

The Canadian Overnight Market: Recent Evolution and Structural Changes

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- *The introduction of the Large Value Transfer System in February 1999, fixed announcement dates in December 2000, and changes in funding and collateral management practices have had an important effect on the structure and dynamics of the overnight market.*
- *Between 2001 and 2005, there was generally little difference between the overnight rate on collateralized overnight funding transactions and the target overnight rate set by the Bank of Canada. Beginning in early 2005, however, the rate on collateralized funding (repo transactions) began to drift more consistently below the target for the overnight rate.*
- *The increased demand for collateral has altered the behaviour and decision-making process of participants in the overnight market. Optimizing the use of collateral has become an increasingly important consideration among participants in forming their overnight funding strategies.*
- *A significant development in the overnight market has been the introduction of a new product, the overnight index swap (OIS) market in 1999. OIS instruments are used by participants to hedge or speculate and to gauge future expectations in the overnight market and have contributed to the improved informational efficiency of the market.*

Major financial market participants in Canada with a temporary surplus or shortage of funds use the overnight market to lend or borrow among themselves until the next business day. The interest rate at which these transactions occur is referred to as the overnight rate, and it is through its influence on the level of this rate that the Bank of Canada implements monetary policy. This is done by setting a target level for the overnight rate, often referred to as the Bank's key interest rate or policy rate. As part of the transmission mechanism for monetary policy, changes in the target overnight rate influence other interest rates and the exchange rate, leading to changes in asset prices, aggregate demand, the output gap, and eventually, inflation.¹ As a result, the efficiency of the overnight market is of particular interest to the Bank of Canada.

This article provides an overview of the current structure of the Canadian overnight market and describes how it has evolved since the Bank last published a review of this market in 1997.² Among other developments, the introduction of the Large Value Transfer System (LVTS) in February 1999, the adoption of fixed announcement dates (FADs) in December 2000, and changes in funding and collateral management practices have had an important effect on the structure and dynamics of the overnight market. As a result, this market has shifted from being mainly a source of

1. See Macklem (2002) for a description of how monetary policy is formulated.

2. See Lundrigan and Toll (1997–98) for details of that review.

funding to one where collateral management has become an important consideration.

Market Overview

The overnight market brings together financial market participants with temporary surplus funds and those that are potential borrowers. Participants include a broad array of financial entities: banks, investment dealers, interdealer brokers, corporations, investment funds (including hedge funds), pension funds, insurance companies, trust companies, finance companies, government agencies, and the Government of Canada.³ Over the past decade, the range of participants has not changed dramatically. However, their relative importance has changed somewhat, with institutional investors in general playing a modestly larger role in this market.

Commercial banks and investment dealers remain the largest borrowers and lenders of funds in the overnight market, primarily because of their market-making activities in a wide variety of financial assets (e.g., stocks and bonds), which require them to hold inventories of financial securities financed largely by borrowing in the overnight market. Other participants, such as asset managers (including managers of hedge funds) and sophisticated investors, also use the overnight market to finance their market positions, but to a lesser extent.

Financial institutions are the main providers of liquidity in the overnight market and are usually willing to provide quotes for both borrowing and lending overnight funds to their clients and other financial institutions.

Financial instruments in the overnight market

While banks are active participants in the market for overnight funds, most of their funding needs, including the funding of their overall operations, are still met through wholesale deposits. These deposits continue to make up the largest proportion of overnight transactions, followed by collateralized transactions and uncollateralized transactions.⁴ Wholesale deposits provide banks with a stable source of funding and are consistent with maintaining strong client relationships. As a result, deposit-taking institutions provide their

clients with daily bid and offer rates for overnight funding, adjusted slightly to account for the institution's preference to be a net lender or borrower of funds on that day. The functioning of this segment of the market has not changed materially over the past decade.⁵ However, quotes in the wholesale deposit market are now based on the Bank of Canada's target overnight rate (introduced in 1999), which has helped to improve the level of price transparency in this segment of the market.

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The repo market is by far the largest component of the collateralized segment of the overnight market and is of particular importance, owing to its high level of transparency relative to other segments of the market. Repo and reverse-repo transactions are also an important component of banks' funding and are the main funding vehicles for firms that do not have access to deposits (e.g., securities dealers). A repo combines both an immediate sale of securities and a simultaneous agreement to repurchase these securities at a pre-specified price and date (usually the next day). The opposite transaction is known as a reverse repo.⁶ From an economic standpoint, a reverse repo can be likened to a collateralized loan, where one party loans funds to another and in return receives collateral in the form of acceptable securities as insurance that the loan will be repaid. In Canada, from a legal standpoint, repos and reverse-repo transactions are actually buy/sellback agreements. This implies that the securities are bought and resold at different prices to reflect both the interest on the implicit cash loan and any cash flows that occur over the term of the agreement. Other components of the collateralized segment of the overnight market, such as call loans, once the primary

3. A significant amount of the information in this article was gathered during consultations between the Bank and market participants in April and May 2006.

4. Technically, commercial banks borrow wholesale deposits on an uncollateralized basis.

5. See Lundrigan and Toll (1997–98) for greater detail on the wholesale deposit market.

6. See Morrow (1994–95).

source of financing for investment dealers, have gradually decreased in importance.

Most of the collateral used in the Canadian overnight market consists of Government of Canada marketable debt. The repo market does not usually differentiate between specific Government of Canada securities, collectively referring to them as “general collateral” or the GC repo market. If, however, a security is in particular demand (Government of Canada or otherwise), perhaps because of a specific trading strategy prevalent in the broader market, it can trade at a lower rate⁷ in the repo market and is referred to as being on “special.” Specials markets are common in most major overnight repo markets, including those in the United States and the United Kingdom, and increasingly in the Canadian market.

The use of alternative sources of collateral, including provincial and government-guaranteed securities, has increased somewhat but has yet to become an active component of the Canadian repo market. This may be partly because these products are not perfect substitutes for Government of Canada collateral, given their slightly lower credit quality. The use of other forms of collateral, such as corporate or municipal bonds, presents an additional hurdle. Specifically, a bank that uses these products as collateral must put

7. Since securities in high demand will trade at a lower rate in the repo market, participants who own such securities can lend them in the repo market in return for cash on which they pay a lower interest rate than that available in the GC repo market.

aside additional capital in accordance with the capital-adequacy requirements laid out by the Office of the Superintendent of Financial Institutions (OSFI).

