



Department of Finance
Canada

Ministère des Finances
Canada

Government of Canada Treasury Risk Management Framework

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Part I: Background and Overview

1. Purpose

The *Government of Canada Treasury Risk Management Framework* is a reference document prepared by the Department of Finance Canada, in collaboration with the Bank of Canada, that provides information on the risk management framework within which the government's liquid financial assets and marketable debt are managed. The framework is considered to be dynamic because it evolves over time to incorporate developments in tools and practices in the area of treasury risk management.

Government funds management encompasses a wide range of activities related to the issuance of debt and the management of liquid financial assets. The government manages its activities according to a set of key objectives and principles that include prudence, cost-effectiveness, and leading practices (see Appendix A).

The treasury risk management framework described in this document applies to most of the government's funds management programs, the exceptions being the Retail Debt Program,¹ Canada Pension Plan bonds² and the standby line of credit facility.³ It does not apply to the financial assets and liabilities of Crown entities and Government of Canada interests therein.

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1. The Retail Debt Program is administered through a tripartite memorandum of understanding between the Department of Finance Canada, the Bank of Canada, and the Canada Investment and Savings Agency, a special operating agency of the Department of Finance Canada.
 2. Canada Pension Plan bonds represent non-marketable Government of Canada debt issued to the Canada Pension Plan in the 1980s and early 1990s that is now held by the Canada Pension Plan Investment Board.
 3. The government maintains a US\$6-billion standby credit facility with international banks. There is no risk exposure to the government from maintaining this credit facility; there is therefore no discussion of this facility in this document.

Box 1: The Government Funds Management Programs

Domestic Programs

Market Debt Programs:

- Marketable bonds (fixed-rate bonds and real return bonds maturities)
- Treasury bills (short-term zero-coupon securities)
- Retail Debt (Canada Savings Bonds and Canada Premium Bonds)
- Canada Pension Plan bonds

Liquid Financial Asset Programs:

- Receiver General Cash Management Framework

Foreign Currency Programs

Liability Programs:

- Marketable bonds (global bonds—fixed-rate bonds issued in US dollars and in other currencies)
- Canada bills (zero-coupon securities issued in US dollars)
- Foreign currency notes (Canada Notes and Euro Medium-Term Notes)
- Swaps of domestic obligations (a foreign-currency liability)

Liquid Financial Asset Programs:

- Exchange Fund Account (Foreign Exchange Reserves)
 - Deposits
 - Securities
 - US Dollar Repurchase
 - Securities Lending

2. Guiding Principles of the Risk Management Framework

To the extent possible, the Government of Canada takes thorough steps to limit or mitigate the risks that arise in the course of funding and investment operations. The main risks that the government strives to mitigate include credit, market, liquidity, legal, and operational risks (see Box 2). Broadly, domestic debt operations focus on managing interest rate risk, while foreign debt operations focus on managing interest and exchange rate risks through an asset-liability matching framework and credit risk through strict credit guidelines and collateral frameworks.

The major principles of the government's treasury risk management framework are listed below.

- ▶ *Independence*: Risk monitoring and oversight, supported by analytic capacity and a governance framework, are independent of funds management operations.
- ▶ *Risk culture*: The Department of Finance Canada and the Bank of Canada strive to create a culture where risk management is highly valued, considered an integral part of all treasury management activities, and viewed as the responsibility of all staff.
- ▶ *Risk identification*: All existing and new lines of business are thoroughly reviewed on an ongoing basis to identify all material relevant risks.
- ▶ *Risk mitigation*: Credit, market, liquidity, legal, and operational risks are mitigated to the extent possible.
- ▶ *Risk measurement*: Appropriate quantitative and qualitative measures have been developed in line with policies and guidelines.
- ▶ *Monitoring and reporting*: Reports provide context and significance to managers on issues surrounding risk management and the government's overall risk position and are prepared on a regular basis.
- ▶ *Review*: Periodic review of risk management policies, procedures, and operations by internal staff as well as external, independent, experts are undertaken. Risk policies are in line with leading practices of other comparable sovereigns.

Box 2: Major Risk Types

Credit risk: The risk that a business counterparty, or an issuer of a security, will default or be downgraded.

Market risk: The risk the government faces from adverse changes in the value of its assets or liabilities resulting from changes in interest and exchange rates.

Liquidity risk: The risk that a market position cannot be unwound at or near the previous market price because of inadequate market depth or market disruption.

Legal risk: The risk that contracts are not legally enforceable or appropriately documented or executed.

Operational risk: The risk resulting from inadequate or failed internal processes as a result of human or system errors or external events.

3. Funds Management Governance

3.1 Legislative authority

Ultimate authority for treasury management policy rests with the Minister of Finance. The Minister's legal authorities and responsibilities are set out in two acts.

The first, the *Financial Administration Act* (FAA),⁴ establishes the legal authority for the government's borrowing, cash management, and bond buyback programs. The FAA states that the Minister cannot borrow money without the authority of Parliament. The latter authorizes the Minister to borrow new funds through borrowing authority acts. The Minister is authorized by the FAA to refinance maturing debt without further parliamentary authority. It provides the Minister with the authority to repurchase marketable Government of Canada bonds. It also provides the Minister with the authority to use derivatives such as interest rate and currency swaps, options, futures, and forwards in the conduct of financial operations and for risk management purposes. The FAA provides the Minister of Finance with legislative authority to establish rules governing the sale of the government's debt.

The second key act is the *Currency Act*,⁵ which governs the Exchange Fund Account (EFA) held in the name of the Minister of Finance. The legislative mandate of the EFA is to aid in the control and protection of the external value of the Canadian dollar. Under the Act, the Minister is required to establish an investment policy for the management of the EFA. The Act allows the Minister to acquire, borrow, sell, or lend assets in accordance with the *Statement of Investment Policy* (SIP). The Act requires that the Minister provide Parliament with a report on the operations of the EFA for each fiscal year.⁶

Beyond these two key Acts, the *Bank of Canada Act*⁷ provides statutory authority for the Bank of Canada to act as the government's fiscal agent.

4. *Financial Administration Act* (R.S., 1985, c. F-11), available at <http://laws.justice.gc.ca/en/F-11/index.html>.

5. *Currency Act* (R.S., 1985, c. C-52), available at <http://laws.justice.gc.ca/en/C-52/index.html>.

6. *Report on the Management of Canada's Official International Reserves* available at <http://www.fin.gc.ca/purl/efa-e.html>.

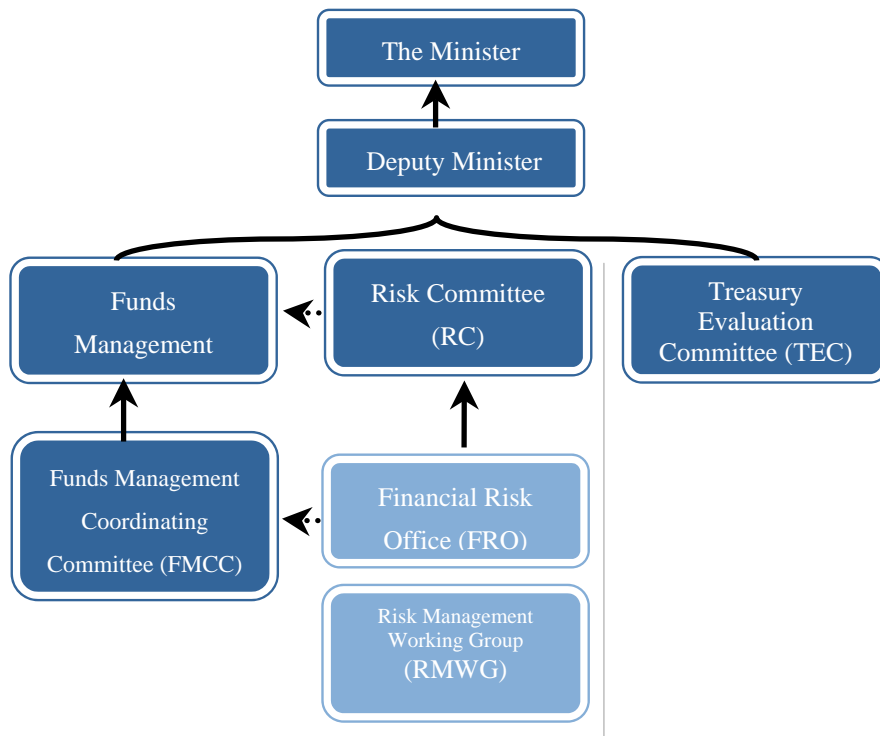
7. *Bank of Canada Act* (R.S., 1985, c. B-2), available at <http://laws.justice.gc.ca/en/B-2/index.html>.

