper)[22] is exempt from the prospectus and other disclosure requirements **(Table 1)**, although the structure of ABCP is generally more complex than that of regular commercial paper.[23] The extensive legal documentation supporting ABCP that is provided to investors on demand is contained in multiple documents, is not fully standardized, and is not typically summarized and made public in a single, concise document.

The exempt securitization market is primarily an institutional investors' market, and those investors have historically been presumed to know what information they need and to have the negotiating power to get it. However, the recent crisis has demonstrated that this was not always the case. In good times, investors may not obtain or use all the information required to make fully informed investment decisions. Additional disclosure does not guarantee that all investors will make good use of the available information, or that it alone is sufficient to avert a crisis. However, at times of stress, properly designed disclosure will limit contagion.

20 In 2008, securities regulators, under the auspices of the Canadian Securities Administrators (CSA), undertook consultations on proposed policy responses to address the role of ABCP in the financial crisis, including a possible amendment to exclude ABCP from the short-term debt exemption. Subsequently, CSA committees have been assessing and developing regulatory responses for the sale of securitized products.

21 National Instrument 45–106.

22 There is no ABCP conduit in Canada with a lower rating than that needed to make use of the exemption, and only a handful of CP issuers.

23 See Toovey and Kiff (2003) for an earlier discussion of disclosure issues regarding Canadian ABCP.

Table 1: Disclosure requirements for private or exempt issuances of asset-backed commercial paper (ABCP)

	At time of issue	Continuous disclosure
Requirements under securities law	Securities qualify for an exemption (short-term debt exemption or accredited investor exemption). No disclosure to investors required (NI 45-106).	No continuous disclosure required on the securities, which are issued in the exempt market by non-reporting issuers.
Documents	Required form of report for exempt distribution must be filed with securities regulatory authorities if the accredited investor exemption is used (although not if the short-term debt exemption is used).	No continuous disclosure required on the securities, which are issued in the exempt market by non-reporting issuers.
Completeness of information	Not applicable	Not applicable
Clarity of information	Not applicable	Not applicable

Although there is no requirement to regularly report on the performance of the underlying assets or the financial health of parties involved in the transaction, the practice has evolved such that ABCP sponsors in Canada now typically voluntarily release unaudited monthly investor reports with static pool and pool asset information. In addition, detailed monthly reports are released by rating agencies.

Current practice for ABS

Securities regulation in Canada calls for a high level of disclosure by issuers of public ABS, compared with what exists for ABCP, which is issued in the exempt market **(Table 2)**. Full, true, and plain disclosure of all material facts is required at the time of issuance with the filing of a prospectus. Disclosure is also provided during the life of the asset through the Annual Information Form (AIF), which must contain all the information that would likely influence a reasonable investor's decision on whether to buy, sell, or hold the securities of a particular issuer. The AIF discloses information regarding the underlying pool of assets, factors that may affect the timing or amount of payments or distributions to be made, and any other relevant information. There is also a general requirement applicable to all public securities to reveal all material changes in a timely manner.

Prospectus requirements

In Canada, securities issuers subject to a prospectus requirement have four options: they can use a long-form prospectus, a short-form prospectus, a base-shelf prospectus followed by a prospectus supplement, or they can issue under an exemption. Our focus is on disclosure in the public market and not on the regulatory framework of the exempt market. The main difference between the long- and short-form prospectus is that the latter permits the incorporation of information by referencing other publicly available documents, such as audited financial statements, while the former does not. Because all forms must contain a full, true, and plain disclosure of all material facts, they do not differ materially in terms of the overall information disclosed. Most ABS issuers in Canada use a short-form prospectus, which entails a much more rapid review process.

For ABS, the issuer must provide a description of the material attributes of the securities, including information regarding the parties involved in the transaction, the duration of the obligation and related payments, the nature and composition of underlying assets, and the embedded contingencies. Issuers are also required to summarize contractual arrangements in plain language. This requirement is typically not adhered to, however, perhaps because of concerns that the level of precision required to support clarity in a legal sense would be compromised by the use of plain language. In broad terms, ABS prospectuses contain:

- information on the business of the issuer and the identities of the other key parties involved in the transaction (e.g., servicers);
- statistics on the performance of the issuer's assets that are of the same type as those backing the ABS being issued;
- descriptive information on the particular pool of assets selected for the ABS being issued (e.g., geographical and interest rate distribution); and
- descriptions of legal documents specific to the creation of the asset pool and issuance of the notes.

The third option—the shelf prospectus—splits the filing of information into two steps: the base shelf and a prospectus

Figure 1: ABS investors require information about the underlying assets and structure

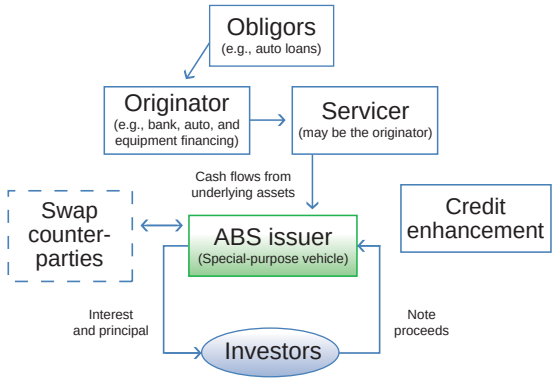

Table 2: Disclosure requirements for public issuance of asset-backed securities (ABS)