The interbank market in Canada, in which financial institutions borrow from and lend to each other without the borrower posting collateral, is small and continues to decline as a fraction of the overall overnight market. This contrasts with the United States, where the interbank market is deep and broadly based and the targeted policy rate, the federal funds rate, is in fact an interbank rate. The interbank market in Canada is currently used primarily by smaller financial institutions without a broad domestic deposit base. It is also used among direct participants in the LVTTS, not as a significant source of funding, but for end-of-day adjustment transactions. Depending on the institution, foreign exchange swaps⁸ will also be of varying importance in achieving day-to-day funding requirements.

A significant recent development in the overnight market has been the introduction of a new product, the overnight index swap (OIS) market in 1999. OIS instruments are used by participants to hedge or speculate and to gauge future expectations in the overnight market and have improved the market's

8. These are the sale (purchase) of foreign currency on a given date with a matching purchase (sale) arranged for a future date, for the same amount, with the same counterparty. Fully hedged borrowing (lending), called northbound (southbound), involves borrowing (lending) U.S. dollars and entering into foreign exchange swaps in which Canadian dollars are purchased (sold) for settlement today with an agreement to sell (buy) them for settlement at the end of the borrowing period.

Box 1: The Overnight Index Swap Market

An overnight index swap (OIS) is an over-the-counter derivative¹ in which two parties agree to exchange, or swap, for an agreed period, a fixed interest rate determined at the time of the trade for a floating rate that will vary over time. In this regard, OIS contracts are similar to traditional fixed-floating interest rate swaps. The distinguishing feature of the OIS is that the floating rate is the Canadian Overnight Repo Rate Average (CORRA) over the period.

Market participants predominantly use the OIS market for hedging activities, which are often

1. Over-the-counter trades occur directly between participants and not through a centralized exchange.

related to risk management. Specifically, participants can use the OIS to hedge either their funding costs or their exposure to short-term interest rate movements. The OIS market can also be used to alter the term structure of a portfolio or for taking a speculative position on the future path of the Bank of Canada's target overnight rate.

Related to the speculative and hedging functions of the OIS, the fixed-rate portion is also used by some market participants to derive market expectations of the Bank's future policy rate changes. If the duration of the swap extends over a FAD, for example, the difference between the fixed rate and the current overnight rate can be used to calculate the market expectations of a future change in policy

Box 1: The Overnight Index Swap Market (cont'd)

rates. The OIS has several advantages over other money market instruments in calculating expectations. Unlike other financial instruments, it is directly linked to the Canadian overnight rate. Furthermore, given that they are derivatives instruments, the supply of OIS contracts is not fixed. Supply factors can occasionally influence the pricing of other instruments, such as bankers' acceptances (BAs). The use of the OIS market to gauge expectations also presents some challenges. At times there is a lack of price information or market depth in the OIS market, particularly in farther-dated contracts. Moreover, if the CORRA rate were expected to deviate from the overnight target, gauging expectations of future interest rates would become more difficult.

Market development

The Canadian OIS market has grown rapidly since it was introduced in March 1999. Although it is difficult to determine the market's exact size, anecdotal evidence and information obtained from dealers suggest that the notional principal amount outstanding is between \$40 billion and \$100 billion.² This compares reasonably well with other money market instruments, such as BAs and Government of Canada treasury bills, which have outstanding amounts of around \$55 billion and \$130 billion, respectively. The most active and liquid money market instruments, however, remain futures contracts on BAs, which have an open interest of around \$475 billion.

Several factors have contributed to the growth of the OIS market, including both the adoption of the FADs by the Bank of Canada and improvements to the publishing of the CORRA.³ The relative stability and predictability of the CORRA and the off-balance-sheet nature of an OIS transaction,⁴ as well as the flexibility of its term to maturity, have also helped to attract interest from market participants.

Since there is no transfer of principal between counterparties, another advantage of the OIS is that there is relatively little credit risk. Interest rate swaps, including the OIS, do not involve the participants in the exchange of principal. The only transfer of funds occurs at the maturity of the contract and reflects the net obligation of one party to the other. The net obligation is the difference between the interest accrued on the fixed (OIS) rate and the compounded floating rate over the term of the swap.⁵

Market overview

The terms to maturity for OIS typically range from one week to one year, with the majority of trading and quotes concentrated in relatively short and standardized maturities of three months or less. The bid/ask spreads for OIS were originally as wide as five basis points (bps), but are now typically one to two bps for swaps of three months or less and slightly wider for longer-term swaps.⁶ Like those for other money market instruments, the spreads can vary from day to day, depending on market conditions. The more common factors that affect spreads include the predictability and consistency of the CORRA and the relative level of uncertainty about future changes in the target overnight rate by the Bank of Canada.

The standard quote sizes for an OIS tend to be between \$25 million and \$125 million, with the \$125 million applying to contracts up to six months and the \$25 million applying to longer contracts. However, actual transactions tend to be for amounts significantly larger than the standard quotes. Market depth has tended to be quite good in recent years, and it is not uncommon to see transactions for over \$1 billion in the 1-month area and several hundred million dollars for other swap terms on a daily basis.

2. Information used to estimate market size was collected through visits with dealers during the autumn of 2005.

3. These include greater precision (moving from two decimals to four), refining the window in which trades are recorded (06:00 to 16:00), and publishing the CORRA earlier, at 09:00 rather than noon on the next business day.

4. Notional amounts do not appear in the main body of the firm's financial statements.

5. Swaps, including the OIS, are based on an agreed notional amount.

6. Usually the spread compresses quite significantly before a trade is completed, declining from approximately two bps to as little as one-quarter of a basis point.

informational efficiency. The OIS market is discussed in greater detail in Box 1.

Overall, most of the assets that are funded in the overnight market continue to be denominated in Canadian dollars. Therefore, despite the globalization of capital markets, most of the overnight funding requirements of Canadian financial participants continue to be met through Canadian-dollar-denominated overnight financial instruments.