3.2 Governance structure

The governance structure, described in the document entitled *Treasury Management Governance Framework*,⁸ sets out the structure within which funds management and associated risks are managed. The framework delineates roles and responsibilities among managers and officials within the Department of Finance Canada, the Bank of Canada, as fiscal agent of the government, and the Canada Investment and Savings Agency, a special operating agency of the Department of Finance Canada, and describes the organizational committees established to govern treasury activities.

At the top of the structure is the Minister of Finance. Providing policy advice to the Minister and the Deputy Minister are three separate committees: the Funds Management Committee (FMC); the Treasury Evaluation Committee (TEC), and the Retail Debt Steering Committee (RDSC). The first of these is described here. The TEC is addressed in section 4, and the RDSC falls outside the scope of this document.

Figure 1: Governance Structure



Funds Management Committee

The FMC, composed of senior management from the Department of Finance Canada and the Bank of Canada, oversees all activities covering wholesale debt, cash management, reserves, and risk management. The mandate of the FMC is to advise the Minister, through the Deputy Minister, on policy and strategy for funds and risk management, to oversee the implementation of approved policies, and to review performance outcome reports. The agenda of the FMC is supported by the work of the Funds Management Coordinating Committee (FMCC) and the Risk Committee (RC).

Funds Management Coordinating Committee

The FMCC meets to discuss key issues, develop policy advice, and provide ongoing coordination of work on domestic debt, the Receiver General for Canada's (RG) cash balances, and foreign currency asset and debt programs. It is composed of management and senior officials from the Department of Finance Canada and the Bank of Canada.

Risk Committee

The RC is an advisory body to the FMC that reviews and provides opinions on the risk implications of recommendations put forward by the FMCC, i.e. the risk governance framework separates funds management operations from risk management. The RC provides advice to relevant sections of the Department of Finance Canada and the Bank of Canada on risk implications during the development of policy proposals and recommendations and operational practices. The RC is composed of two senior officials each from the Department of Finance Canada and the Bank of Canada, including one independent member from outside the funds management process.

Financial Risk Office

The RC is supported by the Financial Risk Office (FRO), which monitors and reports on risk outcomes for funds management activities. The structure, mandate, operations, and composition of the RC and the FRO are set out in the *Memorandum of Understanding on Treasury Risk Management* between the Bank of Canada and the Department of Finance Canada.⁹

8. The *Treasury Management Governance Framework*, Department of Finance Canada, Bank of Canada, and the Canada Investment and Savings Agency, will be available on the website of the Department of Finance Canada.

9. Available at <http://www.fin.gc.ca/treas/Goveev/mou-trm-e.html>.

The FRO, established at the Bank of Canada, deals with risk management. It identifies, measures, and monitors treasury risks related to financing and investment activities based on the best practices of central bank and sovereign government treasury operations and knowledge of private sector financial institution (FI) practices. The FRO is supported in its work by the Risk Management Working Group, which meets as required to provide a forum for discussion and updates on a wide range of current issues related to risk. The working group, composed of officials from the Department of Finance Canada and the Bank of Canada, develops and proposes the agendas for the RC meetings.

4. Public Accountability

The Department of Finance Canada has a review program in place that includes internal audits and evaluations in addition to an external program evaluation process. The various facets of these ongoing reviews are aimed at ensuring good governance and public transparency by providing regular reports to the Minister, Parliament, and the public on the management and performance of treasury programs.

4.1 Audits

In addition to the periodic internal audits conducted by the Department of Finance Canada and the Bank of Canada, the Office of the Auditor General of Canada (OAG) carries out a formal audit of the financial statements of the EFA, the results of which are published annually as part of the *Report on the Management of Canada's Official International Reserves*.¹⁰ In addition, the OAG also audits the *Public Accounts of Canada*,¹¹ published annually, which include the government's financial statements.

4.2 Evaluations

The Department of Finance Canada maintains an external evaluation function, the Treasury Evaluation Program (TEP),¹² specific to funds management, where independent third parties undertake multi-year reviews of funding and investing policies and practices. These reviews contribute to the development of policy and priorities. The TEC, headed by the Senior Associate Deputy Minister, provides oversight for the TEP. Further details on the TEP are contained in the *Debt and Reserves Management Program Evaluation Overview*.¹³

10. Available at <http://www.fin.gc.ca/purl/efa-e.html>.

11. Available at <http://www.pwgsc.gc.ca/recgen/text/pub-acc-e.html>.

12. Available at http://www.fin.gc.ca/activity/tep_e.html.

13. Available at <http://www.fin.gc.ca/activity/goveval-e.html>.

Reports on the findings of these evaluations and the government's response to each evaluation are tabled with the House of Commons Standing Committee on Public Accounts Committee by the Minister of Finance. A copy is also sent to the Auditor General of Canada. The reports are posted on the Department's website.¹⁴

4.3 Public reports

A number of reports, described below and available on the Department of Finance Canada's website,¹⁵ are published to ensure appropriate accountability and transparency.

Debt Management Strategy

Before the beginning of a fiscal year, the Minister of Finance submits a report to Parliament that provides details on the Government of Canada's wholesale and retail debt management strategy for the coming fiscal year.¹⁶

Debt Management Report

Within 45 sitting days of the tabling of the *Public Accounts of Canada* in Parliament, the Minister of Finance provides Parliament with a report on the Government of Canada debt operations for the previous fiscal year.¹⁷ The *Debt Management Report* (DMR) provides measurement of performance against the plans set out in the *Debt Management Strategy* (DMS).

Report on the Management of Canada's Official International Reserves

The Minister of Finance provides Parliament, on a fiscal-year basis, with a review of the operations of the EFA and the changes in Canada's official international reserve holdings against the background of developments in the foreign exchange market.¹⁸ The accompanying financial statements, which are audited by the OAG, provide additional information on the operations of the EFA.

The Department of Finance Canada also publishes a monthly press release on the official international reserves, which includes details on the level and composition of Canada's reserves over the previous month as well as the major factors underlying the change in reserves.

14. Available at <http://www.fin.gc.ca/access/fininste.html#Treasury>.

15. Available at <http://www.fin.gc.ca>.

16. Available at <http://www.fin.gc.ca/purl/dms-e.html>.

17. Available at <http://www.fin.gc.ca/purl/dmr-e.html>.

18. Available at <http://www.fin.gc.ca/efa-e.html>.

Departmental performance report

At the end of each fiscal year, the Minister of Finance publishes the *Report on Plans and Priorities* (RPP) ¹⁹ in which the activities and accomplishments of the Department of Finance Canada over the previous year are articulated.

Treasury Evaluation Program

The reports produced as part of the TEP, described above, are also publicly available. The DMR includes a summary of the reports conducted during the fiscal year, and the Department's website contains the reports along with the government's response to the findings therein.

19. Available at <http://www.fin.gc.ca/purl/rpp-e.html>.

Part II: Risk Management Policies for Domestic Funds Management Programs

This section details the risk management framework for the government's two domestic funds management programs: issuance of domestic debt and investment of the RG cash balances. As a result of differences in risk types within the two programs, their risks are managed on a program basis.

