



BANK OF CANADA

Financial System Review

June 2003

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Developments

and

Trends

Notes

The material in this document is based on information available to 10 June 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 of Canada, RBC Financial Group, Scotiabank, and TD Bank Financial Group.

Introduction

This section of the Financial System Review examines the recent performance of the Canadian financial system and the factors, both domestic and international, that are influencing it. In each issue, one or more subjects of particular interest are discussed as highlighted topics.

Key Points

- The Canadian financial system has continued to display impressive resilience in the face of global financial stress.
- Pressure on the financial positions of Canadian firms increased during the cyclical downturn, but the deterioration has been relatively modest, and firms have moved to strengthen their balance sheets.
- Several factors suggest that the financial environment is gradually improving.

The Canadian financial system has performed well despite the presence of global financial stress. During the past six months, global developments, such as the military conflict in Iraq, buffeted financial markets and have also contributed to the uncertainty associated with the world economic outlook. Projections for global economic growth this year have fallen relative to the expectations of late last year. In this difficult environment, the domestic financial system has behaved in a robust manner.

The impact of a challenging economic and financial environment on the financial system can be transmitted through a variety of channels. One is the deterioration in corporate credit

quality that has occurred over the current cycle, both here and abroad.

In the Canadian corporate sector, the extent of the financial challenges varies by industry; most recently, the airline and aerospace manufacturing sectors have come under increased pressure. In some sectors, these challenges are intensified by the potential financial demands arising from the need to increase contributions to corporate pension plans, as well as by the recent strong appreciation of the Canadian dollar. Nevertheless, the Canadian business sector as a whole has moved to contain its credit exposure and to strengthen balance sheets.

Despite the difficult global environment, there are some indications that, in recent quarters, the severity of the cycle in corporate credit quality has begun to diminish. As well, it appears that investors are becoming more willing to bear credit risk than they were in the second half of 2002. Finally, Canadian financial institutions, especially commercial banks, have recently reported improved financial results. This bodes well for the financial environment. Establishing a firm positive trend, however, remains dependent on a favourable economic outlook.

It is also important to act upon what has been learned from past shocks to the financial system. In particular, authorities in Canada and elsewhere have continued their efforts to bolster investor confidence by implementing reforms to corporate governance and addressing concerns surrounding corporate financial statements. Although the impact of these endeavours is difficult to assess, the trend towards improved financial disclosure by firms is welcome.

Highlighted Issues

Financial Developments in the Corporate Sector

The challenging global economic environment of the past few years has placed the financial health of the Canadian corporate sector under pressure.¹ This can have wide-ranging implications for the financial system. For example, broad-based declines in equity prices (Chart 1) reduce the wealth of equity holders and can also lead to investment losses for a range of financial institutions. Defaults by corporations (e.g., on their bonds or bank loans) may lead to significant losses among financial system participants. This section highlights the pressures on corporate balance sheets that have emerged globally and, more specifically, within Canada.

Global evolution of corporate credit quality

Associated with the stress on firms' financial positions is the marked cycle in credit quality that has emerged both globally and in Canada. Past economic and financial shocks (e.g., the telecom bubble and breakdowns in corporate governance), together with a sluggish global economy, have increased pressure on firms, which is reflected in relatively high rates of default on corporate bonds and downgrades to credit ratings.

On a global basis, both the number and value of defaults on corporate bonds rose to unprecedented levels in 2002 (Chart 2). For both 2001 and 2002, the default rate (newly defaulted debt relative to total rated debt) has exceeded the previous peak reached in the early 1990s (Chart 3). An unusual feature of the current credit cycle is the relatively large number of companies that were rated "investment grade" at the beginning of the year that subsequently defaulted on their bonds.² Some of these companies were the subject of corporate governance and accounting scandals. Some defaults also

1. For a summary of recent economic and financial shocks, see the December 2002 *Financial System Review*.
2. The probability that an issuer would default when rated as investment grade is traditionally extremely low. Note, however, that the default rate on speculative-grade issues alone has not reached the previous peak set in 1991.

Chart 1 Equity Indexes

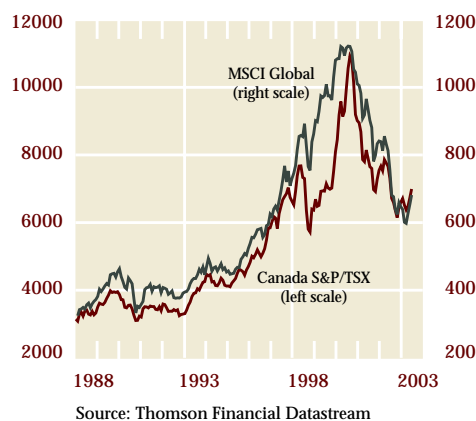


Chart 2 Global Corporate Defaults

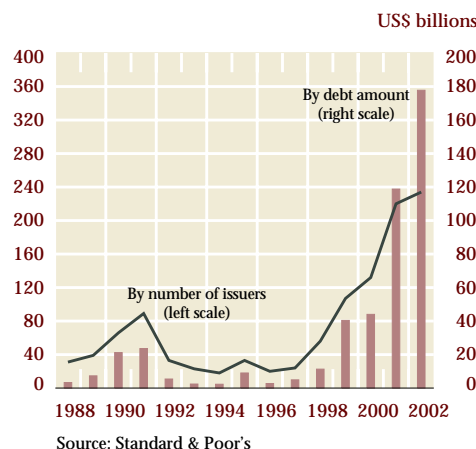


Chart 3 Rate of Global Corporate Defaults

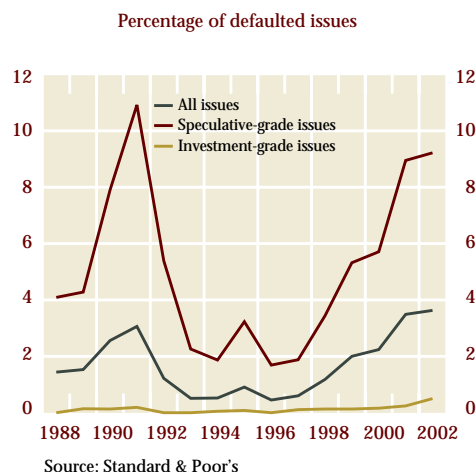
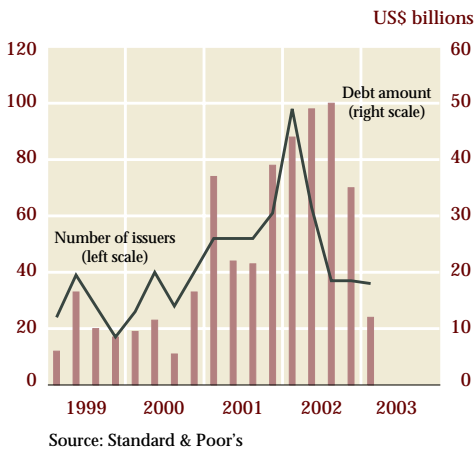
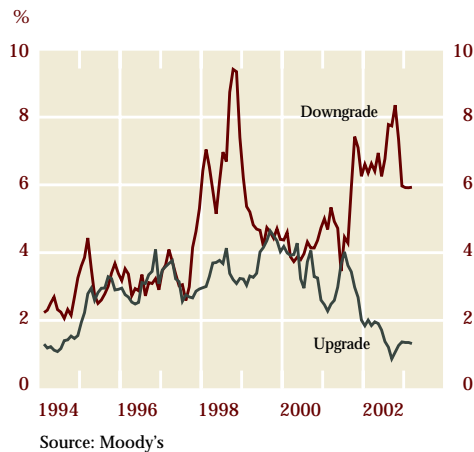
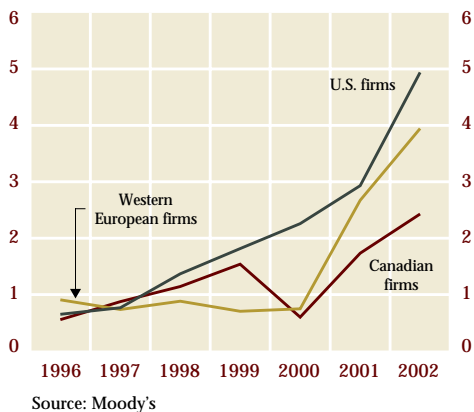


Chart 4 Global Corporate Defaults: Quarterly**Chart 5 Global Rating Reviews****Chart 6 Corporate Credit Ratio: Downgrades/Upgrades**

involved triggers in companies' debt covenants (e.g., provisions that, in specified circumstances, can trigger calls on firm liquidity, such as the early repayment of bank loans), which has led to closer examination of these provisions by market participants and credit rating agencies.

In the first part of 2003, although corporations worldwide have continued to show signs of financial stress, indications emerged of a slowing in the pace of deterioration in credit quality (consistent with the decline in spreads on high-yield corporate bonds). In particular, the number and value of global corporate defaults declined from previous quarters (Chart 4). The global credit ratio—the number of rating downgrades per upgrade—for all financial and non-financial issuers fell to 4.7 in the first quarter of 2003 from 5.9 in the previous quarter.³ Nevertheless, the proportion of firms whose ratings remain under review for a potential downgrade is relatively high, particularly when compared with the number of firms whose ratings may be upgraded (Chart 5).

The deterioration in credit quality of Canadian firms appears to have been less severe than that experienced in the early 1990s and in comparison to that of firms in other regions (Chart 6). A relatively strong macroeconomic performance, including well-sustained aggregate corporate profit levels over the current cycle, contributed to this outcome. The pace of rating downgrades among Canadian issuers has not yet shown a clear tendency to decline, however (Chart 7), with telecommunication companies continuing to figure prominently among firms whose credit ratings have been lowered. Also in early 2003, a relatively large proportion of Canadian-rated issues remained under review with negative implications or held a "negative outlook" (about 30 per cent, based on data from Standard & Poor's).

The cyclical deterioration in credit quality in North America is also reflected in the loan books of Canadian banks. The major banks have increased their provisions for loan losses, although, aided by the less-severe domestic credit cycle, measures of loan quality have not deteriorated to the levels observed at the beginning of the 1990s (Chart 8). In the first part of 2003, the pace of new provisions declined. Banks have stressed that the deterioration in the

3. These figures are from Standard & Poor's.

quality of their loan portfolios has been concentrated in their corporate loan book (especially in their foreign corporate exposure), and several have announced plans to de-emphasize their involvement in corporate-lending activities, over time.

Financial leverage of Canadian firms

A traditional measure of corporate financial health is the corporate debt-to-assets ratio. Over the recent period, the ratio of debt to assets for Canadian non-financial firms has remained at favourable levels compared with earlier periods (Chart 9). Alternative measures of financial leverage include (non-financial) corporate debt relative to GDP or business cash flow. These measures indicate that the aggregate debt load of firms has declined in recent quarters, consistent with efforts to restructure their overall balance sheets (Chart 10). Nevertheless, the ratio of debt to GDP remains high relative to historical experience, although on the basis of the ratio of debt to cash flow the current cycle is less severe than earlier episodes.

One key issue is the ongoing capacity of corporations to service their debt in the present environment. The debt-service ratio (interest costs as a per cent of corporate profits) has remained at relatively low levels since the mid-1990s (Chart 11). The current level of the debt-service ratio has been favourably influenced by the lower level of market interest rates and the sustained high level of profits relative to earlier years. In some instances, firms have attempted to reduce their sensitivity to short-term movements in interest rates by increasing the proportion of their debt in longer-term instruments (at relatively favourable interest rates).

The changing environment is reflected in the growth of business credit, which has slowed substantially since 2001 (Chart 12).⁴ The demand for credit has diminished as firms have sought to manage their financial exposure in the context of weaker global economic growth and an uncertain business environment. Firms have curtailed investment plans, including merger and acquisition activity and, in some

4. Over the longer term, there have been substantial shifts in the composition of credit extended to Canadian corporations, an area explored in Engert and Freedman (2003).

Chart 7 Number of Credit Rating Downgrades: Canada

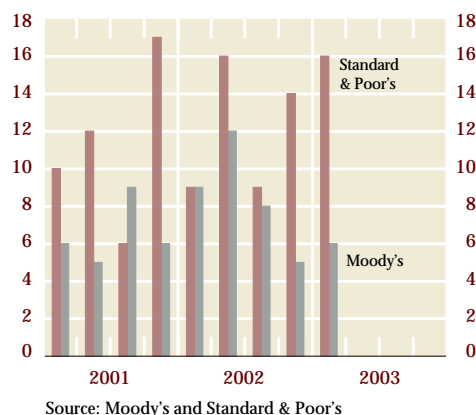


Chart 8 Major Canadian Banks: Asset Quality

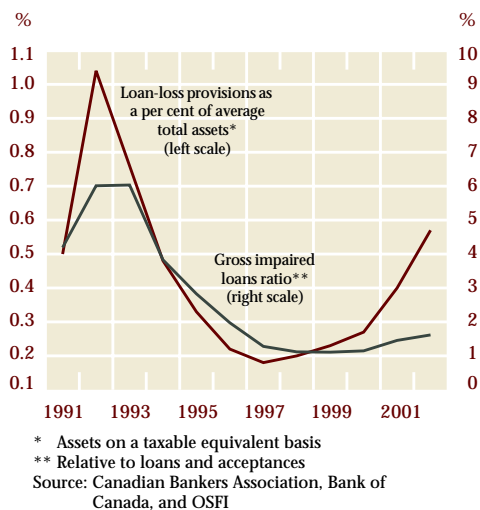


Chart 9 Corporate Leverage: 1

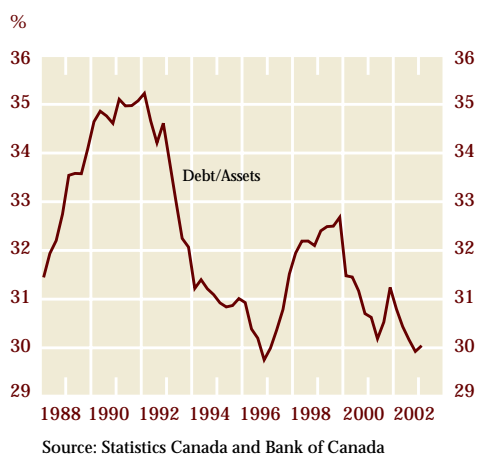
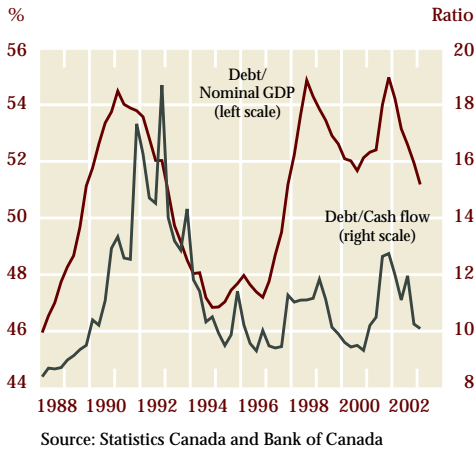
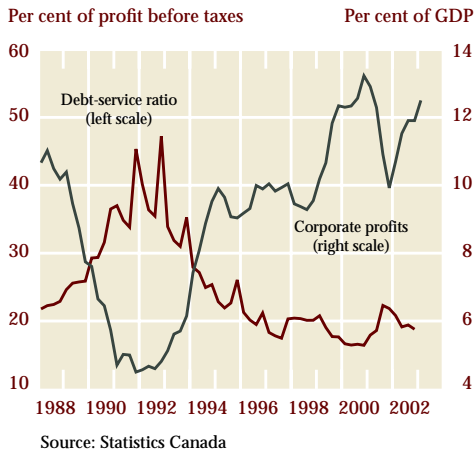
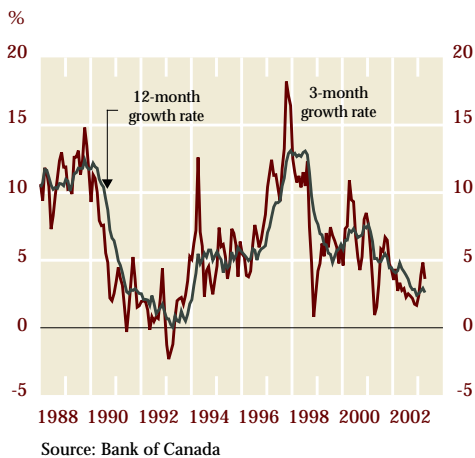


Chart 10 Corporate Leverage: 2**Chart 11 Debt Service****Chart 12 Growth in Total Business Credit**

cases, have relied more heavily on internal cash generation. As credit quality diminished and uncertainty increased, the supply of credit from lenders has also been more constrained, presenting some firms with tighter credit conditions and increased pressure to strengthen their balance sheets.

The impact on business credit has been most evident in short-term credit, which has declined in absolute terms (Chart 13). In a pattern similar to that observed during the cyclical slowdown in the early 1990s, bankers' acceptances and commercial paper outstanding, a significant source of short-term credit for firms, has fallen.⁵

An important caveat, however, is that rapid financial innovation has complicated the assessment of different forms of lending. For example, loan syndications and securitized instruments fall somewhere between the more traditional loans from financial institutions and bond issues (from financial markets).⁶ The increasing use of alternative sources of financing can make it more difficult (at least temporarily) to track and evaluate firms' reliance on debt. Yet in the current uncertain environment, the added flexibility created by these sources of financing has likely benefited firms (and lenders), allowing them to more carefully align their debt exposure with their current economic circumstances.

Corporate pensions

Other sources of stress on corporate balance sheets have also emerged. The persistent weakness in stock markets has significantly undermined the financial health of corporate pension plans in aggregate, both in Canada and elsewhere. The unfunded portion of corporate pension plans represents a potential claim on the cash flow of corporations, although the magnitude and timing are often unclear. Among the countries most heavily affected are Canada, the United Kingdom, and the United States.

5. A more dramatic contraction has occurred in the U.S. commercial paper market. For a discussion of the elements underlying this phenomenon, see Shen (2003).
6. For more on loan syndication and securitization, see the articles in this *Review* by Armstrong (p. 69) and Toovey and Kiff (p. 43)

Pension liabilities have traditionally received only limited attention in assessments of a firm's current and future financial health. But they (possibly in conjunction with additional post-retirement obligations, such as medical expenses) can interact with other elements to make a difficult situation worse. Credit rating firms have increasingly focused on their potential impact, citing pension liabilities as a significant factor in the placement of a number of firms on credit rating review and in some recent credit rating downgrades.

Several recent reports have attempted to estimate the overall funding gap (the difference between the market value of plan assets and actuarially calculated liabilities), usually based on firms' published financial accounts. Since any financial analysis of pensions will be based on various assumptions, the results must be treated with caution. Nevertheless, they describe a deterioration in the current aggregate financial position of company pension plans, owing to market developments.

For example, Credit Suisse First Boston (CSFB) and Standard & Poor's analyzed the companies included in the S&P 500 index that have defined-benefit pension plans. They estimated a net deficit position in excess of US\$200 billion at the end of 2002 (Chart 14).⁷ A significant portion of the underfunding is concentrated in certain industries; for example, those with relatively "mature" plans, where significant payouts are likely to occur at an earlier stage (e.g., the North American automotive sector, Chart 15).

Information available on the aggregate position of Canadian corporate pension plans paints a picture similar to that in the United States. Aggregate funding positions have moved to a net deficit in 2002 from a roughly neutral position in 2001 and a net surplus at the end of 2000. One recent survey of 104 Canadian companies with defined-benefit pension plans indicated an overall funding deficit of about Can\$19 billion in fiscal 2002, with approximately three-

Chart 13 Short-Term Business Credit

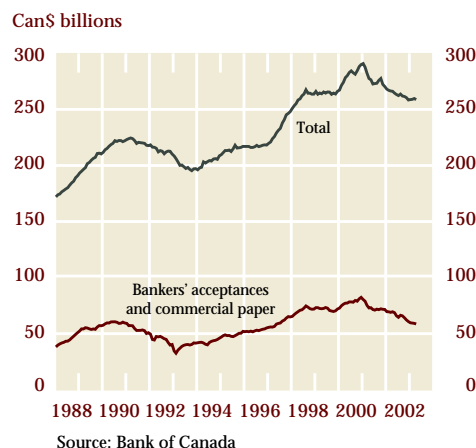
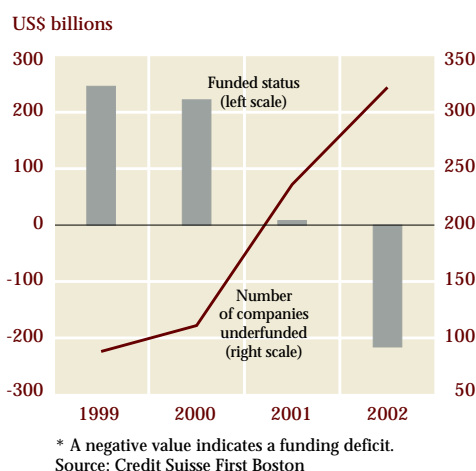
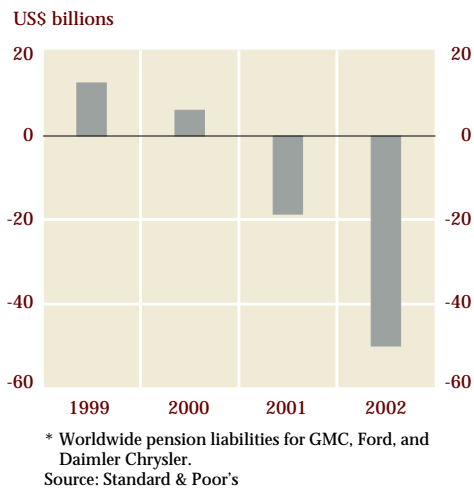
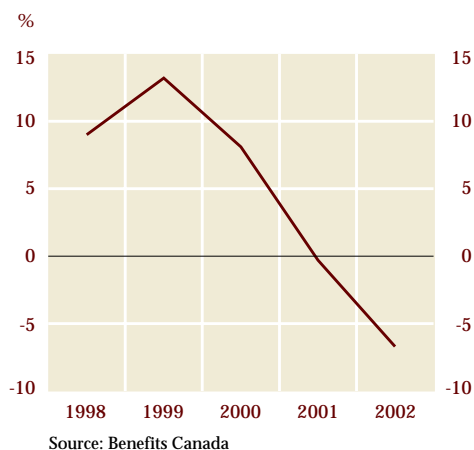


Chart 14 Status of Pension Funding: U.S. Firms*



7. CSFB estimated a net deficit of US\$216 billion at the end of 2002, and Standard & Poor's estimated US\$206 billion. For a larger number of companies, the head of the U.S. Pension Benefit Guaranty Corporation indicated that underfunding exceeded US\$300 billion in 2002.

Chart 15 Pension Fund Status of Major North American Automakers***Chart 16 Average Rate of Investment Return: Major Canadian Pension Funds**

quarters of the plans in an underfunded position.⁸ This was primarily attributable to declining asset values. The funding position for the same set of companies in fiscal 2001 was a net deficit of about \$1 billion.⁹ The overall rate of return on major public and private Canadian pension funds fell sharply in 2002 (Chart 16).

A key issue is the impact of these developments on the magnitude and timing of firms' cash contributions to their pension plans, which potentially represents a significant drain on their financial resources. Estimated shortfalls do not have to be met immediately. In practice, firms' contributions will be influenced by a number of factors, including their financial objectives, regulatory requirements, and changes to the market value of plan assets and estimated pension liabilities.

Evidence from the United States and the United Kingdom, however, points to a significant increase in employer pension contributions in both countries. For example, CSFB calculated that U.S. firms tripled the amount they paid into pension plans in 2002 (to US\$46 billion). While some of this may have been in response to regulatory requirements, a significant portion was likely voluntary (perhaps in response to market commentaries or to pressure on credit ratings). A number of Canadian firms also increased their contributions to company pensions in 2002, and some have announced that there will be further increases this year.

Corporate governance

Corporate financial statements continue to evoke concern on the part of investors, owing to a heightened awareness of their limitations (Box 1). Authorities in Canada and elsewhere have continued their efforts to bolster confidence (and, indirectly, firms' access to capital) by implementing reforms to corporate governance and improving the reliability and transparency of corporate statements.

8. As reported in *The Globe and Mail*, 12 May 2003. Another survey, covering a somewhat different group of companies, was reported in *The National Post*, 3 May 2003.

9. For U.K. companies, one estimate suggests that the aggregate deficit was approaching £100 billion as of early 2003.

In the United States, the Securities and Exchange Commission (SEC), in its continuing response to the requirements of the Sarbanes-Oxley Act, adopted a set of new rules in January 2003 that cover corporate disclosure, auditing, and conflicts of interest. In April, the SEC approved new audit committee rules. The U.S. Public Company Accounting Oversight Board is also becoming more active, examining, for example, issues such as the impact of tax work by accounting firms on auditor independence.

