DEPARTMENT OF FINANCE
EVALUATION OF THE DEBT AUCTION PROCESS
NOMINAL BONDS, REAL RETURN BONDS, TREASURY BILLS

SUMMARY REPORT

OCTOBER 21, 2010

Submitted by

Marlene Puffer
Alexandra MacKay
David Goldreich

Twist Financial Corp.
www.Twistfinancial.com
416 460 3945

TABLE OF CONTENTS

0. Executive Summary

This report summarizes the results of the evaluation of the Government of Canada debt auction process for nominal bonds, Real Return Bonds (RRBs) and treasury bills (excluding cash management bills) that was performed by Twist Financial Corp from November 2008 through November 2009. The purpose of the evaluation is to assess the design and approach to managing the auction process, and the controls around it, including the determination of the terms of the call for tenders, the system for accepting bids, the release of results, and settlement.

The scope of the evaluation includes an assessment of whether the existing procedures and practices support the well-functioning of the auctions and whether they provide sufficient information, on a timely basis, to the participants and the market to meet the debt strategy objectives and principles. This study looked at governance of the current auction process in Canada, examined how the process works, and compared the Canadian approach to other sovereigns.

Our research has led us to make the following overall conclusions:

- The current structure works well, and supports the transparency, effectiveness and efficiency of debt auctions.

- Overall, the auction process has been successful in its immediate, intermediate, and ultimate goals of raising necessary funding at a low cost. Moreover, the auction process has helped sustain a liquid and efficient secondary market for Government of Canada debt.

While we suggest making several marginal changes to the auction process, we expect that the process will continue to achieve its objectives in the longer term in its current form or with the suggested changes in process that we cite.

We make four recommendations primarily focused on internal and external process. For example, we suggest specific ways to improve process and communication in the pre-auction phase between the Department of Finance and the Bank of Canada, as well as with the various players in the process (such as more detailed reports or new and improved channels of communication including more frequent conference calls and consultation with market participants). We also suggest ways to encourage more auction participation in certain market conditions by relaxing the upper limit on bids and counteracting the potential impact on short squeezes by reserving the right to re-open issues at any time. We recommend encouraging greater participation of customers already holding a bidder number, and identifying and actively soliciting potential new customers. We recommend motivating government securities distributor to strive to become primary dealers (who are subject to more stringent minimum bidding requirements) by attaching more visibility and prestige to the primary dealer status. Finally, we make recommendations about dissemination of auction results and staffing.

Summary of Recommendations

Recommendation 1: Improve communication and reporting between Department of Finance and the Bank of Canada

- For potential improvements in efficiency, consider changing the interaction between the Department of Finance and the Bank of Canada occurring ahead of bond auctions to a reporting function rather than an approval process. (p. 15)
- Replace authorization letters for debt auction operations with more informative, timely reporting and accountability to senior management. (p.15)

Recommendation 2: Improve communications with market participants

- Increase the frequency of consultations with a larger sample of current and potential customers utilizing a mix of communication formats (including more frequent telephone conference calls and multilateral discussions in addition to the traditional bilateral visits with individual dealers). (p.17)
- Obtain detailed feedback from a larger number of market participants, including large and small customers, prior to and following auctions of Real Return bonds and 30-year nominal bonds. (p. 17)
- Release auction results simultaneously on the Bank of Canada pages on Reuters and Bloomberg and through CanDeal and other relevant trading systems used by Canadian market participants. (p. 24)

Recommendation 3: Improve participation at auction

- Encourage all market participants to play a more active role in the design of the debt strategy, such as through an annual workshop in addition to the standard consultation process. (p. 17)
- Promote greater participation of customers already holding a bidder identification number, and identify and actively solicit potential new customers. Large customers should be offered direct access to the Communication, Auction and Reporting System (CARS). (p.19)
- Relax the upper limit on bids and emphasize the government's right to re-open a security at any time through something like the United Kingdom mini-tender facility, or similar to the Australian approach of re-opening at its discretion, which will both support participation and counteract the possibility of a participant attempting to exert undue influence on the price of a security.(p.21)
- Encourage Government Securities Distributors to strive to become Primary Dealers (who are subject to more stringent minimum bidding requirement) by attaching more visibility and prestige to the primary dealer status (e.g., as in France). (p.23)

Recommendation 4: Support the transfer of corporate knowledge

- Review and update annually detailed guidelines and process documentation at the senior management level at both the Bank of Canada and Department of Finance. (p. 2

1. Background and Scope of the Evaluation

This report summarizes the results of the evaluation of the Government of Canada debt auction process that was performed by Twist Financial Corp. Twist Financial was engaged by the Department of Finance to perform this evaluation. The intended audience and key stakeholders related to this report include the Department of Finance, the Bank of Canada, government securities distributors, investors and other capital market participants. The purpose of the evaluation is to assess the design and approach to managing the auction process, and the controls around it, including the determination of the terms of the call for tenders, the system for accepting bids, the release of results, and settlement. This third-party independent evaluation is intended to ensure that policies and practices in the domain of federal treasury operations are appropriate and achieving their objectives.

The Government of Canada's primary debt strategy objective is to raise stable, low-cost funding. An associated objective is to sustain a liquid and efficient market for Government of Canada securities. A well-functioning auction framework and process is central to the achievement of these objectives.

The scope of the evaluation includes an assessment of whether the existing procedures and practices support the well-functioning of the auctions and whether they provide sufficient information, on a timely basis, to the participants and the market to meet the debt strategy objectives and principles. The scope of the evaluation does not include an evaluation of the auction format nor does it include an assessment of the IT system which embodies the processes and controls.

2. Methodology

Time period and structure: The period of evaluation is from April 1, 2003, to March 31, 2008. The sovereign comparison focused on the current status of auction processes in each country as at August, 2009. Interviews were conducted with officials from the Bank of Canada and the Department of Finance in November and December 2008. The structure of the evaluation consists of sovereign comparison case studies, a literature review, data analysis, and interviews with market participants. This structure was determined by the Department of Finance and the Bank of Canada and was detailed in the publicly issued Request for Proposal. A list of evaluation questions corresponding to the criteria outlined in the request for proposal was developed by Twist Financial and approved by the Department of Finance and the Bank of Canada.

Sovereign Comparison: Case studies of Canada, Australia, the United Kingdom (UK), the United States (US), and France were conducted, and auction officials in each country (except France) were interviewed from June through September 2009. The sovereign comparison case studies focused on the current status of auction processes in each country as at August 2009. These G7 sovereigns were chosen in consultation with the Bank of Canada and the Department of Finance. The choices ensure inclusion of the largest and most liquid sovereign markets (US and UK) as well as a small less liquid market (Australia) and a representative market that lies between these extremes (France). To structure the case studies and to conduct interviews with each sovereign, a list of questions was designed and agreed upon with the

Department of Finance and the Bank of Canada. The list was comprehensive and addressed all aspects of the effectiveness and efficiency of debt operations, but did not address implementation systems in detail, which is outside the scope of this study.

Literature Review: A literature review was conducted, comprised of a study of relevant auction literature and interviews with two leading treasury auction academics. Most academic literature focuses on the auction format, and there is relatively little academic literature that directly addresses the issue of auction effectiveness or efficiency.

Data Analysis: Data analysis was performed using auction data provided by the Bank of Canada for all auctions from spring 2003 to spring 2008 (May 7, 2003 to February 27, 2008 for nominal and RRBs and April 8, 2003 to March 18, 2008 for treasury bills). The analysis examined each security type separately and, for each, we measured the effect of Bank of Canada participation and financial market conditions on auction effectiveness. This report summarizes the results regression analysis aimed at evaluating auction effectiveness. We conducted a detailed analysis using multiple and simple regressions, but conclusions were generally similar. Any material differences are noted in this report. We also examined dealer and customer participation in auctions and their effects on auction results using detailed data provided by the Bank of Canada. The dataset represents all auctions during the evaluation period.