5. Domestic Debt Program

The fundamental objective of domestic debt management is to raise stable, low-cost funding for the Government of Canada. The domestic debt programs covered in this document include the Treasury bill program²⁰ and the marketable bond program²¹ (fixed-coupon marketable bonds and real return bonds).²² The government borrows in Canadian dollars mainly through wholesale funding.²³ These securities are sold through auctions to Government of Canada securities distributors and end-investors.²⁴ The domestic borrowing program faces interest rate risk and legal risk as well as a very small, temporary exposure to settlement risk.²⁵

The government conducts two types of bond buyback operations: regular bond buybacks (on a cash or switch basis) and cash management bond buybacks. Regular bond buybacks permit the maintenance of a liquid new bond issue program. These operations are sizeable and play a strategic role in maintaining an active new-issue bond program. The second type of buyback operation, cash management bond buybacks, assists in the management of the government's cash balances by repurchasing bonds maturing within the next 18 months. These buyback operations also face legal risk and a very small, temporary exposure to settlement risk.²⁶

20. This includes cash management bills.

21. This includes the issuance of bonds through switch buyback operations.

22. Retail debt management falls outside of the scope of this document.

23. Retail debt is also used to raise Canadian dollar debt; however, it represents only a small proportion of market debt.

24. Details on the framework for government securities auctions can be found at <http://www.bankofcanada.ca/en/auct.htm>.

25. A very limited amount of credit risk also exists with respect to potential default on the part of government securities distributors before delivery of securities won at auction (settlement risk).

26. A very limited amount of credit risk also exists with respect to potential default on the part of government securities distributors to deliver securities that were repurchased.

5.1 Interest rate risk

The primary focus of risk management in the context of domestic debt strategy has always been on the management of the interest rate risk exposure inherent in the domestic debt (i.e. the mix of fixed- and floating-rate debt instruments that make up the debt stock), which is by far the most significant form of financial risk to which the government is exposed.²⁷

5.1.1 Mitigating interest rate risk

The structure of the debt (i.e. the mix of long- versus short-term borrowing) is managed in a way to protect the fiscal position from unexpectedly large increases in interest rates.

When determining the appropriate debt structure, the government generally faces a trade-off between keeping borrowing costs low and ensuring that the cost impact of unexpected increases in interest rates does not exceed its tolerance for risk. Specifically, long-term instruments such as bonds typically have higher debt-servicing costs than short-term instruments such as Treasury bills. On the other hand, interest costs for outstanding bonds are known with certainty over their entire life, whereas Treasury bills need to be refinanced several times throughout the year at new prevailing market interest rates. As a result, debt-servicing costs increase (decrease) and interest rate risk decreases (increases) with a higher (lower) fixed-rate share. Thus, a debt structure that uses greater levels of long-term debt is more prudent but is also likely to be more expensive.²⁸

5.1.2 Measuring interest rate risk

The main operational measure of the debt structure is the fixed-rate share, which is an attractive target because it is intuitive and easy to compute. It represents the amount of debt exposed to interest rate risk over the following year. While risk has several dimensions and can be expressed in a number of different ways, debt managers pay particular attention to the risk that rising debt costs could disrupt the budget plan, using two risk measures in particular: cost-at-risk and relative cost-at-risk.

27. Risk in the domestic debt portfolio is defined in terms of potential variations in debt costs rather than variations in the market value of the debt. Debt costs are the largest single expenditure item of the government, while changes in the market value of the debt have no impact on the budget balance.

28. Details on the government's decision-making process for selection of an appropriate debt structure can be found in the debt management strategy at <http://www.fin.gc.ca/purl/dms-e.html>.

a) Cost-at-risk

Cost-at-risk, which allows for quantification of risk in terms of the maximum costs that could occur with a given probability in a particular year, is one of the tools used to compare alternative debt structures. This measure, also used by a number of other sovereign borrowers, is similar to the well-known value-at-risk (VaR) measure but is based on the distribution of debt costs rather than marked-to-market values. This approach is in line with best practices of other similar sovereigns.

b) Relative cost-at-risk

Relative cost-at-risk expresses the maximum increase in debt costs that can be expected with a 95 per cent probability. This measure is particularly attractive for gauging risk in the debt portfolio because it can be directly compared to the level of prudence incorporated in the budget framework. In other words, in evaluating an appropriate debt structure, debt managers assess whether relative cost-at-risk remains within risk tolerance levels.

Canada also monitors other measures of the debt structure, such as the average term to maturity and duration, to complement the information provided by the fixed-rate share.

5.2 Legal risk

Legal risk is mitigated by having a clearly documented, legally enforceable, process in place for the issuance or repurchase of Government of Canada, Canadian dollar-denominated debt. The legislative authority for the issuance of domestic debt was described in section 3.1. The following provides information on the documentation in place for Treasury bills and marketable bonds.

All new issues of Treasury bills and marketable bonds are issued in global form, whereby a single global certificate for the full principal amount of each security offered is issued in fully registered form to The Canadian Depository for Securities Limited (CDS). Terms and conditions of each issue are attached to the global certificate. The securities must be purchased, transferred, or sold directly or indirectly through a participant of the CDSX²⁹ Clearing Service. The CDS is responsible for tracking bondholders over the life of the bond and ensuring that coupon and principal payments, which the government pays to CDS, are distributed to the investors of record.

29. CDSX is the proprietary name for the clearing and settlement system operated by the CDS.

6. RG Cash Management Program

RG cash balances, the government's Canadian-dollar balances, fluctuate widely over the year with variations in the government's financial operations, periodic large maturities of Government of Canada bonds, the operations of the Bank of Canada, and changes in market conditions.

The primary objective is to minimize the level of cash balances, consistent with ensuring funds are available to meet daily requirements with an appropriate margin for uncertainty while investing the cash balances in the market to help mitigate the cost of carrying cash balances.

The investment of these balances is achieved through twice-daily auctions of the funds, one in the morning (whereby there is a collateralized framework and participants have limited access to uncollateralized deposits) and one in the afternoon. As these cash balances can at times exceed \$20 billion, the largest source of risk of this program is credit risk.

6.1 Credit risk

Credit risk in the RG framework includes both counterparty (risk exposure to the financial institution) and collateral (risk exposure associated with the collateral posted) risks.

6.1.1 Mitigating credit risk

a) Counterparty risk

In September 2002 a collateralized framework was implemented for the morning auction of the RG cash balances in an effort to mitigate credit risk.³⁰

Under the RG collateral framework,³¹ eligibility for the morning auction includes regulated Canadian deposit-taking institutions, federal Crown corporations and their agents, provincial governments and their agents, municipal governments and municipal finance authorities, other FIs, investment dealers, and corporations. Participants must be resident in Canada, be regular participants in wholesale capital markets, have a minimum long-term unsecured debt credit rating of "BBB," or be in a participant in the Large Value Transfer System (LVTS) or a primary dealer (PD) of Government of Canada securities. As with other credit ratings based risk management policies, the government uses ratings supplied by credit rating agencies.

30. Before the new framework, balances were placed as unsecured deposits with the auction winners (restricted to LVTS participants).

31. A full explanation of eligibility criteria for participants and eligible securities for sale and repurchase agreements may be found in the *Terms and Conditions Governing the Morning Auction of Receiver General Cash Balances* available at http://www.bankofcanada.ca/en/auction/rec_general.pdf.

For regulated Canadian deposit-taking institutions, agents of the federal government, provinces, and agents of provinces, the unsecured bidding limit is \$250 million for those rated “AA” or better and \$100 million for “A” rated participants. For all other participants, the unsecured bidding limit is \$100 million for those rated “AA” or better and \$50 million for “A” rated participants.

Winnings are placed with the participants as an unsecured deposit. Participants may bid for amounts in excess of the unsecured bidding limits up to 100 per cent of the amount being auctioned. Auction winnings in excess of their unsecured limit are fully secured with eligible securities through sale and repurchase agreements.

The afternoon auction is used to invest residual cash balances and is limited to LVTS participants. Auction winnings are placed with successful bidders as unsecured deposits. Credit risk is managed through the use of auction limits. The afternoon limit for an individual institution is correlated to its market share of Canadian dollar deposits (for tranches of less than \$2 billion, the limit is calculated on the basis of a floor of a \$2 billion tender). Credit risk is further managed by the exposure being only for a single business day and the auctions being limited to a single tranche.

b) Collateral risk

The government manages collateral risk by setting out strict guidelines as to the quality of eligible securities that may be used as collateral to minimize the risk of loss owing to default and by setting margin requirements or haircuts to protect the government from adverse changes in the value of collateral resulting from movements in interest rates.

