

Developing a Medium-Term Debt-Management Strategy for the Government of Canada

Marc Larson and Etienne Lessard, Funds Management and Banking Department

- *The development of a sound medium-term debt-management strategy is a complex task that requires a thoughtful balance between cost and risk. Moreover, any change to the government's debt structure has to be considered from a long-term, forward-looking perspective.*
- *Federal debt managers have various analytic tools to assess the cost-risk trade-offs of different borrowing strategies. These tools, combined with debt managers' judgment and experience, are used to develop Canada's medium-term debt strategy.*
- *An important element of the decision-making process is to engage market participants in regular and open dialogue.*

The recent international focus on levels of sovereign debt and the sustainability of countries' borrowing programs has reinforced the importance of developing a sound strategy for structuring and managing government debt.¹ There are, however, a number of other policies that work in conjunction with the debt strategy to keep debt costs low and stable, such as a sustainable fiscal policy; a monetary policy that keeps inflation low, stable and predictable; and an efficient financial system.

While the Government of Canada's federal debt-to-GDP ratio of about 34 per cent is the lowest in the G-7 countries, considerable effort and planning is still required to develop a debt-management strategy² that thoughtfully balances many different cost and risk considerations.³ Moreover, a well-developed debt strategy can have considerable financial benefits. With over \$575 billion of Government of Canada market debt outstanding (**Chart 1**), annual interest payments on that debt are about \$17 billion, and about 8 cents of every tax dollar collected by the government goes toward paying these interest charges.⁴

As the fiscal agent for the Government of Canada, the Bank of Canada provides strategic policy advice on the management of the government's debt in addition to being responsible for conducting

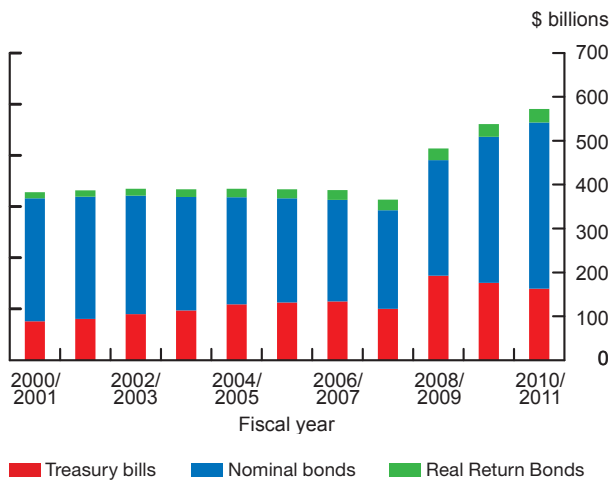
¹ The article focuses on the Canadian-dollar-denominated debt issued by the Government of Canada, and so excludes debt issued by federal Crown corporations and global bonds issued by the Government of Canada to fund the Exchange Fund Account.

² The debt-management strategy sets out the Government of Canada's objectives, strategy and plans for managing its domestic and foreign debt, other financial liabilities and related assets.

³ See the Government of Canada's Budget 2011 at <<http://www.budget.gc.ca/2011/home-accueil-eng.html>>.

⁴ See the Public Accounts of Canada 2010 at <<http://www.tpsgc-pwgsc.gc.ca/recgen/txt/72-eng.html>>.

Chart 1: Outstanding amount of treasury bills and bonds



Source: Bank of Canada

Last observation: 31 March 2011

debt-management operations, such as auctions of Government of Canada securities. The Minister of Finance is responsible for making final decisions that pertain to the Government of Canada's debt-management strategy. To this end, the Bank of Canada and Department of Finance collaborate through a number of committees created to ensure the effectiveness of the decision-making process.⁵

A new medium-term debt strategy was announced in the "Debt Management Strategy for 2011–12," which was released as part of the federal Budget on 22 March 2011.⁶ The new strategy has an increased focus on issuing short- and medium-term bonds (with maturities of 2, 3 and 5 years). It also includes specific actions, such as a reduction in the stock of treasury bills and changes to maturity dates in certain bond sectors, to reduce the amount of debt maturing over near-term horizons. This article provides further insight and more details on the decision-making process that led to the formulation of this new strategy. This includes the debt-management objectives, the modelling approach, the long-term perspective of the decision made, the communication strategy and the use of debt-management metrics to monitor and assess the evolution of the debt structure over time.