Market transparency and flows

Given the myriad of funding products available in the overnight market, the Bank of Canada uses two measures of the collateralized overnight rate as proxies for the overall average cost of overnight funding. The two measures, which the Bank publishes, are the Canadian Overnight Repo Rate Average (CORRA) and the overnight money market financing rate. The CORRA consists of a weighted average of rates on repo transactions conducted onscreen between 06:00 and 16:00 and subsequently reported by interdealer brokers. The CORRA is limited to repo transactions that involve general collateral (GC) and provides a transparent intraday and end-of-day measure of the level of the overnight rate.

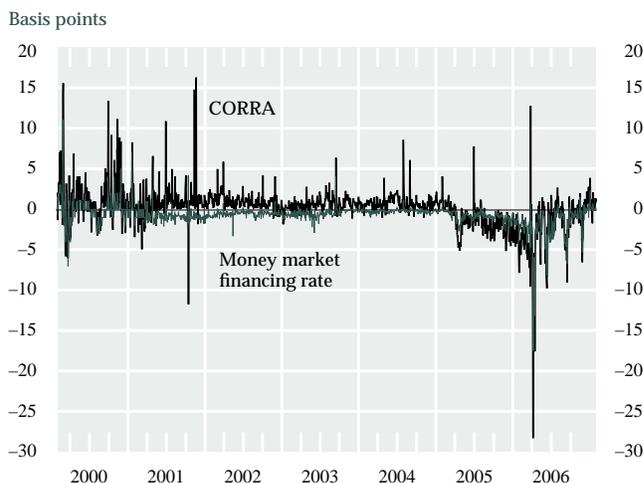
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The overnight money market financing rate is an estimate compiled at the end of the day by the Bank of Canada through a survey of major participants in the overnight market. This estimate, which comprises the weighted-average repo funding cost of major money market dealers, including special purchase and resale agreements (SPRAs)⁹ with the Bank of Canada and trades that are conducted directly between dealers, provides a somewhat broader measure than the CORRA. The overnight money market financing rate observed in Chart 1 is less volatile than the CORRA,

9. SPRAs and SRAs are repo-type and reverse repo-type transactions, respectively, in which the Bank offers to purchase (sell) Government of Canada securities from designated counterparties with an agreement to sell (buy) them back at a predetermined price on the next business day.

Chart 1

The Money Market Financing Rate and the Canadian Overnight Repo Rate*



* Both rates are shown minus the target for the overnight rate.

partly because the average money market financing rate represents a significantly greater volume of overnight transactions from a broader set of participants.

A portion of repo and reverse-repo transactions are visible to most wholesale market participants on various interdealer broker screens (both the size of the trade and the rate at which it was transacted). However, since most transactions (repo and otherwise) in the overnight market are conducted directly between counterparties, not through brokers, the true level of activity in the overnight repo market is not easily discernible by participants. Quarterly trading statistics provided to the Bank and the Investment Dealers Association by government securities distributors suggest that the volume of Canadian repo transactions involving Government of Canada marketable debt is approximately Can\$55 billion a day. The daily volume has grown considerably since 1994–95 when the Bank first reviewed the Canadian repo market (Morrow 1994–95). As can be seen in Chart 2, however, weekly repo volume peaked in 1997–98 and then remained relatively stable, albeit at a modestly lower level, between 1999 and 2005. Recently, repo volumes in Canada have increased and are approaching their highest recorded levels.

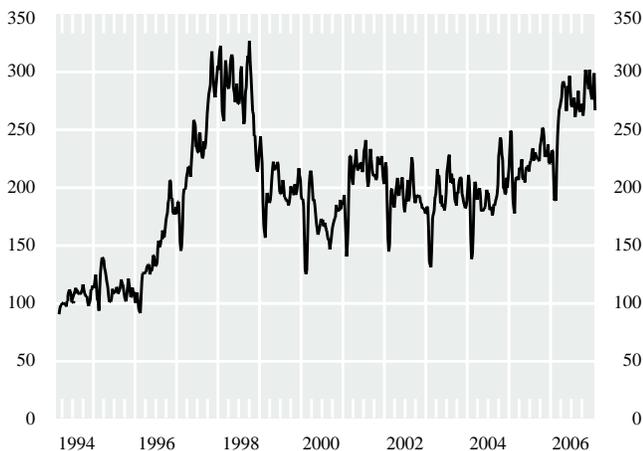
Despite the prevalence of direct bilateral transactions, market participants in general believe that the quotes posted by interdealer brokers for Government of Canada securities accurately reflect the price in the broader over-the-counter (OTC) overnight market at any given

Chart 2

Weekly Repo Trading Volumes of Government of Canada Securities

4-week moving average

Billions of Can\$



time. The interdealer broker screens therefore provide a primary source of price discovery throughout the day. In addition, at the end of the day, when most participants are fine-tuning their funding positions, the interdealer broker screens are also used as a way to find counterparties with offsetting positions.

While the repo transactions conducted through the interdealer brokers provide some transparency, the volume of transactions conducted in that segment of the market has, on occasion, been very low. Since

1999, there have been 145 instances where the daily volume of GC repo transactions conducted through interdealer brokers was below \$500 million, the minimum threshold for setting the CORRA since December 2005. When the volume of daily repo transactions recorded by the interdealer brokers is below \$500 million, the CORRA is simply set as the target overnight rate, which may or may not accurately reflect the true rate of collateralized funding. Overall, however, the volume of repo transactions conducted through interdealer brokers has increased since 1999, and this has helped to improve the transparency of the overnight market.¹⁰

In the uncollateralized portion of the market, interbank quotes are also visible on interdealer broker screens, but market depth remains limited. In addition, while rates on wholesale deposits are not visible to the market as a whole, rates quoted to customers are set relative to the target overnight rate. The improvements to the monetary policy framework, including the explicit communication of the target overnight rate, have thus provided some level of transparency to wholesale deposit clients.

Another measure of the uncollateralized portion of the market as proposed by Hendry and Kamhi (2007) can be obtained from the overnight loan and loan repayment transactions that occur through the LVTS (Box 2).