International efforts to harmonize accounting standards also continue. The International Accounting Standards Board is addressing a wide range of accounting issues and is currently proposing new financial reporting rules for derivatives. Progress is also being made in Canada, where the directors of the new Canadian Public Accountability Board have recently been named (Box 2).

The impact of the efforts made to date is difficult to assess. New revelations on the extent of past corporate malfeasance and new questionable activities (such as those associated with the firms Healthsouth and Ahold) work against short-term improvements. At the same time, it is clear that firms in Canada and the United States are generally improving disclosure in their financial statements, and the boards and audit committees of firms are becoming more active. This suggests that prospects for improving investor confidence over time are reasonably good.

Conclusion

The heightened financial difficulties of corporations have contributed to losses for a range of investors and financial institutions. The deterioration in global credit quality has been significant, with the need for many firms to strengthen their pension plans emerging as an additional source of financial stress. However, the current credit cycle has been less severe in Canada than elsewhere. Measures of corporate leverage have improved in recent quarters and, on the whole, compare favourably with those of earlier periods. In the current environment, Canadian firms have worked to contain their debt loads, and debt-servicing burdens remain relatively low. While performance varies across industrial sectors, the Canadian corporate sector in aggregate remains well positioned to address ongoing financial challenges, supported by

Box 1

Pitfalls in Assessing Financial Statements

The choices available to businesses when preparing financial reports are numerous and can materially affect the financial statements of a firm. For example, companies owning fixed assets must depreciate those assets to reflect wear and tear over time. But a business can choose from a number of methods when calculating this annual depreciation, and that choice can lead to either higher or lower asset values and profits in the near term. Likewise, manufacturing businesses have several methods for valuing inventories that can materially affect their value on the balance sheet. Other major areas where choices are available include the accounting methods used to value leases, deferred revenues, financial investments, pension liabilities, intangible assets, and deferred tax assets or liabilities. Thus, judging the economic value of balance-sheet items based on their accounting value can be a difficult and somewhat subjective process.

Another pitfall in assessing financial statements concerns off-balance-sheet items. Over the last two decades, financial innovations in capital markets have created a number of techniques that companies can use in managing their balance sheets more proactively. Businesses can monetize assets on their balance sheet through securitization, enter into financial contracts not recorded on the balance sheet through the use of contracts involving derivatives, and enter into non-arm's-length transactions with related entities through the use of special-purpose entities or unconsolidated subsidiaries. Pension liabilities are another major source of exposure that are usually not on the balance sheet. Instead, these types of transactions are generally disclosed in the footnotes to the financial statements, even though their impact on the financial position of a company may be significant.

Accounting rules and principles are continuously evolving, and these changes may affect the valuation of a firm. Changes to accounting principles may be driven by financial innovations such as the growth of derivatives; new business practices, such as the growth of employee stock-option schemes; or by financial scandals such as the Enron or WorldCom debacles.

Box 2**Corporate Governance and Accounting Reforms in Canada: An Update**

Canadian authorities are continuing to implement enhancements to corporate governance and accounting standards aimed at supporting investor confidence.¹ Regulators in Canada have been monitoring the outcome of recently enacted U.S. reforms, many of which are being driven by the far-reaching Sarbanes-Oxley Act, passed in mid-2002. The announced intent is to put in place appropriate safeguards that reflect Canada's differing market structure and regulatory and legal systems. The following are highlights of recent and pending initiatives.

Based on powers recently granted in the Securities Act, the Ontario Securities Commission (OSC) has announced its intention to bring in rules that would require certification of financial statements by CEOs and CFOs. The legislation also grants the OSC rule-making authority over audit committees. The OSC will also introduce rules with respect to the independence of audit committees of public companies.

In December 2002, the Accounting Standards Board (AcSB) issued for comment proposed standards that would require the recognition of an expense for all employee stock-based compensation transactions, including the issuance of stock options.

The new Auditing and Assurance Standards Oversight Council (AASOC), which was established in late 2002, began operations in March of 2003. The role of this independent body is to oversee the Assurance Standards Board, which establishes auditing rules in Canada.

The Canadian Public Accountability Board (CPAB), first announced in July 2002, is currently being staffed and should be in full operation in the near future. It has far-reaching powers to oversee audit firms. Gordon Thiessen, former Governor of the Bank of Canada, will serve as founding Chair of the CPAB.

On 24 January 2003, the Office of the Superintendent of Financial Institutions (OSFI) released a new guideline on corporate governance for federal financial institutions. The guideline provides information to the boards of directors and management of federally regulated financial institutions on corporate governance and the factors OSFI takes into account in assessing the quality of governance at each institution.

In its 18 February budget, the federal government announced that it will propose actions to strengthen the corporate governance standards in the Canada Business Corporations Act and financial institution statutes. Many of Canada's largest corporations fall under the provisions of this Act.

Since the beginning of 2003, the Standing Senate Committee on Banking, Trade and Commerce has been carrying out a series of hearings on corporate governance to assess whether federal legislation is necessary in this area.

In April 2003, the AcSB released proposed new standards that would require all financial instruments (including derivatives) to be reported on a company's balance sheet at "fair value" or, in limited circumstances when fair value may not be the most appropriate, at cost. The proposed guidelines also specify when gains and losses as a result of changes in fair values are to be recognized in the income statement.

Also in April, the Investment Dealers Association of Canada approved new rules to manage conflicts of interest involving research analysts, especially with regard to the relationship between the investment banking and research areas of an investment dealer.

On 7 May 2003, the Canadian Institute of Chartered Accountants (CICA) issued new guidance to help improve Management's Discussion and Analysis (MD&A) disclosures about off-balance-sheet arrangements and related exposures.

1. See the December 2002 *Financial System Review* (Box 2, page 9) for an earlier summary.

broad-based efforts to bolster confidence in financial statements.

The Macrofinancial Environment

Although geopolitical uncertainties have eased with the end of the war in Iraq, significant global economic uncertainty remains over the near term. The situation in Asia has been further clouded by the outbreak of Severe Acute Respiratory Syndrome (SARS).

Global Environment

Expectations regarding the strength of the global economic recovery have been reduced in recent quarters. Consensus projections for growth in 2003 in the industrialized economies have been lowered substantially since mid-2002 (Chart 17). The sluggish global economy and geopolitical uncertainties are reflected in weak international air passenger and freight volumes (Chart 18). The air traffic of Asian carriers had previously remained comparatively robust, but has suffered in response to SARS. Nevertheless, recovering consumer confidence in some key regions and lower oil prices are positive signs for the economic outlook.

Fears of supply disruptions in the Middle East, in addition to a temporary disruption of oil exports from Venezuela and the drop in U.S. oil stocks, contributed to a marked rise in crude oil prices between mid-November and mid-March. With the easing of the threat of long-lasting disruptions to Iraqi oil production, crude oil prices have subsequently fallen back (Chart 19).

Emerging markets

The economic performance of emerging markets (particularly those in Latin America) continues to be hampered by the effects of the financial crises that have occurred in recent years (Chart 20). These crises have stimulated efforts to prevent and resolve them. The G-7 group of countries have been at the forefront of ongoing work in this area (Box 3).

Although weakness in the United States and other major economies has hurt the exports of emerging markets, heavily indebted emerging economies have benefited from low global interest rates and renewed investor interest in riskier assets. Equity markets in a number of

Chart 17 Evolution of Consensus Growth Estimates for 2003

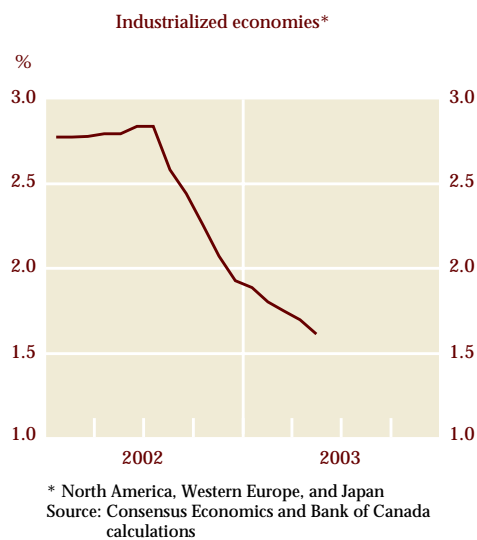


Chart 18 International Air Traffic by Carriers Registered in Indicated Region

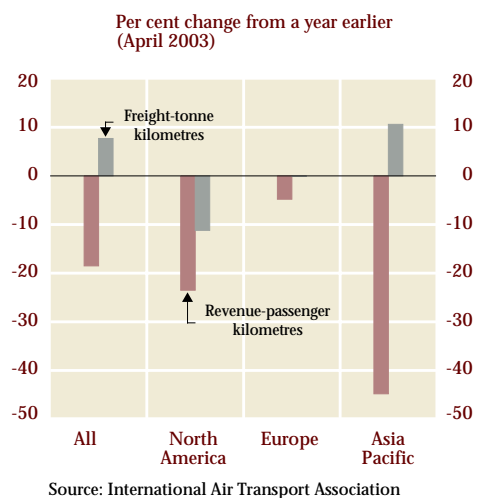
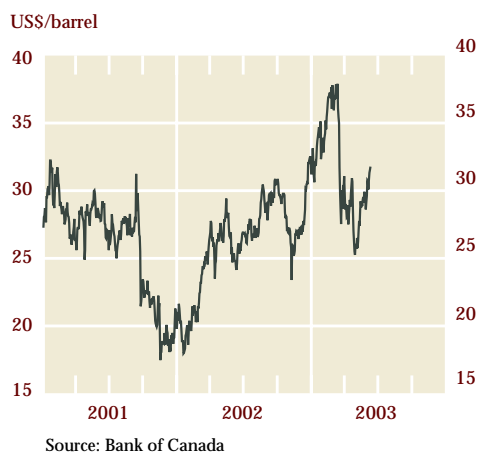


Chart 19 Crude Oil Prices



Box 3

The Prevention and Resolution of International Financial Crises: A Status Report on G-7 Initiatives

Since the Mexican peso crisis in 1995, the Group of Seven countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) have worked to bring about macroeconomic and institutional changes that would reduce the likelihood of international financial crises and help resolve, in an orderly and timely fashion, those crises that do occur. These efforts were given renewed impetus by a string of financial crises in emerging markets that began with Asia in 1997–98. These crises led to a sharp contraction of output in many of the affected economies and put strains on the international financial system.

One aspect of this work involves efforts to prevent the economic and financial imbalances that can lead to crises, through better domestic policies and through IMF economic “surveillance.” Another aspect recognizes that the current approach to crisis management, involving international financial assistance, must be supported by tools and incentives for countries and their creditors to negotiate a restructuring of claims, if necessary.

In April 2002, G-7 finance ministers and governors released an Action Plan that outlined four priorities for further work in this area. The first priority involved efforts to strengthen IMF surveillance. The second was an agreement on the need to limit official financing, so that large assistance packages do not substitute for the negotiated restructuring of debt. The last two priorities were aimed at providing the tools to facilitate these restructuring efforts. This entailed (i) studying a proposal made by senior IMF officials for a Sovereign Debt Restructuring Mechanism (SDRM) that would create a formal process for the restructuring of sovereign debts, analogous in some respects to domestic bankruptcy legislation; and (ii) encouraging the use of collective-action clauses, which facilitate the renegotiation of bond covenants by providing for the modification of repayment terms when supported by a qualified majority of investors, rather than requiring the unanimous consent that may be very difficult to achieve.

Over the last year, the G-7 has worked in cooperation with other international bodies, private

sector groups, and international financial institutions to advance these priorities. These efforts are documented in the *Update to the Action Plan*, released in April 2003. Ministers and governors took note of the important progress made in terms of improving the IMF’s surveillance and the strides made by many emerging markets to improve banking supervision, increase transparency, and strengthen debt-management practices. They also underscored the need for greater discipline in the provision of official financing, the availability of which can affect the incentives of both borrowing countries and creditors. Accordingly, while existing limits on normal access to IMF resources were reaffirmed, future requests for exceptional access will trigger a series of procedures that, in the context of specified criteria, will require substantial justification for access above normal limits.

Steps have also been taken to facilitate debt restructuring in the event that a country’s debt load were to become unsustainable. The G-7 noted that the inclusion of collective-action clauses in recent Mexican bond issues is a significant step forward. More recently, several other countries have also gone to the market with bonds featuring these clauses. In addition, the G-7 acknowledged that voluntary codes of good conduct could play a useful role in debt-restructuring negotiations by fostering an environment conducive to the timely, orderly resolution of financial crises. Over the next several months, the official community will be working with the private sector on a common approach towards codes of good conduct.

Finally, ministers and governors reviewed the analysis and consultations undertaken in the course of the IMF’s work on the SDRM, which has greatly increased the official sector’s understanding of sovereign debt crises. Given the inclusion of collective-action clauses in bonds issued by a number of countries, as well as the interest in a code of good conduct, they agreed that it was not feasible to proceed with a formal SDRM proposal at the present time. However, work on issues of general relevance to crisis resolution will continue.

emerging-market economies have improved in recent months (Chart 21). In addition, sovereign spreads have declined from the recent peak reached in October 2002 (Chart 22), supported by positive developments in Brazil and stabilization in Argentina.

Venezuela is an exception to this more positive picture. Partly owing to the depressing effect of a strike on economic activity, GDP has contracted sharply on a year-over-year basis. Remarks from some of the country's officials suggest that a restructuring of Venezuela's external debt is possible in the coming months.

The SARS outbreak will dampen activity in most economies of Emerging Asia this year, with an expected reduction in growth of 0.5 to 1.0 per cent on average, assuming rapid containment of the disease.¹⁰ Nevertheless, some countries in the region could experience a reduction in growth of as much as 2 percentage points. These estimates will likely be revised as the situation evolves. The fall-off is most noticeable in the tourism (travel and hospitality) and retail trade sectors but is also affecting normal business practices, as business travel and spending decisions are deferred. Reduced economic activity, financial aid for affected businesses, and increased health spending will worsen most fiscal accounts. However, some of the economic consequences might be mitigated if pent-up demand emerges after SARS is contained.

Europe and Japan

In Europe, growth in economic activity remains below expectations. Tepid economic activity has led to a deterioration in European public finances (Chart 23). In January, Standard & Poor's lowered the outlook on Italy's sovereign debt from stable to negative, citing the country's failure to address budgetary imbalances with lasting structural measures. Based on current fiscal policy measures, the European Commission believes that the 2003 deficits of France and Germany could exceed the Stability and Growth Pact's ceiling of 3 per cent of GDP.

In an environment of weak economic conditions and declining equity prices (Chart 24), the European corporate sector is experiencing continued pressure. The credit ratio—the ratio

Chart 20 Evolution of Consensus Growth Estimates for 2003

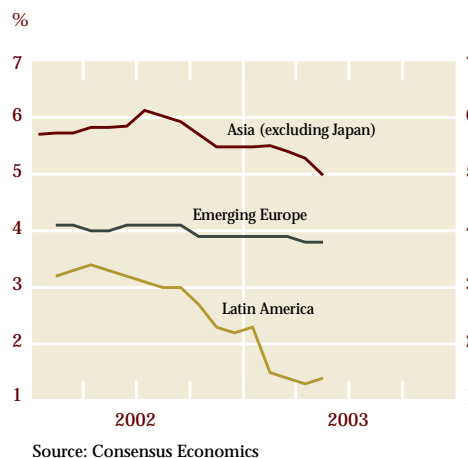


Chart 21 Stock Market Indexes (US\$)

Indexed to 1 January 2002 = 100

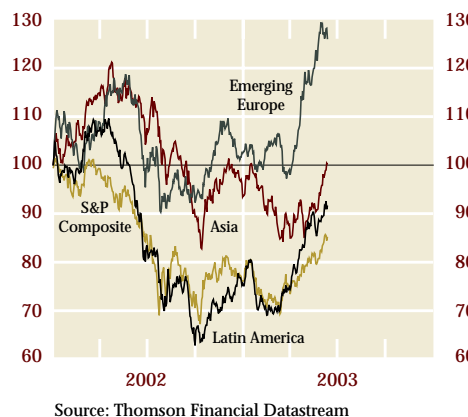
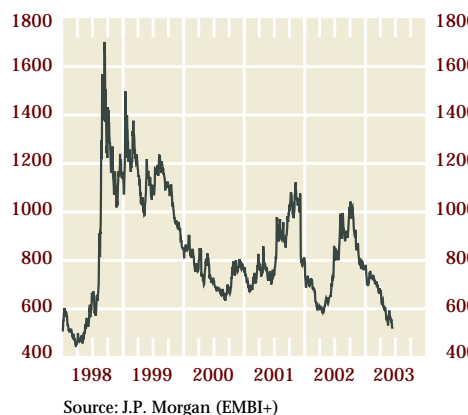


Chart 22 Emerging-Market Bond Index

Basis points



10. This range from the International Monetary Fund is at the upper end of estimates of the economic impact that SARS will have on East Asia and China.

Chart 23 Government Budgetary Balance

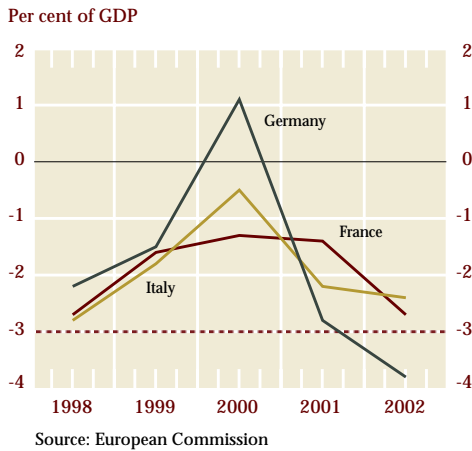


Chart 24 Stock Market Indexes

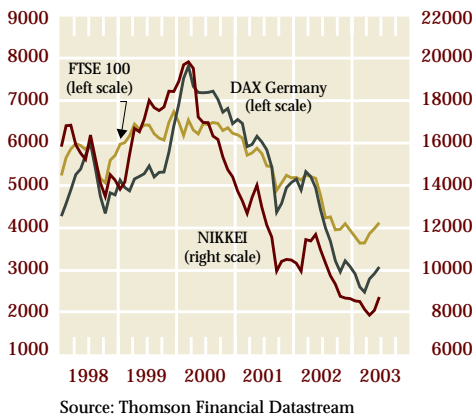
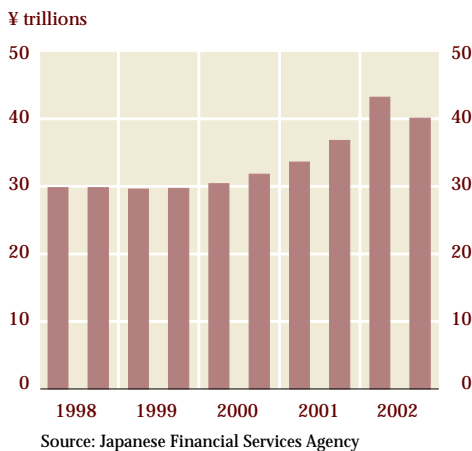


Chart 25 Japan: Non-Performing Loans Held by All Banks



of credit rating downgrades per upgrade—rose to 20.5 in the first quarter of 2003 from 16.3 in the fourth quarter of last year.¹¹ Insurance companies, banks, and utilities are among the sectors most affected. Citing concerns over unfunded pension liabilities, credit rating agencies have lowered the ratings of some large European corporations and are reviewing the ratings of other companies for possible downgrading.

European banks, particularly those in Germany, have moved to cut costs in an effort to raise profitability. Recent losses at some banks resulted from restructuring charges and writedowns of goodwill. In addition, some banks have faced losses from their insurance subsidiaries.

In Japan, near-term prospects for growth remain relatively poor, reflecting low confidence levels, structural difficulties, and weak external demand.

Efforts to revitalize the country's banking and corporate sectors are proceeding. In recent months, Japan's four largest banks unveiled measures to increase their capital. Despite sizable writedowns, the recent inspections carried out by the Financial Services Agency (FSA) revealed new non-performing loans (Chart 25). As a result, banks are under increased pressure to make additional loan-loss provisions. To maintain capital-adequacy ratios, fresh injections of capital may be required. Indeed, in mid-May the FSA announced that it would provide support of ¥2 trillion (about Can\$23 billion) to a large, domestically oriented bank (Resona Bank).

In March, the Bank of Japan announced that it would raise its purchases of equities held by banks by ¥1 trillion, to ¥3 trillion, to reduce their vulnerability to further falls in share prices. Market perceptions of Japanese banks, reflected in their share prices, remain generally negative (Chart 26).

The creation of the Industrial Revitalization Corporation (IRC) received final approval from the Diet on 2 April. Beginning operations in May, it is scheduled to remain active for a period of five years. The IRC aims to clear non-performing loans off the books of banks by helping major lenders to take over debt-laden corporate borrowers that are deemed to have some hope of recovery. If the IRC assessment is that a

11. These figures are from Standard & Poor's.

company can be turned around, it will use public funds to buy out lenders other than the “main bank.” The IRC and the main bank will then have three years to restructure and sell the company, allowing the bank to clear the loan from its books.

United States

Real economic activity in the United States grew modestly in the first quarter of 2003 (Chart 27). Uncertainty surrounding economic conditions and concerns about the effects of the war with Iraq affected both consumer and business confidence. Businesses were very cautious about their investment plans, and consumers moderated their spending. However, the latest indicators point to a recovery in consumer confidence since the end of the war, which could help support a firming in growth.

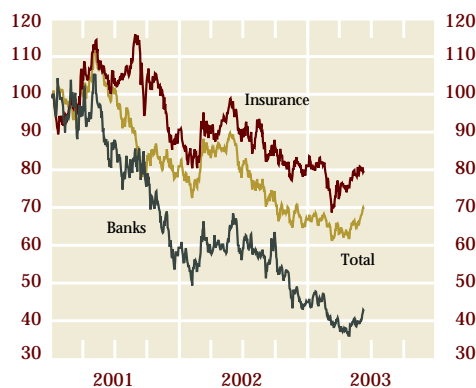
U.S. corporations are striving to improve their balance sheets. Although corporate debt remains elevated as a proportion of cash flow, it is fairly low as a proportion of corporate assets. Long-term liabilities as a proportion of total corporate debt have increased, as firms seek to lock in low interest rates. Overall, interest payment ratios have declined (Chart 28). Corporate earnings have recently shown positive growth, but some firms face a drain on financial resources from underfunded pension plans.

U.S. consumers remain highly indebted, although some of the recent increase reflects a rise in the rate of home ownership. Debt-servicing ratios are high by historical standards, but, aided by the decline in interest rates, they have decreased somewhat. Adverse shocks to household income or wealth could still pose a risk to consumption.

Despite weaknesses in some business lines, U.S. banks continue to maintain strong profitability owing to the beneficial effects of low interest rates on the financial health of borrowers and sustained demand for consumer loans. The return on assets made by U.S. banks in 2002 rose to record levels, eclipsing the previous high set in 1999 (Chart 29). Strong profitability extended into the first quarter of 2003, with the pace of additions to loan-loss provisions diminishing. The strong financial position of U.S. banks has facilitated the relatively prompt recognition of losses.