Interviews: Interviews with the Bank of Canada, the Department of Finance, and market participants were conducted in November and December 2008. Interview questions were developed to address the relevant evaluation questions. Six of the largest primary dealers and one smaller primary dealer were interviewed. At each, the head Government of Canada bond trader, at least one other bond trader, the head of money market trading, and the senior relationship manager for the Government of Canada were interviewed, usually simultaneously. In addition, several customers were interviewed, selected in consultation with the Bank of Canada based mainly on auction participation. Some customers participated primarily in nominal and/or real return bond auctions, others primarily in treasury bill auctions, and some in all auctions.

3. Limitations of the Approaches

Time period and structure: It is important to note that the period of evaluation was prior to the financial crisis which began in 2008 when market volatility and debt issuance increased. However, interviews with market participants and sovereigns occurred after the crisis had begun, and some input was gathered to reflect the more volatile environment. We make comments about the impact of the crisis on conclusions throughout this document where relevant, but the full data analysis and interviews related to the auction process during the crisis period was not conducted.[1]

Sovereign Comparison: A complete review of all G7 markets was deemed to be cost prohibitive and unnecessary. There are many common elements, but also many differences in the auction process across countries. Many aspects of the process are interrelated and each case study must be analysed in detail to draw relevant comparisons to Canada. General conclusions about specific best practices are not possible. Given the limited nature of the recommended improvements to the Canadian auction process based on the comparison to the selected sovereigns, it seems unlikely that additional analysis would have changed the conclusions or recommendations significantly.

Literature Review: We do not believe there are limitations to the literature review that would impact the conclusions of this study. The literature search was thorough, and we believe we captured a very broad sample of relevant literature. Most literature on bond auctions focuses on the auction structure (which is not considered in this report) rather than the auction process or the influence of market conditions on auction effectiveness or efficiency.

Data Analysis: Limitations of the data analysis are mainly due to the relatively short sample period which includes only a limited number of auctions conducted in periods of high volatility, credit market distress, or illiquidity. However, a longer historical sample period may not be indicative of future market conditions. We believe that the evaluation period represents a reasonable balance. The variability of different market conditions (liquidity, credit conditions, and volatility), within the sample period is limited, which may drive the generally weak data evidence. Although they were observed to be effective and efficient during the credit crisis, and we do not believe the conclusions of this study would change, the auctions during the credit crisis in 2008 and 2009 may be worthy of further data analysis. The data analysis is the primary line of evidence regarding some of the specific evaluation areas, such as the impact of Bank of Canada participation and the bond buyback program on auction effectiveness and the impact of different market conditions on auction effectiveness. Interviews with market participants and the sovereign comparison offer additional support for some of the conclusions, but the literature review provides no evidence in these areas. The market condition variables and measurement approaches are common in academic literature. However, the volatility measure could have been represented by implied option volatility. We did not use this more computationally complex measure because Canadian bond options are not highly liquid, and implied volatility may not be a better measure of overall bond market volatility compared to the rolling average we use. Historical and implied volatility of financial securities are generally highly correlated.

Interviews: A larger sample of dealers and customers would likely be of limited added value since the participants interviewed represented the largest most active dealers and customer participants, as well as two smaller dealers. The opinions of individual interviewees required some subjective interpretation since they were divergent and often appeared to reflect individual self interest rather than the effectiveness and efficiency of the auctions from the government perspective.

4. Overview of Governance for Debt Management Activities

The legislative basis for the government's borrowing program is Part 4 (Public Debt) of the Financial Administration Act (FAA)[2]. The FAA empowers the Governor in Council to authorize the Minister of Finance to borrow money. The Act provides the Minister of Finance with legislative authority to establish rules governing the auction of debt. In addition, the Act provides the Minister with powers over the management of the Government's assets and liabilities. The powers of the Minister can be delegated to officials of the Department of Finance.

Ultimate decision-making authority for the Government's funds management (activities related to market debt and liquid assets, including the foreign exchange reserves) rests with the Minister of Finance. The Minister of Finance approves policies for funds and risk management activities, and is responsible for seeking Governor in Council approval to borrow money on behalf of the Government for each fiscal year.[3] Prior to the start of each fiscal year, the Minister must report to Parliament on the Government of Canada's debt management strategy for the coming fiscal year (the *Debt Management*

Strategy)[4]. Within 30 sitting days of the tabling of the Public Accounts of Canada in Parliament, the Minister must submit a report on federal debt operations for the previous fiscal year (the *Debt Management Report*).[5]

Section 24 of the Bank of Canada Act[6] provides statutory authority for the Bank of Canada to act as the government's fiscal agent in the payment of interest and principal and generally in respect of the management of the public debt of Canada. Under a funds management governance framework[7], the design of key strategies and policies, the oversight of operations and the coordination of activities are jointly borne by officials at the Department of Finance and the Bank of Canada. Regular governance committee meetings facilitate work planning, coordination and communication between the institutions.

The Funds Management Committee, which consists of senior officials from the Department of Finance and the Bank of Canada, heads the committees under the governance framework. The mandate of the Funds Management Committee is to advise the Minister, through the Deputy Minister, on policy and strategy, to oversee the implementation of approved policies and plans, and to review performance outcome reports.

The Funds Management Committee is supported by the Risk Committee, whose mandate is to oversee and advise on the risk management policy and to report on financial risk positions. The Financial Risk Office at the Bank of Canada provides analytical support to the Risk Committee in this role and is responsible for monitoring and regularly reporting on the financial performance and position of certain financial assets and foreign-currency-denominated derivatives, including market, credit, operational, liquidity and legal risks.

Funds management programs and activities are subject to independent advice obtained through ongoing program evaluations. The Minister of Finance tables reports on the findings of these evaluations, including Department of Finance comments, with the Public Accounts Committee of the House of Commons. A copy is also sent to the Auditor General of Canada[8].

5. Description of the Auction Process

a. Domestic Debt Operations

Domestic borrowing is conducted on a regular, transparent basis to maximize investor interest and participation. Nominal bonds, RRBs and treasury bills are sold via auction, with the Bank of Canada operating as the fiscal agent, to Government of Canada securities distributors and customers. Tenders are submitted to the Bank of Canada via the electronic auction system CARS (Communication, Auction and Reporting System).

Bonds are auctioned on a quarterly basis for nominal 2-, 5-, and 10-year maturities and for the RRB 30-year maturity, and on a semi-annual basis for the 30-year nominal maturity. Bonds may be either new maturities or reopenings of previously auctioned bonds. New bond maturities are generally reopened several times in order to achieve the target benchmark bond size to enhance liquidity.

The Quarterly Bond Schedule (QBS), setting out details of the planned quarterly issuance of marketable bonds, is published by the Bank of Canada prior to the start of each quarter. Final details, including the amounts to be auctioned, the maturity date, and the amount outstanding are released the week prior to the auction.

Bond sales take place via multiple-price auctions, with the exception of RRBs, which are sold via single-price auctions. Government securities distributors and customers may submit competitive tenders or non-competitive tenders. For multiple-price auctions, competitive bids are accepted, up to the bidding deadline, in rising order of yield (declining order of price) until the full amount of the issue being auctioned is reached, and all non-competitive bids are allotted first at the average of the accepted competitive bids. For single-price auctions of RRBs, bonds are allotted at the price equivalent of the highest real yield of accepted competitive tenders, plus accrued interest and inflation adjustment.

Treasury bills are sold via auction on a discount basis. Those with terms to maturity of approximately 3-, 6-, and 12-months are currently auctioned on a biweekly basis, generally on a Tuesday for delivery Thursday. Under the biweekly issuance pattern, 3-month treasury bills are reopenings of previous 6- and 12-month bills; while new issues of 6- and 12-month treasury bills are offered in the same week and then reopened once at the next regular auction two weeks later.

When conducted, bond buyback operations on a cash basis are held 20 minutes after nominal bond auctions. The QBS includes the target amount of bonds the government intends to repurchase during the quarter. Final details of each operation, including the maximum amount to be repurchased and the basket of eligible bonds, are released the week prior to the operation along with the release of bond auction announcement.

Buyback operations on a switch basis offer an opportunity for participants to exchange less liquid securities for new more liquid benchmark securities. Switch buybacks are announced in the QBS. Final details of switch buyback operations, including eligible bonds for repurchase, the replacement bond and the maximum replacement amount for the replacement bond, are published the week prior to the operation.