⁵ A detailed description of the Treasury Management Governance Framework can be found at <http://www.fin.gc.ca/treas/goveev/tmgf03_1-eng.asp>.

⁶ The "Debt Management Strategy for 2011–12" can be found at <<http://www.fin.gc.ca/pub/dms-sgd/index-eng.asp>>.

Objectives

The fundamental objective of debt management is to raise stable, low-cost funding to meet the financial needs of the Government of Canada. This objective reflects the fundamental cost-risk trade-off that the government faces as a borrower: shorter-term debt instruments are generally less costly but also more risky (i.e., annual borrowing costs are more variable) than longer-term debt instruments. An associated objective is to maintain a well-functioning market (i.e., liquid and efficient) in Government of Canada securities. Well-functioning markets for government securities attract broad investor interest and increase competitive demand for those securities, which helps to keep debt costs low and stable and provides broader benefits to domestic capital markets.⁷

The fundamental objective of debt management is to raise stable, low-cost funding

In pursuing these objectives, the government adheres to key principles for debt management that include prudence, transparency, liquidity and regularity. These principles ensure that debt-strategy decisions are taken with a long-term perspective, balance cost and risk, are communicated in a timely and transparent manner to market participants, and support the liquidity in the Government of Canada securities market.

Adherence to these objectives and principles helps to ensure that the operational framework is consistent with the best practices of comparable sovereign borrowers.

The Road Toward Establishing a New Medium-Term Debt-Management Strategy

The complex task of developing a medium-term debt strategy requires a thoughtful balance between the many considerations that flow from the debt-management objectives and principles (see **Box**). Factors that must be taken into account include

⁷ A well-functioning Government of Canada securities market also supports other Canadian financial markets (e.g., markets for provincial and corporate bonds and derivatives markets) in addition to supporting the implementation of monetary policy.

A Brief History of the Debt Strategy

As the underlying budgetary and economic environments have changed and evolved over the past 20 years, so has Canada's debt strategy, which can be broadly grouped into four periods:

1991–94

To improve Canada's financial position, considering the prevailing environment of volatile interest rates and high debt levels, the government focused on extending the average term of its debt maturities. The main metric used to track progress on this objective was the fixed-rate share of the debt (the share of the debt stock that will not mature or be repriced in the next 12 months), which increased from a level of 50 per cent to 55 per cent over the period.

1995–2002

In 1995, the government announced that it would increase the fixed-rate share of the debt to 65 per cent by no later than the end of 2004–05. This initiative was undertaken to achieve a more prudent debt structure in an increasingly volatile market environment and to moderate refinancing

risk. The fixed-rate target of 65 per cent was achieved in 1997, much sooner than expected. Thereafter, the debt structure was reviewed annually and was managed so as to maintain a target for the fixed-rate share of about two-thirds.

2003–07

In 2003, the target for the fixed-rate share of the debt was reduced from two-thirds to 60 per cent, to be achieved within a five-year period. This decision reflected an environment in which the ratio of debt to gross domestic product (GDP) was declining, as well as the desire to reduce the expected costs of the debt by lowering the share of fixed-rate debt. The 60 per cent target was achieved in 2006–07, before the onset of the financial crisis in late 2007.

2008–11

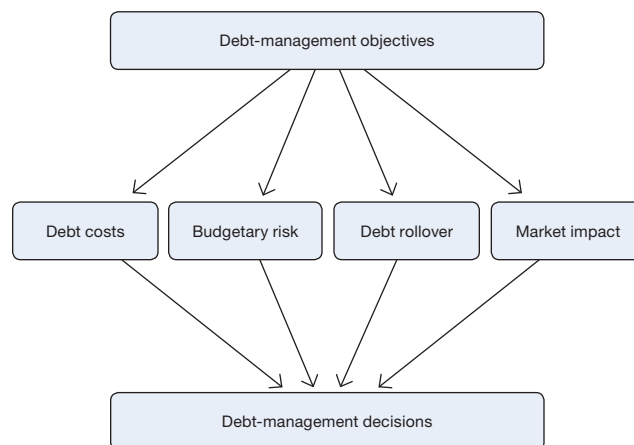
The increased borrowing requirements necessitated by the financial crisis served to reinforce the importance of the government's ongoing practice to regularly review its debt-management strategy.

projected debt costs, the projected annual variability of debt costs and their potential impact on the budgetary balance (budgetary risk), the amount of debt maturing or rolling over in a specific period (debt rollover), and the maintenance of a well-functioning market in Government of Canada securities (market impact) (**Figure 1**).