Eligible securities include a broad range of corporate and government (federal, provincial, or their agents, or municipal) securities denominated in Canadian dollars with long-term unsecured debt ratings of “A” or better and with a term to maturity of up to 10.5 years. Risk of undue exposure to any single issuer or any single security is managed through the restrictions on the quality and outstanding value of securities pledged. General restrictions address issues of denomination, duration, liquidity, a prohibition on embedded options, book entry format, and a requirement that collateral be held in CDSX. Furthermore, there are limits on amounts of any one security that may be pledged by each participant based on issuer and rating.

Margin requirements are applied against each security, depending on the issuer of the security and the remaining term to maturity of the security. Appendix A contains a list of securities limits and margin requirements.

6.1.2 Measuring credit risk

On a monthly basis, the Bank of Canada provides a report to management showing the uncollateralized exposures to each participant over the previous month for the morning and afternoon auctions. The report highlights monthly changes in peak uncollateralized exposures on both an individual and aggregate basis.

6.2 Legal risk

All participants in the RG cash balances morning auctions are required to sign several documents as set out in the *Terms and Conditions Governing the Morning Auction of Receiver General Cash Balances*,³² which establish their rights and responsibilities as participants in the auctions. These contracts limit potential losses by the Government of Canada resulting from the auctions.

Participants in the afternoon RG cash balances auctions are covered by arrangements signed with LVTS participants either through the *Memorandum of Understanding for Banking Arrangements* or, for participants who are not party to those arrangements, a separate memorandum of understanding for afternoon auctions.

32. Available at http://www.bankofcanada.ca/en/auction/rec_general.pdf.

Part III: Foreign Currency Liability Programs and the Exchange Fund Account

Whereas risks in the domestic funds programs are program specific, the risks associated with the foreign currency programs cut across business lines and are addressed below in that manner to view them more comprehensively. Section 7 provides an overview of the foreign currency programs, and sections 8 to 12 provide a description of the management of the risks associated with these programs.

Specific details on the management of international reserves are also available in the *Report on the Management of Canada's Official International Reserves*, which is published annually.³³

7. Overview of Foreign Currency Programs

The EFA is the principal repository of the government's official international reserves. The government holds foreign exchange reserve assets to provide foreign currency liquidity and to provide the funds, if required, to help promote orderly conditions for the Canadian dollar in the foreign exchange markets. The government's foreign currency reserves are funded through foreign currency liabilities. The foreign currency reserve assets, and liabilities financing those assets, are managed on an asset-liability management framework.

7.1 Foreign currency liability programs

a) Foreign currency debt

Historically, foreign currency debt was issued to fund foreign currency reserves. The securities issued were Canada bills, foreign-currency global bonds, Canada Notes, Euro Medium-Term Notes (EMTNs), and cross-currency swaps. Most recently, however, funding requirements have increasingly been met through cross-currency swaps, which are more cost-effective compared to other funding sources.

b) Cross-currency swaps

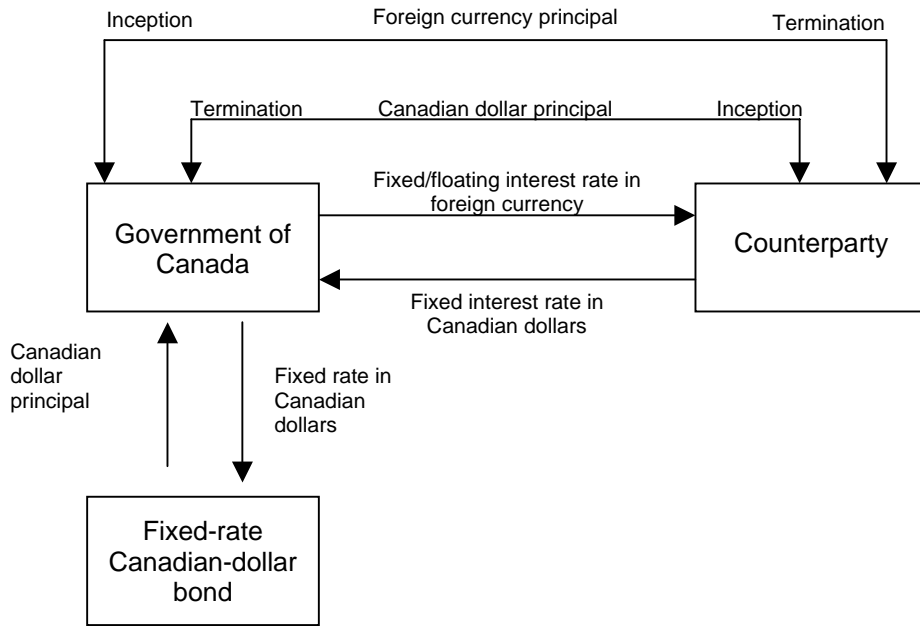
Cross-currency swaps, in which Canada issues domestic currency debt and swaps it for a foreign currency liability (denominated in US dollars, euro, or yen) have been used since 1995 to fund the foreign exchange reserves. The government deals with about 20 swap counterparties and the swap portfolio exceeds US\$20 billion. While swaps are an integral part of the government's foreign-currency borrowing strategy, they engender credit risks. Consistent with best practices, the *Swap Management Policy* (SMP) formally documents the policies concerning the

33. Available at <http://www.fin.gc.ca/purl/efa-e.html>.

government’s swap program, including risk exposure limits, and permitted and prohibited activities.

Figure 2 below depicts a simple domestic currency swap. The Government of Canada issues Canadian-dollar debt and, at inception of the swap, gives the incoming borrowed funds to the counterparty in exchange for foreign currency principal. During the life of the agreement, the government and the counterparty swap interest payments (based on either a fixed or floating interest rate). The government uses the interest it receives to pay (in whole or in part) the interest it owes on the wholesale domestic debt it issued before inception of the agreement. At the termination of the swap agreement, the two parties exchange the principal amounts exchanged at inception of the swap agreement.

Figure 2: The Government’s use of Cross-currency Swaps



7.2 The Exchange Fund Account

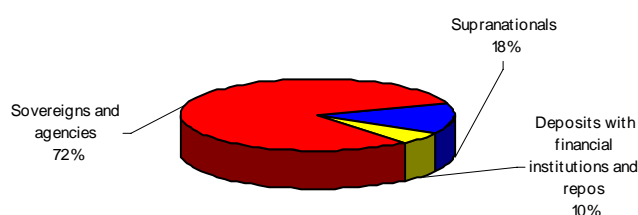
The assets held in the EFA are managed in accordance with the policies set forth in the *Statement of Investment Policy (SIP)*. It formally documents the investment objectives, portfolio structure, eligible asset classes and currencies, and risk exposure limits.³⁴

34. If there is a discrepancy between this document and the SIP, the latter shall be deemed correct.

The EFA is structured into two tiers: the Liquidity Tier and the Investment Tier. The Liquidity Tier serves to meet the government's liquidity requirements in foreign currencies whereas the Investment Tier consists of a diversified mix of highly rated securities and longer-term deposits and repurchase agreements. The EFA can hold bonds, notes, and bills issued by governments, central banks, supranationals, and agencies only. It can also hold corporate commercial paper (CP) and certificates of deposit (CDs) as well as deposits or repurchase agreements with FIs. An overview of the EFA's asset allocation is displayed in Chart 1.

Chart 1: EFA Investments by Issuer

(As at March 31, 2006)



8. Credit Risk

The government faces credit risk exposure on its EFA operations in numerous ways. The most direct credit exposure is on EFA assets since a credit event, such as a default or credit downgrade of the issuer of securities held in the EFA, would reduce the market value of the assets. The effect of a downgrade, in the case of a marketable security, would depend upon the price sensitivity of the security to yield (and spread) increases. Hence, longer-term and lower-rated securities are exposed to greater downgrade and default risks than shorter-term and higher-rated ones. In addition, market downgrade expectations could also widen yield spreads in advance of actual downgrades. The government also faces credit risk in its swap, deposits, and repurchase programs.

8.1 Mitigating credit risk

The government strives to mitigate credit risk through consolidated credit restrictions and limits. Program-specific guidelines and limits have also been established.