Cash management bond buyback operations target large bonds with less than 18 months to maturity. These are held on an irregular basis to meet government cash management needs. They are held on most Tuesday mornings after treasury bill auctions. Details of the operations, including the maximum amount to be repurchased and the basket of eligible bonds, are announced one week in advance.

Regular bond buyback and cash management bond buyback operations are settled on a cash basis and take place via multiple-yield reverse auctions. Switch buyback operations are settled on a replacement bond and cash basis. In all bond buyback operations, competitive offers are accepted in decreasing order of yield (increasing order of price) until the maximum amount to repurchase or the maximum replacement amount is met. The amount repurchased may be less than the maximum amount.

b. Domestic Distribution System

The participation of government securities distributors and customers at Government of Canada debt auctions is governed by a set of standard terms and terms of participation introduced in October 1998.

There are 21 government securities distributors that participate in the primary distribution of bonds and treasury bills. All must be either members or affiliate members of the Investment Industry Regulatory Organization of Canada (IIROC) and have their core trading and sales operation for Government of Canada securities in Canada.

Under the terms of participation, there are specific bidding limits that apply to government securities distributors and customers at treasury bill and bond auctions. The limits vary by government securities distributor based on the firms' relative market activity in the primary and secondary markets as well as its participation at buyback operations (bonds) and non-fungible cash management bills (treasury bills). However, for bond buyback operations, and non-fungible cash management bills, all participants have a 100 per cent bidding limit.

Primary dealers in the bond market have bidding limits tiered from 10 to 25 per cent of the auctioned amount for bids on their own account while other government securities distributors have bidding limits tiered from 0 to 9 per cent. Primary dealers in the treasury bill market have bidding limits of 25 per cent of the auctioned amount for bids on their own account while other government securities distributors have bidding limits of 10 per cent. Primary dealers can submit up to 25 per cent of the auctioned amount on behalf of customers whereas other government securities distributors can submit up to 10 per cent of the auctioned amount on behalf of customers.

In addition, the aggregate limit for the sum of the bids submitted by a primary dealer on its own behalf and on behalf of its customers is 40 per cent of the tender less the dealer’s excess net long position (up to the dealer’s bidding limit). A customer may bid for up to 25 per cent of the amount auctioned.

All government securities distributors also have ongoing reporting responsibilities to provide weekly statistical reports on their domestic fixed-income trading activities to IIROC and the Bank of Canada. In addition, government securities distributors and customers must report their aggregate net positions in the auctioned security to the Bank of Canada for all treasury bills, bonds, RRBs and switch operations when submitting their own bids or bids on behalf of their customers. Their net positions must be reported, whether they are long or short positions.

Government securities distributors that maintain a certain threshold of activity in the primary and secondary market for Government of Canada securities may become primary dealers, and form part of the core group of distributors of Government of Canada securities. The primary dealer classification can be attained in either treasury bills or marketable bonds, or both. Primary dealers assume a number of responsibilities with respect to Government of Canada securities. They must comply with minimum bidding requirements for every securities auction (except for non-fungible cash management bill auctions) and they must consistently make two-sided markets to a broad customer base. At every auction, a primary dealer’s submitted bids must total a minimum of 50 per cent of its auction bidding limit or 50 per cent of its formula calculation, whichever is less.

Prior to the start of each quarter, the Bank of Canada, on behalf of the Minister of Finance, publishes the QBS[9], which provides details on the Government of Canada marketable bonds to be auctioned. The calls for tender, auction results, terms of participation and other related information can also be found on the Bank of Canada website[10].

Regular and on-going consultations with government securities distributors, institutional investors and other interested parties are considered to be an integral part of the debt management process. Official consultations are held typically once a year (or as required) in order to obtain views on the liquidity and efficiency of the Government of Canada securities market, and the design and operation of the Government debt program. Consultation notices, questions and summaries are posted on the Bank of Canada website.

6. Sovereign Comparison

Case studies of Canada, Australia, the United Kingdom (UK), the United States (US), and France, as well as interviews with auction officials in each country (except France) were conducted. Refer to Appendix A for a discussion of the results as well as a detailed table comparing the features and approaches in each country. Where relevant, a comparison to the experience of other sovereigns is referenced throughout this document.

In the context of increasingly integrated global markets, the major global issuers of debt tend to use broadly similar issuance procedures and debt management policies that facilitate or encourage liquid markets. This is due to a common desire to achieve low cost funding. This is facilitated by broad and deep primary and secondary markets and a high degree of transparency and predictability. For example, auction calendars and electronic auction systems are commonly used to achieve transparency in primary markets[11].

The many similarities between Canadian auctions and those of other sovereigns suggest limited ways in which other sovereigns' practices might be used to improve Canada's auctions. Transparency and communication with participants is at least as effective in Canada as it is in other sovereigns. Canada succeeds at rapidly releasing relevant information to participants after the auction, and the information released is similar to that of other sovereigns.

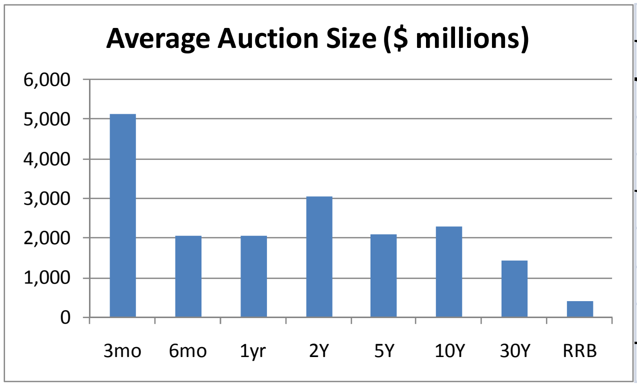
7. Literature Review

See Appendix B of this report for a summary of the literature review and references.

8. Market Data Analysis

The focus of the data and market analysis was on measuring the effect of Bank of Canada participation and financial market conditions on auction effectiveness. We also examined dealer and customer participation in auctions and their effects on auction results. Methodology and results are summarized in Appendix C of this report. Market effectiveness is measured by the auction Tail (the difference between the highest accepted yield and the average auction yield – usually less than one basis point in normal market conditions) and the Bid-Cover ratio (ratio of total bids to auction size – usually over 2 times).

Auction sizes vary depending on the product and term-to-maturity of the instrument being auctioned. The chart below shows the average auction sizes over this period for each instrument. Real Return Bonds (RRBs) are only auctioned for 30-year terms and have a relatively small auction size, averaging $405 million compared to $1.4 billion for 30-year nominal bonds, $3 billion for 2-year bonds, and $5.1 billion for 3-month treasury bills. Auction sizes for 3-month treasury bills and 2-year bonds are significantly larger than for other terms, reflecting demand and contributing to their greater liquidity.



Auction Size (millions)	Avg	Std Dev	Min	Max
3mo	5,145	807	3,800	7,100
6mo	2,048	269	1,600	2,700
1yr	2,048	269	1,600	2,700
2Y	3,053	449	2,400	3,600
5Y	2,083	129	1,900	2,300
10Y	2,295	185	2,000	2,600
30Y	1,410	99	1,300	1,600
RRB	405	100	300	650

We measure market conditions by credit spreads, yield volatility, and trading volume. There is generally little statistical evidence of the impact of market conditions on bond auction characteristics. However, for treasury bills, higher volatility, wider credit spreads, and lower liquidity are related to wider auction tails, i.e. less effective auctions.

The Bank of Canada participates up to 15 per cent in nominal bond auctions and up to 25 per cent in treasury bill auctions. The general evidence is that these different levels of Bank of Canada participation do not impact auction effectiveness for any of the types of auction securities.

For nominal bonds, customer participation, which ranges from zero to 8 per cent, has little impact on auction effectiveness. Likely due to significantly larger customer participation in RRB auctions (representing 10 to 40 per cent of total bids), Bid-Cover and Tail are both favourably affected by increased customer participation. The relationship is stronger for auctions that occur near coupon payment dates. We find no relationship between the willingness of dealers to bid at auction and market conditions, but we did not measure this effect during the crisis.