10. Specifically, in 2006, there were only four instances when the daily volume fell below the minimum threshold.

Box 2: An Alternative Measure of the Uncollateralized Portion of the Overnight Market

Hendry and Kamhi (2007) derive an estimate of the uncollateralized portion of the overnight market for the two-year period starting March 2004 by analyzing the transactions flows in Canada's LVTS. Adapting a methodology developed in the United States for imputing federal funds transactions from Fedwire activity,¹ the authors estimate that about US\$5 billion of uncollateralized overnight loans are

1. Fedwire is a real-time gross-settlement system operated by the Federal Reserve that enables participating financial institutions to electronically transfer funds among themselves. In conjunction with the privately held Clearing House Interbank Payments System (CHIPS), Fedwire forms the primary network for large-value domestic and international payments in the United States.

transacted daily. This figure represents a lower bound estimate of the uncollateralized market, given that certain overnight loans do not lead to LVTS payments. As such, the uncollateralized market is slightly larger than the brokered repo market, but only about one-tenth the size of the direct-trade repo market. The implied overnight interest rate on these loans displayed little variation from the target overnight rate, with a mean spread of only 0.017 basis points. This implied interest rate was found to vary with general market conditions, the size of the loan, and the size of the borrower and lender. The data also revealed that, as expected, smaller LVTS participants are, in general, a net source of funds to the larger banks.

Structural Change and the Collateralized Overnight Rate

The Canadian overnight market has continued to evolve since its inception. The past 10 years have witnessed exceptional change, including the introduction of the LVTS and the FADs, changes in market practices regarding risk management, the rise of securities lending, and the growing importance of the collateralized portion of the overnight market.

The LVTS

In Canada, the implementation of monetary policy is closely linked to the system through which payments clear and settle on a daily basis. The LVTS, an electronic network for sending and receiving large payments, was introduced by the Canadian Payments Association on 4 February 1999. The system allows for LVTS direct participants to settle their large payment obligations both among themselves and for their clients. To minimize the risk of one of the participants failing to meet its obligations, members are required to post collateral to support their payment flows. All direct LVTS participants hold settlement accounts at the Bank of Canada.

Earlier, in 1994, the Bank had started to direct its policy actions towards maintaining the overnight rate at a level within a 50-basis-point operating band that was consistent with its objective for overall monetary conditions. The Bank offered SRAs and SPRAs as a mechanism to set the limits of the band. With the introduction of the LVTS, the Bank made various modifications to the framework for the implementation of monetary policy (Howard 1998). The Bank formally set the target overnight rate as the midpoint of the 50-basis-point operating band and reinforced the latter with its end-of-day deposit and lending facility. The upper limit of the band, known as the Bank Rate, became the rate charged to LVTS participants that require an overdraft loan to cover a deficit position and permit LVTS settlement at the end of the day. The lower limit of the band became the rate at which the Bank of Canada remunerates LVTS participants holding deposits at the end of each day's LVTS settlement.¹¹ This mechanism greatly reduces the probability that the overnight rate will trade outside of the band.

11. Both the upper and lower limits of the band are generally thought of as collateralized rates. Technically, however, the Bank does not pledge collateral when it borrows funds at the lower limit, since it poses no counterparty risk. LVTS participants do provide collateral when they take advances from the Bank of Canada.

Given the cost incentives in the LVTS, it is mutually beneficial for participants with short and long funding positions to trade with each other, rather than to leave those positions with the Bank. Furthermore, the symmetry of the operating band creates incentives for LVTS participants to transact at or near the target overnight rate. The Bank also continues to intervene intraday in the overnight market with SPRAs and SRAs, as needed, to reinforce the midpoint as the target overnight rate.

The symmetry of the operating band creates incentives for LVTS participants to transact at or near the target overnight rate.

Assuming that no excess balances are left in the system, the aggregate position of all LVTS members with settlement accounts at the Bank will be zero at the end of the day. Members with a deficit balance will thus be aware that an offsetting positive position exists in the account of one or more other members. While the LVTS framework can operate with zero settlement balances, the Bank has often left a small positive amount of settlement balances to offset transactions costs and other minor market structure frictions (see "Evolution of the Overnight Rate and the Demand for Collateral," below).

Not all financial market participants are LVTS members. As of December 2006, excluding the Bank of Canada, there were 14 direct members of the LVTS. However, since direct LVTS participants transact with their customers, including other financial institutions and commercial and government entities, a link is created between the incentives within the LVTS and the broader cost of overnight funding. Consequently, the LVTS framework has contributed to a more predictable overall cost of funding, thus providing a benefit to both international and domestic investors, the Canadian economy, and, ultimately, the welfare of all Canadians.

The evolution of the Bank of Canada's monetary policy framework is outlined in Table 1.

Fixed announcement dates

In December 2000, the Bank of Canada adopted a new framework, the fixed announcement dates (FADs), consisting of eight pre-specified dates a year on which policy rate decisions would be announced. Before the

Table 1
Evolution of the Monetary Policy Framework

Date	Change in Policy Implementation Framework
Pre-November 1956 and June 1962 to March 1980	Bank Rate set at the discretion of the Bank of Canada
November 1956 to June 1962 and March 1980 to February 1996	Bank Rate set weekly at 25 basis points above the 3-month treasury bill rate at tender
November 1991 to June 1992	Operating framework changed in anticipation of the removal of statutory reserve requirements
June 1992 to June 1994	Phase-out of statutory reserves
Mid-1994	Introduction of 50-basis-point operating band for the overnight rate; changes in operating band are inferred from the Bank's use of SPRAs /SRAs.
February 1996	Bank Rate set at upper limit of operating band; changes in operating band announced by press release
February 1999	Introduction of the Large Value Transfer System
December 2000	Introduction of the fixed announcement dates