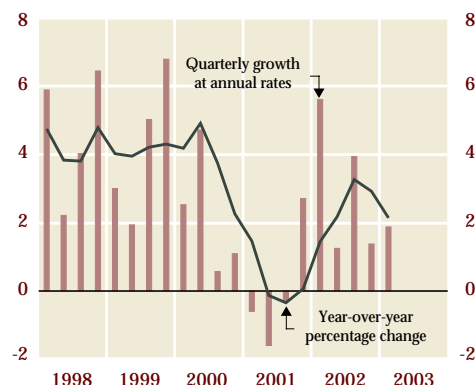
Chart 26 Japan: Equity Prices (Nikkei)

Indexed to 2 January 2001 = 100



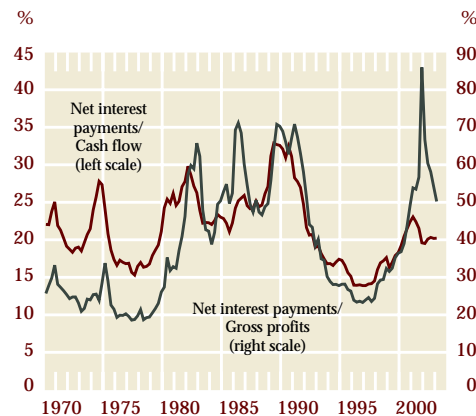
Source: Thomson Financial Datastream

Chart 27 Real GDP Growth: United States

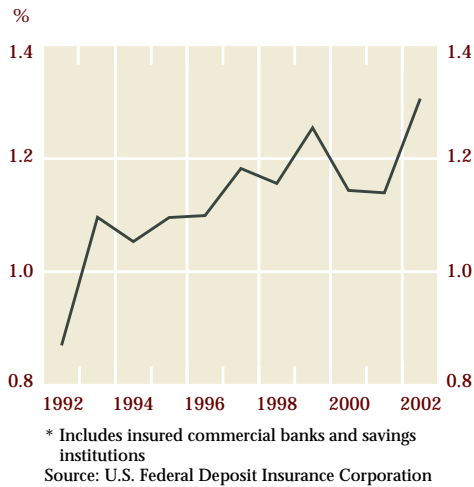
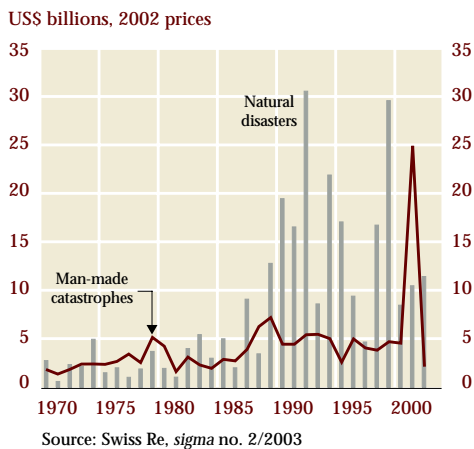
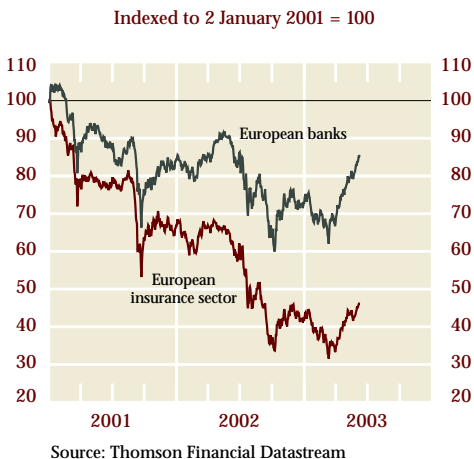


Source: Thomson Financial Datastream

Chart 28 Net Interest Payments



Source: U.S. Federal Reserve and Bureau of Economic Analysis

Chart 29 Return on Assets: All FDIC-Insured Institutions***Chart 30 Insured Losses****Chart 31 Equity Prices for European Financial Institutions**

In late April, a number of large U.S. investment banks reached a major settlement with U.S. securities regulators with respect to enforcement actions over conflicts of interest. Together, they will pay US\$1.4 billion, of which a significant portion will be used to restructure and improve the independence of their investment research. It is difficult, however, to evaluate the potential future costs facing U.S. financial institutions arising out of further litigation associated with past governance scandals and their possible contribution to, and liability for, investor losses. Investment banks will face further challenges over their handling of equity research and the allocation of initial public offerings, as well as their involvement with specific firms (e.g., Enron). Some investment banks have made specific provisions for anticipated litigation costs.

Global insurance sector

The global insurance industry has seen its financial performance affected by the shocks that have adversely affected the global economy. After a decade of elevated losses from natural disasters, the 11 September 2001 terrorist attack in the United States resulted in the largest-ever, single-event insurance loss (Chart 30). Much of this was concentrated in the property and casualty (P&C) insurance and reinsurance industries. In addition, weaker-than-expected investment returns have further eroded the net worth of insurers.

Some large European insurance companies reported losses for 2002, and the credit ratings of a number of firms were lowered during the year. These effects were reflected in weak equity prices (Chart 31).¹² Insurance firms have responded by taking various steps, including adjusting their asset portfolios, tightening underwriting standards, limiting coverage for some types of risk, and raising premiums. Several major firms have moved to secure additional capital, and markets appear to have been receptive. For example, Munich Re, the world's largest reinsurance company, recently issued €3.4 billion in bonds, while Allianz, another large European insurer, successfully placed a €4.4 billion rights issue.

12. The reinsurance sector, which is dominated by large European firms (although their operations are increasingly global), has been particularly affected by recent adverse developments.

The capital positions of U.S. insurance companies have also been under downward pressure, although overall they are still considered to be at acceptable levels. Global developments have had a relatively limited impact on Canadian insurance companies, although they have contributed to a modest extent to the difficulties of the domestic P&C insurance industry.

Canadian Developments

Domestic factors that influence developments in the Canadian financial system include the state of the Canadian economy, the financial position of the household and corporate sectors, and developments within specific industrial sectors.

Canadian economy

Canada's economic growth has eased from its earlier vigorous pace (Chart 32). Canada's exports have fallen back, following the significant gains made earlier, as the rate of economic expansion in the United States has slowed. However, the significant monetary stimulus provided by low interest rates contributed to further strong growth in household spending in the second half of 2002 and the first quarter of 2003.

The private sector consensus view for Canadian economic growth in 2003, while still solid, has eased since last November as a result of weaker global economic prospects and concerns about the economic impact of SARS. The rate of economic expansion in Canada is expected to strengthen in 2004. Nevertheless, Canada's economic prospects are likely to depend on the evolution of business and household confidence and on global economic developments.

Household and corporate sectors

Household balance sheets remain in good shape. Indeed, there have been ongoing reductions in the number of mortgages in arrears and credit card delinquencies. The current strength in housing prices has helped offset the loss in wealth arising from weaker equity prices (Chart 33), and household debt service remains at a favourable level compared with that of earlier cycles (Chart 34). Even so, consumer confidence has eased since mid-2002.

Business balance sheets in all but a few non-financial industries continue to be healthy, since

Chart 32 Real GDP Growth: Canada

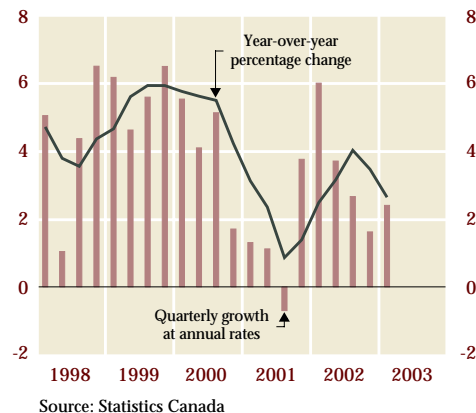


Chart 33 Growth in House Prices

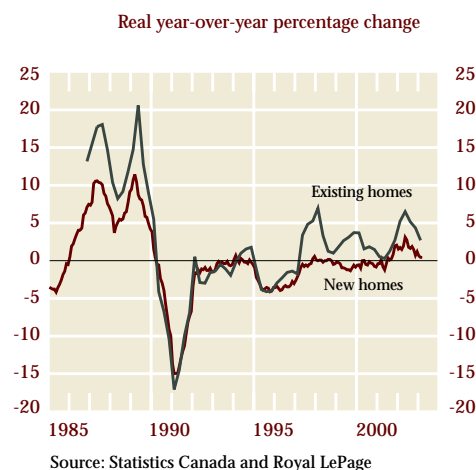


Chart 34 Personal Sector Debt

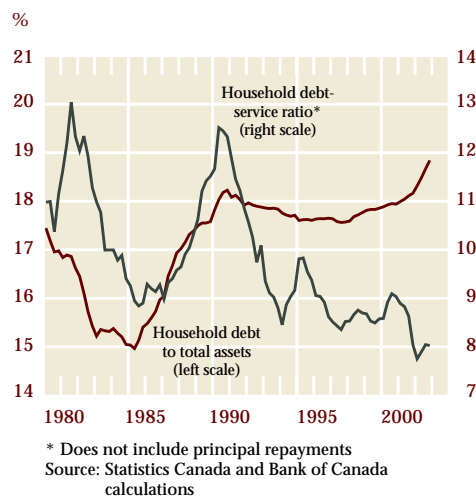
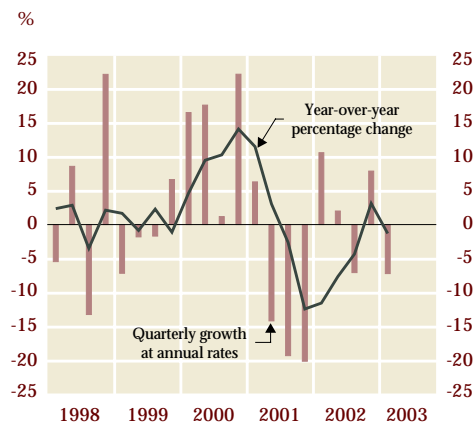


Chart 35 Canadian Business Confidence

Indexed to 2000Q4 = 100



Source: The Conference Board of Canada

Chart 36 Real Output Growth: Air Transportation

Source: Statistics Canada

Chart 37 Return on Equity: Electronic and Computer Manufacturing

Source: Statistics Canada

profitability recovered markedly in 2002 and in early 2003. The confidence levels of both large and small firms have, on balance, changed little since the third quarter of 2002 (Chart 35). Progress in restructuring troubled industry sectors will help to improve corporate credit quality.¹³

Industry

Although several Canadian industrial sectors remain under severe financial stress (e.g., the telecom, airline, and forest products sectors) they represent a relatively small proportion of the domestic economy. Indeed, some of the most financially vulnerable sectors staged a partial recovery in the first three quarters of 2002.

More recently, however, there have been cutbacks in production and a deterioration in profitability in some of these sectors. Among the factors that explain the recent weakening are the slowdown in the U.S. economy and the impact on confidence of recent global shocks, such as the war in Iraq. In addition, corporate pension plan deficits weigh particularly heavily on this set of financially vulnerable industries. While the recent higher level of the Canadian dollar, if sustained, could also adversely affect the profitability of export-oriented industries, firms where imported goods are a significant cost component of their operations will stand to benefit.

The airline and aerospace manufacturing industries have been hit particularly hard by the global shocks, which have resulted in continued weak demand and higher fuel costs (Chart 36). As a result, several companies in these industries are restructuring their operations and their balance sheets. Activity and profitability in these and other tourist-related industries, especially those in the Greater Toronto Area, have also been adversely affected by SARS.

The electronic and computer manufacturing industry (especially manufacturers of telecom equipment) recorded substantial losses throughout 2002 (Chart 37). Many firms are still experiencing losses, with orders remaining weak overall (Chart 38). The consensus continues to call for activity in this sector to remain low until 2004. The higher value of the

13. For further discussion of the financial position of the Canadian corporate sector, including the cycle in credit quality, see Highlighted Issues, beginning on page 4.

Canadian dollar is also likely to add to downward pressure on profitability in this industry.

As well, the near-term financial prospects for the auto industry remain weak (Chart 39), because of global excess capacity, the high cost of sales incentives, declines in North American auto sales, and the need to shore up pension plans.

Profitability in the forest products sector is likely to remain low, given weak prices, the adverse impact of high duties on lumber exports to the United States, and the higher value of the Canadian dollar. The short-term financial outlook for Canada's farm sector also remains bleak, after a poor Prairie grain harvest in 2002. This sector has recently been affected by heightened uncertainty related to the appearance of bovine spongiform encephalopathy (BSE) in Canada.

The Financial System

Financial markets and institutions that are both sound and flexible are instrumental in helping financial system participants cope with the increased level of uncertainty and in allowing them to adjust their risk profiles accordingly. The evidence continues to point to the underlying robustness of the Canadian financial system.

Financial Markets

Conditions in worldwide financial markets have improved since the volatile episodes during the summer and autumn of 2002. Overall, financial indicators suggest that investors are less risk-averse than they were during those episodes.

Fixed-income credit markets

Conditions in North American corporate debt markets have shown a steady improvement since the beginning of the year, continuing the recovery that began last autumn. Against the background of continuing low yields (Chart 40), interest rate spreads have narrowed, and the primary market in both Canada and the United States has been quite robust.

Developments in North American corporate bond markets indicate that investors have become more willing to bear credit risk in recent months. Yield spreads between corporate and government debt have generally narrowed

Chart 38 New Orders: Communication Equipment Manufacturing

Indexed to 2000Q3 = 100

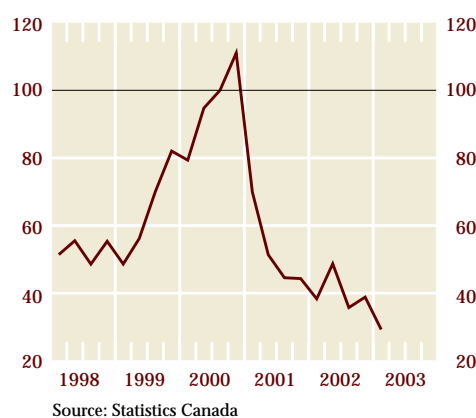


Chart 39 Return on Equity: Automotive Manufacturing

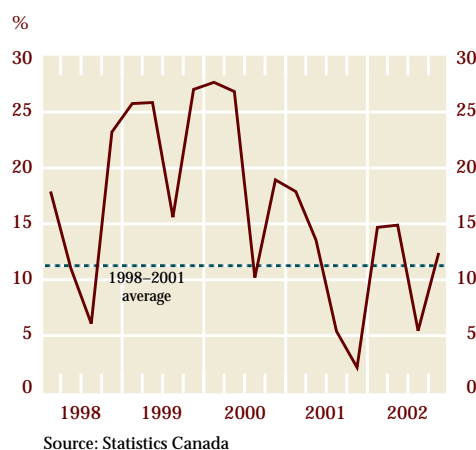


Chart 40 Yield for 10-Year Benchmark Bond

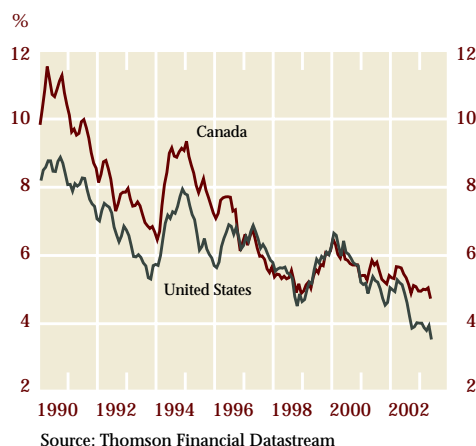
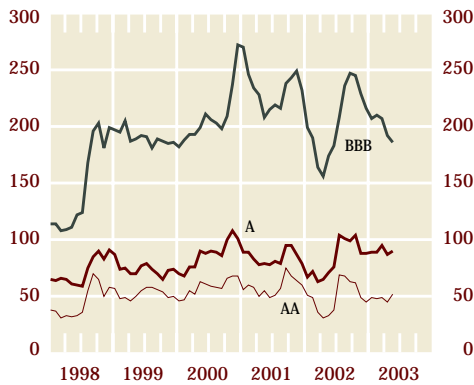


Chart 41 Canadian Corporate Spreads by Credit Quality (5- to 10-year bonds)

Basis points over government securities



Source: Thomson Financial Datastream

across the credit spectrum, particularly for lower-rated credits, and remain significantly lower than the peaks reached in the autumn of 2002 (Chart 41).

Issuers have had good access to debt markets this year, in the context of strong investor demand and low borrowing costs. The net issuance of bonds by Canadian companies rebounded in the first quarter (Chart 42), with lower-rated Canadian issuers among those who benefited from continued access to U.S. debt capital markets. Firms facing difficult financing conditions in the traditional wholesale debt market have been able to secure funding through asset securitization and income trusts or through the retail market. It is noteworthy that issuance has grown in an environment where corporations are generally focusing on improving their financial positions rather than on expanding their asset bases, thus limiting corporate borrowing needs (see Highlighted Issues, page 4).

Chart 42 Corporate New Issuance

Can\$ billions



* Second quarter 2003 includes April and May data.

** Data not available for second quarter of 2003.

Source: Bank of Canada

Equity markets

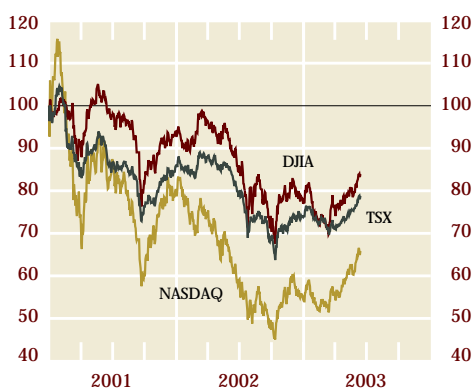
From the lows reached in October 2002, North American equity prices rebounded in late 2002 and early 2003 amid renewed optimism about economic prospects (Chart 43). This rally has, at times, been constrained by the geopolitical environment and ongoing concerns about corporate profitability.

In recent months, concerns about the economic consequences of the military conflict in the Middle East have abated and, in aggregate, earnings reports have compared favourably with market expectations. However, these expectations had earlier been revised down significantly. Growth in U.S. corporate profits continues to be driven by cost-cutting and asset sales, as firms reduce debt and restructure their businesses around core operations. The ability of firms to meet their revenue targets in an uncertain economic environment remains a risk for equities.

With the exception of the second half of March, when the war in Iraq began, North American equity prices have not been particularly volatile in recent months, especially when compared with episodes in the second half of last year (Chart 44). Volatility implied by options prices has also declined to levels that are near long-term historical averages.

Chart 43 North American Equity Indexes

Indexed to 1 January 2001 = 100



Source: Thomson Financial Datastream

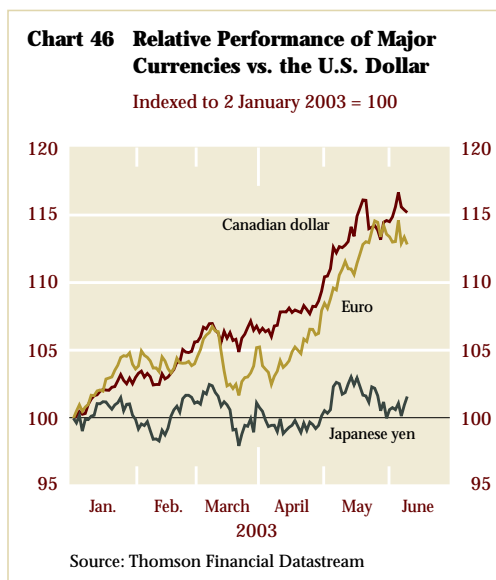
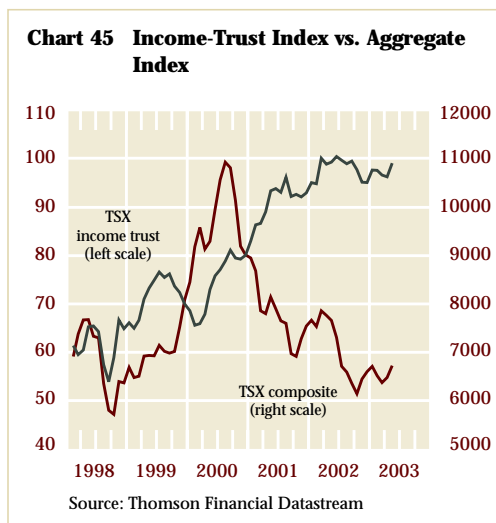
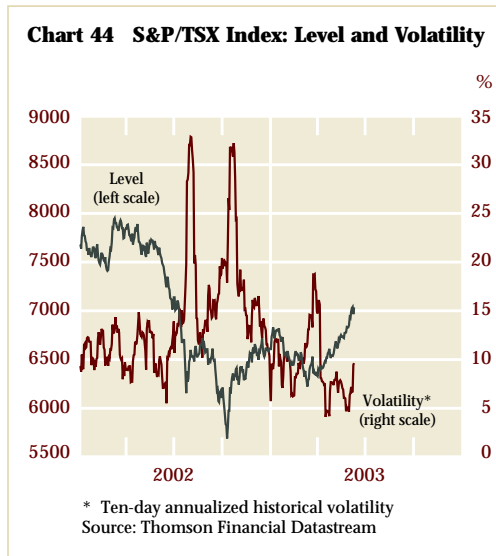
Over a longer period, Canadian equity markets have been supported by the rapid growth of the income-trust sector. Over the past two years, income-trusts represented 40 per cent of the equity issues on Canadian stock exchanges, and until recently, these trusts have offered superior returns (Chart 45). The sharp rise of income-trust valuations and the large supply of new issues, particularly those in non-traditional areas, have generated increased scrutiny of this asset class. The Ontario government has recently proposed a set of limited-liability provisions that would bring the liability of unit holders into line with that of the shareholders of corporations. These changes would likely support market interest, particularly from institutional investors.

Foreign exchange markets

A key element at work in foreign exchange markets is the broadly based weakening of the U.S. dollar that has occurred in recent months. Several factors have contributed to this outcome, including uncertainty about the U.S. economic outlook and concerns over the sustainability of the U.S. current account deficit (especially in an environment of increased government borrowing and lacklustre investment returns).

In conjunction with other major international currencies, the Canadian dollar has appreciated considerably against the U.S. dollar since the beginning of the year (Chart 46). The Canadian dollar has been supported by the prevailing view that the domestic economy is poised to continue to grow at a faster pace than that of most other industrial economies. Nevertheless, factors such as SARS and BSE have contributed to the recent volatility in the Canadian dollar (Chart 47).

The higher value of the Canadian dollar can affect the financial system through several avenues. If sustained, it would adversely affect the profitability of corporations with a substantial export orientation, while firms that are net importers of capital goods would benefit. The appreciation can also affect the value of various financial assets and liabilities. For example, firms (including financial institutions) with net U.S.-dollar liabilities would benefit (e.g., through a decline in the Canadian-dollar value of debt), while those with net U.S.-dollar assets could be adversely affected. But the diffuse



nature of these effects suggests that the overall impact on financial stability will be limited.

Financial Institutions

The financial performance of Canadian banks improved in the first part of 2003. The pace at which banks found it necessary to add to loan-loss provisions fell sharply (Chart 48). Driven by strong revenues and lower provisions for credit losses, the average return on equity has risen markedly (Chart 49). Both the coverage ratio and the ratio of gross impaired loans (Chart 50) have shown signs of stabilizing, suggesting that the deterioration in credit quality may have largely run its course. The credit rating outlooks for some banks were revised upwards following the release of first-quarter results.

Nevertheless, several negative factors will affect bank performance over the near term, including uncertainty surrounding the economic outlook and the continuing need for banks to address their exposure to weak sectors of the economy. For example, the financial position of the North American power and power-generation sector has deteriorated substantially since the end of 2001, with the proportion of sectoral debt rated as non-investment-grade rising sharply (Box 4). Several Canadian banks have significant exposures to this sector, and it has joined telecoms as being at the forefront of credit concerns.¹⁴ Even in adverse scenarios, however, losses in this sector should be limited, partly because recovery rates from any potential defaults are expected to be relatively high owing to reliable revenue streams and the value of existing collateral.¹⁵ The banking sector's exposure to the airline and aerospace industries—other sectors that are facing difficulties—is relatively limited.

Several major Canadian banks accessed capital markets in the first part of 2003 to buttress and restructure their capital positions. Having entered the current period of credit deterioration in a much-improved position relative to that of the early 1990s, and given their generally solid balance sheets, the major banks are well prepared to address current challenges. They,

14. Canadian banks' aggregate exposure to the energy sector in early 2003 was \$13.7 billion, compared with \$16.7 billion in telecommunications exposure.
15. Several firms have recently been able to secure substantial new financing, although the financing cost reflects the relatively risky position of some firms.

Chart 47 Exchange Rate and Volatility

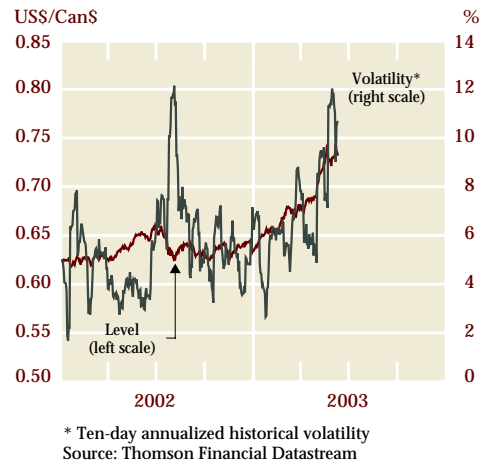


Chart 48 Provision for Credit Losses: Major Canadian Banks

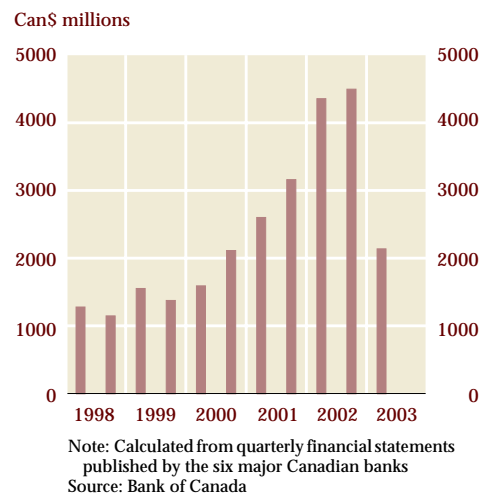
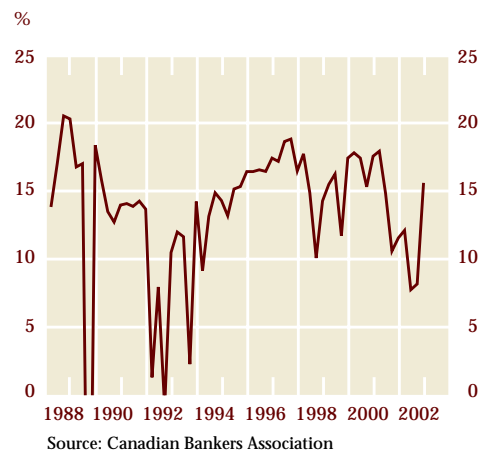


Chart 49 Return on Equity: Major Canadian Banks



Box 4

Developments in the North American Merchant Energy Sector

Since the early 1990s, the U.S. Federal Energy Regulatory Commission has undertaken important initiatives to facilitate the development of competitive wholesale electricity markets. A number of state governments have also endeavoured to promote competition in retail electricity markets (Joskow 2002a). These policy reforms partly contributed to the sharp expansion of what is commonly termed the North American merchant energy sector, which is composed of major firms involved in the wholesale marketing of electricity and other forms of energy. These firms are usually involved in other activities such as electric power generation and the transportation of natural gas.