	At time of issue	Continuous disclosure
Requirements under securities law	Full, true, and plain disclosure of all material facts that would reasonably be expected to have a significant effect on the market price or value of the securities (e.g., s. 56 Ontario Securities Act (OSA)).	- When a material change (a change in the business, operations, or capital of the issuer) occurs, the issuer must put out a press release, file a Form 51-102F3 Material Change Report with securities regulators, and report to them (e.g., s. 75 OSA, NI 51-102). - Periodic disclosure (NI 51-102)
Documents	Prospectus	- Press release and material change reports - Audited annual and interim financial statements and Management Discussion and Analysis (MD&A) - Annual information forms[a] - No legal requirement for monthly servicer reports
Completeness of information	- Information applicable to all public securities prospectuses plus additional information particular to ABS (NI-41-101 F1s. 5.3). - Extensive information regarding the issuer, parties involved in the transaction, and the underlying assets.	- Information common to all public securities such as audited financial statements and some additional information particular to ABS (NI 51-102F2 s. 5.3) - NI 51-102 sets out requirements for all continuous disclosure - No comprehensive set of disclosure requirements specifically adapted to ABS
Clarity of information	- No standard templates for documents - Plain language guidance (NI 44-101, Companion Policy s. 4.1), but typically not adhered to	- No standard templates for documents - Companion Policy to NI 51-102 states that issuers "should apply plain language principles when [they] prepare their disclosure including: using short sentences, using everyday language, using active voice, avoiding superfluous words, organizing document in clear, concise sections and avoiding jargon."

a. A "form" in this case is a list of the information that must be revealed; it is not a template that standardizes how the information is reported.

supplement. The base shelf contains information about the issuer, statistics on the performance of similar assets, and a generic description of the standard legal documents used, but no information on the specific pool of assets being securitized or the specific legal documents pertaining to the notes being issued (except for legal documents that will apply to all notes issued under the shelf prospectus). This information is contained in the prospectus supplement, which is typically filed after the deal has been priced.[24] Given the nature of ABS and the type of information contained in the documents, the prospectus supplement is more detailed, lengthy, and material than for corporate bonds, so the base-shelf option may be appropriate only for ABS backed by a revolving pool of assets, such as credit card receivables, where multiple series of notes with an ownership interest in the same asset pool are issued.

Continuous disclosure

In addition to filing a prospectus at the time of issue, ABS issuers are subject to a legal requirement for continuous disclosure. Securities law in Canada requires the filing of quarterly financial statements, the annual completion of an AIF,[25] and the issuance of a press release and filing of a material change report if there is a material change in the business, operations, or capital of the issuer. The term "material change" is defined as "a change in the business, operations or capital of the reporting issuer that would reasonably be expected to have a significant effect on the market price or value of any of the securities of the reporting issuer." However, items that are material for an ABS differ from those for a standard security, such as a corporate bond or equity, owing to the very different nature of the securities **(**see **Figure 1)**. In particular:

- Audited financial statements of an ABS issuer (a trust or special-purpose vehicle) are useful, but are of less value to investors than the financial statements of a corporate bond or equity issuer. This is because the trust's financial statements can pertain to a number of ABS series and asset pools, not only to the specific assets underlying the securities of interest to the investor. For the same reason, those statements are also of less value to ABS investors than either information on the composition and performance of the actual pool of assets underlying the specific notes they hold, or data on individual loans within the pool.
- The AIF is required to be released on an annual basis only, thus limiting its usefulness to investors looking for timely information on changes in the performance of the assets and expected payouts, particularly in a crisis. It is not required to be audited, potentially reducing at least its perceived reliability in the eyes of investors.

24 A draft supplement is typically distributed to investors during the marketing of the deal, but this draft is not legally binding and could be subject to change prior to the filing, although this would be unusual.

25 Securities law generally does not require the annual completion of an AIF. It is, however, required in order for securities to be eligible for issuance under the short-form prospectus, which is how most ABS are issued.

In addition to the trust's financial statements and an annual form, ABS investors need detailed and timely information on the performance of the underlying assets. Recognizing this, ABS issuers often do release monthly servicer reports with information on the performance of pool assets. The right to view the performance of pool assets is governed by the transaction agreements. While there is no specific legal requirement for them, ABS prospectuses typically include statements to the effect that investors will receive monthly reports from their servicers.[26] However, the information that these reports contain is left to the issuer's discretion, and there is no requirement to have them certified or audited.

Principles of Disclosure for Securitized Products and Areas for Potential Improvement

Disclosure requirements should be assessed from the point of view of the objectives of the requirement (i.e., investor protection, market efficiency, and reduced systemic risk), as well as what is material to the investor in terms of:

- *Timeliness of the information*—at the time of issue and continuously over the life of the security.
- *Completeness of the information*—all pertinent information to allow pricing and foster market liquidity, including: information about all parties involved; the duration of the obligation, distribution of cash flows, and possible trigger events and consequences; the nature, quality, and performance of the underlying assets; and the embedded contingencies and credit enhancements.
- *Clarity of the information*—standardized terminology and clear language should be used in all reporting.

Fundamentally, the same overarching principle—to disclose in a timely fashion all material facts and material changes—should apply to all securities issued in the public market. As suggested above, securitized products are very different from—and typically more complex than—traditional securities and, as a result, the nature of what constitutes "material information" is also likely to be quite different. This argues in favour of disclosure requirements that are tailored to securitized products, and clear guidance with regard to their application. The minimum requirements should be based on the IOSCO disclosure principles for public offerings of ABS.

These principles, which apply at the time of issuance, include disclosure of:[27]

1. the identity of parties involved and their responsibilities (e.g., arrangers, sponsors, servicers, trustees);
2. description of the ABS (e.g., types and classes of securities, triggers, overcollateralization, credit rating) and structure of the transaction (e.g., flow of funds, distribution, fees, prepayment considerations);
3. static pool data (i.e., how assets originated at different periods have performed over time);[28]
4. pool assets (e.g., composition and characteristics of asset pool, as well as delinquency and loss information);
5. significant obligors of assets;
6. credit enhancements and other forms of credit support; and
7. significant derivatives contracts beyond credit support (e.g., identity of interest rate or currency swap counterparties and terms of agreements, financial information of significant counterparties).

While the spirit of securities regulation in Canada is aligned with these principles, and ABS prospectuses do contain much of the information that investors need, there are areas for improvement in terms of the disclosure requirements. For example, more comprehensive disclosure requirements that are tailored to securitized products may be desirable, given significant differences in the nature of those securities compared with traditional corporate debt.[29] History and research show that voluntary disclosure is less likely to be forthcoming in complex markets (Fishman and Hagerty 2003). This suggests that more precise guidance for disclosure of information related to securitized products may be helpful, since reliance on voluntary disclosure may not, over time, achieve the optimal level of disclosure.