To balance these competing considerations, Canada's debt managers have developed various approaches to assessing the cost-risk trade-offs of different borrowing strategies. These include analytic tools that complement debt managers' judgment and experience, such as the modelling of uncertainty about the future evolution of the economy and interest rates and the corresponding effect on the budgetary balance, as well as developing metrics to monitor the evolving cost-risk characteristics of the debt structure. They also include consultations with market participants.

The balance of the article provides a broad description of these tools and approaches.

Figure 1: Factors considered in debt-management decisions



The Modelling Approach

The ability to model Canada's debt has evolved gradually. Canada's core debt model was developed about 10 years ago to assess and quantify the expected variability of debt costs. Since then, the model has been enhanced to include the addition of macroeconomic variables (e.g., inflation and the output gap), to examine the relationship between these variables and the government's borrowing requirements, and to improve the simulation engine that generates the future paths of interest rates. The current version of the Canadian Debt-Strategy Model (CDSM) reflects a considerable amount of research undertaken over the past five years.⁸ Based on feedback received from other countries, the CDSM is one of the most sophisticated models developed by sovereign debt managers.

The objective of any model is to help to develop intuition and to facilitate the understanding of complex (i.e., densely interconnected) and/or complicated (i.e., many moving parts) real-world phenomena. The CDSM is no exception. The future evolution of the economy, interest rates and financial requirements are all uncertain and interrelated in a complex way. The CDSM can provide information on the trade-offs between the government's debt costs and the risks associated with different financing strategies. The model also allows debt managers to examine how these trade-offs change across a wide variety of different economic and interest rate environments, thereby providing a comprehensive evaluation of different funding choices. The main objective of the analysis is to find a funding mix consisting of treasury bills, nominal bonds and inflation-linked bonds that ensures a prudent risk profile while simultaneously minimizing debt-service charges and maintaining a well-functioning market in Government of Canada securities.

By examining hundreds of different financing strategies, each with different proportions of short-, medium- and long-term bonds and treasury bills, the CDSM can provide broad directional guidance for the debt-management strategy. For example, modelling analysis conducted in 2010 demonstrated that over a wide range of interest rate scenarios, debt portfolios weighted toward more short- and medium-term bonds would improve the efficiency of the debt structure in

the long run, while reducing exposure to debt-rollover risk. In this context, improving the efficiency of a portfolio means either reducing cost for a given level of risk or reducing risk for a given level of cost.

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The modelling process used to support the medium-term debt-management strategy consists of five steps (each of which is explained below):

1. generation of random (stochastic) economic and interest rate scenarios
2. calculation of debt cost and risks
3. determination and composition of optimal strategies
4. imposition of minimum issuance constraints to meet the objective of maintaining well-functioning markets
5. sensitivity, scenario and stress-testing analysis

Step 1 – Generating economic and interest rate scenarios

This step employs a stochastic macroeconomic term-structure model that generates various economic and interest rate scenarios over a long-term period (e.g., 10,000 scenarios over a 10-year horizon).⁹ The scenarios contain paths for the output gap, inflation, the overnight interest rate, the term structure of interest rates and the government's borrowing requirements.

Step 2 – Calculating costs and risks

The second step computes the government's debt costs and the associated risk measures for a specific financing strategy.¹⁰ Computing debt costs is relatively straightforward, since they can be calculated

⁸ Working papers that cover the technical aspects of the model are available on the Bank of Canada's website. For example, Bolder and Rubin (2007) provide a thorough description and evaluation of several optimization techniques. A full description of the CDSM can be found in Bolder (2008) and Bolder and Deeley (2011).

⁹ Several Bank of Canada working papers provide a detailed description of the macroeconomic term-structure models used. See, for example, Bolder (2001, 2006), Bolder and Gusba (2002) and Bolder and Liu (2007).