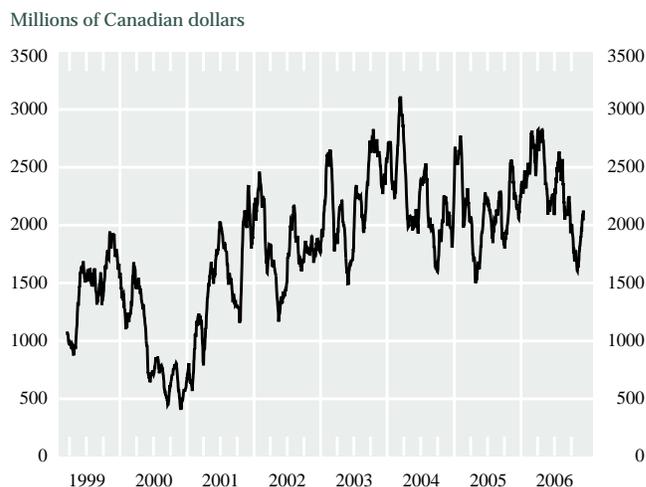
adoption of the FADs, changes to the target overnight rate could be announced at 09:00 on virtually any business day. Because of the uncertainty that surrounded the timing of the announcements, market participants incorporated a risk premium in the price that they were willing to quote their customers to borrow and lend funds for periods longer than one day. The introduction of the FADs has greatly reduced this uncertainty (Parent, Munro, and Parker 2003) and has led to improvements in the efficiency of the Canadian money market, including the development of new financial instruments such as the OIS (Box 1). Among its other uses, the OIS market allows participants to more effectively hedge their funding requirements and/or short-term interest rate exposure.

The introduction of the FADs has increased hedging opportunities and encouraged the use of term repo transactions.

The introduction of the FADs has also contributed to changes in how transactions take place in the repo market, with an increasing proportion of such transac-

Chart 3
Daily Overnight Repo Volume Conducted through Interdealer Brokers

30-day moving average



tions being conducted over longer terms (referred to as term repos) rather than on an overnight basis.¹² Instead of unwinding the next day, a growing number of repo transactions now mature on, or close to, the FADs. The evidence presented in Chart 3 suggests that this shift has not materially affected daily liquidity in the overnight repo market, perhaps because of the growth in overall repo volumes (Chart 2). The growth of term repo transactions has, however, reduced daily rollover risk for financial market participants. It also implies that large volumes may be transacted at or near the FADs.

Overall, however, the introduction of the FADs has increased hedging opportunities and encouraged the use of term repo transactions. This, in turn, has facilitated the management of risk in the daily funding requirements of financial market participants.

Receiver General auctions

As the government's fiscal agent, the Bank of Canada manages the government's cash balances to ensure it can meet its operating requirements and that any balances in excess of daily requirements are invested in a cost-effective manner. These excess short-term Canadian-dollar balances are invested through daily

12. To a lesser extent, transactions and settlement costs may have also influenced the shift in the term of repo transactions.

auctions of Receiver General (RG) balances.¹³ Coincident with the introduction of the LVTs, the frequency of RG auctions was expanded to twice daily (morning and afternoon), and all LVTs participants became eligible participants. In addition, the list of eligible institutions for the morning auction was expanded in 2002 to include certain other qualifying participants. The morning auction typically represents the bulk of the amount auctioned and is to a large extent collateralized. A cushion of balances is maintained through to the afternoon to ensure sufficient balances to meet any unexpected requirements. Once the closing amounts are determined, the final auction is held at 16:15. Only LVTs participants are eligible to participate in the afternoon auctions (which are uncollateralized).

Under the September 2002 revisions to the terms of participation in RG auctions, the morning government auction of deposits to specified participants requires the borrower to post collateral beyond a certain threshold in the form of financial securities such as government bonds and bills.¹⁴ As such, the collateralized portion of the morning RG auction can be likened to a large repo transaction. Since the results of the auction are transparent to all participants in the auction system, it stands to reason that the auction may provide an early source of price discovery in the overnight market.¹⁵ Nonetheless, there is little evidence that the auctions have had a material impact on the daily average repo rate as measured by the CORRA, other than perhaps at times of seasonal peaks in the level of balances. Specifically, since 2002, the spread between the rate received by the Receiver General at the morning auction and the target overnight rate has shown little correlation (0.14) with the spread between the CORRA and the target overnight rate.

Securities lenders

Improvements in the government's fiscal position over the past decade have led to a decline in the supply of Government of Canada marketable debt. In theory,

a significant decline in available collateral could reduce the efficiency of the Canadian repo market, the overnight market, and the Canadian securities market more broadly. However, the decline in the supply of Government of Canada marketable debt has, to date, been a relatively modest percentage of the total outstanding¹⁶ and has been at least partially offset by the growth of securities-lending agreements.

Securities-lending agreements help to mobilize the stock of existing securities sitting with custodians¹⁷ into active use in the collateralized portion of the overnight market. The increase in the amount of securities being made available for overnight transactions has been facilitated by the growth of securities-lending agents, who act as third party to the borrowing or lending of financial securities. Securities lending is generally conducted by large, often global custodians or asset managers on behalf of numerous clients. For instance, an asset manager may hold a number of securities in its portfolio, but for reasons of cost or size, perhaps, may choose not to enter into the repo market directly. In the past, those securities would have been unavailable for use as collateral in the overnight market. Increasingly, however, portfolio managers are entering into agreements with securities lenders (frequently their custodians) to allow them to act (under certain restrictions) as a third-party agent in lending out portions of their portfolio in return for a fee.

In Canada, the pool of securities available from securities lenders has experienced strong growth over the past decade. This may reflect, in part, the removal in 2001 of some restrictions on the participation of Canadian mutual funds in securities lending and in repo and reverse-repo transactions. While mutual funds can now enter the overnight market directly, many may choose, for cost or strategic efficiency reasons, to participate indirectly through securities-lending agreements.

Securities lending has likely been positive, on net, to the liquidity of the Canadian fixed-income market, but its impact on the overnight market remains somewhat difficult to gauge. Specifically, the cost to financial participants of accessing securities via a securities lender is higher, owing to an additional fee structure

13. These daily auctions are also the mechanism for the transfer of balances to and from the Bank of Canada's balance sheet to those of the private sector. The difference between the aggregate amount maturing on any given day and the new balances auctioned typically represents the neutralization of the net impact of any public sector flows to and from the Bank of Canada's balance sheet.

14. For a list of acceptable collateral, see "Terms and Conditions Governing the Morning Auction of Receiver General Cash Balances" on the Bank's website at www.bankofcanada.ca/en/auction/rec_general.pdf.

15. Results are typically released to auction participants at about 09:20.

16. The amount of marketable Government of Canada debt fell from \$467 billion in 1997–98 to \$427 billion in 2005–2006, an 8.5 per cent decline.