8.1.1 Consolidated credit restrictions and limits

Credit risk is predominantly managed through two sets of policies. The first set addresses credit quality: the EFA can only do business with highly rated counterparties. The second set emphasizes diversification: the potential for material credit losses can be minimized if the exposure to each counterparty is restricted to a relatively small share of the total portfolio. For yet greater protection, credit risk is further mitigated through counterparty maturity limits and counterparty type restrictions.

a) Issuer type restrictions

The government can invest in fixed-income securities issued by a sovereign, sovereign agencies, government-supported entities, and supranationals. Corporate CP and CDs are also eligible asset classes. In addition, reserves can be invested in cash deposits or repurchase agreements with FIs. Of note, investments in securities with embedded options, such as callable bonds, are prohibited except when held as collateral.

b) Counterparty credit quality restrictions and diversification limits

To be eligible for EFA investment or to become a swap, deposit, or repurchase counterparty, an issuer or counterparty must have a credit rating in the top seven categories from at least two of the four main rating agencies: Moody's Investors Service, Standard & Poor's (S&P), Fitch Ratings, and Dominion Bond Rating Service (DBRS). When there are two or more ratings for a counterparty, the rating of the second highest rating agency will be used to assess eligibility.³⁵ The Bank for International Settlements (BIS) and the International Monetary Fund (IMF) are deemed to have a rating of "AAA." The credit quality and diversification limits for sovereigns, their central banks, and their directly guaranteed agencies are detailed in Table 1 below. Likewise, the credit quality and diversification limits for government-sponsored enterprises (GSE) and supranational institutions are detailed in Table 2. Note that all limits are based on par value and current exchange rates in the following tables, unless specified otherwise.

35. For the purposes of setting limits on exposures, it is usual to calculate one "rating" that consolidates the information content of up to four ratings. (All rating references are rescaled according to the S&P syntax. The Moody's A1 and DBRS's A (high) therefore map into A+). In cases where two or more ratings are the same, for example, Moody's is AA, S&P is AA, DBRS is AA-, and Fitch is AA-, the "EFA" rating would be AA (not AA-). In addition, if a long-term senior unsecured debt rating is unavailable, long-term subordinated debt ratings can be substituted after notching up one level. In this document, if the rating is in quotation marks (""), it is an EFA rating.

Table 1: Limits in US dollar on exposure to sovereigns, their central banks, and their directly guaranteed agencies
(As a percentage of liquid reserves target level unless otherwise indicated, based on par value and current exchange rates)

Issuer ³⁶	Aggregate type limits	Individual counterparty limits		
"AAA" in domestic currency	Unlimited	Unlimited		
"AAA" in foreign currency	25%	10%		
"AA-" to "AA+"				
	2%	(millions of US dollars)		
		Total	Of which domestic currency	Of which foreign currency
"A+"		500	500	50
"A"		250	250	25
"A-"		100	100	10

Table 2: Limits on exposures to GSEs and supranational institutions
(As a percentage of liquid reserves target level, based on par value and current exchange rates)

Issuer Type	Aggregate type limits	Individual limits
GSEs (including eligible US agencies)	15%	3%
Supranationals (excluding the BIS)	25%	10%
Bank for International Settlements (BIS)	10%	N/A

The credit quality restrictions and diversification limits for private sector entities reflect the total exposure to individual FIs (i.e. the deposit, CP, CD, and the swap/derivative exposures). This is explained in Table 3.

36. For sovereigns and their directly guaranteed agencies, the lower of the issuer's domestic or foreign currency credit ratings are used for limit purposes.

Type of exposure	Credit Rating of FI Counterparty						
	"A-"	"A"	"A+"	"AA-"	"AA"	"AA+"	"AAA"
Individual actual exposure	10	25	50	100	150	200	300
Total actual exposure	2% of liquid reserves target level			N/A			
	25% of liquid reserves target level						
Deposits (non-marketable) ³⁷	1,500						
Individual potential exposure	25	50	100	200 ³⁶			
Foreign exchange (FX) business for FIs without a CSA ³⁸	1			100			
Actual exposure is equal to the par value of deposits, CP, and CDs plus the mark-to-market position on derivative and FX contracts, taking full account of any close-out netting provisions and collateral posted.							

The current methodology for calculating the swap exposure was put in place in 2000. It is largely based on the BIS methodology, but the government calculates actual and potential exposures separately for individual counterparties across all lines of business. "Actual" exposure represents what the loss would be if the counterparty or obligor were to default immediately. In the case of EFA assets, this is measured in terms of par value; for derivative transactions it is measured as the cost of replacing the defaulted contracts in the market.³⁹ "Potential" exposure represents the plausible future actual exposure and is relevant only to swap and other derivative transactions.

37. The implications of placing a deposit with a particular commercial bank are carefully analyzed before a deposit is made. For example, legal issues, such as security priority, and practical implications, such as the impact to the commercial bank when the funds are withdrawn at a time of potential economic crisis, are studied.

38. The unsettled spot foreign exchange transactions cannot exceed US\$100 million with any one counterparty with a rating less than "AA-."

39. For cash investments, actual exposure is equal to the par value (at current foreign exchange rates) except in the case of repurchase transactions, which, when appropriately collateralized, are assigned an actual exposure value of zero. For derivative contracts, actual exposure is the net replacement cost of all relevant contracts should the counterparty default today and is equal to the total mark-to-market value of all contracts less the value of any collateral posted, unless this total is negative, in which case it is set to zero. (In practice, as a result of some of the mechanical aspects of CSA collateral posting, when a swap counterparty is posting collateral, an actual exposure equal to the limit is assigned.)

Potential exposure is calculated using the add-on approach suggested by the Basle Capital Accord. It is calculated for each contract individually by multiplying the receive-side notional amount by a multiplier. The multiplier depends upon the type of contract (interest rate or currency) and its term to maturity. These multipliers are given in Table 4.

Remaining term to maturity of derivative contract	Receive-side notional multiplier	
	Interest rate contracts (%)	Currency contracts (%)
Less than one year ⁴¹	0	1.0
One to five years	0.5	5.0
Longer than five years	1.5	7.5

c) Maturity limits

To further limit credit risk, the maximum term to maturity on any investment rated “A+” or lower is five years, unless it is denominated in a currency other than the issuer’s “home” currency, in which case the limit is one year. For “AA-” or better, the maximum term to maturity is 10.5 years.⁴² The maximum term is three months for deposits and repurchases and one year for CP and CDs.

40. For example, if a cross-currency swap for US\$100 million has a maturity of over five years, the potential exposure is 7.5 per cent multiplied by US\$100 million equals US\$7.5 million. This amount is broadly consistent with potential losses over a two-week period to replace a swap.

41. Foreign exchange contracts with a remaining maturity of less than 10 business days are excluded from potential exposure calculations.

42. The maximum term to maturity of 10.5 years can potentially be waived if a longer maturity is required for liability hedging purposes.

8.1.2 Other program-specific credit risk policies

a) EFA securities

Transactions done on delivery-versus-payment basis

To decrease credit risk during the execution of transactions (i.e. buying and selling EFA securities), the normal “A-” threshold also applies to the dealers through whom securities trades are transacted on a delivery-versus-payment basis.⁴³ Some flexibility is exercised, however, in that the dealer itself needs not necessarily have the required rating if its parent does. Counterparties who do not meet these criteria can be submitted to the Risk Committee for an exception review.

b) Swaps

The Swap Collateral Management Framework

To be eligible for swap business, counterparties must sign a collateral support annex (CSA). This is signed in addition to the International Swaps and Derivatives Association Inc. (ISDA) Master Agreement, which includes netting and other terms. Under the CSA, high-quality collateral is posted to the government if individual actual credit exposures, arising from changes in the mark-to-market values of swap contracts, exceed pre-set limits (actual exposure limits are shown in Table 3).

Eligible collateral under the CSA

Only marketable securities issued by the US Treasury, Fannie Mae, Freddie Mac, and the Federal Home Loan Bank or Government of Canada Treasury bonds and bills and Canadian and US dollar cash can be submitted as collateral under such CSAs. Further, all US dollar-denominated securities posted should meet the EFA’s eligibility requirements. In addition, a haircut of two per cent is applied to all posted securities with up to one year remaining to maturity, as is industry practice, and five per cent beyond one year. There is no haircut applied to cash collateral. For bonds and notes, the allowable term to maturity is at least one year but no more than ten years.