Initiatives in other countries

In the wake of the financial crisis, jurisdictions around the world are investigating the need to refine their disclosure requirements for securitized products.[30] In April 2010, the U.S. Securities and Exchange Commission (SEC) released a broad and detailed list of proposals for the expansion of disclosure and other requirements to support investor protection. In particular, it proposes new requirements for the disclosure of specified data on the underlying assets, characteristics of obligors, new information on originators and sponsors, and underwriting of the asset. The asset-level data are to be provided in a machine-readable standardized format, along with a computer program of the contractual cash-flow provisions to facilitate the review of the data by

26 A number of sponsors file those reports on the System for Electronic Document Analysis and Retrieval (SEDAR) as open to the public, while some have password-protected websites accessible only to investors.

27 See IOSCO (2010) for a full list of the IOSCO disclosure principles.

28 This can allow investors to detect changes in asset quality and credit standards that may not be as easily or readily detectable with information on pool assets.

29 See, for example, Feldman et al. (2005) for a comparison of U.S. and Canadian disclosure requirements. Note that this comparison was made before the SEC published substantial revisions in April 2010.

30 See FSB (2009) for a brief discussion.

investors. The rule changes also establish new criteria for shelf prospectus eligibility. The American Securitization Forum's Project RESTART is a private sector initiative that has delivered voluntary standardized reporting and disclosure packages, starting with residential mortgage-backed securities (RMBS). Similarly, the European Securitization Forum published its disclosure principles. In addition, both the European Central Bank and the Bank of England have released for consultation detailed disclosure requirements (including, in some cases, for loan-level data) that they are considering applying to ABS that are eligible as collateral to their lending facilities.[31]

Potential enhancements for ABS

As stated above, current disclosure requirements for ABS issued in Canada could be enhanced—both at the time of issue and over the life of the security.[32] One important element of disclosure is how the information is provided. While ABS prospectuses contain much of the information that investors need, benefits could be achieved, in terms of ease of understanding and enhanced ability to compare across issues, from more standardized documentation. This could include a concise summary that describes, in clear language, all the key elements contained in the prospectus (and some guidance on what those key elements are).[33]

There is also room for improvement with regard to the substantive information itself, not simply how it is provided. For example, the IOSCO principles include static pool data that allow for a historical comparison of the performance of assets that are originated at different times, which could allow investors to detect changes in underwriting standards that may not otherwise be evident.[34] In addition, there may be a need to disclose loan-level data for certain types of ABS where this information would be pertinent.[35] Finally, there may be room for enhancing the level of information provided with respect to the various parties involved in an ABS transaction; for example, financial information on those parties that could allow investors to judge their ability to fulfill their obligations.

There is also room for improvement in terms of information disclosure over the life of the security, particularly since IOSCO's disclosure principles for ABS do not address the issue of continuous disclosure. Continuous disclosure requirements for ABS should recognize that the issuer's financial statements are less relevant to investors than in the case of traditional corporate securities issuers, given the need for detailed information on the specific assets underlying the securities rather than on the issuer, as was argued earlier, and that frequent reporting on the performance of the underlying assets is important. So, in addition to an AIF, which is released on an annual basis, certified monthly servicer reports are important for both investors and regulators to be able to make appropriate decisions and properly assess, monitor, and manage the risks inherent in securitized products. In support of this, some guidance should be provided as to the minimum material information these reports should contain for the various types of ABS and how that information should be presented in order to facilitate comparison across securities.

Potential enhancements for ABCP

The greater complexity and unique risk characteristics of securitized products, compared with regular commercial paper, raise the question of whether the level of disclosure mandated under the current form of the short-term debt exemption is appropriate for ABCP.[36] In developing an appropriate set of standards for disclosure, it may be useful to consider some elements of the Bank of Canada's disclosure requirements regarding the ABCP it accepts as collateral under its Standing Liquidity Facility. These were developed in response to the limited disclosure of information in the structure of ABCP products before the crisis. The Bank of Canada requires a single, concise document that contains all relevant information and is validated by the sponsor.[37] These disclosure standards include the identities of the key parties involved; the range of assets that may be held and the manner in which the exposure is gained; the characteristics of asset pools, including performance measures, foreign currency exposures, and hedging methods; the nature of credit enhancements and liquidity facilities; asset-performance triggers and consequences for investors; and flow of funds for the ABCP program. The Bank also requires that this document be accessible to all investors and be updated whenever any significant change occurs.

31 In December 2009, the ECB launched a public consultation process on the establishment of loan-by-loan information requirements for ABS in the Eurosystem collateral framework to increase transparency, allow for more informed risk assessments, and to help restore confidence in securitization markets. The consultation documents include detailed proposed reporting templates for RMBS (see http://www.ecb.int/press/pr/date/2009/html/pr091223.en.html). On 17 March 2010, the Bank of England also announced a consultation on enhanced disclosure requirements for the eligibility of ABS collateral in its operations (see http://www.bankofengland.co.uk/publications/news/2010/031.htm).

32 This may prompt the Bank of Canada to apply additional transparency requirements, based partly on the IOSCO principles, should it decide to expand its list of eligible collateral to include a subset of ABS. The Bank could set disclosure requirements for the securities it would consider accepting as collateral under its Standing Liquidity Facility both to protect its financial interests and to provide leadership in this area.

33 Many prospectuses already contain a summary, highlighting the value of such a document to investors, but there is no legal requirement for it, and greater standardization would help.

34 Since this information is typically requested by rating agencies, it should not represent a material additional cost for the issuer.

35 Loan-level data would be more appropriate for certain types of securitized products (for example, RMBS) than for others (for example, ABS backed by credit card receivables), given the shorter term of the loans, the much higher turnover of portfolios, and the larger number of loans underlying the latter type of securities.

36 Ontario's Standing Committee on Government Agencies (2010) released a report calling for, among other recommendations, an amendment to the short-term debt exemption rule to make this exemption unavailable for the sale of ABCP, and more generally, for improved disclosure with respect to ABCP. An amendment to the short-term debt exemption to make it unavailable to distributions of ABCP was also proposed in 2008 by the CSA ABCP Working Group, which was formed to consider securities regulatory issues stemming from the credit turmoil and to make recommendations to the chairs of the CSA on appropriate regulatory responses.