The same reforms were among the factors contributing to a marked rise in trading activity in various wholesale energy markets. Moreover, many of the companies in this sector purchased significant amounts of electricity-generating capacity from U.S. investor-owned utilities in recent years, as well as making substantial investments in the construction of new capacity. Much of this investment in new capacity was financed with debt.

The financial positions of many companies in the merchant energy sector have, however, deteriorated substantially since late 2001. Perceived efforts to manipulate wholesale markets (most notably in California), the collapse of Enron, and a series of important accounting irregularities have all been detrimental to this sector (Joskow 2002b). With these developments and the overall North American slowdown in economic growth, the amount of trading activity in wholesale energy markets has declined considerably. Moreover, the California electricity crisis in 2000–01 led to heightened uncertainty regarding the future pace of reforms to wholesale and retail markets for electricity in the United States. All of this added to the already high degree of risk associated with the long-term financial prospects of most merchant energy companies.

These adverse developments have contributed to substantial increases in the cost of capital for merchant energy companies, and in many cases their credit ratings have been downgraded to high-yield status (see chart). Most firms have subsequently scaled back their presence in the trading of wholesale energy, sold off assets, renegotiated (or are currently renegotiating) credit agreements, and delayed or cancelled many of their planned

additions to electricity-generating capacity. However, given the prospect of continued uncertainty regarding the nature of future regulation of markets for electric power, the cost of capital for these merchant energy firms is likely to remain high for some time, necessitating further restructuring of operations. Indeed, these companies are facing intensified competition from better-capitalized entrants in such areas of their operations as wholesale energy trading.

To date, a number of merchant energy firms have been able to refinance maturing debt, although often at the cost of pledging most of their unencumbered assets as security for their new debt. Hedge funds have also increased their involvement as lenders to these companies.

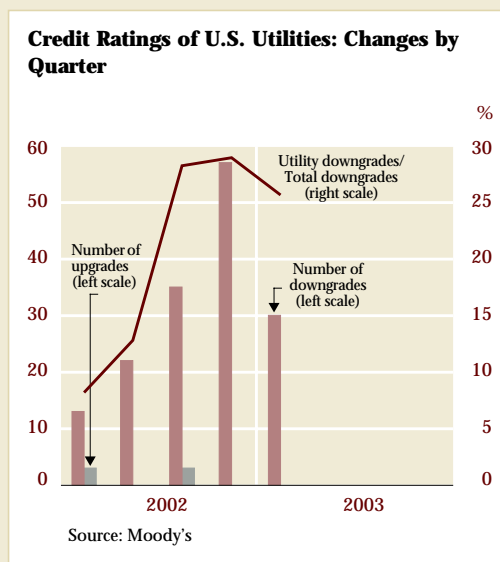
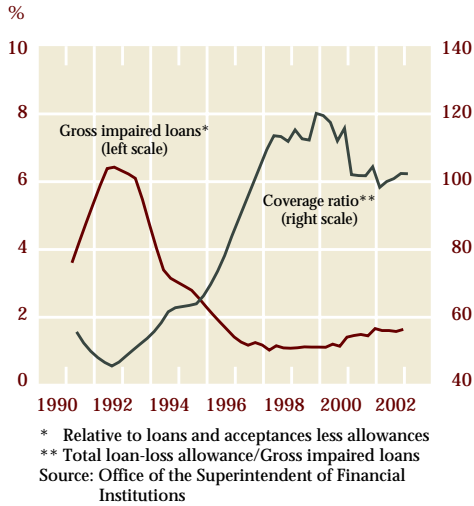
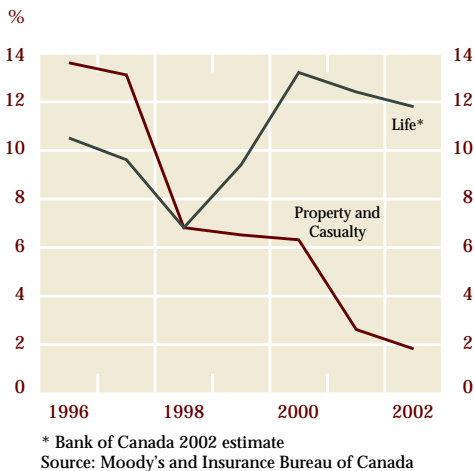


Chart 50 Asset Quality: Major Canadian Banks**Chart 51 Return on Equity: Insurance Companies**

nevertheless, remain under pressure to restructure their operations, in some cases taking substantial writedowns on past investments. As a group, the major banks continue to emphasize a shift from corporate to retail lending.

Under the recent adverse market conditions, the Canadian life insurance and property and casualty insurance industries have performed very differently. Life insurance companies posted favourable financial results in 2002, with the aggregate return on equity remaining above 10 per cent (Chart 51), and their capital ratio rising after a decline in 2001. The significant expansion by life insurers into equity-based insurance products during the 1990s has, however, increased the industry's exposure to the performance of equity markets, as well as to volatility in fee revenues. Canadian life insurance companies have, nevertheless, coped better with capital market pressures than many insurers in other countries, owing to the diversification of their investment portfolios and their conservative investment strategies. Exposures to problem credits remain relatively limited.

The first quarter of 2003 was marked by the announced merger of Great West Lifeco with Canada Life. The new entity will hold almost a one-quarter share of the domestic Canadian life insurance industry. In addition, it will hold a leading position in a number of product lines, including in particular the segregated-funds market.¹⁶ Together with Sun Life's acquisition of Clarica in May 2001, the merger will bring the domestic market share of the three largest Canadian life insurance companies to approximately 60 per cent.

In contrast to the sound performance of life insurance companies, the P&C insurance industry failed to show any financial improvement last year, following poor results in 2001. Growth in claims costs and a deterioration in investment income adversely affected the industry. Reduced interest returns on bond portfolios (representing about 75 per cent of invested assets), as well as the sharp declines in returns on equity holdings, have eroded the industry's traditional ability to offset underwriting losses with investment income. Despite rising premium income as a

16. Segregated funds, which have characteristics similar to mutual funds, expanded significantly in the second half of the 1990s, partly in response to strong equity markets.

result of higher rates, the aggregate return on equity was below 3 per cent in 2002.

Results for the securities industry in the first quarter showed a decline in operating profits following a quarter in which performance had been favourably influenced by the share proceeds that resulted from the Toronto Stock Exchange going public late last year (Chart 52). Commission revenue has been under downward pressure since 2000, as a result of reduced investor activity and the lower value of stocks traded. Revenues from investment banking have fared relatively well, since reduced merger and acquisition activity was somewhat offset by a jump in the issuance of income-trust units.

New issuance of common equities declined in the first quarter (Chart 53), and the cautious attitude of investors towards equity markets is also reflected in the continuing net redemptions (excluding reinvested distributions) of mutual funds (Chart 54). Assets under management have declined by 17 per cent from the same period in 2002 (largely because of lower equity valuations).

Clearing and Settlement Systems

Systems designed to clear and settle payments and other financial obligations are a key element underpinning the Canadian financial system (Box 5).

Recent developments

On 31 March of this year, CDSX began operations. CDSX is owned and operated by The Canadian Depository for Securities (CDS) and currently settles Canadian-dollar debt instruments. It uses a robust method of controlling for risk that is similar to that of the Debt Clearing Service (DCS), the securities settlement system that CDSX replaces. CDSX has been designated under the Payment Clearing and Settlement Act (PCSA). The settlement of equities is expected to be included in CDSX at a later date, and the system currently used for settling equity transactions, the Securities Settlement System, will then cease to exist.¹⁷

On 3 February, a \$25 million cap on paper items settling in the Automated Clearing Settlement System (ACSS) was implemented, with a

Chart 52 Operating Profits: Securities Industry

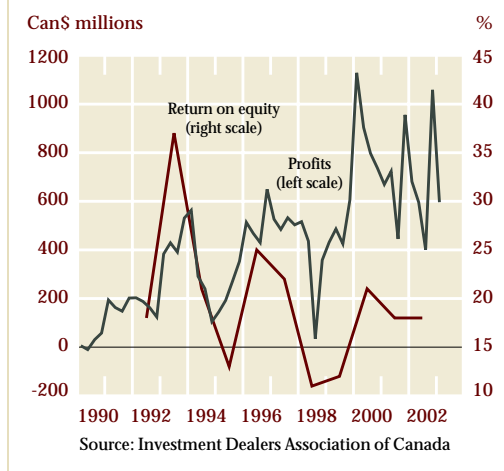


Chart 53 Common Equity Financing: New Issues

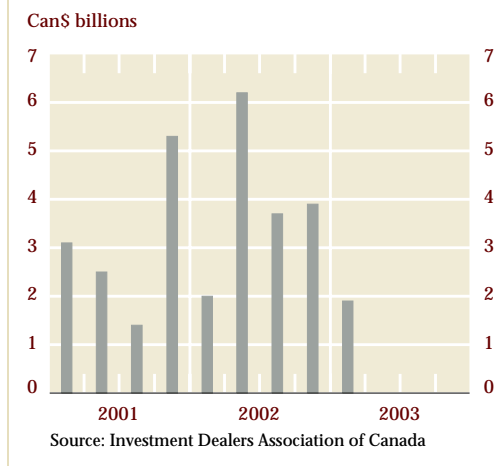
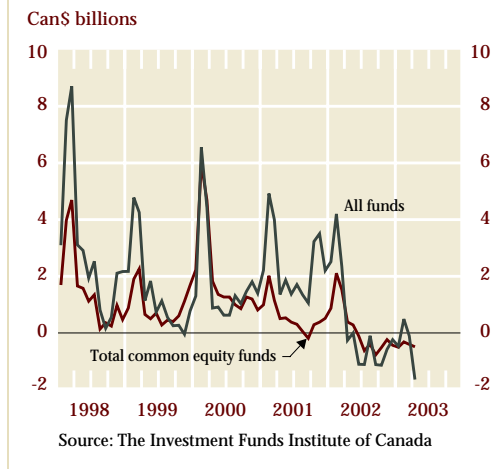


Chart 54 Net New Sales of Mutual Funds
Excluding reinvested distributions



17. For a detailed description of the new CDSX system, see the article in this *Review* by McVanel (p. 59).

Box 5**Payment, Clearing, and Settlement Systems in Canada**

An essential component of the financial system is a robust set of arrangements to clear and settle payments and other financial obligations. Given their central role in settling financial transactions, clearing and settlement systems have the potential to pose systemic risk should they fail to operate as expected. Under the Payment Clearing and Settlement Act, the Bank of Canada designates systems that have the potential to pose systemic risk. It has responsibility for the oversight of such domestic systems and shared oversight with other central banks for international systems that involve the Canadian dollar.

The Bank currently oversees two domestic systems: the Large Value Transfer System (LVTS) for the exchange of large-value and time-sensitive payments, operated by the Canadian Payments Association; and CDSX for the clearing and settlement of securities transactions. CDSX is operated by The Canadian Depository for Securities. In addition, the Bank of Canada shares oversight of the Continuous Linked Settlement Bank (CLS Bank) with other central banks, including the U.S. Federal Reserve, which is the lead overseer. Based in New York, the CLS Bank is an international system for the settlement of foreign exchange transactions and currently deals in seven currencies, including the Canadian dollar.

Other systems, while not judged to have the potential to pose systemic risk, are, nevertheless, important to the financial system. These include settlement systems such as the Automated Clearing Settlement System (ACSS), which settles mainly smaller-value retail payments, and the Canadian Derivatives Clearing Corporation, which clears and settles exchange-traded interest rate and equity derivative contracts in Canada.

The Bank of Canada supplies services to the LVTS, CDSX, the CLS Bank, and the ACSS by providing settlement assets and liquidity, as well as collateral and settlement-agent services. The Bank of Canada also provides contingency arrangements for these settlement systems.

6-month grace period for full transition to the Large Value Transfer System (LVTS) of items that exceed the cap. It is estimated that approximately 35 per cent of the ACSS's daily payment flows of about \$20 billion (in 2002) are accounted for by payments over \$25 million. The cap will encourage the migration of these large-value items to the LVTS (Chart 55), which supports intraday finality of payment and has stronger risk controls, appropriate for settling large-value payments. Chart 56 illustrates the decline in ACSS flows since the cap was introduced. Average daily flows in the ACSS fell by \$4.3 billion and \$2.9 billion in March and April, respectively, compared with a year earlier.

Settlement of foreign exchange transactions in the CLS Bank has increased steadily since the CLS began commercial operations last September. On a global basis, the value of trades settled has peaked at more than \$1 trillion per day on several occasions. Settlement of Canadian-dollar transactions also continues to climb (Chart 57) and averaged about \$13.5 billion per day in April 2003. The savings in liquidity attributable to settlement through the CLS Bank is evident from Chart 57. Settlement of \$13.5 billion worth of foreign exchange transactions required an average of only \$2 billion in Canadian-dollar liquidity.¹⁸

The CLS Bank has operated very smoothly since it began live operations in September 2002, but one significant disturbance occurred on 25 March 2003. Technical problems prevented settlement of many trades involving the Australian dollar or the Japanese yen and other CLS currencies. These trades were resubmitted for settlement through CLS on the following day. While this disruption had the potential to create liquidity pressures, market participants were able to respond well and in a timely manner to the unexpected changes in their CLS funding requirements. The CLS Bank is designed so that such a problem does not put the value of the foreign exchange contracts at risk—i.e., it created no settlement or principal risk.

18. For more information on the structure and operation of the CLS Bank, see Miller and Northcott (2002).

Chart 55 Value of Payments Processed by the LVTS

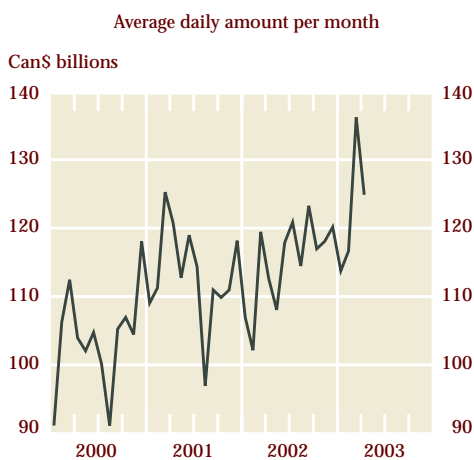


Chart 56 Value of Payments Processed by the ACSS

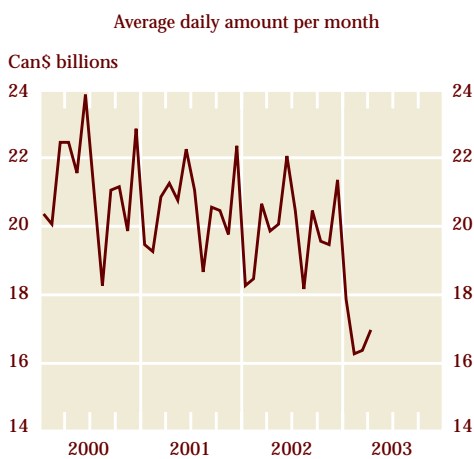
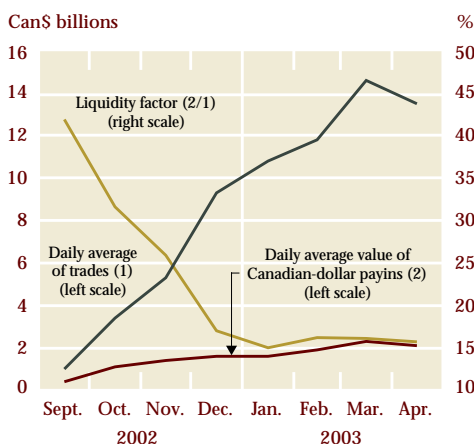


Chart 57 Average Settlement Value of Daily Canadian-Dollar Foreign Exchange Trades in CLS



References

- Engert, W. and C. Freedman. 2003. "Financial Developments in Canada: Past Trends and Future Challenges." *Bank of Canada Review* (Summer), forthcoming.
- Joskow, P. 2002a. "Energy Policy During the 1990s." In *American Economic Policy in the 1990s*, 509–62, edited by J. Frankel and P. Orszag. Cambridge, Mass.: MIT Press.
- . 2002b. "Lessons Learned from Electricity Liberalization in the UK and US." Paper presented at Italian Advanced School of Public Administration. Rome, 24 June. Available at <http://econ-www.mit.edu/faculty/download_pdf.php?id=543>.
- Miller, P. and C.A. Northcott. 2002. "The CLS Bank: Managing Risk in Foreign Exchange Settlements." *Bank of Canada Financial System Review*. (December): 41–44.
- Shen, P. 2003. "Why Has the Nonfinancial Commercial Paper Market Shrunk Recently?" *Federal Reserve Bank of Kansas City Economic Review* 88: 55–76.

Reports

Introduction

Reports address specific issues of relevance to the financial system (whether institutions, markets, or clearing and settlement systems) in greater depth.

Financial markets have evolved enormously over the past decade, in terms of their size and the range of financial instruments available. This has provided Canadian corporations and households with much greater flexibility in terms of their preferred financial structure, including an appropriate balance between financial risk and return. Yet, new financial instruments may also raise concerns. For example, because they are new, they can interact with the rest of the financial system in unexpected ways, particularly during periods of financial stress.

Each of the reports in this issue addresses a rapidly evolving segment of financial markets that is of particular importance to corporations. The first report, *Recent Developments in Markets for Credit-Risk Transfer*, discusses the growing use of instruments designed to facilitate the transfer of credit risk. Although the total value of this global market is still relatively small, it has attracted considerable attention, partly because of a perceived lack of public information about who is ultimately bearing the risk related to different financial events.

The second report, *Developments and Issues in the Canadian Market for Asset-Backed Commercial Paper*, examines the expanding role played by the process of securitization in the market for commercial paper. This market, which exceeds \$60 billion, essentially packages large quantities of small, homogeneous financial assets into new securities. It has become an attractive source of funding for corporations, but at the same time, it can create an added level of complexity in financial relationships.

Recent Developments in Markets for Credit-Risk Transfer

*John Kiff**

Instruments that transfer credit risk from one counterparty to another have existed for a long time.¹ For example, the use of letters of credit and financial guarantees goes back centuries. In recent years, however, the range of such instruments and their use have widened considerably. The modern era of credit-risk transfer (CRT) started in the United States in the 1970s with the packaging of residential mortgages into marketable securities (i.e., securitization) and was followed by the development of secondary markets for bank loans in the 1980s. International markets for credit derivatives, which transfer risk without transferring ownership of the underlying assets, were developed in the 1990s and have grown rapidly. Hence, credit risk is now viewed as being tradable, even when the lender is blocked from selling the underlying assets from its balance sheet.

CRT instruments facilitate the optimal allocation of credit risk in the economy and permit specialization by “unbundling” lending from exposure to credit risk. Financial institutions can also use these instruments to optimize the use of their economic and regulatory capital.

This article begins with a brief description of the various types of CRT instruments and the markets that they trade in, followed by an overview of activity in the Canadian CRT market. The

risks inherent in the instruments themselves are then examined.

Instruments and Markets

The CRT landscape has evolved so that there are now numerous alternative mechanisms for managing credit risk, funding costs, capital allocation, and balance sheet disclosure. The specific instrument employed depends largely on the objective of the transfer and the nature of the credit risks being transferred. Table 1 summarizes the available CRT instruments. Interviews with market participants suggest that those who want to transfer risk usually prefer to simply sell the asset. By taking the asset right off the balance sheet, financial ratios are improved, and funds are freed up for other uses, including paying down debt. But selling is not always possible or cost-effective. For example, a loan may not be transferable, either for legal or customer-relations reasons; the cost of selling may be prohibitive (because of liquidity or transactions costs); or the borrower may be able to block the sale. Such factors have boosted the development of markets for credit derivatives, which transfer risk synthetically. The paperwork and legal work required to sell the loan as a separate item may also outweigh the benefits. This is often the case for credit card receivables and personal lines of credit. As a result, securitization markets, such as those for asset-backed securities (ABSs) and collateralized debt obligations (CDOs), have emerged.

Credit Derivatives

Credit derivatives are contracts that transfer credit risk and return without transferring ownership of the underlying asset.

1. Credit risk relates to the possibility that a counterparty to a financial contract fails to meet its commitments, because of bankruptcy or other reasons. It also reflects the possibility of financial losses that can result when a counterparty's credit rating is downgraded.

* This article reflects work done by the author as part of a working group organized by the Bank for International Settlements (BIS 2003a), as well as work currently in progress with François-Louis Michaud (Banque de France) and Janet Mitchell (Banque Nationale de Belgique).

Credit Default Swaps

Credit default swaps (CDSs) represent about three-quarters of the global market for credit derivatives, by notional amount outstanding.² These instruments basically provide “insurance” against various “credit events.”³ That is, the protection buyer pays the protection seller periodic premiums, in return for a payment if a credit event occurs.

Credit events include bankruptcy, payment failures, and distressed restructuring,⁴ as well as repudiation or moratorium in the case of the obligations of sovereign governments. “Damages” can take the form of a single cash payment that is typically equal to the difference between the par value of the “reference asset” and its market value at the time of the credit event. However, CDSs usually settle “physically,” with the protection buyer delivering the reference asset to the protection seller for its par value.

While most CDS contracts are based on one single reference asset or entity, basket swaps are based on portfolios of reference assets.

Other Types of Credit Derivatives

The other quarter of the credit derivatives market is composed of total-rate-of-return swaps (TRORSs), credit spread options (CSOs), and credit-linked notes (CLNs). TRORSs are contracts that effectively transfer the total economic performance of an underlying asset to the counterparty. A TRORS is really not much more than a synthetic financing transaction or lease, so its status as an instrument for transferring credit risk is somewhat debatable. A CSO is truly a CRT instrument, since it isolates and transfers

2. Some definitions of credit derivatives include synthetic securitization and asset-swap activity. In this article, synthetic securitization is treated as a subset of securitization, and asset swaps are excluded on the grounds that they have an element of ownership transfer.
3. Although credit guarantees and acceptances are quite similar to credit default swaps (CDSs), they are not included in this article’s definition of CRT instruments, owing to subtle contractual features that undermine their usefulness for the transfer of credit risk.
4. The term “distressed restructuring” refers to adjustment in the terms of the reference asset in a CDS contract in a way that is unfavourable to the holders. Such adjustments include reductions in the principal amount or interest payable, as well as postponement of payment.

Table 1
Options Available for Credit-Risk Transfer

Typical CRT ^a	Underlying assets	
ABS & ABCP	Loans to households	Residential mortgages
		Credit card receivables
		Auto loans and leases
	Transferable debt (loans and bonds)	Commercial mortgages
		Trade receivables
		Equipment leases
Outright sale Conventional CDOs		Corporate debt
		Emerging-market debt
Synthetic CDOs, CLNs, CDSs, and CSOs	Non-transferable and transferable debt	Corporate loans
		Emerging-market loans

- a. Abbreviations**
 ABS: asset-backed security
 ABCP: asset-backed commercial paper
 CDO: collateralized debt obligation
 CLN: credit-linked note
 CDS: credit default swap
 CSO: credit spread option

declines in the price of the underlying asset that are independent of shifts in the general yield curve. In effect, a CSO is a CDS that specifies the widening of the yield spread as a credit event.⁵

CLNs are securities that effectively embed CDSs within a traditional fixed-income structure. They typically pay periodic interest and, at maturity, the principal minus a payment on the embedded CDS if a credit event has occurred. CLNs appeal to investors and protection sellers who are prohibited from trading directly in derivatives contracts.⁶

Securitization

Asset-backed securities (ABSs) bundle together numerous assets into a “special-purpose vehicle” (SPV) which, in turn, issues marketable securities. Various structural features and third-party enhancements are used in ABSs to transform a bundle of obligations that are not necessarily high grade (sometimes these even include “junk” bonds) into high-grade (e.g., AAA-rated) “senior securities.”