17. A custodian is a financial institution that has the legal responsibility for safeguarding and managing a firm's or individual's financial assets. Custodians are required to arrange the settlement of any purchases and sales of such securities and to collect the income from such assets on behalf of their owners.

and the need to provide more collateral (in return for the desired securities). Securities lending therefore provides specific liquidity for securities that may be in high demand and thus command a premium in the repo market.¹⁸ By supplying liquidity in specific bonds and treasury bills as well as a range of other financial securities, securities lending provides a net benefit to financial markets more broadly. This benefit is likely mitigated, however, by the degree to which Government of Canada bonds and treasury bills are posted as collateral by participants to obtain specific issues from securities lenders, since the pool of GC is thereby temporarily reduced.

Evolution of the Overnight Rate and the Demand for Collateral

The introduction of the LVTS

The overnight rate initially exhibited some volatility following the introduction of the LVTS in 1999, generally trading above target (Chart 1). During this early period, the Bank customarily set the level of settlement balances in the system at zero. This consistent trading of the overnight rate above target indicated, however, that there was some demand for excess balances. Beginning in September 1999, at month-ends, and starting in November 1999 on a daily basis, the Bank generally provided some positive level of settlement balances and somewhat higher levels when technical pressures occurred. At that time, the Bank also intervened regularly in the overnight market with SPRAs to reinforce

the target overnight rate. After this transition period, the overnight rate became significantly more stable, tracking the overnight target closely between 2001 and 2005. As a result, the Bank of Canada intervened less frequently with SRAs and SPRAs and gradually reduced the level of settlement balances (Table 2).

Recent divergence between secured and unsecured funding

Between 2001 and 2005, there was generally little difference between the overnight rate on collateralized overnight funding transactions and the target overnight rate set by the Bank of Canada. Beginning in early 2005, however, the volatility of the CORRA increased (Chart 1), and the rate on collateralized funding (repo transactions) began to drift more consistently below the target for the overnight rate. As a result, the frequency with which the Bank conducted SRA operations increased (Chart 4), and in March 2006, the Bank introduced some temporary measures to reinforce the target overnight rate. Further measures were added in February 2007 (Box 3).

Anecdotal evidence suggests that a general increase in the demand for GC from various sources led to the downward pressure on the collateralized overnight rate. In a repo transaction, an increase in the value of collateral would be reflected in a decrease in the repo rate; in other words, participants wanting to obtain GC would need to provide in return an overnight loan of funds at lower interest rates.

Table 2

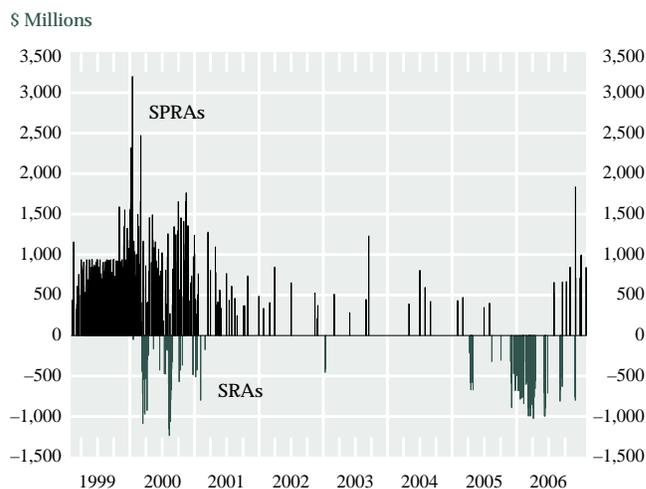
Timetable of Adjustments to Target Settlement Balances

February 1999	End-of-day settlement balances targeted at zero
September 1999	Positive balances on technically tight days (month-ends); zero otherwise
November 1999	Minimum daily balances of \$200 million, higher on technically tight days
April 2001	\$50 million most days; higher on technically tight days (month-ends, mid-months)
March 2006	Zero target balances on a daily basis, with possibility of deficit position

18. Specific securities that are in high demand by borrowers can trade in the repo market at a rate below that of GC. Since these securities are deemed to be trading on special, the rate at which they trade is not included in the CORRA measure of the overnight rate.

Chart 4

SPRA and SRA Operations



Box 3: The Bank of Canada's Temporary Measures to Reinforce the Target for the Overnight Rate

In March 2006, the Bank of Canada introduced temporary measures to help reinforce the target for the overnight rate.¹ Specifically, the Bank announced that, on a temporary basis, it would reduce settlement balances to zero and no longer commit to fully neutralizing SRA operations. That is, when the Bank conducts an SRA, it provides collateral in return for funds on which it pays the target overnight rate. These funds are then usually neutralized (i.e., put back into the system at the end of the day) through a transfer of Receiver General (RG) balances from the Bank's balance sheet to winning participants in the afternoon RG auction. By not committing to fully neutralizing these flows, the Bank could in essence leave the system short, causing one or more LVTS participants to have a deficit position at the end of the day. This short position would then necessitate an advance from the Bank at the Bank Rate (25 basis points above the target overnight rate) and a pledge of collateral. From the

introduction of the temporary measures through to February 2007, the system was left short 15 times. Similar temporary measures were taken in September 1999, soon after the introduction of the LVTS, to not commit to fully neutralize SPRA operations (as opposed to SRAs) at month-end. As a result of the ability to not fully neutralize SRA or SPRA operations, the Bank provides a further incentive to participants to conduct transactions in the overnight market at or very close to the target overnight rate.

In February 2007, to further reinforce the Bank's objective for the overnight rate, the Bank announced that it is prepared to enter into SRAs outside of the regular 11:45 intervention time, including earlier in the morning.²

The Bank has subsequently clarified its policy implementation framework, details of which can be found in the Appendix (p. 28).

1. See "Temporary Measures to Reinforce the Target for the Overnight Rate," Thursday 9 March 2006, available on the Bank's website at www.bankofcanada.ca/en/notices_fmd/2006/not090306.html.

2. See "Temporary Measures to Reinforce the Target for the Overnight Rate," Thursday 15 February 2007, available on the Bank's website at www.bankofcanada.ca/en/notices_fmd/2007/not150207.html.