The data suggest that the buyback program does not impact auction effectiveness for 2- and 5-year auctions. For 10-year auctions, larger buybacks are associated with wider tails for switch buybacks. There is weak evidence that as buyback amounts increase, the tail increases (effectiveness decreases). Note that the buybacks are intended to increase auction size and liquidity, which might be expected to contribute to *more* effective auctions.

9. Review and Recommendations: Process

Practices and procedures that support auctions of government debt fall into three broad categories: pre-auction, the auction itself, and post-auction.

a. **Pre-auction**

i. **Communication between Bank of Canada and Department of Finance**

Pre-auction communications and coordination between the Bank of Canada and the Department of Finance are generally effective. Although our study focused on the period prior to the crisis, the effectiveness of the current process is evidenced by the success of the debt program and operations throughout the crisis in 2008 and 2009. During the period of our study and during the crisis, auctions were characterized by proper authorities, timely decision making, and high quality strategic and policy advice to the Minister. We believe that the process for gathering pre-auction information and summarizing the results is efficient and effective. The Bank of Canada is well positioned to gather detailed market information which serves as key input to the final decision regarding calls for tender since the Department of Finance does not gather information independently.

Transparency of the terms of the annual bond program contributes to the effectiveness and efficiency of the auctions. However, like many other sovereigns, in order to maintain some flexibility to adapt to market conditions Canada does not pre-announce specific auction securities or sizes.

A call for tender is prepared and released every time the Bank of Canada issues bonds for the Government of Canada, whether it is a new issue or a re-opening of a current issue. Although the call for tender release date is officially the Thursday before the auction date, preparation and verification of the call for tender begins a week before its release date. There is a special release time for holidays.

The approach to seeking the market's view on the terms that will be posted on calls for tender for upcoming debt operations is similar to other sovereigns in that it involves consultation with dealers and customers. However, the process used for Canadian bonds is unusual compared to other sovereigns in that the pre-approval of the terms of each call for tender by the Department of Finance is required (the Bank of Canada has been delegated authority for treasury bills and the cash management bond buyback).[12] For the other sovereigns in our study, the authority to determine bond auction terms is delegated completely to the issuing authority within the parameters of the plan that is agreed to in advance, usually on an annual basis.

In normal market conditions, the current timing and process is effective and efficient. The Department of Finance usually accepts the recommendations from Bank of Canada. However, under unusual or distressed market conditions, the process has little time or leeway for dialogue between the Department of Finance and the Bank of Canada or for escalation to senior officials in the case of disagreement.

We question the rationale for the Department of Finance to approve the call for tender for each bond auction. The interests of the Bank of Canada and Department of Finance are aligned to achieve the objectives of the annual bond program. For each auction, the Bank of Canada conducts both formal and informal consultation with market participants and has up-to-date information that informs the decision to balance the desired funding amount with market conditions to determine the details of each auction.

The Department of Finance relies on the market related information provided by the Bank of Canada and does not conduct independent market research. If the Department of Finance disagrees with the recommendation of the Bank of Canada, it is unlikely to be because Finance has superior market information. It may be that the Department of Finance has a different view on how to interpret the market information in light of the trade-offs of size vs. cost and cover, or that it brings a broader perspective with respect to how each individual decision fits within the overall strategy for the issuance program. However, in our opinion, the Bank of Canada is well positioned to analyze market conditions and to assess these trade-offs, especially if there is ongoing communication at the policy level with the Department of Finance.

Recommendation:

For potential improvements in efficiency, consider changing the interaction between the Department of Finance and the Bank of Canada occurring ahead of bond auctions to a reporting function rather than an approval process.

This recommendation is consistent with the process in all the other sovereigns we studied, where the issuing authority has full control over the auction details once the overall borrowing program has been determined, addresses some process related concerns raised during interviews with the Department of Finance and the Bank of Canada, and does not introduce any issues that would likely be of concern to market participants..[13] Input from the Department of Finance can continue to be conveyed to the Bank of Canada through the development of the annual *Debt Management Strategy* and the determination of the QBS where the timing and term type of auctions is announced.

An alternative solution might be to bring in the Department of Finance earlier into the formulation of recommendations for calls for tender for bond auctions. For example, a Bank of Canada staff member could be present at the Bank of Canada's internal debriefing regarding the market consultations that occur prior to the call for tender recommendation to the Department of Finance.

ii. Authorization letter for debt auction operations

Recommendation:

We recommend that the Authorization Letter for debt auction operations be replaced with more informative, timely reporting and accountability to senior management.

The bond auction process currently requires a letter from the Department of Finance to authorize the Bank of Canada to conduct the auction for both treasury bills and bonds. However, in practice the letters are sent after the fact. This process should be replaced with timelier and improved pre- and post-auction reporting from the Bank of Canada to the Department of Finance.

iii. Fungibility

Fungibility, i.e. securities that share the same maturity date, can serve the same purpose as policies on bidding limits and participation at auctions to limit the possibility of market manipulation by participants. It is broadly agreed by all Canadian interview participants and other sovereigns that fungibility helps liquidity overall, which in turn enhances price discovery and auction effectiveness. However, note that in theory, fungibility can have two opposing effects on the price of the security. On the one hand, a concentration of liquidity can improve prices, but on the other hand, an increase in supply can depress prices[14]. Fungibility should continue to be assessed as part of the ongoing annual debt program, and through formal and informal consultation with market participants.

iv. Terms of Bond Buybacks[15]

Buybacks for bonds have been implemented by some sovereigns during times of reduced financing needs primarily as a mechanism to improve the liquidity of government markets. When this has occurred, the general approach has been to buy back older and smaller issues to enhance the size of new benchmark issues. Buybacks for bonds are currently small or irrelevant in every country we surveyed, with the exception of Canada where the buyback program is relevant only for nominal bonds, not treasury bills or RRBs.

Regular buyback operations occur on a cash basis (on auction dates) as well as on a switch basis (on dates not coinciding with bond auction dates). To assess the impact of buybacks on auction effectiveness, we analyzed the relationship between buyback amounts and auction bid-cover and tail. For buybacks on a switch basis, the data suggest that the buyback program does not impact auction effectiveness for 2- and 5-year auctions. For 10-year auctions, larger buybacks are associated with wider tails for switch buybacks, but there is no other evidence of an impact on effectiveness for 10-year auctions.

Interviews with dealers resulted in suggestions that secondary market efficiency may improve if the Bank of Canada retains the option to conduct switch buybacks, with one day notice to the market, when market opportunities are available, not just on a set schedule.

v. Call for Tenders

The timing of the call for tender relative to auctions in Canada is typical of other sovereigns. Most sovereigns continue to value transparency and predictability over flexibility, with the US being the most predictable and rigid in its schedule. Most Canadian dealers and investors were pleased with timing of the call for tenders for nominal bonds and treasury bills, both in terms of timing relative to auctions, and timing of auctions on the calendar for the period we studied.

Some Canadian market participants emphasized the natural source of demand for new issues that arises from coupon payments from existing nominal bonds and RRBs on June 1 and December 1. The coupon payments and resulting cash available for reinvestment may increase customer demand and enable dealers to bid more aggressively and improve auction effectiveness. The auction process currently accommodates this well while staggering operations throughout the quarter.

In general, information transparency is key to process and effectiveness, both pre- and post-auction. This has driven Canada and all the sovereigns we evaluated to provide a great deal of detail well in advance as a matter of policy. However, in light of recent increases in funding needs and volatile market conditions, some sovereigns are reconsidering the trade-off between transparency and flexibility. In some markets transparency may be purposely reduced or securities may be issued through a process other than auctions (syndication or taps) in order to issue debt quickly in an opportunistic way or to increase the likelihood of full placement of the desired amount of debt. Market participants prefer transparency but based on our interviews, they understand the need for flexibility in unusual circumstances, and the effectiveness of auctions and debt distribution has generally been maintained.