Conventional collateralized debt obligations (CDOs) are very similar to ABSs, the main distinctions being the types of assets securitized and the number of subordinated “tranches.” ABSs typically bundle fairly homogeneous consumer loans, such as credit cards, automobile loans, and mortgages, whereas CDOs are usually backed by more diversified corporate and emerging-market debt.

ABS structures typically issue, at most, a couple of tranches. For example, they will often sell a AAA-rated senior note to investors and a low-rated (e.g., BBB) junior security back to the originator. CDO structures, on the other hand, issue numerous tranches; selling AAA-rated senior notes, A-rated “mezzanine” notes, and one or two BBB- to BB-rated “subordinated” notes to investors, as well as an unrated “equity” tranche to investors and back to the originator. The lower-rated tranches serve as credit enhancements to the more senior securities, since they receive

only the cash flow that remains after the claims of the structure’s more senior tranches have been satisfied.

In addition to (or instead of) using subordination, credit risk can be reduced by transferring into the SPV assets with a greater aggregate value than the value of the securities issued (overcollateralization). Third-party enhancements are also frequently used. These include letters of credit and surety bonds from highly rated financial institutions.

In conventional securitizations, the assets are transferred (risk and ownership) into the SPV, whereas synthetic securitizations use one or more CDSs to effect the risk transfer. In this last case, proceeds from the note issuance are used to buy high-quality (usually AAA-rated government) securities. Interest and principal payments on these securities, along with the CDS premiums paid by the originator of the asset, provide the funds for paying interest and principal on the notes and for making CDS payments to the originator if default events occur.

The advantage of the synthetic structure is that it can be used in situations where the underlying assets are not transferable, and it is especially useful for hedging credit lines and other undrawn lending commitments.

Canadian CRT Market Activity

Canadian involvement in CRT markets has followed two paths: development of a domestic market and trade in foreign markets. Domestically, an active market for asset-backed securities has developed, but there is little secondary trade in credit derivatives and loans. Foreign interest in Canadian CRT markets is virtually non-existent,⁷ but some Canadian banks are significant participants in the full spectrum of CRT activity in foreign markets. While foreign insurance companies are becoming big players in U.S. and European CRT markets, Canadian insurers are not involved to any great degree in either Canadian or foreign CRT markets.

The bulk of the domestic Canadian CRT activity takes the form of ABSs, particularly asset-backed

5. Bonds are priced in terms of a yield spread over benchmark instruments of similar maturities, such as government bonds and interest rate swaps. This compensates the investor for the bond’s credit and liquidity risk relative to that of the benchmark instrument. (See Miville and Bernier 1999.)

6. See Kiff and Morrow (2000) for more detail on TRORs, CSOs, and CLNs.

7. Some argue that the 10 per cent withholding tax on interest paid by Canadians to U.S. residents may be partly responsible for the lack of foreign interest in Canadian securitization markets.

commercial paper (ABCP).⁸ The domestic market for other types of CRT instruments is fairly small. Most Canadian banks run trading operations out of their Toronto or Montréal offices that are purely intermediary. On the other hand, some are quite active in U.S. and U.K. markets for credit derivatives and securitizations. Several banks, in particular, are very active in European markets for synthetic CDOs, although details on such activity are extremely hard to track.

Financial System Issues Raised by CRT Markets

Although numerous benefits can be associated with CRT instruments, a recent report by the Bank for International Settlements (BIS 2003a) and some market observers have identified areas of potential concern.

Lack of Transparency and Disclosure

The BIS report identified lack of disclosure at the entity level and the deal level as an area of concern that may require a policy response from the authorities. Information regarding risk-transfer activity by individual banks can be difficult, if not impossible, to find in financial statements, even among institutions known to be extensively involved in CRT markets.

It should be pointed out, however, that some Canadian banks have dramatically improved their disclosure practices for CRT since the BIS report was finalized. For example, two banks provided fairly extensive information on their CDS activity in their 2002 annual reports; one even disclosed the extent of its ABS liquidity and credit-enhancement exposure.⁹ Further moves in this direction would be helpful.

At the transaction level, transparency regarding not only the composition of the securitized-asset pools, but also the identification of third-party enhancers would be helpful. Although credit rating agencies have extensive access to this information for rating-assignment purposes, it is often difficult for private investors to

do their own analysis. Particularly in the case of ABSs, investors should at least be aware of who is providing third-party enhancements.¹⁰

The disclosure of and the accounting for such activity should, however, be helped by the U.S. Financial Accounting Standards Board's (FASB) *Interpretation No. 46*, issued in January 2003. In April 2003, the Canadian Accounting Standards Board (AcSB) of the Canadian Institute of Chartered Accountants (CICA) announced that it is planning to approve a similar guideline. Not only will this raise the risk-transfer standards for removing securitized assets from originator balance sheets, but it may require commercial banks to bring onto their balance sheets some of the assets in the ABCP programs that they sponsor.¹¹

Information on aggregate CRT activity is also lacking. In particular, the BIS report noted the extreme divergence in estimates regarding the size of the markets, and concerns have been raised as to where the credit risk is being transferred.¹²

Fitch Ratings (2003) has also raised some interesting questions regarding whether market participants' management information systems have kept up with their expanding activity in these markets.

Complexity and Reliance on Rating Agencies

The BIS report notes the critical role of the credit rating agencies in various CRT markets, particularly in securitization markets. To properly evaluate such structures, rating agencies have had to significantly expand the scope of their assessments. For example, they evaluate ABS and

8. See the article by Toovey and Kiff in this *Review* (p. 43) for more detail on the Canadian ABCP market.

9. See Toovey and Kiff (p. 43) for more detail on ABS liquidity and credit enhancements.

10. See Toovey and Kiff (p. 43) for more on this point.

11. See Mountain (2003) and Parfeniuk and Azarchs (2003) for some early speculation as to the ultimate impact of FASB (2003).

12. See Fitch (2003) for the preliminary results of a survey of protection-selling activity. The U.K. Financial Services Authority has also expressed concerns about transfers into unregulated companies and insurance companies (FSA 2002). However, although the British Bankers' Association has estimated that insurers comprise 33 per cent of all protection-sale business in credit derivatives markets (BBA 2002) (versus 6 per cent on the protection-purchase side), more than 60 per cent of this was with monoline insurers. Monolines specialize in financial guarantees.

CDO structural enhancements, as well as assessing management systems, controls, and abilities. This is well beyond their traditional purview.

Disclosure shortfalls make this issue even more problematic, since it is almost impossible for individual market participants to do their own ABS/CDO risk analysis.

Other rating-related issues that have been raised by market participants with regard to ABS/CDO markets are “notching” and “rating shopping.”

- **Notching** is the practice whereby a rating agency that is assessing the securitized assets in an ABS/CDO automatically reduces the ratings given to the underlying assets by any other agency. This is relevant only for securitized assets that the first agency does not rate itself, but the practice is seen by some as anti-competitive and designed to force CDO managers to pay for new ratings on such underlying assets from the ABS/CDO rater.
- **Rating shopping** is the practice of “cherry picking” credit ratings for different CDO tranches. For example, if one rating agency is known to be harsher on senior tranches and a second to be harsher on mezzanine tranches, the originator generates the highest ratings for the whole structure by having the first agency rate the mezzanine tranche and the second rate the senior tranche.¹³

Concentrated Intermediation

The BIS report points out that the extremely concentrated intermediation found in most CRT markets undermines the potential tradability of the instruments. High levels of concentration are particularly evident in the CDS market; for example, the U.S. Office of the Comptroller of the Currency has recently reported that three banks accounted for 92 per cent of outstanding credit derivative positions at U.S. banks (OCC 2002).

The shrinking pool of financial institutions rated at or above AA (low) could make things worse in this regard. The AA (low) threshold is particularly important with regard to counterparty risk on CRT transactions and third-party

enhancements. For example, a key requirement for some ABSs to maintain top-tier credit ratings is that any third-party enhancers have minimum ratings of R-1 (middle) or AA (low) from the Dominion Bond Rating Service (DBRS). Most major Canadian banks are rated R-1 (high) and AA (low), but several have been earmarked as more likely to be downgraded than upgraded in the near future.¹⁴

Also, most synthetic CDOs require a guarantee, typically from a small pool of AAA-rated monoline insurance companies, to achieve a AAA rating on the most senior tranche.

The Impact of CRT Activity on Cash Markets

Some market observers have discussed the potential for the trading of CRT instruments to influence the prices and yields of the underlying obligations of the reference entity. For example, the prehedging of impending loan-syndication positions in CDS markets (front running) has been said to lead to widening spreads for the obligations of the underlying entities.¹⁵ Also, “arbitrage” CDOs, which are built to exploit “average” differentials between the yields on CDO tranches and the underlying securitized assets,¹⁶ require that the manager purchase the underlying assets in the open market prior to launching the CDO. This activity has been held responsible for idiosyncratic price increases in the underlying assets.

Some market participants also claim that hedge funds have used CDSs aggressively, buying protection in order to widen spreads in the CDS market and thus create an impression that the

13. See Perraudin and Peretyatkin (2002) for an analysis of rating shopping.

14. Three of the big-five banks that are rated AA (low) have been assigned a negative “trend” indication by the DBRS. The DBRS trend indicates the direction in which the credit rating is heading.

15. See Armstrong (2003) for a detailed discussion of loan syndication. Arguably, syndication is a form of CRT. It is a form of risk transfer that occurs prior to origination, however, whereas this article focuses on transfers that occur after origination.

16. In “balance sheet” CDOs, the institution that originated the assets is initiating the transaction to improve financial ratios or reduce regulatory capital requirements. Arbitrage CDOs are usually initiated by investment banks, dealers, and money managers who are motivated by the potential profits from yield spreads and from actively trading the securitized assets.

reference entity is in trouble.¹⁷ Empirical evidence supports the contention that such spread widening precedes the widening of spreads in cash markets,¹⁸ but no study has yet suggested a causal link. In fact, the more likely reason for CDS spreads to lead cash-market spreads is that it is easier and more cost-effective to sell credit risk in CDS markets.¹⁹

Reduced Incentives to Behave Constructively During Restructuring

Unhedged lenders are usually inclined to participate constructively in distressed restructurings in order to minimize their potential losses. A lender who has purchased protection that covers restructuring events may not be so inclined. On the other hand, a lender that has bought protection that does not cover restructuring may even have an incentive to push the obligor into bankruptcy.

Basis and Pricing Risk

From the perspective of financial stability, the BIS report raised concerns regarding mismatches between CDSs and the instruments they are supposed to be hedging (i.e., basis risk). These mismatches usually revolve around the definition of credit events, particularly events pertaining to restructuring and settlement mechanics.²⁰

The BIS report also voiced some concerns regarding the youthful state of the literature that pertains to the pricing of basket swaps and securitization structures. Not only is the theoretical work in its very early stages, but assessment of default correlation, which is critical for any such models, still appears to be very crude.²¹

Risks Inherent in CRT Instruments

Two additional areas of concern related to CRT instruments themselves are legal risks and incentive problems.

Legal Risk

One of the key legal assumptions that make ABS and conventional CDO structures “work” is the “true sale” principle. In other words, ownership and all of the legal rights to the loans should be absolutely transferred to the SPV so that it is insulated from originator bankruptcy (i.e., it is bankruptcy remote). This has been challenged unsuccessfully in the courts, in both the United States and Canada, but the challenges serve as a reminder that no structure is completely “bankruptcy proof,” and that securitized assets can become, at least temporarily, entangled in the originator’s bankruptcy proceedings. Problems of this nature can be avoided, however, by using synthetic structures, where no ownership transfer actually takes place.

In the CDS market, the use of debt restructuring as a triggering event has become rather controversial and has been dropped from some contracts. The intent of basing CDS payouts on debt restructuring by the reference entity was to ensure that the protection covers all credit events that might cause the price of the reference asset to decline. However, circumstances occasionally arise where restructurings do not result in any damages to the protection buyer, but a payment is still triggered. Although efforts have been made to narrow the focus of this trigger to “distressed” restructurings, another issue has evolved around the delivery option that the protection buyer holds in CDSs

17. Sender (2002) provides several examples where it appeared that hedge funds had aggressively purchased protection on entities whose credit ratings hovered on the precipice of becoming “junk bonds” (i.e., rated below BBB (low) by DBRS). The point of targeting such firms is that numerous institutional investors are prohibited from holding, or at least limited in their ability to hold, junk bonds. If, in fact, aggressive CDS buying does cause fundamental ripple effects that push credit ratings into the junk bond range, such activity could be very profitable.

18. See Box 2 in Kiff and Morrow (2000) for a discussion of the linkages between CDS premiums and the yields to maturity on the reference assets. Also, see Hull, Predescu, and White (2003) for empirical evidence of the “leading” role taken by CDS spreads when credits are deteriorating. They also show that CDS spreads tend to be closely aligned with cash-market spreads when they are narrowing.

19. The BBA (2002) survey shows that hedge funds are much more active buyers of protection than sellers.

20. See Kessler and Levenstein (2001) and O’Kane and McAdie (2001) for a discussion of basis risk.

21. One difficulty with assessing default correlations, and default statistics in general, is the paucity of defaults, particularly among investment-grade entities.

that settle “physically.”²² In several recent restructurings, it has been argued that protection buyers have abused the option by delivering lower-priced, low-coupon, longer-maturity bonds against the higher-valued loans that the contracts were designed to protect.²³ The treatment of restructuring was identified as an important issue in the BIS report, and it may not be completely resolved unless the new Basel Capital Accord drops the need for CDS hedges to include restructuring as a credit event.²⁴

In fact, the most recent Accord proposal (BIS 2003b) does indeed make restructuring an optional event when the bank has complete control over the restructuring decision. However, since few banks are in this position, the BIS indicates that it will continue to explore alternative restructuring treatments.

Incentive Problems

Both BIS (2003a) and Kiff, Michaud, and Mitchell (2003) discuss extensively the ways that CRT instruments change the relationships between borrowers and lenders, creating new relationships with other risk takers. Many features inherent in CRT instruments limit the conflicting incentives that could arise from these relationships.

For example, lenders have an incentive to protect only high-risk assets, and to lower their standards regarding the screening and monitoring of such borrowers after they have purchased protection. Appropriate incentives are introduced by credit support from lenders (e.g., providing letters of credit for ABSs), structural enhancements (e.g., overcollateralization and taking subordinated interests), and through the

issuer’s desire to maintain a reputation for issuing quality securities.

CDOs, which give collateral managers some latitude over the composition of the asset pool and timing of transactions within the pool, are particularly prone to incentive problems. For example, a CDO manager who is also the source of the pool’s assets might be tempted to replace maturing assets with low-quality assets off its own balance sheet. Such incentives can be mitigated by the use of independent management boards, strict substitution rules, and the provision of information on the securitized assets, plus manager participation in the equity tranche and other forms of risk retention.²⁵

Summary

There is little doubt that CRT instruments increase market efficiency and the dispersion of risk, but in doing so they create other potential risks and problems. These include legal and incentive-alignment issues that the market seems to be well on the way to solving. In addition, on a more systemic level, disclosure and transparency seem low, although various authorities are in the process of requiring improvements in this area for many of these instruments. Finally, the increasing complexity of these instruments is of some concern as is the increasing reliance of market participants on rating-agency and “black-box” risk assessments.

Such concerns are allayed to some extent by the still low levels of activity in these markets, particularly when compared with other risk-transfer markets, such as those for interest rate and currency derivatives. For example, the notional value of outstanding contracts for credit derivatives is only about 2 per cent of the value of outstanding interest rate and currency-swap contracts.²⁶ Also, for many lenders, managing

22. In physical delivery contracts, it is necessary to provide for more than one deliverable asset, to ensure that the contract can actually be settled.

23. In 1999, the International Swaps and Derivatives Association (ISDA) introduced some modifications to the market-standard documentation that restricted the terms to maturity of the assets that can be delivered under a restructuring event. However, this “modified restructuring” language does not seem to have completely eliminated the potential for delivery option exploitation.

24. On 3 March 2003, the Creditflux news service reported that CIBC is suing Ace Capital Re Overseas Ltd. over the monoline insurance company’s refusal to honour its side of a CDS that referenced Xerox. In 2002, Xerox’s bankers extended the maturities of some of its bank loans, triggering a controversy as to whether this was a “distressed” restructuring.

25. See Nazarian (2002) for a discussion of potentially abusive practices by CDO managers and some suggested solutions.

26. According to the ISDA (2003) there were US\$2 trillion of credit derivatives outstanding (by notional value) at the end of 2002, versus US\$100 trillion of interest rate and currency derivatives. However, the potential risk exposures being transferred by credit derivatives, relative to those being transferred by other types of derivatives, may in fact be larger than those inferred from just comparing notional values. For example, the impact of a reference entity bankruptcy on the value of a credit derivative would likely be much greater than that of even the most extreme interest rate or currency “events.”

credit risk at the origin of the transaction remains the preferred way of achieving their target profile for credit risk.²⁷

References

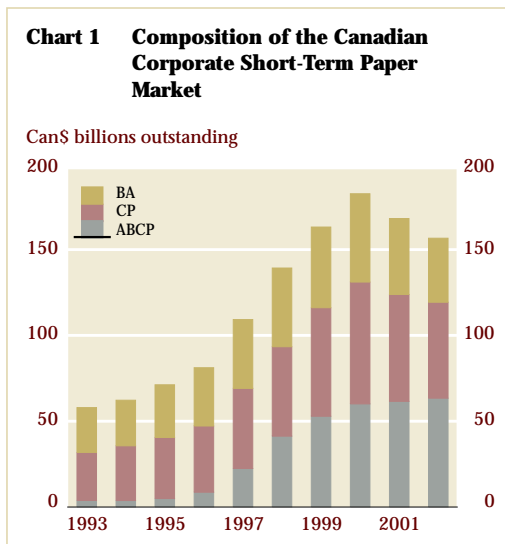
- Armstrong, J. 1997. "The Changing Business Activities of Banks in Canada." *Bank of Canada Review* (Spring): 11–38.
- . 2003. "The Syndicated Loan Market: Developments in the North American Context." Bank of Canada Working Paper No. 2003-15.
- Bank for International Settlements (BIS). 2003a. *Credit Risk Transfer*. Report submitted by a working group established by the Committee on the Global Financial System. Basel: BIS (January).
- . 2003b. *The New Basel Capital Accord*. Third Consultative Paper by the Basel Committee on Banking Supervision. Basel: BIS (April).
- British Bankers' Association (BBA). 2002. *BBA Credit Derivatives Report 2001/2002*. London: BBA.
- Financial Accounting Standards Board (FASB). 2003. "Consolidation of Variable Interest Entities – An Interpretation of ARB No. 51." *FASB Interpretation No. 46* (January).
- Financial Services Authority (FSA). 2002. "Cross-Sector Risk Transfers." Discussion Paper. London: FSA.
- Fitch Ratings. 2003. "Global Credit Derivatives: Risk Management or Risk?" Special Report 10 March. Available at <http://www.fitchratings.com>.
- Hull, J., M. Predescu, and A. White. 2003. "The Relationship Between Credit Default Swap Spreads, Bond Yields, and Credit Rating Announcements." University of Toronto Working Paper (March).
- International Swaps and Derivatives Association, Inc. (ISDA). 2003. "ISDA 2002 Year-End Market Survey." New York: ISDA (19 March). Available at <http://www.isda.org>.
- Kessler, M. and L. Levenstein. 2001. "Credit Default Swaps versus Financial Guarantees – Are the Risks the Same?" Moody's Investors Service (June).

27. This is demonstrated in, for example, the Rutter Associates survey, which is summarized in Smithson et al. (2002).

- Kiff, J., F.-L. Michaud, and J. Mitchell. 2003. "An Analytical Review of Credit-Risk-Transfer Instruments." *Banque de France Financial Stability Review* (June).
- Kiff, J. and R. Morrow. 2000. "Credit Derivatives." *Bank of Canada Review* (Autumn): 3–11.
- Miville, M. and A. Bernier. 1999. "The Corporate Bond Market in Canada." *Bank of Canada Review* (Autumn): 3–8.
- Mountain, J. 2003. "FASB's SPE-cial Delivery on Consolidation Accounting." *Deloitte & Touche Heads Up* 10 (4 February).
- Nazarian, D. 2002. "Structural Features Aimed at Enhancing CDO Ratings Stability: An Overview." Moody's Investors Service, Special Report (July).
- Office of the Comptroller of the Currency (OCC). 2002. *Bank Derivatives Report: Third Quarter 2002*. Washington: OCC (December). Available at <http://www.occ.treas.gov>.
- O'Kane, D. and R. McAdie. 2001. "Explaining the Basis: Cash versus Default Swaps." *Lehman Brothers Structured Credit Research* (May).
- Parfeniuk, L. and T. Azarchs. 2003. "FIN 46 Likely to Have Impact on Major Canadian Banks." *Standard & Poor's* (16 April).
- Perraudin, W. and V. Peretyatkin. 2002. "EL and DP Approaches to Rating CDOs and the Scope for 'Ratings Shopping.'" In *Credit Ratings: Methodologies, Rationale and Default Risk*. Edited by M.K. Ong. Risk Books.
- Sender, H. 2002. "Deals & Deal Makers: A Market Backfires, and Investors Pay," *Wall Street Journal*, 5 December, C1.
- Smithson, C., S. Brannan, D. Mengle, and M. Zmiewski. 2002. "Results from the 2002 Survey of Credit Portfolio Management Practices." Rutter Associates (17 October). Available at <http://www.rutterassociates.com>.
- Toovey, P. and J. Kiff. 2003. "Developments and Issues in the Canadian Market for Asset-Backed Commercial Paper." *Bank of Canada Financial System Review*, this issue.

Developments and Issues in the Canadian Market for Asset-Backed Commercial Paper

Paula Toovey and John Kiff



The market for asset-backed commercial paper (ABCP) in Canada has grown considerably over the past 6 years. It now accounts for about 40 per cent of the market for short-term corporate paper (Chart 1), and is the dominant form of asset-backed securities issued in Canada (Table 1). Asset-backed securities typically repackage large quantities of small, homogeneous assets into a “special purpose vehicle” (SPV) that issues highly rated securities. Typical assets include mortgages, credit card receivables, automobile loans and leases, and trade receivables.

The development of the ABCP market has been encouraged by complementary factors. Investors have been seeking to invest in highly rated short-term securities while, at the same time, the supply of government treasury bills has shrunk (Chouinard and Lalani 2001–2002, 19).

The big buyers of ABCP appear to be money market mutual funds, pension funds, corporations, governments, and financial institutions.¹ There is little foreign interest in the domestic ABCP market. The 10 per cent withholding tax levied on interest payments by Canadians to U.S. residents makes it uneconomical to sell securitized short-term corporate obligations, equipment leases, residential mortgages, and personal loans to U.S. investors.²

On the supply side, securitization provides firms with an alternative source of funding, potentially at lower cost than traditional sources. The alternatives include traditional commercial paper and bankers’ acceptances. Commercial

1. This buy-side information is based on informal surveys conducted by the authors among the Canadian banks active in the ABCP market.
2. There is some expectation within the market that the withholding tax will be lifted (Fingerhut 2003).

paper will usually be more expensive for all but the highest-rated firms, since the market demands a higher rate of return on instruments rated below typical ABCP. Bankers' acceptances effectively carry the guarantee of a top-rated bank and can be issued at rates that are competitive with those on ABCP, but after the bank "acceptance" charge is factored in, they would probably be more expensive.

Another important supply-side factor has been the capital taxes levied on corporations by the federal and provincial governments. Such taxes are paid regardless of whether the corporation is profitable, and differ from province to province, recently ranging from 0.225 per cent to 0.865 per cent of capital. For purposes of this tax, "capital" includes, among other things, capital stock, retained earnings, and liabilities.³ Hence, tax savings could result from paying down liabilities with the proceeds of securitizations. However, both the federal and some of the provincial governments have recently announced that they will be reducing these taxes in steps, so that by 2008 they should be completely eliminated.

The major banks account for the issuance of about 90 per cent of outstanding ABCP, with three of them accounting for over 75 per cent. In addition, some banks have been quite active in the U.S. ABCP market.⁴

Most ABCP issuance takes the form of a multi-seller structure, in which the sponsor, usually one of the major banks, seeks to provide financing to a diverse group of clients. Multi-seller ABCP provides funding on an anonymous basis, which could be important for some who might otherwise issue traditional commercial paper or bankers' acceptances.⁵ In contrast, in

Table 1
Outstanding Domestic Asset-Backed Securities^a
\$ billions

	Asset-backed commercial paper		Single-seller term	Total
	Multi-seller ^b	Single-seller ^c		
Bank of Montreal	19.476	-	3.587	23.063
CIBC	11.356	3.465	4.205	19.026
TD Bank	9.713	4.820	2.468	17.002
Scotiabank	2.681	0.534	5.561	8.776
Royal Bank	5.486	0.086	2.992	8.545
Merrill Lynch	-	-	3.709	3.709
Coventree Capital Group Inc.	3.342	-	-	3.342
National Bank of Canada	-	0.919	1.415	2.334
Other	1.862	0.058	0.488	2.408
Total	53.897	9.881	24.426	88.204

a. National Housing Act mortgage-backed securities (NHA-MBS) transactions are not included in the tabulation.

b. The multi-seller ABCP breakdown by institution is based on who sponsors the issuance.

c. The single-seller breakdowns are based on which institution provided lead structuring services.