¹⁰ In this context, a financing strategy is composed of a relative mix of 3-, 6- and 12-month treasury bills; 2-, 3-, 5-, 10- and 30-year nominal bonds; and 30-year inflation-linked bonds (Real Return Bonds). Global bonds issued by the Government of Canada to fund the Exchange Fund Account are excluded from the analysis since they are managed within an asset-liability-matching framework.

as the average annual debt-service charges in dollars or as a percentage of the total debt stock over a specific simulation horizon (e.g., 10 years).

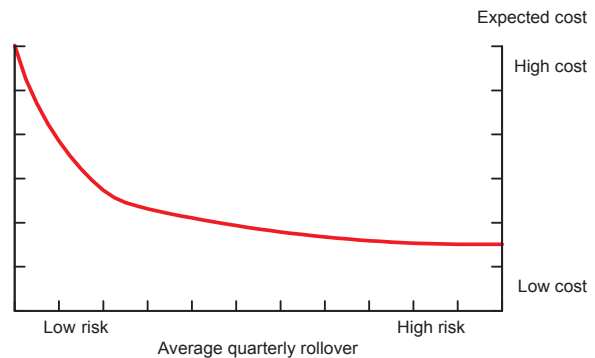
Measuring risk is more complex, however, since it can be defined many different ways, depending on the policy objectives of the government. In the context of debt modelling, risk is characterized as the amount of debt maturing or rolling over in a specific period (single-day, quarter or year), the variability of interest costs over time (i.e., the extent to which interest costs could change significantly from one year to the next), and the variability of the government's budgetary balance resulting from the correlation between debt costs and the government's revenues and expenditures. Moreover, although risk can be mitigated by modifying the issuance structure of the debt, other tools are also available to debt managers to mitigate some types of risks. For example, a bond-buyback program, as well as a liquidity plan,¹¹ can help mitigate debt-rollover risk.

Step 3 – Selecting optimal strategies

In this step, a wide range of different financing strategies are reviewed, some of which may involve issuing debt in only some maturity sectors but not others. An optimization algorithm is then used to select those strategies with the best cost-risk trade-offs, or the lowest cost for a specific level of risk. The output of this work is a curve that represents the most efficient financing strategies, similar to an efficient portfolio frontier, as well as the composition of the most efficient financing strategies.

Chart 2 and **Chart 3** illustrate the results of the optimization exercise based on debt rollover as a risk measure. Note that the same exercise can also be performed using other risk measures. **Chart 2** shows the efficient frontier of the optimal debt structures (lowest cost for a specific level of risk). Moving along this frontier from left to right shows how expected borrowing costs decrease—and rollover risk increases—as the government shifts the proportion of its borrowing program from long-term debt to short-term debt. **Chart 3** illustrates how the proportion of short-term debt in the optimal portfolio changes as one moves along the efficient frontier. Each colour represents a different debt instrument issued by the Government of Canada. As shown in this chart, low-risk debt structures contain mainly long-term maturity instruments (10-year and 30-year nominal bonds and

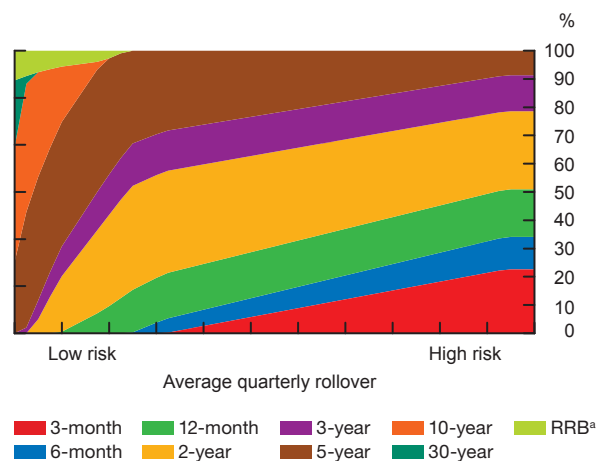
Chart 2: Expected cost frontier



Source: Bank of Canada

Last observation: 24 May 2011

Chart 3: Optimal portfolio weights



a. Real Return Bonds

Source: Bank of Canada

Last observation: 24 May 2011

Real Return Bonds), while high-risk debt structures contain mostly short-term debt instruments (3-, 6- and 12-month treasury bills and 2-year bonds).