Some interviewees suggested the use of headline announcements or standby for new issue alerts for calls for tenders on Bloomberg and other news services, and through bond trading platforms such as CanDeal and CanPx[16].

vi. Formal and informal consultations

Recommendation:

For all securities, a mix of communication formats should be considered by the Bank of Canada, including more frequent telephone conference calls and multi-lateral discussions in addition to the traditional bi-lateral visits with individual dealers. Encourage all market participants to play a more active role in the design of the debt strategy, such as through an annual workshop in addition to the standard consultation process. Consult with a larger sample of current and potential customers more frequently. Include them in annual formal consultations individually and in group formats. For less liquid securities (long-term bonds and RRBs), we recommend more detailed and consistent feedback from a larger number of market participants, including large and small customers, prior to and following each auction.

All sovereigns have regular informal consultation between the auction authority and market participants, and varying levels and frequency of formal consultation. Canada has an annual formal consultation process, with other communication occurring prior to each auction with every Primary Dealer. Compared to other sovereigns we studied, the consultation and communication are in the middle of the pack in terms of formality and frequency. This process is well received by the market and is generally perceived to be transparent, timely, effective and efficient, but a few market participants would prefer more communication. However, it is not clear that under normal market conditions more communication would improve effectiveness or efficiency, particularly for the most liquid securities (treasury bills and nominal bonds under 10 years to maturity). The importance of consultations is greater in the presence of changing issuance amounts (either significantly higher or lower than recent experience) or during volatile or distressed market conditions.

vii. When-Issued (WI) market

The role and importance of a when-issued (WI) market is closely related to the fungibility of auction securities and the prevalence of new issues vs. re-openings. The WI market can facilitate price discovery and hedging or setting up for the auction by auction participants. It is also related to the depth and liquidity of the secondary market, futures markets, or markets for similar securities. The deeper and more liquid these markets, the less important the WI market for price discovery. However, the WI market will tend not to exist or will have limited activity or liquidity for securities that themselves have limited secondary market liquidity, such as inflation-linked bonds in markets other than the US.

For all sovereign nominal bond and treasury bill markets, interviews suggested that where there is limited trading in WI markets, it is because price discovery is effective in other markets for similar securities. According to the interviews, the importance of WI markets for auction effectiveness is limited for shorter-term securities, and secondary or related markets are viewed as effective substitutes. For longer-term securities, there are fewer effective substitutes, and auctions for new issues may benefit from a WI market.[17]

Based on the Canadian market participant interviews, two dealers said that in treasury bills, WI market activity is mainly aimed at maintaining duration in the treasury bill book, not price discovery because customers and hedgers (rather than speculators) dominate the market, and customers are all buyers, with no sellers. One dealer pointed out that for bonds, the WI market plays no role in setting up for the auction – it is only for price discovery.

viii. Impact of market conditions

Higher market volatility and general illiquidity in 2008 and 2009 presented some challenges for dealers and customers around auctions, but auctions were nonetheless effective. As a result, dealers found it harder to bid aggressively. Market participants acknowledge that in extreme and rare events there could be good reasons to delay an auction, but that predictability is normally preferred. The data analysis examined the impact of three factors on bid-to-cover and tail: bond yield volatility, credit conditions (Baa spread), and liquidity (monthly trading volume for the auctioned security or similar securities). The evidence supports the conclusion that higher volatility, wider credit spreads, and lower liquidity are related to wider auction tails (i.e. less effective auctions) for nominal maturities up to 10 years, and for treasury bills, but not for longer term nominal bonds or RRBs.[18] Although the auctions in 2008 and 2009 were effective, if the data period had included the remainder of 2008 and 2009, this conclusion may have had even stronger support.

ix. Selection criteria for participants

Selection criteria for auction participation vary across sovereigns[19]. Only Canada has a significant minimum participation requirement that must be fulfilled in each individual auction. In Canada, there are two types of bidders: Government Securities Distributors and Customers.[20] See Appendix D for a description of the role of primary dealers. A recent OECD study notes that existing primary dealer arrangements have not been working as efficiently as before the crisis, and raises the question whether requirements need to be revised. The study also suggests that the broader business model of cooperation between Debt Management Offices and primary dealers may need to be re-examined, with possible changes to the market-making obligations and market infrastructure in order to support the debt issuance process in times of market stress.[21] The Canadian model worked well during the crisis, as the Canadian banking system remained relatively stable. Auctions continued to be effective, which may be due to the specific structure of the bidding rules that ensure that every auction is covered provided primary dealers wish to maintain their status. Developments in other market should be monitored and evaluated.

x. Dealers pre-auction risk management and willingness to bid

The depth and liquidity of the secondary market are important for the price discovery process. In addition to liquidity, transparency and volatility, factors that affect willingness to bid that were noted in the sovereign and Canadian market participant interviews include: the dealer's pre-auction holdings (short position increases willingness to bid), their ability to hedge[22], coupon payments on similar bonds (especially inflation-linked bonds), the extent of bond index tracking in the market and its implications for demand for the security, the number of traders on holiday, and announcements of potentially market-moving information, repo market conditions, nearness to fiscal year-end for banks, balance sheet constraints, and frequency and size of auctions (concern about "auction fatigue"). There were no concerns expressed by Canadian market participants regarding auction size for any of the bond types. However, there were comments about 10-year new issues sitting in inventory and some dealers have concerns about their ability to meet their obligation to participate at auctions consistently.

We measured dealer Willingness to Bid as the percentage (of total auction size) of dealer bid amounts with bid yield less than the auction average yield, and we examined the relationship between this measure and measures of market volatility, credit conditions, and auction size. In the data analysis, we found no significant relationships between this Willingness to Bid, and Yield Volatility, Baa credit spread and Auction Size for any securities.

xi. Impact of non-competitive bids

Non-competitive bidding varies across sovereigns. In Canada, the US and France, non-competitive bids are intended to permit small bidders to achieve allocation at auction and are restricted to small quantities. However, in the UK, the role of non-competitive bids is to allow dealers a guaranteed supply, and they are permitted to buy up to 10 per cent of the auction non-competitively.

In Canada, non-competitive bids are less than 2 per cent for nominal bond auctions, and less than 1 per cent for treasury bill auctions. They are more substantial for RRB auctions, representing between 3 and 5 per cent of total bids submitted. Non-competitive bids have a dollar maximum which partly explains the differences in their proportions for each type of auction since treasury bill auctions are the largest in size and RRB auctions are the smallest. There has been a steady increase in the proportion of non-competitive bids for 30-year bond auctions over the evaluation period. Also, while still small, non-competitive bids in treasury bill auctions have seen a marked decline since 2006, and no structural change in the auction process or rules appears to explain this. Interviews with market participants suggested that the small size of non-competitive bids means that they do not play an important role at auctions.

b. Day of Auction

i. System for accepting bids

Recommendation:

We recommend encouraging greater participation of customers already holding a bidder identification number, and identifying and actively soliciting potential new customers. Large customers should be offered direct access to the Communication, Auction and Reporting system (CARS).

The Communication, Auction and Reporting System (CARS) system used in Canada has been highly reliable. Rules programmed into the system that prevents most possible types of human input error, and incidences of errors are very rare. Interviews with all existing types of users led to no recommendations regarding improvements to the system. However, several large customers expressed interest in having direct access to the CARS system to simplify their participation in auctions and to allow them to report their holdings directly to the Bank of Canada in an automated fashion.[23] They expressed a preference to not share their holdings with dealers, and were either not aware of the option to bypass dealers for this purpose by conveying holdings directly via phone or fax, or they had a preference for an automated platform. Offering CARS access to large customers has the potential to improve auction effectiveness if some large investors will bid more aggressively.

ii. Bank of Canada participation, right to reject bids, and right to reduce quantity offered

Canada is unique among the sovereigns investigated in that the Central Bank can participate at auction without restriction and not as an add-on. The Government of Canada also can, at its discretion, re-open and issue outside the timetable provided by the QBS and the usual cycle for treasury bill issuance.