Source: Dominion Bond Rating Service. Data as of 31 December 2002.

3. For more detail on capital tax calculations, see McQuillan and Cochrane (1996).
4. According to Standard & Poor's, at year-end 2002, four Canadian banks were involved in US\$31.5 billion of U.S.-based multi-seller ABCP issuance. One bank is also involved in four European structured-investment vehicles (SIVs) with an outstanding value of US\$3.7 billion at the end of September 2002. An SIV is an asset-backed structure that buys high-quality medium- to long-term fixed-income assets and funds them with commercial paper.
5. Anonymity could be important to a borrower for whom the signal effects of a more visible funding operation might reduce its access to other funding sources.

single-seller ABCP issuance, the sponsor is securitizing its own assets. Although most single-seller issuance programs are operated by one of the major banks, several retailers and automobile companies issue ABCP directly.

The Mechanics of Credit-Risk Reduction

Ninety-five per cent of Canadian ABCP carries an R-1 (high) credit rating from the Dominion Bond Rating Service (DBRS). Few securitized assets would receive such a strong rating on a stand-alone basis.

To achieve this rating, the credit risk of the ABCP is reduced by way of various structural and third-party enhancements. The structural enhancements include transferring into the SPV assets with a greater aggregate value than the value of the ABCP issued (“overcollateralization”). Another popular enhancement is the issuance by the SPV of lower-rated securities that absorb the first defaults (“subordination”).⁶

Third-party credit enhancements typically take the form of letters of credit and surety bonds from highly rated financial institutions. The legal documentation for most ABCP specifies minimum ratings for such enhancers (usually AA (low) or R-1 (mid) by the DBRS), but the names of the enhancement providers are not always made known. In fact, in a typical multi-seller issuance program, the sponsor itself could be one of the credit enhancers.⁷

In addition to these concrete enhancements, “implicit recourse” to the originator of the loan may play a role in mitigating credit risk. Examples of implicit recourse include repurchasing assets from the SPV at an amount greater than fair value, as well as exchanging performing assets for non-performing assets. Implicit recourse is a form of moral or reputational risk mitiga-

tion. For example, should the originator’s reputation be tarnished by a poorly performing securitization, its ability to securitize cost-effectively in the future could be compromised. The originator therefore has an incentive to provide additional support. However, regulators look unfavourably on banks that provide such support to the issuance programs that they manage. For example, the most recent consultation paper on the Basel Capital Accord (BIS 2003) proposes severe regulatory penalties for banks that provide such non-contractual support.

Reduction of Rollover Risk⁸

Because the assets are typically of longer maturity than the ABCP financing them, some sort of liquidity buffer is required to protect against rollover risk and timing mismatches. Hence, ABCP issuance programs purchase liquidity protection. At a minimum, such protection must safeguard against what the Office of the Superintendent of Financial Institutions (OSFI) calls a “general market disruption,” which is defined by market participants as a situation in which “not a single dollar of corporate or asset-backed commercial paper can be placed in the market—at any price.”⁹

A general market disruption is a highly unlikely event, and Canadian liquidity facilities, which do not cover anything beyond this minimum criterion, have never been triggered. According to OSFI (1994), a bank providing liquidity protection that embeds protection against other risks, like credit risk, would incur regulatory capital charges that, when passed on to the issuance program, could make the ABCP less economical.

U.S. regulatory charges have, however, been lighter on liquidity facilities that offer some degree of credit protection. Hence, liquidity enhancement for U.S. ABCP programs typically covers more than just general market

6. See the article by Kiff in this *Review* (p. 33) for a more generic discussion of securitization and other methods of transferring credit risk.
7. Such “self insurance” helps to align the interests of the issuance-program sponsor (and originator in the case of some single-seller ABCP) and the ABCP holders. See Kiff, Michaud, and Mitchell (2003) for a more detailed discussion of incentive-alignment issues in securitization.

8. Important contributions to the discussion of rollover risk were made by Andrew Kriegler, Huston Loke, and Maria Rabiasz.
9. OSFI (1994) provides details on the Canadian regulatory rules that apply to bank securitization activity but does not explicitly define the term general market disruption. Kriegler et al. (2002) provide the market’s generally accepted interpretation given here.

disruptions, offering some elements of protection against credit risk.¹⁰

In fact, a couple of U.S. rating agencies have questioned the adequacy of Canadian-style liquidity enhancement. Their position is that if the rollover protection is not at least somewhat specific to the issuance program, then “timely payment”—an essential element of a top-tier rating by their standards—is not guaranteed. A recent report by Standard & Poor’s points to circumstances when, even in the absence of a general market disruption, liquidity problems could arise although there was no substantive deterioration in the quality of the ABCP program’s underlying assets. These circumstances include rumours and reputational concerns regarding the program sponsor, as well as temporary program-specific operational problems (Rabiasz and Connell 2002). Moody’s has drawn a parallel with the partial market disruption that occurred in the United States following the 11 September 2001 attacks on New York City, noting that Canadian liquidity lines are currently so restrictive that they could not be invoked, even if such a clearly non-credit event caused the liquidity crisis (Kriegler et al. 2002). Because these types of events are not covered by Canadian-style liquidity enhancements, it becomes difficult for Standard & Poor’s and Moody’s to give even investment-grade ratings to Canadian ABCP.

However, the DBRS argues that Canadian ABCP is already fully protected against timing mismatches and credit-deterioration problems, via the program’s credit enhancements and operational practices. Hence, they say that it would be redundant to add U.S.-style supplemental credit-risk protection to the liquidity facility, and they give most Canadian ABCP their highest rating, R-1 (high). In a recent discussion paper, Moody’s has also proposed that the quality of the underlying structure be taken into consideration when determining liquidity-enhancement requirements for top-tier ratings.¹¹

Moody’s suggests that while it is possible for liquidity enhancement to be completely separated from credit enhancement, doing so effectively requires a costly assessment of the stand-alone credit quality of the ABCP program.

As an alternative that does not require liquidity enhancement, some ABCP issuance programs offer “extendible commercial paper” (ECP), which gives the program sponsor the option of extending the term of an issue up to a cumulative maximum of 365 days. The extendibility feature replaces the liquidity facility, essentially passing the liquidity risk, and the compensation for bearing this risk, on to the investor. ECP accounted for about 5 per cent of the Canadian ABCP market at the end of 2002.

Legal Risks Associated with the Securitization Process

The legal structures that support ABCP programs are complex compared with those for conventional debt securities, and there is little standardization of the legal documents that make up their structures. The situation in which ABCP is most likely to be subject to a legal challenge is one where the originator becomes insolvent and its creditors seek to bring the securitized assets back into the estate of the originator to satisfy the claims of the creditors.

The key legal risk is the risk that the transfer of assets into the SPV may be found not to constitute a “true sale,” thereby leaving the securitized assets within the estate of the originator. The legal documentation supporting an ABCP program must be carefully crafted to produce a legal sale of the assets rather than a loan. Although there have been few court challenges of asset securitization in Canada, the recent decision of the Ontario Superior Court of Justice in *Metropolitan Toronto Police Widows and Orphans Fund v. Telus Communications Inc.*¹² demonstrates the strict tests that the courts will apply in determining whether an asset securitization is a true sale. In this case, the Court looked beyond the wording of the contract that created the asset transfer (which clearly showed an intention to create a sale) to examine the conduct of the parties, as well as traditional indications of true sales, including transfer of ownership risk to the purchaser; which party has the right to any

10. Proposed changes to the Basel Capital Accord (BIS 2003) would require the credit risk embedded in U.S.-style liquidity enhancements to be reflected in capital charges. However, implementation of the new Accord is not expected until year-end 2006. These changes are not expected to affect OSFI’s treatment of Canadian liquidity facilities.

11. See Adams (2001) for the DBRS viewpoint and Kriegler et al. (2002) for that of Moody’s.

12. [2003] O.J. No. 128

surplus arising from the collection of the receivables; whether the assets are clearly identified; whether there is an identifiable purchase price for the assets; and which party is responsible for collecting the receivables on whose behalf. In this case, however, a true sale was deemed to have taken place.

While the need to structure the ABCP program as a true sale is the most important legal risk associated with ABCP, there are other significant legal risks. These include the risk that the SPV may not be properly structured as a legal entity separate from the originator, thus failing to make it “bankruptcy remote;” the risk that the transfer of assets to the SPV may be set aside as a fraudulent preference and, in the case of mortgage-backed securities, the risk that the rights of the holders of the commercial paper could be subordinate to the claims of creditors who have registered assignments of the mortgages on title.

The only way that the legal risks associated with ABCP can be controlled is by careful crafting of the legal structure for each securitization program. Security holders can take some comfort from the fact that an issue that has obtained a minimum rating of R-1 (high) from DBRS has likely undergone some due-diligence examination of the underlying structure. In this context, holders decide whether a high credit rating from one rating agency is sufficient comfort as to the underlying legal structure of an issue or whether further examination of the structure is needed.

Disclosure Issues

The fact that securitization is a complicated process involving many participants would seem to argue for a high degree of disclosure. But the market is relatively opaque.

Transaction Details Are Hard to Come By

The rating-policy decisions taken by Standard & Poor’s and Moody’s mean that the sole source of details regarding securitization transactions in the ABCP market is the DBRS. Like all commercial paper, ABCP is exempt from the prospectus and other disclosure requirements of Canadian securities law. As a result, no documents pertaining to most of the big multi-seller

issuance programs can be found on SEDAR (the System for Electronic Document Analysis and Retrieval).¹³ Thus, an investor who wants a “second opinion” is currently constrained, although some relevant details may be available directly from the sponsor or underwriter of the issuance program. Furthermore, what little detail is publicly available is often silent on which banks are providing credit and liquidity enhancements and on the composition of the asset pool.

Although the rating agencies publish some of this information, many details are held back because of confidentiality policies. The DBRS has expressed concern in this regard:

Much more detailed information on pools and sellers, and better statistics on asset quality and enhancement levels are needed. DBRS already publishes some information on each pool monthly, but much more information is available (Schroeder and Loke 1998, 10).

Nevertheless, in the case of multi-seller programs, increased disclosure regarding the asset pool would have to be mindful of the desire for originator anonymity. There are, however, no obvious reasons why information about credit and liquidity enhancement should not be made available.

Unclear Degree of Real Risk Transference

Real and effective transfer of risk is one of the premises upon which securitization is based. From the little information available on individual issuance programs, however, it appears that the originating institutions can choose to retain a fair degree of exposure to the assets they are securitizing. For example, in the case of some Canadian multi-seller issuance programs, some banks may have credit-risk exposures to the assets in the SPV. It would be useful if more information on such matters was disclosed.

Improvements may be on the way, thanks to moves by the Canadian Accounting Standards

13. SEDAR is managed by CDS INC., a subsidiary of The Canadian Depository for Securities Ltd. (CDS). All Canadian public companies and mutual funds must file on SEDAR all documents required by the various bodies that regulate securities markets.

Board of the Canadian Institute of Chartered Accountants and the U.S. Financial Accounting Standards Board (FASB) to improve disclosure standards for all securitization activity. These new standards may also require banks to include in their balance sheets some of the assets in the multi-seller ABCP issuance programs that they sponsor. The question of how much exposure is to be brought onto their balance sheets (i.e., consolidated) may depend in part upon the amount of credit-risk protection embedded in any liquidity enhancements provided by the sponsoring bank. It seems likely that some Canadian banks will have to consolidate the exposure that pertains to their U.S.-based programs, where liquidity protection sometimes goes beyond general market disruption. The degree of consolidation required for their Canadian-based programs is less clear, given the more restrictive nature of the liquidity enhancements.¹⁴

In addition, “Pillar 3” of the new Basel Accord will require increased disclosure of credit-risk transfer in general, although implementation is not expected to take place until the end of 2006.

Summary

The Canadian market for ABCP has grown from near zero in 1985 to \$63.7 billion at the end of 2002, and most ABCP carries a top-tier credit rating. The market has played an important role in providing low-cost corporate funding and in filling the gaps in the high-quality, short-term paper market left by the shrinking issuance of government treasury bills.

Although ABCP poses potential legal and liquidity risks that are inherent in the securitization process, the Canadian investment community seems comfortable with them. On the other hand, current disclosure of transaction details leaves much to be desired, and information that reveals the extent to which risk has actually been transferred by the originator and where it has actually gone is lacking. This last concern is being addressed by recent initiatives introduced by accounting and regulatory authorities.


14. See Mountain (2003) for more on the FASB guidelines and Parfeniuk and Azarchs (2003) for speculation regarding the potential impact on the balance sheets of Canadian banks.

References

- Adams, M. 2001. *Canadian Liquidity Facilities—The Preferred Alternative*. Dominion Bond Rating Service Limited (March).
- Bank for International Settlements (BIS). 2003. *The New Basel Capital Accord*. Third Consultative Paper by the Basel Committee on Banking Supervision. Basel: BIS (April).
- Chouinard, É. and Z. Lalani. 2001–2002. “The Canadian Fixed-Income Market: Recent Developments and Outlook.” *Bank of Canada Review* (Winter): 15–25.
- Fingerhut, M. 2003. *Canadian Securitization—2002 in Review*, Blake, Cassels & Graydon LLP (21 February).
- Kiff, J. 2003. “Recent Developments in Markets for Credit-Risk Transfer.” *Bank of Canada Financial System Review*, this issue.
- Kiff, J., F.-L. Michaud, and J. Mitchell. 2003. “An Analytical Review of Credit-Risk-Transfer Instruments.” *Banque de France Financial Stability Review* (June).
- Kriegler, A., S. Pilcer, J. Dornhofer, and V. Poole. 2002. “Alternatives for Structuring Liquidity for Asset-Backed Commercial Paper Programs: Conduit Issuer Ratings and Pure Liquidity Support.” Moody’s Investors Service, 26 February.
- McQuillan, P.E. and E.C. Cochrane. 1996. “Capital Tax Issues.” Government of Canada, Department of Finance, Technical Committee on Business Taxation. December.
- Mountain, J. 2003. “FASB’s SPE-cial Delivery on Consolidation Accounting.” *Deloitte & Touche Heads Up* 10 (4 February).
- Ontario Superior Court of Justice, Court File No: 99-CL-003317, 21 January 2003.
- Office of the Superintendent of Financial Institutions (OSFI). 1994. “Asset Securitization.” OSFI Guideline No. B-5 (July).
- Parfeniuk, L. and T. Azarchs. 2003. “FIN 46 Likely to Have Impact on Major Canadian Banks.” *Standard & Poor’s* (16 April).

Rabiasz, M. and T. Connell. 2002. "Leap of Faith: Canadian asset-backed commercial paper often lacks liquidity backup." *Canadian Treasurer* 18: 29–32.

Schroeder, W. and H. Loke. 1998. *The Basics of Multi-Seller Securitizations in Conduits*. Dominion Bond Rating Service Limited (April).



Policy and
Infrastructure
Developments

Introduction

The financial system and all of its various components (institutions, markets, and clearing and settlement systems) are supported by a set of arrangements, including government policies, that influence its structure and facilitate its operation. Taken together, these arrangements form the financial system's infrastructure. Experience has demonstrated that a key determinant of a robust financial system is the extent to which it is underpinned by a solid, well-developed infrastructure. This section of the Review highlights work in this area, including that related to relevant policy developments.

In the design of financial clearing and settlement systems, one critical objective is to minimize the risks faced by participants. Supporting the ability of important systems to operate without prolonged disruptions is a key element in meeting this objective.

To this end, the Bank of Canada is involved in ongoing discussions with system operators and participants regarding the capacity of Canadian clearing and settlement systems to recover from severe operational shocks. *Business-Continuity Planning in Clearing and Settlement Systems: A Systemwide Approach* examines the issues that are being addressed as system operators and participants, together with regulators, move to enhance the overall robustness of current systems.

Multiple sources of risk are potentially associated with the clearing and settlement of each securities transaction. *CDSX: Canada's New Clearing and Settlement System for Securities* describes a new system for debt and equity transactions that is currently being implemented. CDSX is a well-designed system that meets international standards for controlling risk and is expected to deliver significant cost savings.

Business-Continuity Planning in Clearing and Settlement Systems: A Systemwide Approach

Ron Allenby

Clearing and settlement systems are interconnected networks that include the operators of these systems, the participants, liquidity providers, and settlement agents. Clearing and settlement systems that transfer large values are essential to the smooth functioning of the financial system and the economy. It is therefore important that these systems function without any significant and prolonged disruption, even when disaster strikes.

The operators and participants in these systems have always viewed business-continuity planning (BCP)¹ as important. However, events such as the 1998 ice storm in Eastern Ontario and Quebec, Y2K, and the terrorist attacks in New York and Washington in September 2001 underscored the interdependencies in these networks and called into question the scope of the scenarios that BCP has traditionally been designed to address. For example, these events have heightened the need to consider scenarios that have regional impacts, rather than focusing on events that affect only single institutions.

The Bank of Canada is therefore encouraging a closer examination of the ability of the financial infrastructure to recover from severe shocks and to continue to provide critical services.² The Bank of Canada's focus is on the systemwide implications of the business-continuity plans developed by individual institutions for various elements of critical clearing and settlement systems. Recent events have made it clear that financial institutions, clearing and settlement

systems, and financial markets depend not only on each other, but also on other key non-financial service providers in a manner that had not been fully appreciated. For example, single points of failure (e.g., two independent telecommunication providers sharing common infrastructure points) or concentrated reliance by many institutions on a common provider for recovery services may result in problems in the event of regionwide difficulties. The Bank consequently felt that there would be benefits from discussing BCP issues with system operators and participants and assessing whether coordination of BCP activities was warranted.

In early 2003, the Bank of Canada met with the operators of Canada's two large-value clearing and settlement systems and some of their participants to discuss a number of systemwide BCP issues. Based on that meeting, it was agreed that some coordination of planning efforts would be worthwhile, and several private sector initiatives are now underway. A follow-up to this initial meeting will be held later in 2003.

Critical Clearing and Settlement Systems in Canada

Canada has two large-value clearing and settlement systems that are judged to be systemically important, both of which are operated by the private sector. The Large Value Transfer System (LVTS), which is operated by the Canadian Payments Association (CPA), accounted for approximately 85 per cent of the value of all payments settled through payments systems in Canada in 2002. CDSX, which is operated by The Canadian Depository for Securities Limited (CDS), holds almost all debt securities issued in Canada and allows debt-securities transactions

1. BCP is a method for managing one aspect of operational risk. For more on managing operational risk, see the article by McPhail in this issue (p. 79).
2. Similar reassessments are being undertaken by other central banks, the Basel Committee on Banking Supervision of the Bank for International Settlements, and the Financial Stability Forum.

to be settled on an intraday basis.³ End-of-day funds positions in CDSX are settled through the LVTS. Both systems have risk-proofing measures that result in transactions being final and irrevocable.

In the event that these systems were unable to operate or to complete a day's activities, serious disruptions would arise in the financial system and the economy. Without a functioning LVTS, settlement of a wide range of important transactions in a risk-free environment would be very difficult. Without CDSX, settlement of almost any security transaction would be impossible. This could severely disrupt the functioning of financial markets. It could also disrupt the operations of the LVTS, since CDSX is used to pledge collateral to support LVTS payments. It is therefore critical that these systems be designed to resist most system interruptions and have the capability to quickly recover operations on the rare occasion when disruptions might occur.

Identifying Important Participants

Not only are some systems critical to the operation of the financial system, but certain system participants may also be critical to the overall stability of clearing and settlement systems.⁴ These institutions could be crucial because they perform certain functions, or because they are a major supplier—or unique supplier—of a particular type of activity. Not all participants will have the same degree of importance, but finding a precise definition for an “important” participant is a challenge. In theory, the definition might be the threshold at which a participant, should it suffer operational difficulties, prevents a critical clearing and settlement system from operating effectively. In such a case, there could be significant strain on the liquidity of the system, such that major transactions could not be completed (McPhail and Senger 2002). It may seem obvious that some larger participants fit

this definition. In practice, however, this determination is not easy to make.

Should participants that are deemed “important” to the stability of critical clearing and settlement systems be held to higher recovery standards than others? If important participants are not held to higher standards, then critical clearing and settlement systems could be affected by a protracted participant disruption. At the same time, requiring important participants to meet higher standards could potentially lead to increased costs. These costs might simply be passed on to clients as a cost of doing such business. However, they might also lead clients to divert their business towards less-well-protected—and systemically less important—participants, if the clients were unwilling to pay higher prices and if other service providers were available.

On the other hand, important participants could see their competitive positions erode, and some participants might simply choose to exit the business under such circumstances. This could reinforce the concentration of business in the hands of a smaller number of participants, possibly leaving the system as a whole more vulnerable or poorly served. This, in turn, could mean that these participants would face higher recovery standards as they became relatively more important, again setting in train an adjustment process as costs are ultimately shifted to clients. More work is needed to examine the implications of having higher recovery standards for “important” participants in clearing and settlement systems.

Recovery Times: What Is Acceptable?

Even in ordinary times, critical systems and their important participants have plans for rapid business recovery. Currently, a recovery time of two hours or less is seen by many to be the maximum acceptable for critical business functions. The pressure to minimize any downtime continues to increase, pressure that is reinforced by the recent introduction of the CLS Bank. Settlement of foreign exchange transactions through the CLS Bank requires tight deadlines for delivery of Canadian dollars to the CLS Bank. Any significant delay in receiving these funds will result in disruptions to CLS settlement and could create liquidity disruptions in

3. Equities are expected to be included in CDSX later in 2003. For more on CDSX, see the article by McVanel in this issue (p. 59).

4. Thirteen deposit-taking institutions, as well as the Bank of Canada, participate directly in the LVTS. Of these, 11 also participate in CDSX. CDSX has approximately 80 participants, including banks, trust companies, investment dealers, and the Bank of Canada.

the payments systems of a number of countries. While certain steps can be taken to deal with interruptions to the CLS Bank's operations, interruption of essential services for much more than two hours can have very significant undesirable effects.

The Range of Planning Scenarios

Traditionally, the scenarios contemplated when designing a business-continuity plan were limited to a single institution's problems, with the assumption that staff could quickly relocate to backup facilities and that other clearing and settlement participants were not affected. But, as mentioned earlier, recent events have raised the prospect of broader regional events. A broader regional event challenges the typical BCP model that has primary and backup sites located in relatively close proximity and which assumes that employees will always be able to move from a primary to a backup site. If the sites are too close together, a widespread event could prevent the execution of operations at the site to which employees would be expected to relocate.

A very conservative BCP model might call for split parallel operations, with sufficient distance between the two sites and enough staff in each location to take over full operation. Fully staffing and equipping a second site could, however, reduce the benefits of economies of scale and significantly increase operating costs for clearing and settlement systems and their participants. The associated costs make this model difficult to rationalize for many participants. From a systemwide perspective, finding an appropriate balance between benefits and costs so that payments and securities can continue to be exchanged in the event of an outage over a wide area is not a simple task.

Are the Incentives Right?

Do the operators of critical clearing and settlement systems, their important participants, and other key non-financial service providers (such as telecommunications and hydro operators) have the right incentives to implement an appropriate level of recovery capability? The interdependencies involved in these networks create externalities. More robust contingency arrangements at one participant, for example, tend to benefit others and the system as a whole. One

might therefore expect that, acting in isolation, participants would underinvest in BCP to contain the systemwide impact of events. If each participant adopted this attitude, the system as a whole might remain underprotected.

That is why it becomes helpful for system operators, participants, and other key service providers to take a broader look at the issues and to understand the impact that their decisions can have on the system as a whole. A coordinated BCP effort may benefit the whole financial system and, therefore, participants with large stakes in its continued operation.

Next Steps

Private sector operators and their participants must continue to have the key role in assessing whether their BCP is adequate and that their plans provide sufficient resiliency to avoid disruption to their critical operations. The public sector can contribute by bringing a systemwide perspective to this effort. Such coordinated efforts within the Canadian financial system offer benefits beyond those that any single institution can achieve alone. The Bank of Canada will continue to encourage system operators and important participants to work together to achieve robustness for the whole system, so that critical systems will be able to withstand or recover relatively quickly from severe disruptions. A broad systemwide perspective on BCP will provide additional benefits that include understanding the impact that the decisions and actions of individual participants have on the whole system; helping to identify codependencies, such as single points of failure or concentrated reliance by many institutions on a common service provider; helping to enhance standards of technical competency; and establishing a communications strategy both to prepare for an event and to assist in managing an event.