The Increased Demand for Collateral

Since 1997, there has been a notable increase in the number of uses and hence in the demand for collateral. This greater demand stems in large part from changes in risk-management practices,¹⁹ greater use of financial derivatives, and the increased need for collateral in the major settlement and payments systems. Given these changes, market participants have altered their valuation and management of collateral.

Greater focus on risk management has increased the focus on collateral management. For instance, participants increasingly differentiate between the risks and internal capital costs of collateralized versus uncollateralized funding. Since one loan is backed by collateral and the other is not, there is little reason, from a risk-management perspective, for the rates on the two loans to be equivalent. Overall, participants

are becoming more reluctant to lend in the overnight market on an uncollateralized basis without appropriate remuneration. This trend may intensify as Basel II²⁰ is adopted and even greater emphasis is put on risk management and internally calculated capital costs.

Participants are also putting greater emphasis at the margin on maintaining appropriate internal liquidity ratios, which in essence requires them to maintain larger cushions of collateral to ensure that they are able to raise additional funds in a timely manner, if needed (either in the repo market or by liquidating these positions).

In addition, collateral is increasingly used worldwide to help mitigate the counterparty risk associated with swap and other OTC derivative activity. As these markets

19. Changes in risk management were likely prompted in part by the guidelines for capital-adequacy requirements provided by OSFI to deposit-taking institutions.

20. Basel II is the second Basel Accord and represents a revision of the international standards for measuring the adequacy of a bank's capital. The aim of the Accord is to promote greater consistency in the way banks and banking regulators approach risk management across countries. Implementation of the Accord is expected in 2008.

continue to grow, and more ISDA Master Agreements²¹ are put into place between counterparties, the demand for collateral is expected to increase even more. As an example of recent growth, the amount of collateral pledged for OTC derivative exposure worldwide had grown from US\$200 billion in 2000 to over US\$1.3 trillion by the end of 2005 (BIS 2007).

Demand for collateral has grown for other reasons as well, including the needs pertaining to the clearing and settlement systems (e.g., the LVTS, the Canadian Depository for Securities Limited (CDS), and the CLS Bank)²² and the partial collateralization of RG term deposits. For instance, for many participants, the collateral needs stemming from the LVTS represent their single largest demand for collateral. Not only is this demand for collateral new since the last published overview of the overnight market in 1997, but the requirements have grown, partly because of the growth of foreign exchange settlement via the CLS Bank.²³ The average amount of collateral pledged daily for LVTS/CDS/CLS Bank purposes increased from about \$18 billion in 2000 to \$26 billion in 2006Q2.

Overall, the Bank's measures of the overnight rate have remained predominantly at, or close to, the target overnight rate. However, an increase in the overall demand for Government of Canada collateral has, at the margin, increased the likelihood that participants will have more difficulty finding sufficient collateral on certain occasions. This implies that temporary additional increases in the demand for collateral have been more likely to result in the collateralized overnight rate moving away from the target.

Collateral Management and Changes in Market Behaviour

The implicit, if not explicit, increase in the value of collateral has altered the behaviour and decision-making processes of participants in the overnight market. The optimal use of collateral has become an increasingly

21. The International Swaps and Derivatives Association (ISDA) is a trade organization of participants in the OTC derivatives market. An ISDA Master Agreement is a standardized contract (which includes collateral arrangements) that two parties to an agreement sign before entering into a derivative transaction with each other. The Bank for International Settlements (BIS) reports that the number of ISDA Master Agreements worldwide increased from 12,000 in 1998 to about 110,000 at the end of 2005 (BIS 2007).

22. Based in New York City and regulated by the Federal Reserve Board, CLS Bank International provides "continuous linked settlement" (CLS) for foreign exchange transactions. For more information, see Miller and Northcott (2002).

23. The Bank of Canada provides the CLS Bank with a settlement account for the Canadian-dollar leg of the settlement and acts on its behalf in the LVTS.

important consideration among participants in forming their overnight funding strategies.

Although not a new development, it is important to consider that different types of securities can be pledged as collateral for different purposes (and often at different levels of collateralization). For example, when corporate bonds are used as collateral, the lender typically requires the borrower to pledge a greater amount of collateral than if Government of Canada securities had been pledged, reflecting the difference in credit quality.²⁴ Furthermore, to safeguard the knowledge of its market positions, a participant may be less willing to pledge some types of collateral with competing participants. Collateral management is further complicated by the fact that the exact magnitude of the funding requirements of market participants is not known at the commencement of trading, but evolves throughout the day. Given the increased demand for collateral, the importance of determining which collateral to pledge for each different requirement has therefore increased, requiring participants to evaluate the optimal use of their stock of collateral relative to their needs.

Given the increased demand for collateral, the importance of determining which collateral to pledge for each different requirement has therefore increased, requiring participants to evaluate the optimal use of their stock of collateral relative to their needs.

Examining the evolution of the types of collateral pledged in the LVTS provides an understanding of the growing importance of collateral management and its impact on the behaviour of market participants. For example, the range of securities that can be pledged in the LVTS was expanded in 2001 in response to requests from financial institutions to include (with certain

24. The additional collateral reflects the imposition of a "haircut" by financial participants. A haircut is the percentage by which an asset's market value is reduced for the purpose of calculating the levels of capital requirements, margins, and collateral. Since the value is reduced for the purpose of calculating collateral requirements, a greater amount of collateral is pledged than if no haircut was applied.

restrictions) BAs, promissory notes, commercial paper and short-term municipal paper, and corporate and municipal bonds.²⁵ Of note, the use of the expanded list of collateral has grown, from about 4 to 6 per cent of the total collateral pledged in the LVTS when the expanded list was first introduced, to about 15 to 20 per cent today. This use probably reflects participants' decision to redeploy Government of Canada collateral to other uses, perhaps in the GC repo market.

The emergence of increasingly sophisticated investment practices has also likely led to more dynamic collateral management on the part of securities dealers. A hedge fund, for example, by executing a large trade through a dealer, may in turn force the dealer to enter the repo market, which increases the complexity of the dealer's collateral management.²⁶ In addition, to the extent that commercial banks lend to select institutions, such as hedge funds, the amount of the associated collateral posted with the Bank will also fluctuate with the market value of the fund, and frequent substitutions of collateral may also be required as these funds alter their market positions.