37 For details, see <http://www.bankofcanada.ca/en/financial/securities.pdf>.

Conclusion

This report focuses on issues related to the disclosure requirements for ABCP and ABS in Canada, and argues that enhancements to current disclosure requirements, and their application, should be considered. As illustrated by the recent crisis, inadequate disclosure of information can contribute to financial instability in times of stress. The unique nature of securitized products, compared with traditional corporate securities, suggests that disclosure standards that are better tailored to these products would be desirable. Securitized markets suffered significant stress during the crisis, with many closing down completely. To restore market confidence and ensure the reopening of ABS markets on a solid footing, enhanced disclosure is necessary to provide investors with sufficient information to make informed decisions.

Enhanced disclosure is, however, only one element in a comprehensive policy and industry response to the recent financial crisis. Other initiatives, including steps to reduce conflicts of interest in the securitization chain, the simplification and standardization of structures, and appropriate prudential regulation and accounting standards, are key factors in putting securitization markets on a more stable footing. These initiatives can reinforce each other and, if appropriately implemented, would augment the benefits of more stringent requirements for transparency and disclosure.

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The Bank of Canada's Analytic Framework for Assessing the Vulnerability of the Household Sector

Ramdane Djoudad

Introduction

Changes in household debt-service costs as a share of income—i.e., the debt-service ratio, or DSR—are a measure of changing risk associated with household debt. While aggregate data provide an indication of average shifts in household debt positions, such variations frequently obscure vulnerabilities that only a review of the microdata can reveal. The availability of microdata for this type of review has assisted the Bank in developing an analytical framework for assessing risk in the household sector.[1]

Although the DSR is not the only barometer of the financial health of households, it remains a good indicator of their vulnerability. A rise in the DSR, for example, increases the vulnerability of households to negative shocks and can also have potential adverse consequences for the balance sheets of financial institutions. Since household debt accounts for a significant proportion of the loan portfolios of banks, shifts in household vulnerability arising from potential variations in macroeconomic conditions must be monitored. This report outlines the Bank's framework for analyzing changes in household vulnerability as described in the June and December 2009 issues of the *Financial System Review* (FSR),[2] as well as recent improvements to that framework. The unique feature of the framework is the use of microdata in stress-testing simulations to measure the impact of various shocks (debt, interest rates, employment, amortization period, etc.) on the distribution of the DSR and, ultimately, on household solvency. These analyses are an attempt to gauge the impact of an adverse shock under simulated conditions rather than to identify the most likely changes in the financial conditions of households.

There are three steps in the stress-testing exercise **(Table 1)**. In Step 1, the key assumptions of a scenario representing a macro environment under stress are defined. The scenario should be consistent with the Bank's assessment of possible risks to the household sector. For example, in the December 2009 issue of the FSR, one of the main developments we wanted to evaluate was a continuation of strong credit growth in an environment of rising interest rates. Once the aggregate scenario is set (Step 1), we need to distribute the effect across individual households (Step 2). Finally, based on the evolution of the DSR distribution, we estimate the effects of an adverse shock on the credit losses at banks (Step 3).

Table 1: Steps in the stress-testing exercise

Step 1	Step 2	Step 3
• Establish the key assumptions for the macro scenario: – Growth in aggregate credit and income – Interest rate path	• Calculate the implications of the macro scenario for the distribution of the household debt-service ratio	• Estimate the impact of adverse shocks on bank loan portfolios

Two major improvements have recently been made to the methodology. First, those buying a home for the first time have been explicitly taken into account as a separate class in Step 2. Second, the risk assessments in Step 3 will be strengthened by combining elements from previous exercises reported in the June and December 2009 issues of the FSR. Specifically, household vulnerabilities will evolve over time by simulating changes in indebtedness and interest rates (as in the December 2009 FSR), and potential losses at banks will then be assessed using an explicit employment shock comparable to the one described in the June 2009 FSR.

1 Data are from the Canadian Financial Monitor (CFM) annual survey of approximately 12,000 households conducted by Ipsos Reid. The survey was launched in 1999.

2 *Financial System Review*, June 2009, pp. 21–23 and December 2009, pp. 23–26.

The Data

The DSR derived from microdata includes principal repayments on all instalment loans. To calculate the DSR, its three major components are evaluated: household debt, interest rates, and household income, as shown in the following formula.

$$\text{DSR} = \frac{\sum \text{Payments}}{\text{Gross income}} = \frac{\sum(\text{Principal} + \text{Interest})}{\text{Gross income}}. \qquad (1)$$

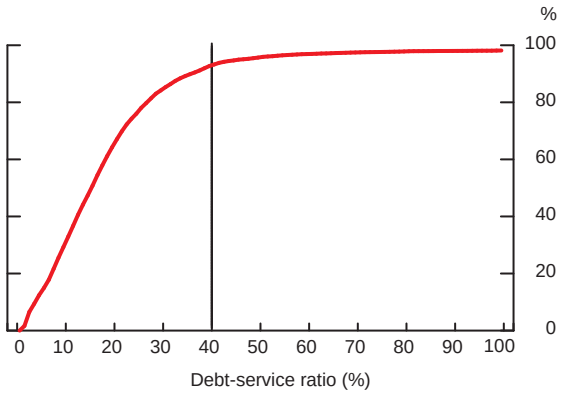
The microdata used for the calculation include credit card debt, personal loans, personal lines of credit, vehicle loans, and mortgage loans. The following information is available for all loans except credit card debt:

- the amount of the monthly payment
- the effective interest rate
- the term[3] of a mortgage loan (in years), but not its maturity date
- the balance of the loan

In previous issues of the FSR,[4] the Bank reviewed the distribution of the DSR using microdata to better determine how debt was spread across various households classified by income. Determining the distribution of risk among households naturally requires a review of the upper tail of the DSR distribution since, all things being equal, households with a high DSR will obviously have a more difficult time meeting their financial obligations. Thus, the greater a household's debt load, the greater its sensitivity to idiosyncratic shocks, such as divorce or a serious illness, or to economic shocks, such as the loss of a job. A household's assets are also a significant factor in assessing its ability to weather negative financial shocks.