The Bank of Canada participated up to 15 per cent in nominal bond auctions and up to 25 per cent for treasury bill auctions. During the evaluation period, the Bank of Canada participated at a constant 10 per cent of all 2-year auctions and 15 per cent of all 5-year auctions. The minimum purchase by the Bank of Canada changed in the 10-year and 30-year sectors from 10 to 15 per cent in January 2008. Dealers are most concerned about the net size of auction plus buyback. No one commented directly on the recent change in bidding amounts, with the implication that the change has not been a concern.

iii. Timing of buybacks relative to auction

Participants were generally pleased with the timing of buyback operations relative to auctions. However, two dealers expressed a strong preference that buybacks be at least 5 minutes earlier relative to auctions to reduce dealer risk exposure. They suggested that this may lead to more aggressive bidding at auctions and therefore increase auction effectiveness. It is not clear whether this change would make a meaningful difference in auction effectiveness, but this may be worth considering in light of higher issuance volumes and increased desire to ensure maximum auction participation. Interviews with the Bank of Canada and Department of Finance suggested that this timing is achievable with minor operational concerns.

iv. Reporting holdings

In Canada, there are minimum and maximum bidding requirements for Primary Dealers and maximum holdings acquired through the primary market for all auction participants. Canada requires reporting of net positions (including derivatives exposures) prior to the auction for dealers as well as customers who have a bidder identification number. In order to ensure that limits are not exceeded, position reporting is required since the maximum permitted bidding levels are based on the auctioned amount but could be limited by the net position amount.

In Canada, bidders are required to report their net holdings of the auction security prior to the auction. For customers, this may be done through dealers who have access to the CARS system for automated entry, or directly by phone and fax to the Bank of Canada.

Position reporting requirements vary substantially for other sovereigns and are related to the existence or absence of maximum bidding limits. The pre-auction reporting requirements are varied, but each sovereign's own rules appear to work well for its auction process.[24] In Canada, pre-auction net position reporting is required and compliance certificates and post-auction verification of net positions are the enforcement mechanisms. It is possible that a more systematic checking of pre-auction reporting limits is desirable, rather than random spot checks, but it would be labour intensive and it is not clear that the current almost self-monitoring system is subject to violations. The threat of penalty appears to suffice.

v. Bidding requirements

Recommendation:

When it is desirable to encourage more participation due to higher debt issuance, Canada could relax the upper limit on bids and counteract the potential impact on short squeezes by reserving the right to re-open issues at any time through something like the United Kingdom mini-tender facility, or similar to the Australian approach of re-opening at its discretion. Given the stringent participation rules in Canada, we recommend a carefully chosen reservation price for some auctions since it may contribute to lower cost funding, although at the risk of less than desired funding amount at any given auction. In periods where the need to raise funds is relatively great, a reservation price is not likely to improve effectiveness and is not recommended. If Canadian bond and treasury bill issuance volume grows substantially, we recommend a post-auction option to increase the offering size. This provides greater predictability of raising the desired amount of funds without unduly disrupting the market.

Countries with strict selection criteria tend to have fewer bidding restrictions or obligations. Canada lies in the middle of the range of countries we examined in terms of strictness of selection criteria and obligations. All bidders must certify that they will not bid in concert with any other bidder. A government securities distributor who reaches a threshold level of primary and secondary market activity could become a primary dealer, with the commensurate responsibilities. The obligations of a primary dealer include meaningful minimum bidding requirements at each auction, in addition to an average over time. The Bank of Canada requires regular reporting of distributor activities related to Government of Canada debt, including firm-wide positions. Dealers are required to make available real-time information on fixed-income prices and yields. They may be required to (i) report secondary market trading; and (ii) report detailed issue-specific trading to the Bank of Canada. The purpose of such reports is typically to clarify why specific securities trade in the cash and repo markets at prices divergent from issues of similar maturity. In every country we surveyed there is a perceived value in the status associated with being a primary dealer.

One unique characteristic of the rules of the Canadian auction is the minimum bid required of all Primary Dealers (50 per cent of the auction limit or calculated value whichever is less, with a maximum of 12.5 per cent of the auctioned amount). While other sovereigns have guidelines for bidding requirements, none has a similar minimum for each auction. Given the number of Primary Dealers in Canada, this assures that in the absence of a disaster scenario, all auctions will be covered. Since all sovereigns are particularly concerned with execution risk (that an auction will be uncovered), Canada is in the unique position that it does not currently face this risk. Of course, in the longer run, such a rule cannot guarantee auction success. If Primary Dealers find this requirement to be too burdensome, some could choose to withdraw from being Primary Dealers.

With a fixed number of bidders, according to the literature, a higher price can be achieved with a well chosen reservation price, but an alternative distribution channel, such as a re-opening, may be necessary. However, in a model with endogenous entry, which may be relevant in auctions which are open to a broad range of bidders and do not have minimum participation rules, there is no advantage to having a reservation price. Canada has endogenous entry, but does have minimum participation rates, which does not quite fit the assumptions in the literature.

Based on volatile market conditions and the desire to increase funding amounts, some countries have introduced a post-auction option that allows winning bidders to purchase additional amounts of auctioned securities.[25] This gives more flexibility regarding the issue size compared to fixed announcement of issuance amounts in advance. This option may encourage bidding at auction and raise more funds.

vi. Number of participants and participation rates – government securities distributors vs. customers

There is substantial variation in permitted bidders at auctions across sovereigns. Countries with strict selection criteria tend to have fewer bidding restrictions or obligations. Canada lies in the middle of the range of countries we examined in terms of strictness of selection criteria and obligations. As described in the previous section, in Canada, there are two types of bidders: Government Securities Distributors and Customers.

The number of Primary Dealers is 10 (treasury bills) or 12 (bonds) in Canada, compared to up to 18 in France and the US. In Canada there are 5 other government securities distributors (smaller institutions) and customers bid through government securities distributors. In France there are other dealers and customers occasionally participate through dealers. The US has the broadest participation, with many other dealers and customers participating directly. There are no other participants permitted in Australia or the UK, but customers can ask dealers to bid on their behalf. In Canada, Primary Dealers dominate nominal bond and treasury bill auctions, and Customer participation is greatest for RRB auctions. The number of total bidders in individual auctions including customers is not generally reported publicly.

For nominal bonds, customer participation is low (0 to 8 per cent) and does not appear to contribute to auction effectiveness or transparency. Customers participate more in RRB auctions (up to 40 per cent), where bid-to-cover and tail are both favourably affected by increased customer participation. For treasury bill auctions, customers participate up to 25 per cent, and higher customer participation tends to be associated with a greater bid-to-cover ratio, but tail is not impacted.

Each sovereign interviewed feels the number of bidders is roughly optimal in its own situation. Some bidders may have better information about market conditions and may be able to make more informed bids than others. Therefore, there may be a trade-off between quantity and quality of bidders.

Based on the analysis of the auction data, for a given security, greater dealer participation compared to customer bids is associated with a lower bid-to-cover ratio for 5-year bonds, RRBs and 6-month and 1-year treasury bills, but not for other bond maturities. Tail is unrelated to relative dealer participation except for 5-year bonds[26]. We also examined whether the number of bidders is related to market conditions.[27]

Aspects of the auction process differ across the sovereigns, contributing to the overall efficiency of the process. Modifying one or more aspects of the process is unlikely to lead to greater efficiency on the whole since the various pieces work together as part of the broad process.

With regard to pre-auction rules vs. flexibility, Canada has strict limits on maximum award, but Australian model has no limits and maintains the option to re-open to prevent short squeeze.

Based on volatile market conditions and the desire to increase funding amounts, some countries have introduced a post-auction option that allows winning bidders to purchase additional amounts of auctioned securities. For example, in June 2009, the UK, announced a post-auction option facility open from 12 to 2pm (starts an hour after the auction closes) where dealers can take down an additional 10 per cent of the auction amount at the auction price i.e. they make a profit if the secondary market price rises . The option does not apply if the auction was not covered. This gives more flexibility regarding the issue size compared to fixed announcement of issuance amounts in advance. The post-auction option facility was the result of a 2008/2009 UK consultation on supplementary issuance methods, which looked at a variety of alternative issuance methods. This option may encourage bidding at auction and raise more funds. In some sovereign markets, particularly the US, encouraging broad distribution at auctions is a policy priority. Greater customer participation may contribute to greater auction success, lower the likelihood of a failed auction, and lower and broader distribution.