43. In the event that a particular rating agency has a short-term rating for the counterparty in question but no long-term unsecured debt rating, the short-term rating may be mapped to an equivalent long-term unsecured debt rating. More specifically, a Moody’s P-1, any S&P A-1, any Fitch F1, and a DBRS R-1 (mid) maps to an A- long-term unsecured rating. An S&P A-1+, a Fitch F1+ and a DBRS R-1 (high) maps into a AA- long-term unsecured debt rating. The usual two-rating rule nevertheless applies.

Valuation of swaps and collateral

Swaps are marked to market every day, and actual exposures are calculated daily. The degree of under-collateralization is reviewed bi-monthly, on the first and fifteenth, or more frequently if required. The minimum collateral transfer amount is US\$10 million for counterparties rated “AA-” and better and US\$1 million for counterparties rated below “AA-.” Hence, the net actual exposure can be up to US\$10 million above limit before a recollateralization call can be made. Margin calls are made in accordance with the CSA agreement.

*c) US dollar tripartite repurchase program**Counterparty eligibility*

Counterparty eligibility limits are determined by a combination of collateral and credit rating. The details are shown in Table 5.

Table 5: Individual limits on outstanding amounts of repurchase (repo) transactions (Par value, millions of US dollars)			
	Credit Rating		
	“A-” to “A+”	“AA-” to “AA+”	“AAA”
Versus US Treasury and US Agency Discount Note collateral combined	300	500	750

If a dealer is unrated, the parent company must have a credit rating of “A-” or above.⁴⁴

Eligible collateral

The repurchase program permits only US Agency Discount Notes with terms to maturity not exceeding 10.5 years. In addition, a haircut of two per cent applies to all collateral, as is common market practice.

44. In the event that a particular rating agency has a short-term rating for the counterparty in question but no long-term unsecured debt rating, the short-term rating may be mapped into an equivalent long-term unsecured debt rating. The details of this mapping were discussed in footnote 43.

Intra-day credit limit to custodians

Under the government's tripartite repurchase framework, daily unwinding of repurchase trades is not permitted, and a repurchase counterparty can only substitute collateral on a security-by-security basis. This is to eliminate intraday credit exposure except on repurchase inception and termination dates. In order to control the intra-day credit risk to clearing banks on inception and termination dates, a daily US\$500 million credit cap (including interest) was put in place. Repurchase trades and maturities have to be structured so that, in any one day and with any one clearing bank, no more than US\$500 million in new deals can be processed and maturities can come due in total.

Term limits

The term to maturity for repurchase transactions varies from overnight to three months (the maximum term limit).

Collateral management

The clearing banks manage the repurchase collateral during the term of the repurchase. This includes valuing the initial collateral and marking the collateral to market, making collateral substitutions, and ensuring that the repurchase is fully collateralized at all times.

d) Securities lending program

Under the securities lending authorization agreements contracted between the government and its agents, the agents agree to indemnify the EFA against any loss resulting from the default of a borrower, thus reducing the counterparty risk faced by the EFA.

Eligible collateral

Each loan must be initially collateralized at 102 per cent using cash or eligible securities (high-credit, short-term sovereign; supranational notes; or US agency discount notes).

Valuation

The loans are marked to market daily, and additional collateral is required should the market value of the collateral fall below 101 per cent of the market value of the repurchase.

8.2 Measuring credit risk

a) Controlling aggregate exposure

For purposes of measuring and controlling credit risk to specific counterparties, actual exposure is calculated on a cumulative basis (to account for both swap and investment positions). Exposures are calculated monthly by type of counterparty and geographic distribution while credit rating events are monitored on a daily basis. Finally, aggregate collateral holdings from the repurchase, swap, and securities lending programs are calculated and reported on a monthly basis.

b) Credit value-at-risk

Credit value-at-risk (VaR) is defined as the maximum loss that the portfolio could potentially incur at a certain confidence level (99.9 per cent) over a one-year horizon as a result of credit events under normal market conditions. The credit VaR provides a more complete understanding of credit risk at the portfolio level because it takes into account downgrade and upgrade probabilities for each credit rating and asset correlation as well as the duration of credit exposures.

c) Expected shortfall

The expected shortfall is the average of the losses that exceed the credit VaR threshold. It gives an indication of the size of extreme losses, whose possibility of happening (0.1 per cent) is not captured by the credit VaR.

d) Credit risk stress tests

Credit risk stress tests evaluate potential losses to the EFA assets under hypothetical credit events, such as counterparties with negative outlook being downgraded.

9. Market Risk

Strict policies have been established to minimize the net impact of exchange rate and interest rate changes on the value of Canada's foreign reserves and associated liabilities.

9.1 Mitigating market risk

Since EFA reserves are reported in US dollars, currency risk relates only to the potential for movements in the euro and yen against the US dollar. The government follows an “asset-liability matching framework,” whereby the assets, and the liabilities that fund them, are matched as closely as possible in currency and duration so that the government is not materially exposed, on a net basis, to changes in currency values and interest rates. In order to minimize risk as a result of an imbalance between the market values of assets and liabilities, a net reserve operating range of +/- US\$300 million has been instituted.⁴⁵

To limit the market risk associated with having to roll over a large portion of the portfolio, the par value of EFA liabilities that mature within any 12-month period should not exceed one-third of the official liquid reserve market value. This is known as the encumbered ratio. By limiting the size of the maturing liabilities, the annual funding requirements faced by the government are kept at manageable levels. Furthermore, liabilities are managed to ensure a smooth profile of maturities (i.e. to avoid lumpy maturities).

9.2 Measuring market risk

For EFA deposits and securities, the government uses three measures for market risk: market VaR, key rate duration, and the asset-liability gap (as discussed above). Stress tests and the total return performance measure are also used to complement these measures.

a) Market VaR

Market VaR is a statistical measure that estimates the loss in portfolio value expected within a specific time period during normal market conditions at a given confidence level as a result of changes in interest and exchange rates. Market VaR is calculated on a gross (assets only) and net (i.e. market VaR on assets minus market VaR on associated liabilities) basis.

The gross market VaR is relevant because there are guidelines specifying targets for the total level of liquid reserves and for the US dollar share. The gross market VaR can thus be used to provide an indication of the probability of breaching those thresholds over a certain time period. The net market VaR is a useful indicator of how well the portfolio is matched and can be supplemented with traditional interest rate sensitivity and exchange rate sensitivity analysis.

45. The net reserve position is equal to the market value of assets less liabilities.

b) Key rate duration

Key rate duration is the sensitivity of the portfolio value to movements in individual points, or spot rates, along the yield curve. Key rate duration provides a measure of the overall level of interest rate exposure (overall dollar duration) and information on whether or not the portfolio is exposed to risk from non-parallel shifts in the yield curve, such as steepening or flattening, which cannot be measured from ordinary dollar duration.

c) Stress tests

As a complement to these measures, market VaR in particular, stress tests are used and reported in order to give a sense of how the portfolio is expected to perform in periods of market turbulence. Specifically, stress tests attempt to gauge the vulnerability of a portfolio to hypothetical events, by using hypothetical or actual extreme historical events, to measure the possible losses in either type of scenario. Stress tests do not indicate the probability that either the hypothetical scenarios will occur or that the historic events will re-occur; they simply indicate the effect on the portfolio in question.

d) Total return

While total return is a measure of performance, it also gives an indication of how well the EFA is matched in duration and currency to corresponding liabilities and therefore hedged against market risk.

10. Liquidity Risk

Adequate liquidity is crucial for the EFA given that it is intended to meet the government's core liquidity requirements in foreign currencies. Intervention, if required, would likely take the form of sales of US dollars to purchase Canadian dollars, and US dollar liquidity is therefore particularly important. In general, the EFA holds only such securities that are known to trade in deep markets at tight bid-offer spreads.