Chart 1 shows the cumulative distribution of the DSR for 2009.[5] This distribution indicates that the majority of households are below the critical 40 per cent threshold. Households with a DSR above this threshold may have difficulty meeting their debt obligations. By comparing this distribution with that of previous years, we can determine the changing profile of household sensitivity to shocks. However, a methodological framework is required to gauge the effect of certain shocks on the distribution. The purpose of this report is to describe the Bank's simulation model for quantifying the effects of changes in certain macroeconomic variables on the distribution of the DSR and, ultimately, on potential losses at banks.

Chart 1: In 2009, the majority of households had a debt-service ratio below 40 per cent
Cumulative distribution of the debt-service ratio, 2009



Source: Ipsos Reid

Impact on the Distribution of the Debt-Service Ratio

Having defined the aggregate hypothesis consistent with the macroeconomic scenario established in Step 1, the impact of these assumptions on the distribution of the DSR is assessed in Step 2. Simulations are carried out over a three-year horizon.

In this model, interest rate shocks affect only interest payable and not the amount of principal repayments. Consequently, interest payments must be distinguished from repayments of principal. The variable PC represents a household's total annual loan payments, SC is its current credit balance, and i, the applicable interest rate.

The following formula is used to determine the approximate amount of the principal repayments:

$$\text{Principal} = PC - \text{Interest} = PC - (SC^{*}\, i). \qquad (2)$$

When simulations are performed, principal payments[6] are deemed to be a constant share of the credit balance:

$$\text{Share\_Principal} = (\text{Principal}/SC). \qquad (3)$$

Thus, a household is required to make the following payment in each period:

$$PC = SC^{*}(\text{Share\_Principal} + i). \qquad (4)$$

3 Data are available for 6-month, 1-year, 2-year, 3-year, 5-year, 7-year, 10-year, and variable-rate mortgage loans.

4 See the five issues of the FSR published from December 2007 to December 2009.

5 For more details on the historical profile of changes to the DSR and the proportion of vulnerable households, see the December 2006 issue of the FSR, pp. 15–16.

6 In fact, the share of principal repayments may vary over time. However, since the simulations are performed over a short period of time, we do not think that this will significantly affect the results.

Future payments and the dynamics of the DSR will be determined by the simulated profile of changes in household income and debt, as well as in interest rates.

Interest rates

To design an interest rate scenario, we must define a profile of changes to the overnight rate (Step 1). For example, in the December 2009 issue of the FSR (pp. 23–24), the Bank considered two hypothetical paths for the overnight rate. The first was a reflection of market expectations embodied in current yields on Government of Canada securities, while the second assumed a sharper rise. Additional assumptions are required for the profiles of risk and term premiums on household debt. In the December 2009 FSR (p. 24), the Bank assumed that risk premiums would return to their historical levels at the end of the simulation period.[7]

Since we know the date on which each household completed the Ipsos Reid questionnaire, we are able to calculate the risk premium on variable-rate loans by subtracting the overnight rate from the actual interest rate. It is assumed that households make credit card payments equal to 2 per cent of the monthly balance; i.e., the minimum payments generally required by card issuers. It is also assumed that variable interest rates apply to all other types of consumer loans (personal loans, personal lines of credit, and vehicle loans).[8] Variable-rate debt responds immediately to changes in the overnight rate.

For simplification, we assume that the proportion of households whose mortgages are renewed in a given year is equal to the reciprocal of the term to maturity. For example, for a 5-year term, 20 per cent (1/5 = 0.2) of households would renew their mortgage each year (5 per cent per quarter).

Heterogeneity in income growth

Income is the second variable required to plot the projected evolution of the DSR. The approach used was to divide households into five classes, based on income (for details, see Djoudad 2009). The following equation represents the distribution of income growth for a particular class:

$$\text{Income} \sim N\left(r_j,\ \sigma_j\right) \quad j = 1, 2, 3, 4, 5, \tag{5}$$

where

j = household income class

r_j = average income growth of households in class j

σ_j = estimated standard deviation of income growth for households in class j (Djoudad 2009).

In this framework, income growth is assumed to be heterogeneous within each class. Between classes, the mean and standard deviation may be assumed to be similar or different, although overall growth must be consistent with the aggregate scenario (Step 1). For example, a shock to income (Step 1) may have a greater impact on the income growth of households in the lowest income classes (1 and 2) than for households in the highest income classes (3, 4, and 5).

Heterogeneity in the growth of household debt

The macroeconomic scenario considered includes assumptions for total growth in mortgage and consumer debt. That said, all households cannot be presumed to experience identical debt growth. The distribution of the growth of aggregate debt across income classes must therefore be determined. Since all households are not comparable, the simulation model incorporates household heterogeneity by allowing the growth of each household's debt to depend on its specific socioeconomic characteristics and certain empirical relationships (as described below). A specific distinction is made between first-time homebuyers, who have yet to contract mortgage debt, and all others.

First-time homebuyers

First-time homebuyers have accounted for a significant share of the growth in mortgage credit in recent years. According to some analysts (e.g., the Canadian Association of Accredited Mortgage Professionals (CAAMP 2010)), nearly 50 per cent of all homebuyers were new to the market in 2009. After purchasing their first home, their debt exceeds the average for Canadian households. While first-time homebuyers were implicit in previous exercises, they are now taken explicitly into account in the model. They must therefore be distinguished from other households to avoid unduly increasing the debt loads of current mortgage holders, thus inflating the proportion of vulnerable households. Taking first-time homebuyers into account leads to lower levels in the measures of vulnerability, given that a significant share of new mortgages goes to households that previously had no mortgage debt.

To illustrate the impact of the new methodology, **Table 2** compares simulation results of a model with and without first-time homebuyers. These simulations use updated data for 2009H2 and 2010Q1. Under Scenario 2 of the December FSR, the results indicate that taking explicit account of first-time homebuyers lowers the proportion of vulnerable households to 7.4 per cent from 8.4 per cent, and the percentage of debt owed by these vulnerable households to 14.3 per cent from 17.2 per cent, by the end of 2012Q2.[9]

In each period, new households that have neither taken on a mortgage nor purchased a home are drawn from our data on

7 The methodology is flexible and lends itself to a variety of scenarios.

8 Credit cards are at fixed rates; personal lines of credit account for almost 75 per cent of all remaining consumer loans, most of which are at variable rates.