25. See "Terms and Conditions for the Expanded Bank of Canada Collateral List Effective 1 November 2001," available on the Bank's website at www.bankofcanada.ca/en/notices_fmd/2001/not221001.html.

26. An example might be the prevalence among investors to own a futures contract while simultaneously selling short the underlying bond. This strategy would in turn create a need to borrow this bond in the repo market, putting downward pressure on the repo rate of the specific collateral. This may partly explain the recent increase in the number of securities trading on special in Canada.

The changing role of the repo market

While the repo market continues to be an important market in which to finance securities inventories and to raise and lend funds, it has become equally important as a market in which to borrow and lend securities and, therefore, to manage collateral. Correspondingly, the repo market's contribution to market efficiency continues to gain importance. Not only does it facilitate collateral management, the repo market improves price discovery in securities markets by facilitating short sales, lowers trading frictions and settlement risk by improving overall market liquidity, and improves portfolio risk management.

Conclusion

The overnight market is a key component of the transmission mechanism through which monetary policy influences asset prices, aggregate demand, the output gap, and eventually, inflation. Several important changes have taken place since the late 1990s, including the introduction of the LVTS and the FADs, and the growth of securities lending. Overall, despite some volatility, the overnight rate has shown much greater stability than it did under the previous monetary policy framework. These improvements have led to the growth and increased efficiency of the Canadian money market and contribute to the enhancement of liquidity in the Canadian fixed-income market more broadly.

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Appendix

The Bank of Canada's Target for the Overnight Interest Rate: Policy Implementation Framework

Within the framework for implementing monetary policy, the Bank of Canada (the Bank) sets a target for the overnight interest rate. This target is the first stage in the transmission mechanism through which the monetary policy actions taken by the Bank affect the level of economic activity and, ultimately, inflation. The key features of this monetary policy implementation framework are the target for the overnight rate, the operating band, the ability to conduct buy-sellback and sell-buyback transactions at the target rate, and the management of settlement balances.¹ Given the nature of this framework and the Canadian overnight market, the Bank is best able to influence short-term rates by targeting a level for the collateralized overnight rate.

Target for the Overnight Rate

The Bank of Canada's target for the overnight rate is the rate on collateralized, market-based overnight transactions.² This is defined as the rate at which major participants in the money market borrow and lend funds fully secured by acceptable collateral for a term of one business day. The Bank will use the rate on overnight general collateral (overnight loans that are secured by non-specific government securities, referred to as the GC overnight rate) as its guide to conditions in the overnight market, although this information may, at times, need to be supplemented by information on conditions in other sectors of the overnight market.³ Implicit in this arrangement is the possibility that, if collateralized funds trade at the Bank's target for the overnight rate, uncollateralized funds may well trade at rates above the target.

1. For further details, see "A Primer on the Implementation of Monetary Policy in the LVTS Environment," and "The Framework for the Implementation of Monetary Policy in the Large Value Transfer System Environment." Both are available on the Bank of Canada's website at www.bankofcanada.ca/en/monetary/lvts/index.html.

2. Previously, the target for the overnight rate had been broadly defined as a target for the rate at which major participants in the money market borrow and lend one-day funds to each other.

3. Such as times when there are relatively few GC trades observed.

Operating Band

The Bank's target for the overnight rate is the midpoint of a 50-basis-point band. The interest rate charged for collateralized overdraft loans (advances) that are made available through the Bank's standing facilities to members of the Large Value Transfer System (LVTS) at final settlement is the upper limit of the operating band, referred to as the Bank Rate. The interest rate paid by the Bank on any positive balances held by LVTS participants after final settlement is set at the lower limit of the operating band.

These arrangements encourage transactions for overnight funds in the marketplace at rates inside of this band, since participants are aware that they will earn at least the Bank Rate less 50 basis points on positive balances, and need not pay more than the Bank Rate to cover negative balances. In addition, given that the opportunity costs of borrowing from and lending to the Bank at the end of the day are the same at the midpoint of the band, trades should generally take place near that point.

Open Market Purchase/Repurchase Agreements

To reinforce the target for the overnight rate, the Bank can intervene in the overnight market by conducting buyback operations at the target rate, if required. If the collateralized overnight rate is generally trading above the target rate, the Bank will intervene with Special Purchase and Resale Agreements (SPRAs), whereby the Bank purchases government securities from primary dealers⁴ with an agreement to resell those securities the next business day, with the difference in price equal to the value of interest for one business day paid at the target for the overnight rate. Conversely, if the collateralized overnight rate is generally trading below target, the Bank will intervene with Sale and Repurchase Agreements (SRAs), selling government securities with an agreement to repurchase them on the next business day, with the price difference equal

4. Primary dealers are a subgroup of government securities distributors that have reached a threshold level of activity in the Government of Canada debt markets.

to one business day's worth of interest calculated at the target for the overnight rate.

These operations are typically conducted at 11:45, encouraging market participants to trade with each other during the morning, when a large proportion of daily funding activity occurs. The Bank is prepared, however, to enter into multiple rounds of open market operations, if necessary, and to conduct those operations outside of the regular time, including earlier in the morning, if warranted by conditions in the overnight market.

Typically, the Bank neutralizes the cash impact on the system of any SPRA or SRA operations. However, as an additional tool to offset pressure on the overnight rate, the Bank has the option of not fully neutralizing the impact of open market operations. If some or all SPRA or SRA operations are not neutralized, the system could be left in a larger surplus or deficit position at the end of the day, requiring at least one LVTS participant to leave funds on deposit at the Bank of Canada at the Bank Rate less 50 basis points, or to take advances at the Bank Rate.

Settlement Balances

Since the introduction of the LVTS, the level of settlement balances in the system has typically been targeted at zero or greater. Any participant in the LVTS with a deficit position is therefore aware that, typically, there is at least one participant in the system with an offsetting surplus position who is a potential counterparty for transactions at market rates.

Several adjustments have been made to the target level of settlement balances since the inception of the LVTS. Currently, the Bank will typically target a small positive amount of settlement balances (\$25 million), thus alleviating transactions costs and other frictions from the end-of-day process and reducing the need for participants to take frequent small advances from the Bank. The Bank retains the right, however, to adjust the targeted level of settlement balances higher or lower if warranted by conditions in the overnight market.