Recommendation:

We recommend motivating Government Securities Distributors to strive to become primary dealers (who are subject to more stringent minimum bidding requirements) by attaching more visibility and prestige to the primary dealer status (e.g. as in France). For example, a

multilateral forum for primary dealers once a year where they are invited to discuss key issues with senior policy makers.

vii. Compliance with Terms of Participation – Surveillance Framework

There are two potential irregular practices of key interest: a short squeeze and collusive behaviour regarding pricing, such as bidding up yields in the WI or secondary market prior to the auction, or at the auction. Greater concentration of ownership and a smaller number of bidders increase the risk of both short squeezes and collusive behaviour. For sovereigns that take a rules-based approach to prevent irregular practices, there are multiple features of the auction process that play a role: who participates (broader is better), requirements of participants (maximum and minimum bids), pre-auction position reporting, and the possibility of re-opening. Preventing excessive concentration of ownership of a single security is a common goal. Sovereigns take very different approaches to achieving this.

All sovereign interviewees concluded that their auction process is not subject to concerns about irregular practices. The experience of the US in the 1990s is well known and each sovereign is vigilant and subjectively concludes that its own process is effective in preventing irregular practices. However, each sovereign takes a slightly different approach.[28]

The potential for collusion may be related to the auction format. The theoretical literature suggests that single price auctions can, under some circumstances, be more subject to collusion but this is not supported by the empirical literature. Market manipulation and irregular practices are more likely when there are fewer participants and when securities are less liquid. Net positions and bidding limits are the most important factors for curtailing potential manipulation. However, there is little concern that irregular practices occur.

c. Post-auction:

i. Release of results – timing and transparency

Generally, market participants said that the transparency of information released with the results is sufficient to support efficiency. Canada releases information comparable to the other sovereigns in a timely way. The literature is clear that the release of individual bid information should be avoided since it facilitates collusion, which lowers revenue.

All the sovereigns in our study release the results within ten minutes of the deadline for bid submission, usually faster. Some interviewees commented that the dissemination of results could be improved. Some noted that the website is unreliable, and that they would prefer that the information be pushed out more directly. Many customers wait to hear about the results through dealers rather than searching the headlines at major newswires such as Reuters and Bloomberg.

We noted that the Bank of Canada website maintains an email distribution list where market participants can sign up for notice of call for tender and auction results. Website improvements facilitate comparison of auction effectiveness over time by maintaining results for 10 recent auctions on the main page and providing a list of auction results for the past five years[29].

Recommendation:

We recommend additional simultaneous release of results to the Bank of Canada pages on Reuters and Bloomberg and through CanDeal and other relevant trading systems used by Canadian market participants.

ii. Settlement timing and procedure

In the sovereigns we evaluated, the most common settlement timing for bonds, notes, and inflation-linked bonds is T+3, which is the same for Canada. Exceptions are Canadian 2-year bonds which are T+2, UK Gilts that are T+1, and re-openings of French BTAN's (2 to 5-year bonds) which are T+1. Settlement varies in the US. For treasury bills, Canada settles T+2, Australia and the UK are T+1, France T+3 for auctions but T+1 in the secondary market, and the US is T+2 or T+3. There were some mixed comments regarding settlement timing, with some market participants expressing a preference for shorter settlement times for some securities, and others preferring the status quo. Careful consideration is given to settlement dates around holidays.

Adoption of best practices and standards for trade settlement by industry participants is key. This maintains the competitiveness of Canadian capital markets while working to reduce operational costs and risks while improving customer service. National Instrument 24-101 (Institutional Trade Matching and Settlement[30] targets T+1 matching of at least 90 per cent of trades by June 30, 2010. Meeting these targets for secondary market trading will help maintain Canada's capital market competitiveness, reducing credit risk, lowering operational risk and increasing productivity. However, while the Bank of Canada's systems have the ability to move to shorter trade matching timelines, given the settlement practices for other sovereigns in the primary market, there does not appear to be an urgent incentive to settle trades in the primary market earlier than current practice.

Settlement procedures in each sovereign are through standardized third-party systems. None of the sovereigns surveyed expressed any concern regarding settlement risk, and no concerns were expressed by any Canadian market participant or by the Bank of Canada. Both dealers and customers consider settlement procedures to be good overall.

10. Risk Measurement and Management

In normal market conditions, due to the stringent minimum bidding requirements for Canadian primary dealers, execution risk is low, but in the unlikely event that the auction fails to raise the desired funds, the impact is high, so execution risk is still the most important risk regardless of market conditions. The probability of an adverse event that is classified as operational risk is higher, but the impact is lower than for execution risk. Execution risk increases in volatile and illiquid market conditions, and during periods of heavy issuance. Operational and settlement risks are largely independent of market conditions.

a. Execution Risk

Execution risk is measured as the likelihood of a Bid Cover ratio less than one, i.e. a failed auction. This has never occurred during the evaluation period.[31] Most of the sovereign interviewees stated that the main risk is execution risk. In our sample of five sovereigns, only the UK had experienced a failed auction. This occurred three times, most recently in March 2009. This experience led the UK to formally review its auction process.[32]

In the event of a failed auction, treasury bills can be issued as backup funding provided that the cause of the failed auction does not also disable the treasury bill market. For example, if a financial institution fails and does not purchase bonds as expected, this amount could be raised through a same day settlement cash management auction. Execution risk also depends on the ability of dealers to maintain their operational platforms in the event of disaster. It is not possible to hold an effective auction if large bidders are not functional. Dealers have disaster plans and backup operational facilities which reduces execution risk (but we did not evaluate these), and some dealers have operations in different cities.

b. Operational Risk (including bidders compliance with bidding rules)

Operational risk includes the risk of errors in the auction process, such as data entry errors, errors in calculating auction pricing, as well as risks of system failure, human error, or communication error. Also included in this category are risks that bidders do not comply with selection criteria, bidding rules, or position reporting requirements.

The CARS system has built-in rules that prevent most potential human error. In particular, there is a plausibility range within which all bids must fall to be considered valid. This plausibility range provides a high and low that prevent potential “handle” errors where yields could be materially mis-typed. Bids are monitored by trained staff. Market participants and Bank of Canada staff are confident in the system, which has significantly reduced operational risk. The rules are audited by Risk Management.

Bidder compliance with net position reporting is monitored through annual compliance process that begins on November 1st. The process is led by the Bank of Canada in coordination with the Department of Finance. For the semi-annual post-auction verification, an auction is selected, and all participants who submitted competitive bids are contacted and asked to verify the positions reported in CARS. Throughout the year, dealers are expected to notify the Bank of Canada if they have misreported positions. This happens occasionally and they have been communicated quickly. However, the Bank of Canada cannot independently check an error in position reporting and relies on compliance certificates from dealers and customers. A concentrated net position in the primary market is of greatest concern to the Bank of Canada.[33]

c. Settlement Risk

Settlement risk is very low and is difficult to measure. However, third party settlement systems reduce this risk to a negligible level. No incidents in our evaluation period, and no market participants or sovereigns expressed any concern about settlement risk in the Canadian or other markets.[34]

d. Staffing Risk

Recommendation:

We recommend that detailed guidelines and process documentation be reviewed and updated annually at the senior management level at both the Bank of Canada and Department to Finance.