Step 4 – Imposing constraints

The issuance strategies considered in step 3 do not necessarily involve issuing debt in all maturity sectors, and these strategies may therefore be inconsistent with the government's objective of maintaining a well-functioning securities market. Accordingly, the fourth step imposes constraints on the financing strategies whereby they all maintain at least a minimum amount of issuance in all the selected maturity sectors.¹² These levels of minimum issuance differ

¹¹ A liquidity plan consists of having liquid financial assets available to support meeting payment obligations in situations where normal access to markets may be disrupted or delayed.

¹² The bond-buyback program can also be used to help maintain a minimum amount of issuance in some maturity sectors by repurchasing less-liquid bonds in exchange for building benchmark bonds.

for each sector and are generally based on past issuance, comments obtained during consultations with market participants and the judgment of debt managers.

Step 5 – Analyzing results

To assess the robustness of the modelling results, the assumptions underlying the model, as well as the idiosyncratic characteristics built into the model itself, the results are stress tested and analyzed under various scenarios. Tests are conducted to assess the impact of changing assumptions regarding long-term GDP growth, inflation, the government's borrowing requirements and the level of interest rates, as well as the spread between long-term and short-term interest rates. In addition, different interest rate models are used to test the sensitivity of the overall results to the idiosyncratic characteristics of the various models.

A Long-Term Perspective

The transition toward a more efficient debt structure can take many years to be fully realized because of the modest size of the annual bond issuance relative to the size of the outstanding debt portfolio and the fact that some bonds take up to 30 years to mature. In addition, Government of Canada securities play an important role in the Canadian fixed-income market, as a key reference for the pricing of other securities. Debt managers therefore try to avoid potentially disruptive or abrupt changes to the government's annual patterns of debt issuance. Thus, any change to the government's issuance structure has to be based on a long-term, forward-looking perspective.

While the long-term objectives of a given debt strategy may be clear, some degree of flexibility also needs to be built into the strategy

Moreover, while the long-term objectives of a given debt strategy may be clear, some degree of flexibility also needs to be built into the strategy. Annual issuance plans need to remain flexible enough to adapt to evolving fiscal and economic conditions to ensure that the government's financing requirements can always be met.

A Communication Strategy

An important element of the decision-making process when considering the debt strategy is to engage market participants in regular and open dialogue (e.g., annual debt-management-strategy consultations, consultations ahead of each auction call for tender, ad hoc consultations with investors and government securities distributors).

As the largest issuer of Canadian-dollar-denominated fixed-income securities, the government considers consultations with market participants to be an essential component of its ongoing commitment to maintaining a well-functioning government securities market, as well as an integral part of the debt-management process.

Thus, every year, officials from the Bank of Canada and the Department of Finance seek the views of government securities distributors, institutional investors and other interested parties on issues related to the design and operation of the Government of Canada's domestic debt program for the coming year and beyond.

These consultations typically cover general market conditions, the effectiveness of the bond and treasury bill programs, bond-buyback operations, and various operational details. They can thus help to validate many modelling assumptions being used, particularly those related to the minimum level of issuance required to maintain well-functioning markets. Consultations also provide an opportunity to discuss operational considerations (e.g., the size and frequency of auctions) that the government needs to consider when implementing its debt-management strategy. As part of the ongoing effort to promote transparency, a summary of the views expressed during these consultations is provided on the Bank of Canada website and released in conjunction with the government's "Debt Management Strategy."¹³

The release of the "Debt Management Strategy" and the "Debt Management Report," which provides a detailed account of the government's borrowing and debt-management activities for the previous fiscal year, ensures that the current debt strategy is broadly communicated and understood by market participants, investors or any interested parties. These documents describe the expected long-term debt structure using a variety of different