9 The numbers reported in Table 2 for the previous methodology differ from those reported in the December 2009 FSR, owing primarily to a correction to the program code.

Table 2: Impact on the vulnerability measures of introducing first-time homebuyers (%)

	Previous methodology		Explicitly taking into account first-time homebuyers	
Period	Proportion of households with DSR > 40%	Proportion of debt owed by households with DSR > 40%	Proportion of households with DSR > 40%	Proportion of debt owed by households with DSR > 40%
2010Q1	5.1	9.7	5.0	9.6
2010Q4	5.6	11.0	5.4	10.5
2011Q4	7.6	15.2	6.8	12.9
2012Q2	8.4	17.2	7.4	14.3

households and are added to the sample of homeowners. According to data from the CAAMP, in 2007 the average gross DSR for all new mortgage borrowers was around 23 per cent. Households that are added to the sample are assigned a share of new debt on the basis of their income and the distribution of the DSR for first-time buyers, consistent with the observed distribution in recent years.[10]

Other households

The difference between the aggregate new debt and the portion that has been attributed to first-time homebuyers is the residual debt, which is the share of mortgage debt attributed to other households. First, the share of mortgage debt incurred by first-time homebuyers is subtracted from aggregate debt growth (total debt and mortgage debt). Next, residual debt growth is spread among those households with previously incurred debt. For example, if the scenario assumes a 10 per cent increase in aggregate mortgage debt, half of which was taken on by first-time homebuyers, the mortgage debt of all other households whose homes are already mortgaged should increase by only 5 per cent.

Having determined interest rates, increases in real estate prices, and the rate of income growth for individual households, as well as their DSRs, we calculate average growth rates of total credit and mortgage credit, using equations (6) and (7). With the exception of the DSR, all other variables are expressed in first differences.

$$\text{Total household credit} = \text{F}(\text{income, interest rates, housing wealth, dsr}). \quad (6)$$

$$\text{Mortgage credit} = \text{F}(\text{income, interest rates, housing wealth, dsr}). \quad (7)$$

The empirical relationships described in equations (6) and (7) serve to determine changes in the total-credit and mortgage-credit profiles of each of the remaining households. In these equations, the growth of debt depends on household characteristics and the assumptions underlying the macroeconomic scenario. To spread this residual debt among households with previously incurred debt, we use equation (5) to generate a stochastic distribution of income for all households. Equations (6) and (7) were estimated on the basis of data[11] pertaining to various classes of households, while taking into account such variables as the household's labour market status, level of education, place of residence, family income, and housing wealth, as well as interest rates. A detailed analysis of estimation results is provided by Djoudad (2009) and Dey, Djoudad, and Terajima (2008).

Most financial institutions consider a DSR of 40 per cent to be the threshold above which a household may have difficulty making loan payments. Hence, it is more difficult for households with a DSR of 40 per cent or more to incur additional debt, since financial institutions will scrutinize their loan applications more closely. Such households therefore find themselves with greater constraints, and so we surmise that their debt behaviour changes as they reach the threshold. As a result, the model allows the marginal effect of a rise in income or interest rates on debt to diminish as the household reaches a DSR threshold of 40 per cent.

Determining the evolution of the DSR

Now that we have established how interest rates, income, and debt evolve, we are able to recalculate each household's debt-service costs based on the interest rate applicable to any new or renewed debt. We use an individual household's payment schedule and income to calculate changes to its DSR profile over the entire simulation period. These household-specific results are used to calculate the distribution of the DSR across all households.

Risk Assessment

Past issues of the FSR have reported two types of DSR simulation exercises that assess the impact of changes in macroeconomic conditions on the financial health of households and, ultimately, the balance sheets of financial institutions.

Under the first type of simulation,[12] the Bank assessed the medium-term risks stemming from increasing indebtedness in an environment of rising interest rates. While this type of exercise does result in a vulnerability metric (i.e., the share of households where the DSR is equal to or greater than a critical threshold), it provides no direct measure of the losses financial institutions are liable to sustain.

In the June 2009 issue of the FSR, the Bank attempted to assess the impact of a more severe negative shock on the

10 The information on mortgage terms for first-time homebuyers is taken into account in calculating the monthly maturities. Although the methodology can accommodate alternative scenarios, all first-time homebuyers are assumed to have a 5-year mortgage.

11 Specifically, CFM survey data for the years 1999 to 2007 were used.

12 See the December 2009 issue of the FSR, pp. 23–26, for an example.

Canadian economy than was anticipated at the time, by introducing an explicit macroeconomic shock to employment. This exercise (unlike the type of simulation described above) provided a direct assessment of the impact of potential losses on the balance sheets of financial institutions. However, debt, income of the employed, and interest rates were assumed to be constant. These were reasonable simplifying assumptions, since the purpose of that exercise was to assess near-term risks, but they would not be realistic for assessing risks over a longer horizon.

The impact of any negative shock on the balance sheets of households and, ultimately, on those of financial institutions depends on the significance of the vulnerabilities at the time the shock occurs. Accordingly, future stress tests will combine the basic features of both types of simulation within our framework. The effect of changes in income, debt, and interest rates on the DSR distribution will be simulated, and the distributions generated for each time horizon will be used to evaluate the impact of hypothetical shocks to employment on the loan losses of financial institutions. This approach should support a more sophisticated analysis of how risk is transferred from households to the financial system.

Employment shock

A negative shock to employment would result in a significant loss of income for households that are affected. In our model, the distribution of job losses among sampled households is random (retirees, students, and other households with no employment income would not be affected).[13] Sources of funds for unemployed households would be limited to employment insurance, provided they are eligible, and any liquid assets they may have (balances in chequing and savings accounts, term deposits, GICs, etc.). It is possible that illiquid assets could be sold and included in the funds available to households. However, in a systemic crisis, households may have difficulty selling off their assets without triggering a significant drop in prices. The price declines would exacerbate the financial stress. If a broader range of assets were used, then the second-round effects would also need to be considered in the model. Overall, restricting the calculation to liquid assets should not bias the conclusions.