10.1 Mitigating liquidity risk

a) The liquidity and investment tiers

In recognizing the immense importance of liquidity in times of market stress, the government has specified two sets of asset tiers based on liquidity. The first recognizes the value of immediate liquidity by establishing a liquidity tier of assets. By default, the second addresses any additional reserves not deemed to be part of the liquidity tier. This tier is known as the investment tier.

The liquidity tier consists of two sub-tiers: I and II.

Sub-Tier	Maximum Remaining Term	Eligible Investments
I	1 year	US Treasury bills, US agency discount notes, FIXBIS deposits, overnight bank and BIS deposits, overnight repurchase agreements, short-term marketable paper
II	10.5 years	Marketable US Treasury securities, US Agency securities, sovereign and supranational securities (including BIS MTIs)

Moreover, irrespective of maturity, at least 10 per cent of liquid reserves target level must be held in the form of marketable US Treasury securities (on a par-value basis). There are no minimum liquidity limits for other currencies.

b) Terms of investment

Reserves that are not considered liquidity tier instruments are deemed to be in the investment tier. Policies for the mitigation of liquidity risk can be segmented into two groups: maturity limits and holding limits. These limits are listed in Table 7.

Maturity Limits	
Maximum term to maturity on any eligible investment	10.5 years
Maximum term to maturity on any investment rated "A+" or lower	5 years if the investment is denominated in domestic currency 1 year if the investment is denominated in foreign currency
CP and CDs	1 year
Maximum term to maturity on bank deposits, repurchase agreements, and other non-marketable investments	3 months
Maximum of all deposits, repurchase agreements, and other non-marketable investments maturing beyond five business days (based on par value)	15% of reserves target level
Holding Limits	
Minimum amount outstanding of any bond or note purchased for investment (based on par value)	10% of the total amount outstanding

10.2 Measuring liquidity risk

The government monitors the EFA's liquidity position by assessing the EFA's position relative to the liquidity limits. The Department of Finance Canada and the Bank of Canada are working on developing new measures of liquidity risk.

11. Legal Risk

The government strives to ensure contracts with counterparties are appropriately documented, legally enforceable, and executed to mitigate the legal risk involved in the management of the EFA and associated programs.

11.1 Mitigating legal risk

11.1.1 Legal risk policies by program

The following provides an overview of the legal documentation and practices supporting the various foreign currency debt instruments.⁴⁶

a) Canada bills

Canada bills are issued in book-entry form and settled through the Depository Trust Company (DTC). There is a master note in registered form, registered in the name of Cede & Co., the nominee of the DTC, and such Note represents 100 per cent of the principal amount outstanding at any time. Payments are made to the DTC through the fiscal agent.

b) Canada Notes

Each Canada Note issued is represented by global note for the full principal amount registered in the name of Cede & Co., the nominee of the DTC. The terms and condition of the notes are attached to each global certificate. Payments of principal and interest are made to the DTC through the fiscal agent.

c) Euro Medium-Term Note Program

Each Euro Medium-Term Note (EMTN) issued is represented by a permanent global bearer note for the full principal amount that is deposited with Morgan Guaranty Trust Company of New York, Brussels office, as operator of the Euroclear system. The terms and conditions of the notes are set out in the Issuing and Paying Agency Agreement as amended by a pricing supplement for each issue and are attached to the notes. Principal and interest are paid to Euroclear through the fiscal agent.

46. All securities discussed are issued under Canadian law.

d) Global bonds

In general, Global bonds are in the form of registered global securities (each a global bond) registered in the name of the nominee of the DTC and recorded in a register held by the Registrar. Beneficial interest in the global bonds is represented through book-entry accounts of FIs acting on behalf of the beneficial owner as direct and indirect participants in the DTC. Except in limited circumstances, owners of beneficial interest in the Global Bonds will not be entitled to have bonds registered in their names and will not receive or be entitled to receive bonds in definitive form. The bonds are sold in minimum aggregate principal amounts of US\$1,000 and integral multiples thereof.

e) Swaps

Standard documentation for the swap program includes the 1992 International Swap and Derivative Association (ISDA) Master Agreements and the Credit Support Annexes. The former is widely used and is the accepted market standard. It is generally agreed that the Agreements express the intention of the parties and are enforceable in accordance with their terms against the counterparty, subject to solvency.

f) EFA deposits and securities

There are a number of restrictions on which jurisdictions are acceptable for commercial bank deposits. For example, deposits may be booked with Canadian branches and subsidiaries of foreign banks. Deposits may also be placed with New York branches of banks that are not insured by the Federal Deposit Insurance Corporation. Furthermore, deposits may be placed with UK and Irish branches and subsidiaries of UK and Irish commercial banks.

g) US-dollar tripartite repurchase program

Standard documentation for the modified US-dollar tripartite repurchase program includes the Bond Market Association Master Repurchase Agreement under New York law and the Custodial Undertaking in Connection with Master Repurchase Agreement.

h) Securities lending program

The government has one-off agreements between Canada and the securities lending agents under which the agents agree to carry out securities lending on behalf of Canada; there is also an agreement between the agents and the borrower under which Canada's securities are loaned to the borrower.

11.2 Measuring legal risk

The Department of Justice Canada provides a comprehensive legal risk review of treasury functions on a periodic basis. These reviews include a thorough assessment of documentation in place as well as recommendations for the actions required to mitigate, to the greatest extent possible, legal risk.

12. Operational Risk

Operational risk associated with the government's funds management activities is managed by the Bank of Canada through its corporate risk management framework. This framework is fully integrated into the Bank of Canada's strategic planning, quarterly expenditure monitoring and reporting, and year-end stewardship processes. It therefore supports informed decision making by ensuring that the appropriate competencies, analytic tools, and consultation and communication form the foundation for innovation and responsible risk-taking.

12.1 Mitigating operational risk

The Bank of Canada mitigates operational risk by implementing procedures that clearly separate the front (trading), middle, and back office functions. Trade entry, trade validation, and risk monitoring functions are performed by different units within the Bank of Canada. Trades are entered into a fully integrated system that provides a detailed audit trail of all trades. This system also offers real time risk control and risk monitoring.

The Bank of Canada also has business continuity plans in place so that there is appropriate redundancy. This includes back-up systems and second site capabilities to perform operations.

The Bank of Canada's risk management process has six key steps:

- ▶ establish the strategic context, taking into consideration the strategic direction and objectives in the Bank of Canada's medium-term business plan;
- ▶ identify the key risk areas and the approaches to managing the risks;
- ▶ determine the level of risk—likelihood and consequences;
- ▶ assess whether risk is at an acceptable level;
- ▶ develop options for managing a risk that is assessed at an unacceptable level and implement the preferred option; and
- ▶ monitor, manage, and report on the areas of risk.

For each area of risk, an assessment is made as to the likelihood of the risk occurring, the potential consequences, and the approaches to manage the risks. The level of risk (likelihood and consequences) for each key area of risk is evaluated in a qualitative fashion. The broad categories of risk relate to financial, security, operational (e.g. human resources, information technology and systems), legal, and reputational risks.

12.2 Measuring operational risk

Measurement of operational risk at the Bank of Canada is integrated into the same process as its risk mitigation functions.

Appendix A: Limits and Margin Requirements for Receiver General Sale and Repurchase Agreements

A. Limits on amounts of eligible securities

There is no limit on the amount of securities issued or guaranteed by the Government of Canada or an agent of the Government of Canada that will be accepted as collateral under Receiver General Sale and Repurchase Agreements.

Other eligible securities are subject to the limits noted below.

1) Of the total amount of collateral pledged by a participant, the maximum principal amount issued by any one province (including agents of that province) and the aggregate amount issued by all provinces (including agents of all provinces) shall not exceed the limits set out in the following table.

An "A" Rated Province (including agents of that province)	An "AA" or Better Rated Province (including agents of that province)	Aggregate Limit for Securities Issued by All Provinces (including agents of all provinces)
10 per cent	20 per cent	40 per cent

2) Of the total amount of collateral pledged by a participant, the maximum principal amount issued by any other entity (including parties related to that entity) and the aggregate amount issued by all other entities shall not exceed the limits set out in the following table.