In January 2003, the Bank of Canada met with the operators of Canada's critical clearing and settlement systems and some of their participants. This meeting strengthened a process of communication that will continue throughout 2003. The CPA and the CDS, the operators of the LVTS and CDSX, will take forward the initiative. This initiative will focus on many of the systemwide issues discussed above and will involve the participation of many financial institutions, as well as non-financial service

providers. This approach shows considerable promise in addressing many of the difficult issues associated with systemwide BCP and in contributing to strengthening the capacity of critical clearing and settlement systems and the financial sector to withstand and recover from severe shocks.

References

- McPhail, K. and D. Senger. 2002. "The Impact of Participant Outages on Canada's Large Value Transfer System." *Bank of Canada Financial System Review* (December): 45–48.
- McVanel, D. 2003. "CDSX: Canada's New Clearing and Settlement System for Securities." *Bank of Canada Financial System Review*, this issue.

CDSX: Canada's New Clearing and Settlement System for Securities

Darcey McVanel

A typical securities transaction occurs each time two parties enter into a contract to trade debt or equity securities for funds.¹ In theory, the completion of a securities transaction is very simple, requiring nothing more than the direct transfer of securities and funds between the buyer and seller. In reality, however, the process is more complex and involves many parties from start to finish. Securities transactions are typically completed through a central system that transmits, reconciles, and confirms the obligations of participants (clears) and transfers the securities and funds between the parties (settles). Securities are also held in a central depository and transferred electronically rather than physically. The important role played by Canada's securities clearing and settlement system is the focus of this article.

CDSX is the new clearing and settlement system for debt and equity securities in Canada. Implemented in its first stage on 31 March 2003, it replaces the Debt Clearing Service (DCS), which was used to clear and settle most Canadian-dollar debt transactions, and is also expected to replace the Securities Settlement Service (SSS), which settles equities and some debt transactions.² CDSX incorporates the robust risk-containment arrangements used in DCS and represents a significant improvement in cost-efficiency. It is also consistent with international standards for clearing and settlement of securities.³

1. Debt and equities are jointly referred to as securities and are more commonly known as bonds and stocks.
2. Implementation of CDSX began with debt being transferred from DCS, and equities are expected to follow over the course of the next few months.
3. The internationally recognized minimum standards for securities clearing and settlement are the CPSS-IOSCO "Recommendations for Securities Settlement Systems" (BIS 2001b).

CDSX is one of the most important clearing and settlement systems in Canada because it deals in very large values and facilitates a well-functioning collateral market.^{4,5} Collateral is a necessary component of many financial arrangements and is critical to the functioning of other important clearing and settlement systems, such as the Large Value Transfer System (LVTS). CDSX is thus a systemically important clearing and settlement system. Given the size and the type of transactions it processes, it could trigger or transmit serious shocks across domestic and international financial systems or markets if it were insufficiently protected against risk. The stability of the Canadian financial system requires that all systemically important clearing and settlement systems are sufficiently risk-proofed that they are able to operate in all reasonable circumstances. For this reason, systemically important clearing and settlement systems in Canada, which include CDSX, are subject to formal oversight by the Bank of Canada.

The Oversight Process

In 1996, Parliament passed the Payment Clearing and Settlement Act (PCSA), which created a formal designation and oversight process for clearing and settlement systems that could be operated in such a manner as to pose a risk to the system or its participants. In Canada, there are three systemically important clearing and settlement systems: CDSX for securities, the Large Value Transfer System (LVTS) for large-value payments, and the Continuous Linked Settlement Bank (CLS Bank), an international system for settling foreign exchange

4. Debt securities are the primary instrument used as collateral in many financial arrangements.
5. For a general description of Canadian clearing and settlement systems, refer to Box 5 on page 27.

transactions.⁶ The Act provides the means for the Bank of Canada to assess the adequacy of risk-containment arrangements in these systems and provides certainty regarding the enforceability of the legal arrangements that underlie designated systems. The Bank also requires that systems designated for oversight, such as CDSX, meet international minimum standards.

Risk Mitigation through System Design

The issues of system design and risk mitigation are intimately related; that is, the design of the system involves a combination of risk-mitigation techniques. This section provides an overview of system design, followed by a more thorough explanation of the techniques used to mitigate the specific risks inherent in securities clearing and settlement systems. Formal definitions of these risks are given in Box 1.

An Overview of System Design, Risk, and Efficiency in CDSX

CDSX is a system designed to incorporate thorough risk-proofing. At the same time, steps to reduce risk are carried out in the most cost-effective manner. The four most important risk-mitigation techniques and their consequences for cost-efficiency are the following:

- CDSX must be able to withstand the default of the participant with the largest obligation to the system. As a result, participants are subject to limits on their obligations to the central counterparty. They must also collateralize their obligations, which is expensive. Collateral costs in CDSX are decreased by netting payment obligations and by allowing participants to pool collateral within groups of participants. Furthermore, transactions are final and irrevocable intraday, so participants can use as collateral any securities they have purchased immediately upon completion of a transaction.⁷
- There must be a simultaneous transfer of securities and payment obligations in each

6. See Miller and Northcott (2002) for an overview of the CLS Bank.

7. Provided that the securities they have purchased are eligible for use as collateral in CDSX.

Box 1

The Major Risks in Securities Clearing and Settlement^a

Banker risk	The risk that a private institution acting as the settlement agent will fail.
Credit risk	The risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter.
Legal risk	The risk that a party will suffer a loss because laws or regulations do not support the rules of the securities settlement system, the performance of related settlement arrangements, or the property rights and other interests held through the settlement system.
Liquidity risk	The risk that a counterparty will not settle an obligation for full value when due, but on some unspecified date thereafter.
Operational risk	The risk that deficiencies in information systems or internal controls, human errors, or management failures will result in unexpected losses.
Principal risk	The risk that the seller of a security delivers a security but does not receive payment or that the buyer of a security makes payment but does not receive delivery.
Systemic risk	The risk that the inability of one institution to meet its obligations when due will cause other institutions to be unable to meet their obligations when due. Such a failure may cause significant liquidity or credit problems, and, as a result, might threaten the stability of or confidence in markets.
Pre-settlement risk	The risk that a counterparty to a transaction for completion at a future date will default before final settlement. The resulting exposure is the cost of replacing the original transaction at current market prices.

a. Most definitions are from the Bank for International Settlements (BIS 2001a).

transaction. This is referred to as delivery versus payment (DVP) and is facilitated by the fact that the exchange of securities does not require physical transfer between the buyer and seller. Rather, the securities are immobilized in the system, and ownership is transferred via an electronic book-entry process. Immobilization allows transactions to be completed quickly, very accurately, and at a lower cost.

- End-of-day funds exchange must be very secure and therefore takes place on the LVTS, a well-risk-proofed payments system. Since collateral can be transferred between CDSX and LVTS as needed, the demand for collateral in the two systems can be reduced.
- Finally, CDSX must be extremely reliable and must incorporate extensive contingency arrangements. The need for a highly reliable system motivated the replacement of the outmoded SSS with the new system. Combining the two systems will reduce overall operating expenses.

The owner and operator of CDSX, The Canadian Depository for Securities (CDS), plays a major role in risk mitigation.⁸ It acts as the central securities depository to facilitate delivery versus payment, takes the role of central counterparty to maximize the effectiveness of netting, monitors collateral requirements so that the system is able to withstand the default of the largest net debtor, and is responsible for the system's operational security. Finally, CDS sets caps on the total amount of funds each participant is allowed to owe to the system to limit potential risk in the event of a default.

An Efficient Use of Collateral

The most important risk-mitigation objective in CDSX is that it is designed to be able to withstand the default of the largest net debtor. Participants are subject to limits on the maximum amount they can owe to the central counterparty and must pledge collateral to cover payment obligations that arise in the system. In the event that payment obligations are not fulfilled, the collateral is used to generate the liquidity needed for the system to settle, thus eliminating

credit risk. Certain techniques seek to minimize the cost of providing collateral—payments netting is employed, and payment obligations are collateralized only up to the point that the system is able to withstand the default of the largest net debtor.

The settlement of a securities transaction consists of two parts: a securities transfer and a funds transfer.⁹ Either or both of the securities and funds can be transferred on a gross basis, or on a net basis, in which case, a number of transactions are allowed to offset each other. CDSX employs a gross intraday settlement approach for securities: the securities are transferred in real time between the two participants upon settlement of the trade. Funds positions, however, are netted on a transaction-by-transaction basis and are settled at the end of the day.

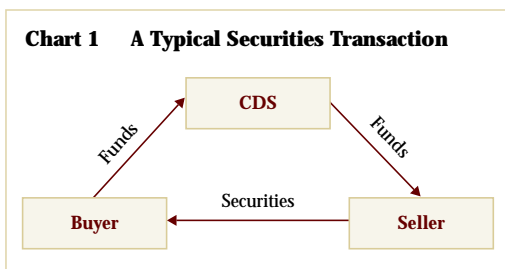
CDS substitutes itself as the central counterparty for the funds portion of each transaction to minimize the end-of-day payment obligations of participants. Chart 1 illustrates a typical securities transaction: securities are transferred directly from the seller to the buyer, and CDS becomes the counterparty for the funds portion of the trade. This way, participants can conduct transactions with many other participants throughout the day and end up with only one netted funds obligation with CDS—either to pay CDS funds owed or to be paid funds owed by CDS.¹⁰

Netting significantly reduces collateral needs so that, for any given value of security trades, the amount of funds needed for settlement is significantly less than otherwise. Specifically, netting allows “buys” (negative funds positions) and “sells” (positive funds positions) to offset each other. Although netting systems are more efficient in their use of liquidity, they have the potential to be riskier if netting arrangements do not have a sound legal basis. In Canada, the PCSA reinforces the legal validity of netting to

8. CDS is a private, not-for-profit institution owned by its participants—Canada's major banks, the stock exchanges, and private investment brokers/dealers.

9. An example of a securities transaction is a pension fund buying 100 shares of Equity X from an investor for \$5 per share. The trade creates an obligation for the investor to deliver 100 shares to the pension fund in exchange for payment of \$500 by the pension fund.

10. CDS acts as the central counterparty for both the funds and the securities portions of future-dated debt transactions, as well as for some equities and cross-border transactions. Caps and collateral are used to minimize risks (such as pre-settlement risk) to which CDS may be exposed.



assure participants that these arrangements will stand up in the event of the default of a participant. The use of netting thus adds efficiency without adding risk.

A second method for minimizing collateral requirements is the use of collateral pools. In a collateral pool, members of the pool combine their collateral for common use and share risk by guaranteeing the obligations of the other members that arise from use of the pool. Each member of a collateral pool is allowed to be in a net debtor position (owe funds to CDS) equal to a proportion of the usable value of all the collateral in their pool.¹¹

In the event of a default by one member of the collateral pool, the securities in the pool are liquidated so that the system can settle. If the defaulter's funds obligation is larger than the liquidation value of the securities it has pledged to the pool, the other collateral pool members are required to cover the defaulter's remaining commitment arising from the defaulter's use of the pool. A collateral-pool arrangement is thus referred to as survivors-pay, because the surviving institutions in that pool share some liability in the event of a default.

CDSX is not structured solely as a survivors-pay arrangement. Indeed, it also operates importantly on a defaulter-pays basis where a participant individually pledges collateral to cover its own payment obligation.

Acceptable Collateral Instruments

The value given to securities as collateral is adjusted to cover the risk that, following a participant's default, the assets pledged to the system cannot be sold for cash (liquidated) at prices close to market value at the time of the pledge. If the only acceptable collateral were cash, this would not be a problem. But since cash is a very expensive form of collateral, acceptable collateral in CDSX also includes securities, the market value of which can fluctuate. Thus, CDSX must be designed to provide a very high probability that all collateral can be liquidated on a timely basis for a value equal to or greater than that assigned to the securities in the system.

11. The usable value of collateral is the market value of each security less a certain amount (a "haircut") to account for day-to-day variability in the market price.

Various types of securities are acceptable as collateral in CDSX. They include Government of Canada bonds and treasury bills, provincial bonds, federal and provincial guaranteed bonds, and certain corporate bonds. In the event of a default, collateral would be used to obtain funds to cover a defaulting participant's negative funds balance in order for the system to settle, and would be sold later. The system operator must therefore be reasonably sure that the value given to securities being used as collateral is not larger than the minimum expected saleable value of the assets. This value, however, is impossible to determine with certainty, since the market value of securities varies daily. The value of securities that can be used as collateral must, therefore, be the current market value *minus* a factor that takes into account expected market variability based on historical performance. This factor is known as a "haircut." Haircuts vary across securities and must take account of (i) the reliability of the market price estimate, (ii) the possibility that market prices decline on the day that the securities are liquidated, and (iii) the estimated number of days required to liquidate the security.

Delivery versus Payment

The system is designed to eliminate principal risk—the risk that one party to a transaction will complete its obligations from a trade but will not receive payment for the asset sold or will not receive the asset it had purchased. To eliminate this risk, CDSX operates using a real-time, delivery-versus-payment (DVP) system, whereby a link between securities transfers and funds transfers ensures that delivery occurs if, and only if, payment occurs (BIS 2001b). Participants are thus assured that, if a transaction is completed, it is completed as contracted.

Tiering

Another risk-control mechanism in CDSX is its use of tiering, whereby some participants—extenders of credit—act as bankers and guarantors for other participants—receivers of credit. The institutions permitted to extend credit include the major banks and, to a limited extent, the Caisse centrale Desjardins du Québec. The receivers of credit include investment dealers and smaller financial institutions.

The main reason for tiering is that it allows the end-of-day funds exchange to go through the LVTS, a well-risk-proofed payments system. To participate in end-of-day funds exchange, participants must have LVTS accounts at the Bank of Canada. Since it is not cost-effective for some smaller participants to hold these accounts, tiering allows the use of the LVTS at a lower cost. The Bank of Canada also acts as settlement agent for CDSX, which means that banker risk is eliminated.

Receivers of credit are required to have their obligations guaranteed by an extender of credit, which means that only a small group of participants have direct obligations to CDS.¹²

Operational Contingency Arrangements

The Canadian financial system depends on the functioning of CDSX. It is therefore important that CDSX be able to operate in all reasonable circumstances and that it be able to recover quickly in the event of any disruption.¹³ That is, it must be adequately protected from operational risk. CDS has designed the functioning of all critical systems to be extremely reliable and able to handle periods of high volume. Operational-risk controls also incorporate contingency planning for key systems, including business-recovery planning and an off-site data centre, which should allow CDSX operations to resume within two hours if operational functionality is lost at its primary site. The process is overseen by both internal and external auditors who examine whether operational-risk controls are sufficiently comprehensive and consistently met.

The Transition Period

The significant benefits of moving to a secure and, in the long run, more cost-effective unified securities clearing and settlement system come with some fairly substantial transition costs. The application of risk controls similar to those in DCS presents a number of challenges for some participants, especially for participants that previously used only the SSS, which

12. Receivers of credit are required to have a line of credit from an extender to cover their payment obligations.
13. For more information on business-continuity planning in Canadian clearing and settlement systems, see Allenby in this issue (p. 55).

employed less-stringent risk-mitigation techniques than CDSX.

To help participants that are not familiar with the risk controls in DCS to adjust to the new requirements, CDSX is being implemented with a transition phase, which will last for 12 months. The system has been designated under the PCSA and will be subject to thorough risk controls. In some cases, the risk-proofing in the transition phase is different from, but equivalent in effectiveness to, what will be required when CDSX is implemented permanently. At the end of the transition period, any changes to the original structure of CDSX that are deemed necessary and are consistent with acceptable risk-containment mechanisms will be made.

Future Developments

The introduction of CDSX is a major change in the Canadian securities market. CDSX is a safe and efficient system and, with its introduction, almost all securities clearing and settlement comes under the formal oversight of the Bank of Canada under the auspices of the PCSA.

The implementation of CDSX by no means signifies the end of the evolution of clearing and settlement arrangements for Canadian securities. Although it has achieved a high degree of risk mitigation, further efficiency gains are possible. Internationally, there are two major mechanisms for improving efficiency in securities clearing and settlement. The first is achieving full automation of trade information so that securities transactions can be completed rapidly and without manual intervention (straight-through processing). The second is standardization of information and processes so that securities clearing and settlement can take place seamlessly on an international basis. The next major changes in securities trading and clearing and settlement arrangements are thus likely to improve efficiency and to facilitate trading in an increasingly global marketplace.

References

- Allenby, R. 2003. "Business-Continuity Planning in Clearing and Settlement Systems: A Systemwide Approach." *Bank of Canada Financial System Review*, this issue.
- Bank for International Settlements (BIS). 2001a. *Core Principles for Systemically Important Payment Systems*. Committee on Payment and Settlement Systems Report No. 43. Basel: BIS, January.
- . 2001b. *Recommendations for Securities Settlement Systems*. Committee on Payment and Settlement Systems Report No. 46. Basel: BIS, November.
- Miller, P. and C.A. Northcott. 2002. "The CLS Bank: Managing Risk in Foreign Exchange Settlements." *Bank of Canada Financial System Review* (December): 41–44.



Research

Summaries

Introduction

Bank of Canada staff undertake research designed to improve their overall knowledge and understanding of the Canadian and international financial systems. This work is often pursued from a broad, systemwide perspective that emphasizes linkages across the different parts of the financial system (institutions, markets, and clearing and settlement systems). Other linkages of importance may include those between the Canadian financial system and the rest of the economy, as well as those with the international environment, including the international financial system. This section summarizes some of the Bank's recent work.

The U.S. syndicated loan market, in which Canadian banks have become active participants, now involves approximately US\$2 trillion in drawn and undrawn commitments. A much smaller Canadian market has also emerged. The continuing development of these markets is another example of ongoing innovation in financial markets. *The Syndicated Loan Market: Developments in the North American Context* examines the recent evolution of this market, its impact on the relationship between borrower and lender, and the potential risks faced by participating banks.

Financial markets are increasingly global in nature. This might suggest that Canadian capital markets will become less important if domestic corporate borrowers rely to an increasing extent on large foreign financial markets for needed funds. Canadian corporations have a long history of using foreign capital markets, and the article *Corporate Capital Markets: Hollowing Out?* discusses whether there has been a noticeable cross-border shift over the past several decades in the markets from which Canadian corporations seek funding.

Canadian clearing and settlement systems also operate in the context of increasingly global and complex financial markets. This has affected the nature and the potential severity of operational

problems that might arise within these systems. *Managing Operational Risk in Clearing and Settlement Systems* describes a dynamic approach for addressing operational risk, a key element of which is the development of improved risk indicators.

The Syndicated Loan Market: Developments in the North American Context

Jim Armstrong

The syndicated loan market, a hybrid of commercial banking and investment banking, is one of the largest and most flexible sources of financing. Syndicated loans have been used for decades by governments. Over the past 20 years or so, they have also become an important source of funding for large firms, and, increasingly, even for mid-sized firms.¹ While this market has evolved continually over the years, there have been some striking developments since the early 1990s—particularly in the United States—as improvements in transparency and liquidity have resulted in a more efficient loan market with many of the features found in securities markets.

The major Canadian banks have become very active in the global syndicated loan market, particularly the U.S. market, and have assumed significant credit exposures. Canada's syndicated loan market is not at the same level of development as its U.S. counterpart in terms of features or range of participants. Nevertheless, it is being influenced by the evolution of the U.S. market, and it is expected to continue to develop.

Key Features

A loan syndication can be broadly defined as two or more lending institutions (often a dozen or more) that jointly agree to provide a credit facility to a borrower (Dennis and Mullineaux 2000).² While syndicates have many variations, the basic structure involves a lead manager (the agent bank) who will represent and operate on behalf of the lending group (the participating banks).

Virtually any type of corporate and commercial loan or credit facility can be syndicated. These include term loans, revolving credit facilities (offering the borrower the right, but not the obligation, to draw down a loan), and standby facilities (these are credit lines that are expected to be used only in extraordinary circumstances, such as market disruptions). Other more specialized facilities, such as construction loans, export-financing loans, and bridge financing facilities, can also be syndicated.

Syndicated credit facilities tend to be of medium-term maturity (1 to 5 years), although facilities have been arranged for periods as short as three months and as long as 20 years. Typically, the interest rate of a syndicated facility floats, in contrast to the fixed-rate instruments often found in debt markets, with the rate being reset every one, two, three, or six months. Large loan-syndication financings usually consist of multiple loan tranches, with the tranches having different features and terms targeted to different investors.

Syndicated loans have some elements in common with certain other instruments for transferring credit risk that have emerged over the last decade and that permit financial market participants to more precisely tailor their exposure to credit risk. These include rapidly expanding types of instruments, such as asset securitizations and credit derivatives.³

The Lending Environment: Transactions Versus Relationships

For years in North America (generally prior to the late 1980s), corporate lending mainly involved a series of bilateral arrangements

1. This article summarizes a recently published Bank of Canada Working Paper (Armstrong 2003).
2. In the U.S. syndicated loan market, it is not uncommon to have 50 or 60 institutions in a syndicate. In the Canadian market, syndicates tend to be much smaller—typically with 7 to 10 participants.

3. See the report by John Kiff in this issue (p. 33) for a discussion of credit-risk-transfer instruments.

between the borrower and one or more individual banks (Chart 1-A). These arrangements were supplemented by occasional “loan club” syndications, a technique whereby very large loans were shared among a number of banks. This early version of the syndicated loan market was essentially a private market with no transparency or liquidity (Asarnow and McAdams 1998).

In contrast, the contemporary syndicated loan market in its most developed state—currently in the United States and increasingly in other nations—uses a highly competitive primary distribution process similar to that used for the initial sale of bonds and stocks.⁴ This is supported by an active secondary market, where loans are traded, to facilitate adjustments after the primary syndication phase. Thus, the corporate loan market now offers many of the features of securities markets.

Under these arrangements, lending is conducted on a transaction-by-transaction basis involving syndicates of lenders (Chart 1-B). Some have argued that in this environment, lending is based less on a relationship between borrower and lender and is much more “transaction-oriented.” This implies that lending is driven more by the terms of the particular financing and by market conditions at the time of syndication than by a borrower-lender relationship. This may be true to a degree, particularly when investment banks are leading the syndicate. Nevertheless, commercial banks stress that their willingness to provide any corporate lending (in syndicated or bilateral form) depends heavily on the profitability of the overall relationship with the client. Syndicated loans involve elements of both approaches in the sense that the lead bank screens and monitors the borrower in a traditional relationship fashion, and then sells or underwrites some or all of the loan in a capital market-like setting (Dennis and Mullineaux 2000).

Evolution of the Market

The U.S. syndication market, which currently totals almost \$2 trillion in drawn and undrawn commitments (Table 1), offers the most

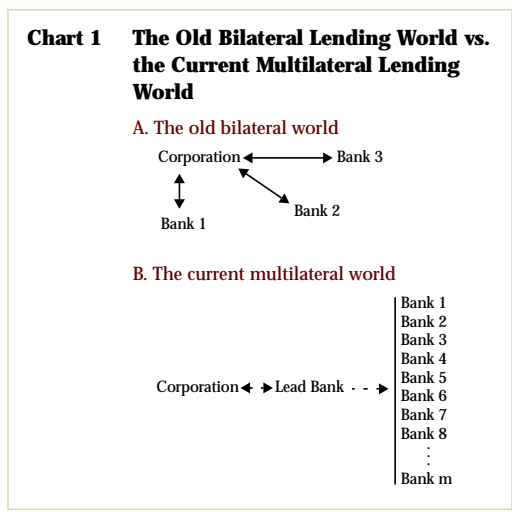
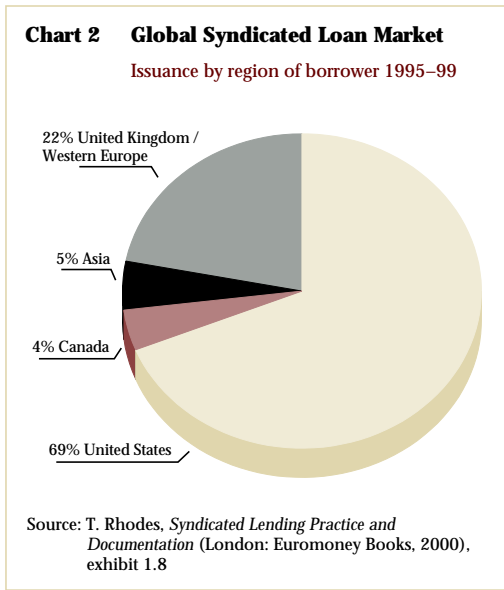


Table 1
Measures of U.S. Syndicated Loan Market Using the Shared National Credit (SNC) Program

	1998	1999	2000	2001	2002
Value of facilities (US\$ billions)	1,759	1,829	1,950	2,050	1,900
Number of facilities	10,389	8,974	9,848	10,146	9,328
Number of borrowers	6,710	5,587	5,844	5,870	5,542

Source: Federal Reserve Board

4. Lead banks often compete for the “mandate” to manage a syndicated financing proposed by a borrower. Alternatively, a lead bank may take the initiative and present a financing proposal to a potential borrower.



advanced features of contemporary corporate syndicated lending. Growth in this market was rapid through most of the 1990s, although it has recently slowed. Globally, the U.S. market constitutes by far the largest in terms of gross issuance (Chart 2).