According to empirical data, only a fraction of households would be eligible for employment insurance benefits in the event of a job loss. Given that all households have fixed expenses (housing, food, etc.), it is assumed that half of the funds available to a household would be used for such expenses and would not be available to cover debt-service costs. We determine a household's ability to fulfill its financial obligations by comparing available funds (including liquid assets) to total payment requirements over the period of unemployment. The longer the period of unemployment lasts, the lower will be the remaining resources available to the household to meet its debt-service obligations and the higher the probability of it becoming insolvent. If a household is unable to meet its debt obligations for more than three consecutive months, it is considered insolvent and its unsecured outstanding debt is considered a loss to financial institutions.

The average period of unemployment is a critical factor in assessing whether a household will become insolvent. Consistent with historical evidence, the higher the unemployment rate, the longer the average period of unemployment will be. Our simulations assume that the duration of unemployment varies among households, following a chi-squared distribution.

The impact of a shock on the default rate

Our measures of vulnerability include the share of household income required to cover debt-service costs. In our estimation, households that devote more than 40 per cent of their income to servicing debt are far more vulnerable to shocks than those carrying a lighter debt load. The proportion of vulnerable households and their share of debt are measures of household vulnerability to external (economic or personal) shocks. These vulnerability measures are a useful summary statistic that is often reported in our stress tests, but they do not represent a direct measure of losses when a shock is realized.

To assess the impact of a shock on the financial system, we estimate the likely number of households that would be unable to meet their payment obligations in the event of a shock. In the June 2009 FSR, the Bank used the method set out above to determine the proportion of households that would become insolvent given a rise in the unemployment rate, as well as the share of debt incurred by such households. Based on these results, the share of unsecured debt owed by these households is calculated to estimate the losses that banks are liable to incur and their impact on Tier 1 capital (equation 8). Unsecured debt does not include mortgage loans, secured lines of credit, and other secured consumer loans.[14]

$$\text{Adjusted Tier 1 capital ratio} = \frac{\text{Tier 1 capital} - \text{Losses on unsecured loans}}{\text{Risk-weighted assets} - \text{Losses on unsecured loans}}. \quad (8)[15]$$

Conclusion

Microdata are a valuable source of information for assessing the risks associated with household debt. The Bank of Canada has been using microdata for several years as a

13 A future research objective is to adjust this distribution to stylized facts. We may assume, for example, that a negative shock to employment will have the greatest impact on low-income or younger workers.

14 Mortgages are excluded, since about half are insured, while the rest have a low loan-to-value ratio.

15 Levels of capital are assumed to increase at some rate before the shock occurs.

complement to its analysis based on aggregate data. This report presents methodological advances made by the Bank in using these data.

Examples of the shocks considered here demonstrate the possible applications of this framework. Of course, this type of tool continues to evolve and could be enhanced by a more refined representation of the economic behaviour of households. For example, certain random data draws could be governed by behavioural rules more in line with economic theory and the stylized facts. Our estimations of the parameters, by household class, using equations (6) and (7), are a step in that direction. We are currently enhancing the model by fleshing out the links between household characteristics and measures of vulnerability. There is also a need to refine the way income is determined. For income growth (equation 5), for example, we could estimate a structural equation.

Although this model is a simplified version of the real world, it nonetheless provides an innovative and promising means of studying household vulnerabilities and risks to the banking system. It is a flexible empirical tool that can be adapted to take into account a wide variety of alternative scenarios.

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Glossary

Readers wishing to access a more comprehensive list of financial and economic terms are directed to the Bank of Canada's online glossaries at <http://www.bankofcanada.ca/en/glossary/index.html>. Additional information on Canada's payment clearing and settlements systems is available at <http://www.bankofcanada.ca/en/financial/payments.html>.

Canadian Acronyms

B

BCAP: Business Credit Availability Program
A program administered by Export Development Canada and the Business Development Bank of Canada to improve access to financing for Canadian small and medium-sized businesses

C

CAAMP: Canadian Association of Accredited Mortgage Professionals
Association of professionals from the Canadian mortgage industry

CDCC: Canadian Derivatives Clearing Corporation
Issuer, clearing house, and guarantor of financial derivatives contracts traded on the Montreal Exchange

CDIC: Canada Deposit Insurance Corporation
A federal Crown corporation that insures specified deposits of Canadians in the event that their bank or CDIC member institution fails

CDOR: Canadian Dealer Offered Rate
The average rate for Canadian bankers' acceptances for specific terms to maturity, determined daily from a survey on bid-side rates provided by the principal market-makers, including the major Canadian banks. CDOR provides the basis for a floating reference rate in Canadian-dollar transactions analogous to the London Interbank Offered Rate.

CFEC: Canadian Foreign Exchange Committee
Committee composed of senior officials from financial institutions actively involved in the Canadian-dollar foreign exchange market, interdealer electronic and voice brokers, the Bank of Canada, and the Department of Finance

CFM: Canadian Financial Monitor
Survey on household balance sheets conducted by Ipsos Reid

CSA: Canadian Securities Administrators
Umbrella organization of Canada's provincial and territorial securities regulators to improve, coordinate, and harmonize the regulation of Canadian capital markets

E

ELA: Emergency Lending Assistance
Bank of Canada facility that provides funding for up to six months to members of the Canadian Payments Association that are solvent but facing serious and persistent liquidity problems

I

IIAC: Investment Industry Association of Canada
Association of firms from the Canadian financial services industry

IMPP: Insured Mortgage Purchase Program
A temporary program created in October 2008 by the Government of Canada to purchase insured residential mortgages from Canadian financial institutions

L

LVTS: Large Value Transfer System
An electronic system for the transfer of large-value or time-critical payments. Operated by the Canadian Payments Association and designated as systemically important under the Payment Clearing and Settlement Act.