An "A" Rated Entity (including parties related to that entity)	An "AA" or Better Rated Entity (including parties related to that entity)	Aggregate Limit for Securities Issued by All Other Entities
5 per cent	10 per cent	20 per cent

B. Margin requirements

The following margin requirements are applied (note that for securities with up to one year to maturity the margins are adjusted by term divided by 365):

Collateral Type	Maturity (in %)				
	up to 1 yr	>1–3 yrs	>3–5 yrs	>5–10.5 yrs	>10.5yrs
Securities issued by the Government of Canada (including strips and residuals)	1.0	1.0	1.5	2.0	2.5
Securities of agents of the Government of Canada or guaranteed by the Government of Canada (including Canada Mortgage Bonds and NHA MBS*)	1.5	2.0	2.5	3.0	3.5
Securities issued by a provincial government (rated A or better)	2.0	3.0	3.5	4.0	
Securities of agents of a province or guaranteed by a province (rated A or better)	3.0	4.0	4.5	5.0	
Bankers' acceptances, BDNs, promissory notes, commercial paper and short-term municipal paper (rated A-1 (high) by S&P or R-1 (mid) or better by DBRS)	7.5				
Bankers' acceptances, BDNs, promissory notes, commercial paper and short-term municipal paper (rated A-1 (mid) by S&P or R-1 (low) by DBRS or P-1 by Moody's)	12.0				
Corporate and Municipal Bonds (rated AA or better)	7.5	7.5	8.5	9.0	
Corporate and Municipal Bonds (rated A)	12.0	12.0	13.0	13.5	

* Minimum pool size of \$75 million.

Appendix B: Glossary

asset-liability matching framework

A market risk mitigation process whereby the assets, and the liabilities that fund them, are matched as closely as possible in currency and duration so that the government is not materially exposed, on a net basis, to changes in currency values and interest rates.

Canada bill

A promissory note denominated in US dollars and issued only in book-entry form. Canada bills mature not more than 270 days from their date of issue and are discount obligations with a minimum order size of US\$1,000,000 and a minimum denomination of US\$1,000. Delivery and payment occur in same-day funds through the Chase Manhattan Bank in New York City. Primary distribution occurs through five dealers: CIBC World Markets Corporation, Credit Suisse First Boston LLC, Goldman, Sachs & Co., Lehman Brothers Inc., and RBC Dominion Securities Inc. Rates are posted daily for terms of one to six months. They are issued for foreign exchange reserve funding purposes only.

Canada Note

A promissory note usually denominated in US dollars and available in book-entry form. Canada notes are issued in denominations of US\$1,000 and integral multiples thereof. At present the aggregate principal amount outstanding issued under the program is limited to US\$10 billion. Notes can be issued for terms of nine months or longer and can be issued at a fixed or a floating rate. The interest rate or interest rate formula, issue price, stated maturity, redemption, or repayment provisions and any other terms are established by the Government of Canada at the time of issuance of the notes and are indicated in the pricing supplement. Delivery and payment occur through the Bank of New York. The notes are offered by the government through five dealers: Credit Suisse First Boston LLC, Goldman, Sachs & Co., Lehman Brothers Inc., Nesbitt Burns Securities Inc., and Scotia Capital Markets (USA) Inc. The government may also sell notes to other dealers or directly to investors. Canada notes are issued for foreign exchange reserve funding purposes only.

credit risk

A credit risk is made up of counterparty and collateral risks.

counterparty risk

A counterparty risk is the risk that a counterparty will default by failing to repay an obligation in a timely manner.

collateral risk

A collateral risk is the risk that the value of the collateral deposited by a counterparty will not be worth what it is expected to be worth due, in particular, to market fluctuations.

cross-currency swap

An agreement that exchanges one type of currency for another (e.g. Canadian dollars for US dollars) and generally one type return for another (e.g. a fixed for a floating rate of interest). The principal amount is exchanged at the origination of the swap and at the termination of the swap.

currency risk

A currency risk, a component of market risk, is the risk that changes in exchange rates will affect the value of assets held by the government.

dollar duration

The proportional impact on the price of a fixed income instrument subject to a 100-basis-point change in interest rates across the whole curve.

Euro Medium-Term Note (EMTN)

A medium-term note issued outside the US and Canada. Government of Canada EMTNs are sold either by dealers in the dealer group or by dealers who are not in the dealer group but who are acting as the government's agent for the particular transaction (called reverse inquiry). EMTNs are sold on a bought-deal basis (i.e. the dealer purchasing EMTNs is responsible for the sale of the notes) and on an intermittent basis. The arranger for the EMTN program is Morgan Stanley Dean Witter. The London-based dealer group includes CIBC World Markets plc, Goldman Sachs International, and J.P. Morgan Securities Ltd. The EMTN program further diversifies the sources of cost-effective funding for the foreign exchange reserves. Notes issued under this program can be denominated in a range of currencies and structured to meet investor demand. EMTNs are issued for foreign exchange reserve funding purposes only.

Exchange Fund Account (EFA)

The EFA is an actively managed portfolio of liquid foreign currency assets, maintained to provide foreign currency liquidity for the Government of Canada and to provide the funds needed to help promote orderly conditions for the Canadian dollar in foreign exchange markets. The EFA is funded by liabilities of the Government of Canada denominated in, or converted to, foreign currency. Assets and liabilities are matched as closely as possible in currency and duration to minimize the government's exposure to currency and interest rate risks.

global bond

A syndicated, marketable debt instrument issued in a foreign currency with a fixed interest rate. The majority of global bonds issued by Canada are denominated in US dollars. Global bonds are issued for foreign exchange reserve funding purposes only.

Government of Canada securities auction

A process used for selling Government of Canada debt securities (mostly marketable bonds and Treasury bills) in which issues are sold by public tender to government securities distributors.

government securities distributor (GSD)

A member of a group of investment dealers and banks through which the government distributes Government of Canada Treasury bills and marketable bonds.

interest rate risk

An interest rate risk, a component of market risk, is the risk that changes in yield will affect the value of assets or the costs of borrowing. An increase (decrease) in yields will lower (raise) the value of fixed income assets and make borrowing more (less) expensive.

Large Value Transfer System (LVTS)

An electronic system for the transfer of large-value or time-critical payments.

legal risk

A legal risk arises when counterparty contracts are not legally enforceable or appropriately documented or executed. Legal risk also arises when counterparties do not have the legal authority (capacity) to engage in relevant transactions and when the government does not comply with relevant statutory or regulatory requirements.

liquidity risk

Liquidity risk arises when a market position cannot be unwound at or near the previous market price because of inadequate market depth or market disruption. Liquidity risk could also result from the difficulties in unwinding or offsetting positions.

market risk

Market risk includes interest rate and currency risks. It reflects the risk the government faces from adverse changes in the value of its positions resulting from changes in market factors such as interest rates and exchange rates.

marketable bond

A Canadian government debt security that is non-cashable before maturity but whose ownership may be transferred from one holder to another on the open (secondary) market.

money market

The market in which short-term capital is raised, invested, and traded using financial instruments such as Treasury bills, bankers' acceptances, commercial paper, and bonds maturing in one year or less.

operational risk

The risk of direct or indirect financial loss resulting from inadequate or failed internal processes, people (by error or fraud), and systems (such as malfunction or crash of computer systems) or from external events over which the organization has no control. The broad definition can include risks such as fraud, settlement, information technology, accounting, personnel, event, and reputation.

primary dealer (PD)

A member of the core group of government securities distributors that maintain a certain threshold of activity in the market for Government of Canada securities. The primary dealer classification can be attained in either Treasury bills or marketable bonds, or both.

repurchase agreement (repo)

A transaction in which a party sells a security and simultaneously agrees to repurchase it at a given price after a specified time.

securities lending

A loan of a security from one counterparty to another, who must eventually return the same security as repayment. The loan is often collateralized. Securities lending allows a counterparty in possession of a particular security to earn enhanced returns on the security.

value-at-risk (VaR)

The VaR is a statistical measure that estimates the maximum expected loss in the value of a portfolio within a period of time, given normal market conditions resulting from credit events (credit VaR), variations in interest and exchange rates (market VaR), etc. For example, a 10-day market VaR of \$10 million means that 95 per cent of the time portfolio losses resulting from market risks will not exceed \$10 million over a 10-day period.