The origins of many of the features of the contemporary syndicated loan market in the United States go back to the period of corporate restructuring, strategic buyouts, and leveraged acquisitions that started in the 1980s, a period when lenders were looking for more efficient ways to manage their rapidly expanding credit exposures. In the 1990s, this market continued to evolve, and today the global syndicated loan market is much more transparent and efficient than earlier versions, as evidenced by a rapidly evolving set of standardized institutional arrangements and a broader range of participants.

The significant developments in the past 10 to 15 years that have contributed to the evolution of the U.S. syndicated loan market include the following:

- The emergence of a group of large syndication banks that operate more like investment banks than commercial banks, focusing on earning fees from managing syndications rather than from earning interest-spread income by holding loans to maturity.
- The rapid growth in the non-investment-grade portion of the market, which offers higher fees to underwriters and higher yields to investors than the investment-grade market. This part of the market also involves higher potential risks.
- The emergence of loans as a new asset class, with a unique set of investment properties, which has attracted the participation of non-bank institutional investors. This development has been facilitated by the introduction of credit ratings on loans by the major ratings agencies—a step taken in 1996. It was also helped by the development of commonly accepted indexes for price and rate of return that expedite comparisons with other asset classes.
- The growth of an active and relatively liquid secondary market for loans, supported by standardized trading arrangements.

Ongoing Risk Issues

Major new developments in financial instruments and markets can pose risk issues that can adversely affect individual financial institutions. With respect to the contemporary syndicated loan market, two concerns that have been raised are briefly discussed.

Asymmetric Information

The role of lead bank has evolved over the years from one of primarily representing a group of banks that share a large loan to one of acting as intermediary between the competing interests of its client—the borrower—and the participating banks. If the lead bank has more information than the other syndicate members, then, potentially, it could engage in opportunistic behaviour, such as retaining a relatively large share of high-quality loans and a lower share of low-quality loans than would be retained if there were no information asymmetries. But the empirical work completed to date finds little evidence of such abuse by the lead bank.⁵

Risks in the “Firm-Commitment” Underwriting Process

It is not uncommon for the lead bank to commit to underwriting the whole amount of the financing and then selling loan shares to other syndicate participants. This “firm-commitment” approach contrasts with the alternative “best-efforts” approach, where the lead bank agrees to take only a specified minimum portion of the planned financing, with the remaining amount syndicated or marketed to a group of banks and other institutions.

A firm commitment is often crucial for the borrower, who needs to know that the funding is in place to support an imminent merger, acquisition, buyout, or other strategic corporate transaction. The lead bank then assumes the risk that other banks may not join as lenders. Contractual arrangements have, however, evolved to

mitigate some of the risks associated with firm commitment. For example, it appears that most syndicated loan agreements now have material adverse change (MAC) clauses, which specify predetermined grounds for legitimate retraction of the commitment by the lender. A more recent contractual development is referred to as “market flex” pricing, which is meant to help the lead bank manage normal market risk.⁶ Under the terms of market flex, the lead bank has scope to vary the borrowing spread over the base rate of the loan (e.g., LIBOR or the prime rate) by a certain number of basis points, depending on how market conditions have changed from the start of the syndication to the closing of the loan.⁷

Conclusion

The rapid evolution of the syndicated loan market over the past decade or so has contributed to greater efficiency and transparency in corporate loan markets. The new corporate loan market is one facet of a surge in the use of various instruments to transfer credit risk that includes credit derivatives and securitizations. This development also points to an important change in the business of banking, as loans become more like tradable securities.

As financial instruments and markets undergo important changes, they can pose risks that need to be monitored. In the case of syndicated loans, some recent developments may pose risks, but they also have the potential for a broader dispersion of credit risk, which should be positive in terms of financial stability.

5. Simons (1993) finds that the proportion of the syndication retained by the lead bank actually increases as credit quality declines. A more recent study by Jones, Lang, and Nigro (2000) analyzes a large panel of loan data from 1995 to 1999. They find that agent banks tend to retain a larger proportion of the lower-quality loans, refuting the notion of opportunistic behaviour.

6. Market flex arrangements seem to have become common in the aftermath of the market disruptions in late 1998 related to the Russian default and LTCM events.

7. Market flex can also work to the benefit of the borrower if market conditions improve over this period.

References

- Armstrong, J. 2003. "The Syndicated Loan Market: Developments in the North American Context." Bank of Canada Working Paper No. 2003-15.
- Asarnow, E. and M. McAdams. 1998. "Corporate Loan Portfolio Management." In *Bank Loans: Secondary Market and Portfolio Management*, 171-79, edited by Frank J. Fabozzi. New Hope, PA: Frank J. Fabozzi Associates.
- Dennis, S. and D. Mullineaux. 2000. "Syndicated Loans." *Journal of Financial Intermediation* 9: 404-26.
- Jones, J., W. Lang, and P. Nigro. 2000. "Recent Trends in Bank Loan Syndications: Evidence for 1995 to 1999." OCC Economic and Policy Analysis Working Paper No. WP2000-10.
- Kiff, J. 2003. "Recent Developments in Markets for Credit-Risk Transfer." *Bank of Canada Financial System Review*, this issue.
- Simons, K. 1993. "Why Do Banks Syndicate Loans?" *New England Economic Review* (January/February): 45-52.

Corporate Capital Markets: Hollowing Out?

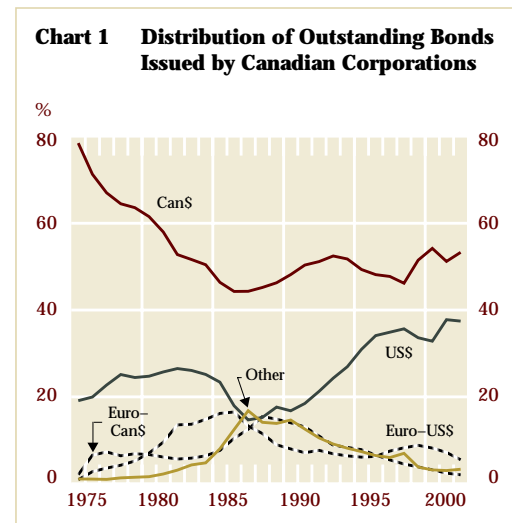
*Charles Freedman and Walter Engert**

As globalization increases, some observers have questioned the future of the bond and stock markets in countries that are on the periphery of the major global financial markets. Will they continue to exist and to prosper, or will activity increasingly shift to markets in other countries? In the case of Canada, we know that Canadian corporations borrow significant amounts in U.S. bond markets and that an appreciable number of large Canadian corporations are cross-listed on U.S. stock exchanges. Is this a harbinger of a future in which Canadian financial markets become ever less important, or is it a reflection of a long-standing and viable situation in which Canadian corporations use both Canadian and U.S. financial markets to conduct their financing?

Bond Markets

To address these questions, one can start by examining the borrowing behaviour of Canadian corporations over the past 25 years. Chart 1 shows the distribution of outstanding bonds issued by Canadian corporations, both non-financial and financial (including government enterprises).¹

Over the first decade of the data (1975–85), a declining share, but well over half, of the issues outstanding were denominated in Canadian dollars and issued in Canada. This ratio has remained at around 50 per cent since the mid-1980s. The share of outstanding bonds denominated in U.S. dollars and issued in the U.S. market increased in the 1990s, but this has been



1. These data include issues of asset-backed securities.

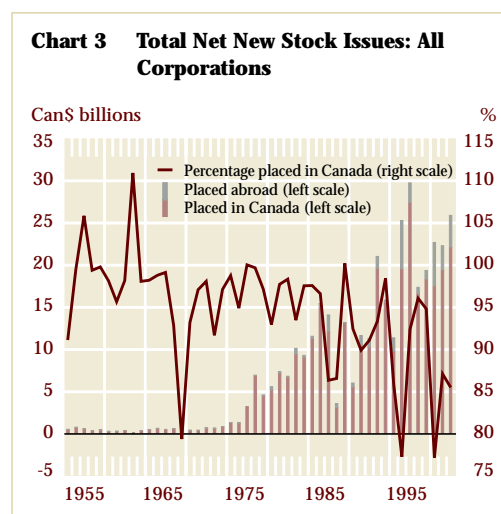
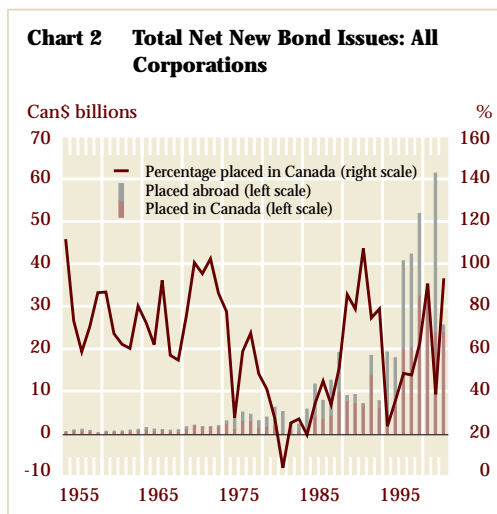
* This note draws from a forthcoming study of financial developments in Canada, Freedman and Engert (2003).

at the expense of other types of issues.² Considering that the measurement of the foreign currency component is inflated by the depreciation of the Canadian dollar over this period, the fact that Canadian-dollar issues placed in Canada have maintained a steady share of the total over the last 15 to 20 years is impressive.

Another perspective can be gained by examining net new issues over the period (Chart 2) rather than levels outstanding. While choppy, these data show that for all corporations, the proportion of bonds issued in Canada over the last 15 years, although lower than the proportion seen before the mid-1970s, has, on balance, remained at about half the total.

It is also worth noting that corporate bond issues as a whole, across all markets, grew rapidly in the 1990s (as indicated by Chart 2). When account is taken of the low rate of inflation and, hence, the relatively low growth of nominal GDP over the period, the growth rates are striking. As a percentage of GDP, Canadian-dollar corporate bonds outstanding rose from 9.0 per cent in 1991 to 10.0 per cent in 1996 and to 16.5 per cent in 2001. Thus, virtually all of the increase came in the second half of the period (1996 to 2001), when the federal government was moving into budget surplus and reducing its demands on the Canadian bond market.

Over this period, 1996–2001, federal government debt denominated in Canadian dollars declined in absolute value, while corporate bond issues increased rapidly. At the same time, provincial governments were shifting from foreign currency debt to Canadian-dollar debt. Thus, over the five years, Canadian-dollar debt excluding federal government issues increased by 54 per cent, while total Canadian-dollar debt (i.e., including federal government debt) rose by 28 per cent, similar to the growth of nominal GDP. "Crowding in" of non-federal debt was very much at work over the period.³



2. These issues include Euro-Canadian bonds (Canadian-dollar issues placed outside Canada), Euro-U.S. dollar bonds (U.S.-dollar bonds placed outside the United States), and bonds in other currencies.
 3. For more on this, see Chouinard and Lalani (2001–2002).

Equity Markets

In the last 15 years, there has been an increase in reliance on foreign placements of net new equity issues. Nevertheless, the share of foreign placements of new issues continues to be relatively small—although volatile—averaging 12 per cent in the last 5 years (Chart 3).⁴ Thus, while the share of net new equity issues placed abroad has tended to increase in recent years, the vast majority of net new equity issues are still placed in Canada.

In the 1990s, there was a sharp increase in the number of Canadian-based stock issues listed on both Canadian and U.S. exchanges, which peaked in 1998. But scaling these data by the number of stocks listed on the Toronto Stock Exchange shows that the percentage of such interlisted firms rose in the last 15 years or so from about 12 per cent in the mid-1980s to about 15 per cent more recently, a modest increase.⁵

There was also an increase in the absolute volume and value of trading of interlisted stocks on U.S. exchanges over the last decade. However, there has been little change since the mid-1980s in the proportion of the value of interlisted stocks traded on U.S. exchanges. About 40 to 50 per cent of total trading in interlisted stocks is on U.S. exchanges, which has been the case for about 20 years.

Finally, the number of Canadian-based firms listing exclusively on U.S. exchanges declined consistently from the levels seen in the mid-1990s through 2002.

Why Borrow in Foreign Markets?

Canadian firms have long been active in foreign capital markets, especially fixed-income markets. What encourages Canadian firms to use foreign markets, particularly U.S. markets?

First, U.S. capital markets are deeper and more liquid, which might allow easier access to cheaper capital for some Canadian firms (and also attract Canadian investors). Thus, for

example, corporations trying to raise very large amounts of funds are more likely to issue securities in the U.S. market than in the Canadian market. Similarly, Canadian firms are more likely to turn to U.S. markets when domestic markets face heavy borrowing programs.

Second, major U.S. financial centres appear to be more skilled and sophisticated in the structuring, pricing, and placement of transactions. As a result, more complex and more risky instruments (such as high-yield securities) are likely to be concentrated in U.S. markets.

A third factor may be the protection from adverse exchange rate movements (i.e., a “natural hedge”) that Canadian exporters have when borrowing in U.S. dollars. With the increase in Canada-U.S. trade in recent years, this factor may have increased in importance. Similarly, Canadian corporations that are considering direct investments in the United States will take into account the natural hedge from denominating their borrowing in U.S. dollars.

Fourth, it is possible that regulation of Canadian financial markets is less efficient than it could be, which effectively taxes capital market activity in Canada.⁶ While, broadly speaking, easy access by Canadian firms to foreign sources of fixed-income and equity capital is positive, the possible inefficiency of capital market regulation in Canada remains a policy concern. As a result, the authorities, both federal and provincial, and market participants are working to improve the efficiency and effectiveness of capital market regulation and thereby facilitate the financing of corporations in Canada.

A fifth key factor until the mid-1990s, was the degree of “crowding out” of corporate securities by large issues of government bonds in Canada.

Conclusions

The main findings from the data are as follows.

- The Canadian corporate sector has had a large appetite for foreign sources of fixed-income financing since the early 1980s.
- However, the share of total corporate bonds that are issued in Canadian dollars (and placed in Canada) has remained fairly

4. These data include income trusts.

5. If this were measured by market capitalization, the result would likely indicate a somewhat larger interlisted presence.

6. For an overview of issues and possible approaches, see Harris (2002) and MacKay (2002).

steady at about half over the past 15 years or so.

- While Canadian equity issuers are turning more to foreign markets, the extent of that reliance is currently small.
- The percentage of Canadian-based firms interlisting on U.S. exchanges has increased only modestly in the last decade, to about 15 per cent. And there has been little change since the mid-1980s in the percentage of trading of interlisted stocks on U.S. exchanges.
- There has been a downward trend in the number of firms listing exclusively on U.S. exchanges.

Thus, while there has been somewhat increased reliance on foreign sources of funds over the last decade, the data reviewed here do not provide much support for the view that domestic capital markets have been abandoned by Canadian firms or have been "hollowed out" in recent years. But other observers have reached more pessimistic conclusions and remain concerned about future developments.

Furthermore, as long as Canadian residents wish to hold Canadian-dollar assets—and there is little reason to suppose that they would not for the foreseeable future—then there will be a demand for such assets. Accordingly, there will be incentives for governments and domestic firms to supply Canadian-dollar securities, including corporate bonds and equities.

What would help domestic corporate capital markets to flourish?

- Continuing efforts on the part of the financial industry to develop the skills needed for corporate capital markets, including the ability to evaluate and price the risks associated with corporate instruments and to place these securities with investors
- A readiness by Canadian investors to make corporate securities a larger part of their portfolios
- An efficient regulatory system
- Continuing fiscal discipline on the part of Canadian governments

References

- Chouinard, É. and Z. Lalani. 2001–2002. "The Canadian Fixed-Income Market: Recent Developments and Outlook." *Bank of Canada Review* (Winter): 15–25.
- Freedman, C. and W. Engert. 2003. "Financial Developments in Canada: Past Trends and Future Challenges." *Bank of Canada Review* (Summer) forthcoming.
- Harris, D. 2002. *A Symposium on Canadian Securities Regulation: Harmonization or Nationalization?* Toronto: Capital Markets Institute, University of Toronto.
- MacKay, H. 2002. Letter to the Minister of Finance Reporting on Canadian Securities Regulation. Ottawa: Department of Finance. Available at <<http://www.fin.gc.ca/news02/02-094e.html>>.

Managing Operational Risk in Clearing and Settlement Systems

Kim McPhail

Clearing and settlement systems (CSS) are a key part of the financial infrastructure. They allow financial institutions (and, indirectly, their clients) to exchange payments, settle securities transactions, and finalize the transfer of funds involved in foreign exchange transactions. CSS consist of networks of interconnected elements—central operators of the systems, their participants, and their settlement agents.¹

Awareness of operational risk in CSS has increased greatly in recent years. Operational problems, such as a computer breakdown, at any one of these key elements have the potential to disrupt the system as a whole and to negatively affect financial stability.

Recent advances in methodologies for managing operational risk at individual financial institutions can be used to develop a framework for managing this risk in systemically important Canadian CSS.² Strong risk management requires, among other things, sound corporate governance and internal controls, reliable formal and informal policies and procedures, good contingency planning, and skilled and knowledgeable people. The methods discussed here could enhance these core aspects of risk management.

Operational risk in CSS is defined as the risk resulting from inadequate or failed internal processes, problems in computer systems, human error, or from external events related to any element of these systems. The focus is on the

consequences of operational problems for financial stability. The trend to globalization, the increased concentration of many financial transactions in a single institution or system, and the increasing complexity of financial instruments are all altering the nature and composition of operational risk and have exacerbated the consequences of severe events. For example, the terrorist attacks of 11 September 2001 severely disrupted the settlement of U.S. government bond transactions and spilled over to payments systems and financial markets. This illustrated the linkages and dependencies among various parts of CSS and highlighted the serious consequences that extreme external events can cause for the financial system.

Systemically Important Canadian CSS

Canada has a number of systems for settling payments, securities, and other transactions. Two domestic settlement systems are central. The first is the Large Value Transfer System (LVTS) for the exchange of large-value or time-sensitive payments. The second is the securities settlement system called CDSX. Another important system is the CLS Bank. The CLS Bank, which is incorporated in New York, settles foreign exchange transactions, including those involving the Canadian dollar.³ Because of their systemic importance for financial stability, the Bank of Canada has oversight responsibility for the functioning of these systems.⁴ One element

1. This note draws on a recent Bank of Canada Working Paper, McPhail (2003).
2. Systemic risk refers to spillover effects where the inability of one financial institution to fulfill its payment obligations in a timely fashion in a clearing and settlement system results in the inability of other financial institutions to fulfill their obligations in that clearing and settlement system or in other systems.

3. For more information on the LVTS, see the Bank of Canada's Web site at <<http://www.bankofcanada.ca>>. For information on CDSX, see McVanel in this issue, (p. 59). For more information on the CLS Bank, see Miller and Northcott (2002a, 2002b).
4. Oversight responsibility for the CLS Bank is shared with other central banks whose currencies are included in CLS. The Federal Reserve in the United States is the lead overseer for the CLS Bank.

of this responsibility is to promote their reliable and secure operation. In addition to its oversight responsibilities, the Bank also provides a number of essential services to CSS. For example, it is the banker for CDSX and for the CLS Bank's Canadian-dollar operations. It is also the settlement agent for the LVTS. The Bank provides liquidity to system participants and collateral-administration services to direct participants in the LVTS. The Bank is also a participant in the LVTS and CDSX.

A Methodology for Managing Operational Risk in CSS

A method of measuring operational risk for individual financial institutions, called the Loss-Distribution Approach, can be adapted for CSS.⁵ The Loss-Distribution Approach captures three elements of risk: the differing degrees of severity that may be associated with a particular type of operational problem, the likelihood of experiencing each of these degrees of severity when such a problem occurs, and the frequency of this type of problem. In the context of CSS, the severity of an operational problem is defined in terms of its impact on financial stability.

An index of financial instability can be created to evaluate the severity of operational problems in CSS. Because the evaluation of operational risk is qualitative, the severity of an operational problem is difficult to estimate and will require judgmental input. Operational experts can benchmark the values of this index by assigning a number from 0 to 7, for example, to assess the severity associated with specific operational problems in CSS. For example, past events such as a one-hour settlement delay of CDSX might be given a value of 2, and a lengthy intraday outage in the LVTS might be given a value of 3. A computer problem that had prevented a large LVTS participant from sending payments through the LVTS for several hours might also be given a value of 2. As operational problems occur in the future, such established benchmarks would make it easier to rank their effects on financial instability less arbitrarily. While very imperfect, such a measure can help to assess the severity associated with various operational problems as rigorously as possible.

Even a *single* operational problem (or type of problem) has the potential to be associated with differing degrees of severity, depending on the timing and duration of the problem. Once an index of financial instability has been created, this variability can be captured by considering the relationship between the likelihood (i.e., the probability) and severity arising from a *single* operational problem. This is called the loss-severity distribution. But this picture of operational risk is incomplete. That is, in addition, the *number* of such problems cannot be predicted perfectly but can be estimated (for example, by using historical data) in a frequency distribution.

Thus, for example, the severity associated with computer problems that prevent a participant from sending payments in the LVTS can vary, depending on factors such as the time of day, the length of the outage, and the size of the participant. These differing degrees of severity are captured by the loss-severity distribution, which estimates the likelihood of each of the potential degrees of severity if such a computer problem occurs. Information collected on past computer problems allows the estimation of a frequency distribution that would measure the average number and variability of these problems over a period of time. The loss-severity distribution and the frequency distribution can be combined, using Monte Carlo simulation, to form an estimate of the loss distribution that takes into account the fact that neither the severity of the outages associated with a single type of operational problem nor the number of such problems can be predicted with certainty.

Even as data on operational problems accumulate, it will be necessary to supplement data with judgment to evaluate the loss-severity distribution associated with certain types of operational problems, because problems that are extremely serious are (fortunately) very rare. The loss-severity distribution and frequency distribution, when combined to produce the loss distribution, provide an overall profile for operational risk in CSS. This profile can be monitored on an ongoing basis. If, for example, the likelihood of relatively severe outcomes arising from certain types of operational disruption appears to be higher than is appropriate, or if they appear to be occurring too frequently, steps (such as stronger risk mitigants) should be taken in order to bring the loss distribution back to

5. For an explanation of the Loss-Distribution Approach, see BIS (1998) and Frachot, Georges, and Roncalli (2001).

a more acceptable profile. Also, as data accumulate, it should become possible to move towards developing quantitative (to supplement qualitative) coincident and leading indicators of operational risk.

A Dynamic Approach to Managing Operational Risk

The measures described above form part of a framework for defining, identifying, measuring, controlling, and mitigating operational risk in each element of CSS—i.e., system operators, participants, and settlement agents. This framework could be applied to enhance the management of risk in systemically important systems in Canada. Strong risk management enhances financial stability.

To implement this framework successfully, additional features are required. Good management-information systems (MIS) are necessary to track operational problems in each element of the system. Analysis of these data can be used to identify trends, changes in causal factors, and useful indicators. Ongoing evaluation and updating of this information can be used to monitor and, when necessary, reassess the profile of operational risk and its potential impact on financial stability. Reliable MIS can also be used to establish performance indicators, evaluate how operations perform relative to these indicators, provide periodic reports, and disseminate this information in a timely fashion where it is needed. If successful, this dynamic process can add a strong forward-looking aspect to the management of operational risk by system operators, participants, and settlement agents.

Canada's systemically important clearing and settlement systems are owned and operated by the private sector. Thus, responsibility for controlling operational risk lies with the owners of these systems. The Bank of Canada, however, also monitors the operations of CSS on an ongoing basis and is implementing the type of framework discussed in this article as a monitoring tool. Furthermore, as a supplier to these systems of the essential services described earlier, the Bank of Canada must also have an effective and forward-looking internal process to manage changing sources of operational risk.

References

- Bank for International Settlements (BIS). 1998. *Operational Risk Management*. Basel Committee Publication No. 42 (September).
- Frachot, A., P. Georges, and T. Roncalli. 2001. "Loss Distribution Approach for Operational Risk." Manuscript. Groupe de Recherche Opérationnelle, Crédit Lyonnais, France. (April). Available at < <http://gro.creditlyonnais.fr/content/wp/lda.pdf> >.
- McPhail, K. 2003. "Managing Operational Risk in Payment, Clearing, and Settlement Systems." Bank of Canada Working Paper No. 2003-2.
- Miller, P. and C.A. Northcott. 2002a. "CLS Bank: Managing Foreign Exchange Settlement Risk." *Bank of Canada Review* (Autumn): 13–25.
- . 2002b. "The CLS Bank: Managing Risk in Foreign Exchange Settlements." *Bank of Canada Financial System Review* (December): 41–43.