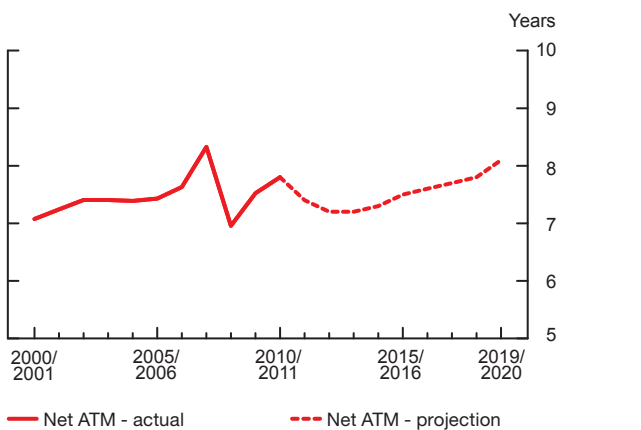
¹³ The consultation document and the summary of consultations can be found at <http://www.bankofcanada.ca/publications-research/market-notices/>.

debt-management metrics (see below). The “Debt Management Strategy” also announces any required adjustments to bond-maturity dates and to the bond-buyback program to smooth the daily debt-maturity profile and to reduce debt-rollover risk.

Debt-Management Metrics

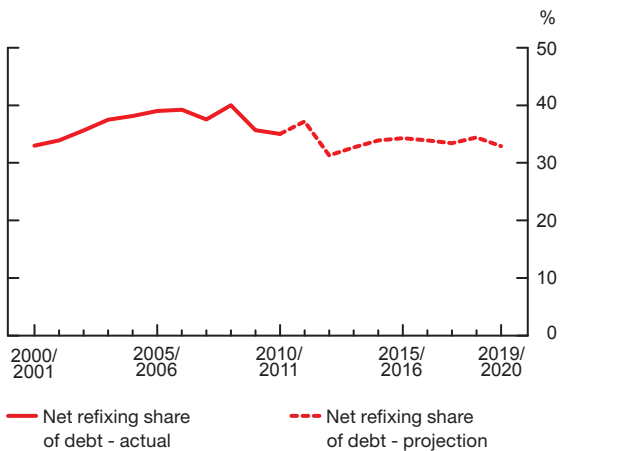
A range of key debt-management metrics (the set of measurements used to describe the structure of the debt portfolio) are used to monitor and assess the evolution of the debt structure. They also consider the objectives of debt management. As a result, they help debt managers to evaluate and monitor the impact of decisions regarding the debt strategy with respect to the four factors discussed earlier: debt costs,

Chart 4: Projected evolution of the ATM of the debt portfolio



Source: Department of Finance Last observation: 22 March 2011

Chart 5: Projected evolution of the refinixing share of debt as a percentage of debt stock



Source: Department of Finance Last observation: 22 March 2011

budgetary risk, debt rollover and market impact. Different metrics can be attributed to each factor.

The “Debt Management Strategy for 2011–12” contains metrics showing the expected evolution of the debt structure over the next 10 years. For example, **Chart 4** shows the historical and expected trend of the average-term-to-maturity (ATM), which is generally used to assess debt costs, given that longer-term debt maturities are generally more costly. **Chart 5**, which highlights the amount of debt to be refinixed (i.e., refinanced or repriced) over a specific period, helps to illustrate interest rate and budgetary risk.

The “Debt Management Report 2009–10” also contains metrics on debt rollover (quarterly maturities of domestic market debt and single-day bond maturities plus coupon payments) and on the well-functioning of markets (size of bond benchmark issues).¹⁴

In addition to providing information on the evolution of the debt portfolio over time, these metrics allow cross-country comparisons of debt structures.

Concluding Remarks

The Government of Canada’s new medium-term debt strategy marks an exciting new chapter in the management of Canada’s sovereign debt. The design and implementation of the medium-term debt-management strategy is a long-term process, resulting from an extensive and sophisticated modelling approach that balances costs and risks and that is supplemented by market input, as well as the judgment and experience of debt managers. Its evolution and direction are also closely monitored on a regular basis to adjust to changing fiscal and economic environments.

Moreover, evolving risk-management practices in debt management and among other sovereign borrowers will continue to be monitored. Combined with ongoing input from market participants, these steps will ensure that the decisions taken will strive to create a debt-management strategy that is efficient, sound and consistent with the government’s objectives.

¹⁴ The most recent “Debt Management Report” can be found at <http://www.fin.gc.ca/dtman/2009-2010/DMR2010_ENG.pdf>.

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