N

NHA MBS: National Housing Act Mortgage-Backed Securities
Pools of amortized residential mortgages insured by the Canada Mortgage and Housing Corporation under the National Housing Act, carrying an unconditional guarantee provided by the Government of Canada of timely payment of interest and principal to the investor

O

OSA: Ontario Securities Act
Legislation regulating the underwriting and distribution of securities in Ontario

OSFI: Office of the Superintendent of Financial Institutions
A federal agency whose mandate is to supervise all federally regulated financial institutions, monitor federally regulated pension plans, and provide actuarial advice to the Government of Canada

P

PRA: purchase and resale agreement
An open market operation in which the Bank of Canada purchases securities from eligible counterparties with an agreement to resell those securities at a specified date in the future, with the price differential representing the implicit interest rate paid by the counterparty

S

SEDAR: System for Electronic Document Analysis and Retrieval
A filing system developed by the CSA to provide access to most public information filed by Canadian public companies and investment funds

SLF: Standing Liquidity Facility
Bank of Canada facility that provides access to overnight liquidity to direct Large Value Transfer System participants against a set of eligible collateral instruments

T

TLF: Term Loan Facility
A temporary Bank of Canada facility introduced in November 2008 that provides term lending to direct Large Value Transfer System participants against an assignment of their non-mortgage loan portfolios as collateral

TSX: Toronto Stock Exchange
Canada's primary stock exchange

Other Selected Abbreviations

A

ABCP: asset-backed commercial paper
A form of commercial paper whose value and income payments are derived from, and collateralized by, a specified pool of underlying assets

ABS: asset-backed security
A security whose value and income payments are derived from, and collateralized by, a specified pool of underlying assets

AIF: annual information form
A source of information on public companies and securities not included in prospectuses or annual financial statements

B

BCBS: Basel Committee on Banking Supervision
A forum for regular international co-operation on supervisory matters, served by a secretariat housed at the Bank for International Settlements

BIS: Bank for International Settlements
An international organization that fosters international monetary and financial co-operation and serves as a bank for central banks

C

CCP: central clearing counterparty
A process by which financial transactions are cleared by a central institution, which acts as a counterparty to both sides of a transaction; that is, as a seller to every buyer and a buyer to every seller

CGFS: Committee on the Global Financial System
A committee of the Bank for International Settlements charged with monitoring developments in the global financial system

CLS: continuous linked settlement
A multi-currency cash settlement system (supporting trades in 17 major currencies) designed to eliminate settlement risk for foreign exchange payment instructions. Designated as systemically important in Canada under the Payment Clearing and Settlement Act.

CP: commercial paper
Unsecured promissory note with a fixed, short-term maturity

CPSS: Committee on Payment and Settlement Systems
A committee of the Bank for International Settlements serving as a standard-setting body for payment and settlement systems and as a forum for central banks to monitor and analyze developments in this area

D

DSR: debt-service ratio
Payments of interest (and principal) on household debt as a proportion of income

E

ECB: European Central Bank
The institution of the European Union tasked with administering monetary policy in the euro area

EURIBOR: Euro Interbank Offered Rate
Benchmark interest rate used to gauge the cost of euro interbank term deposits within the euro area

F

FASB: U.S. Financial Accounting Standards Board
The organization that establishes financial accounting and reporting standards in the United States

FSA: Financial Services Authority
The regulator for the U.K. financial services industry

FSB: Financial Stability Board
Created in 2009 by re-establishing the Financial Stability Forum with a broadened mandate and expanded membership that includes the G-20, Spain, and the European Commission. The FSB is serviced by a secretariat housed at the Bank for International Settlements.

G

G-7: Group of seven industrialized nations (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States)

G-20: Group of twenty major economies (members are the G-7 plus Argentina, Australia, Brazil, China, India, Indonesia, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, and the current E.U.-presiding country)

GARCH: generalized autoregressive heteroscedastic model
An econometric technique that assumes that the variance of error terms is influenced by the magnitude of error terms in previous time periods

GDP: gross domestic product

GIC: guaranteed investment certificate
A senior investment security sold by banks and trust companies

H

HELOC: home equity line of credit
A line of credit extended to a homeowner that uses the borrower's home as collateral

I

IASB: International Accounting Standards Board
Standard-setting body responsible for the development of International Financial Reporting Standards

IMF: International Monetary Fund
An international organization working to foster global monetary co-operation, safeguard financial stability, facilitate international trade, promote high employment and sustainable economic growth, and reduce poverty around the world

IOSCO: International Organization of Securities Commissions
An international forum of securities regulators

ISDA: International Swaps and Derivatives Association, Inc.
Global trade association for institutions active in over-the-counter markets

L

LIBOR: London Interbank Offered Rate
Daily benchmark interest rate used to gauge the cost for banks to borrow unsecured funds from other banks in various currencies in the wholesale international money market

M

MC: Markets Committee
A committee of the Bank for International Settlements charged with monitoring developments in global financial markets

MD&A: Management Discussion and Analysis
A section of a company's annual report providing information not included in the financial statements

MSCI: Morgan Stanley Capital International
A provider of indexes on international equity markets

O

OIS: overnight index swap
Short-term interest rate swap where the reference interest rate is tied to an overnight interest rate (the Canadian Overnight Repo Rate Average in Canada). OIS is often used as a gauge of market expectations for future policy interest rates.

OTC: over-the-counter
A decentralized market (as opposed to an exchange market) where geographically dispersed dealers are linked by telephones and computers

R

RMBS: residential mortgage-backed securities
A type of asset-backed security where the underlying pool of assets is composed of residential mortgages

S

S&P: Standard & Poor's
A credit-rating agency

SEC: Securities and Exchange Commission
The regulator for capital markets in the United States

SIFI: Systemically important financial institution
Financial institution whose failure would cause widespread distress

T

TAF: Term Auction Facility
A temporary program created in December 2007 by the U.S. Federal Reserve to auction term funds to deposit-taking institutions

V

VaR: Value-at-Risk
A statistical estimate of the maximum probable loss over a given time horizon with a given level of confidence. Used extensively by banks to measure risk arising from trading activities.

VIX: Measure of implied volatility obtained from option contracts on the S&P 500 Index