Maintaining a sufficient qualified staff is essential since there is a high dependence on corporate knowledge held by specific experienced individuals related to the determination of the borrowing program, the QBS, and call for tender.

e. Systems Risk (including Disaster Recovery)

Systems backup is a key priority. If, prior to or during an auction, the auction computer site (which has a back-up computer in place on-site) is dysfunctional, business continuity and disaster recovery policies come into play. The Bank of Canada has an off-site facility that reduces operational risk and would likely provide support execution of the auction, but with some delay. These issues are addressed by the Continuity of Operations Group, distinct from Risk Management. A disaster recovery process and business continuity plan is maintained within the context of the overall Bank of Canada operations. [35]

f. Risk Governance and Reporting

The Funds Management Committee (FMC) oversees all activities covering domestic debt, cash management, reserves and risk management. The FMC's mandate is to advise the Minister, through the Deputy Minister or his/her delegate, on policy and strategy for funds and risk management, direct the implementation of approved policy and plans, and review performance outcome reports. The FMC oversees risk management practices and provides direction on establishing guidelines for risk identification, measurement, monitoring and mitigation. The FMC is provided with regular reports from the Financial Risk Office summarizing financial and operational risk exposures and key audit findings. The FMC meets semi-annually, in late spring/early summer and late fall/early winter, and on an ad hoc basis as required. The two meetings are used to discuss work plan priorities at the Department of Finance and the Bank of Canada, and address key policy issues related to funds management activities.

The Risk Committee (RC) is an advisory body to the FMC that reviews and provides opinions on the risk implications of market and operational developments, and policy proposals and recommendations put forward by the Funds Management Coordinating Committee, Asset Liability Management Committee and Retail Debt Coordinating Committee. The RC is supported by the Financial Risk Office (FRO), which provides advice to the RC on risk issues associated with policy proposals and recommendations.

The Financial Risk Office (FRO) monitors and reports on risk exposures, including market, credit and operational risks, related to financing and investment activities based on best practices of sovereign government funds operations and knowledge of private sector financial institution practices. FRO also provides advice in respect of the development of financial asset and liability management policy, particularly related to market, credit and operational risks. The Adviser, Strategic Planning and Risk Management, and the Director of the Financial Risk Office (FRO), Bank of Canada, are responsible for oversight of FRO.

Risk is also governed by the Memorandum of Understanding on Treasury Risk Management between the Bank of Canada and the Department of Finance.

11. Conclusions

We found that the current structure of the debt auction process works well and supports the transparency, efficiency and effectiveness of Canadian auctions as well as the ultimate goals of raising necessary funding at a low cost. Moreover, the auction process has helped sustain a liquid and efficient secondary market for Government of Canada debt.

While we suggest making several marginal changes to the auction process, we expect that the process will continue to achieve its objectives in the longer term in its current form or with the suggested changes in process that we cite. We make 8 recommendations primarily focused on internal and external process and risk management.

Is there still a need for an auction process or is there an alternative method for raising funds?[36]

Both the academic literature and practice across other sovereigns suggest that an auction process should be the main process of issuing government debt. Auctions have been proven to be an effective way of selling securities, especially for selling liquid government debt for which there is little price uncertainty. Not only does the auction effectively raise funds, it also contributes to a liquid secondary market.

When there is more price uncertainty, for example for certain very long dated debt or inflation-linked debt, other sovereigns have sometimes preferred to use non-auction methods, such as syndication. As long as there are government funding needs, there will be a continued need for an auction process to raise funds.

Alignment with Government Priorities: Is the auction program relevant? What are the linkages between program objectives and federal government priorities and departmental strategic outcomes?

In our context, the government's goal is to raise funds to finance its debt and expenditures. Further goals are to raise these funds at the lowest cost, and to contribute to an efficient secondary market. These goals are the same as the objectives of the auction process – to successfully raise funds at low cost by issuing liquid securities.

Consistency with Federal Roles and Responsibilities: Is there a need for the government to deliver this program? Why should this program be delivered by the federal government as opposed to other orders of government or the private sector?

Government debt auctions are conducted by central governments (or central banks) for all sovereigns that we are aware of. Unlike corporations that use intermediaries to underwrite and distribute their debt, an intermediary is generally not necessary for government debt, since such debt has little (if any) credit risk and has liquid secondary markets, and thus very little uncertainty about pricing. Since the purpose of auctions is to fund the federal government, and since the specific funding needs can only be determined at the federal level, it is appropriate for the auction to be conducted by the federal government. Of the sovereigns we investigated, Canada is the only one that uses the central bank to conduct auctions. Others generally use a different government entity, usually an issuing authority that may be independent or part of the treasury function, with the specific mandate of raising funds for the government (see Appendix A). A different model could be considered for Canada, but we found that the current structure works well, and found no evidence to suggest that the efficiency or effectiveness of Canadian auctions would be improved as a result.

Achievement of Expected Outcomes (Immediate, Intermediate and Ultimate): To what extent has the auction process been able to achieve its objectives and expected outcomes in the immediate, intermediate and ultimate long term?

Overall, the auction process has been successful in its immediate, intermediate, and ultimate goals of raising necessary funding at a low cost. Moreover, the auction process has helped sustain a liquid and efficient secondary market for Government of Canada debt. Above, we discuss a number of possible marginal changes to the auction process, but we expect that the process will continue to achieve its objectives in the longer term in its current form or with the suggested changes in place.

Appendix A - Sovereign Comparison Summary

As shown in the table below, the general approach to auctions is similar across sovereigns, but there are different approaches to the trade-off between predictability and transparency, especially in times of market turmoil. Australia has chosen to increase flexibility at the expense of predictability and no longer announces its issuance calendar in advance. The UK retains flexibility by choosing the specific security to be issued based on the needs of the market, and as mentioned above, holds mini tenders to raise smaller sums. In contrast, the US stresses the need for regularity and predictability. It holds more than 200 auctions per year and follows a strict schedule of issuance, so the market knows which maturities will be issued well in advance. The quantity in each auction is also fairly predictable. In this sense, Canada's process is similar to that in the US, in that its auctions are predictable. However, especially in times of market stress, the US could be considered to be a special case. Its markets are extremely liquid and deep, and US auctions benefit from a flight to quality in times of uncertainty.

An important difference across sovereigns is the frequency of new issues compared to re-openings. The bulk of auctions in the US and France are new issues, while in Canada, as well as in the UK and Australia, re-openings are most common. For re-openings, price discovery is helped by a liquid secondary market. New issues need a liquid WI market to achieve satisfactory price discovery. New issues and re-openings also have different implications for combating short squeezes.

Sovereign are aware of the possibility of abusive practices by bidders. To prevent a market corner or a short squeeze, the US strictly limits the quantity that can be awarded to any one bidder. Other than Australia, the other sovereigns, including Canada have similar limits. Australia relies on its flexibility to re-open an issue on an *ad hoc* basis if there appears to be a market distortion caused by the concentration of holdings.

Participation varies across sovereigns. The US allows broad access, even having a system that allows direct customer participation. At the other extreme, Australia limits participation to a specific list of institutions. The remaining countries are in the middle. All of the sovereigns we interviewed have a category of bidder similar to primary dealers. Other than in Australia, primary dealers have auction participation requirements to maintain primary dealer status. Only Canada has a significant minimum participation requirement that must be fulfilled in each individual auction.

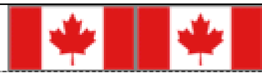
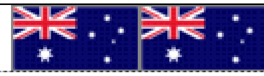
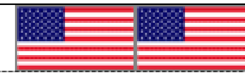
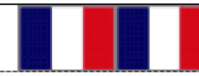
Non-competitive bidding also varies across sovereigns. In Canada, the US and France, non-competitive bids are intended to permit small bidders to achieve allocation at auction and are restricted to small quantities. However, in the UK, the role of non-competitive bids is to allow primary dealers a guaranteed supply, and they are permitted to buy up to 10 per cent of the auction non-competitively.

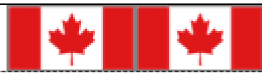
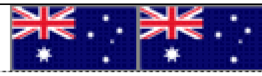
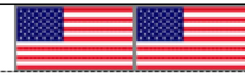
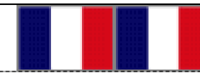
In some areas for which sovereigns differ, e.g., reporting requirements by bidders prior to auctions, Canada's requirements are in the middle ground compared to the others. In Canada, pre-auction position reporting is required and compliance certificates and spot checking are the enforcement mechanisms. It is possible that a more systematic checking of pre-auction reporting limits is desirable, rather than random spot checks, but it would be labour intensive and it is not clear that the current almost self-monitoring system is subject to violations. The threat of penalty appears to suffice.

The UK has found the use of mini tenders beneficial for matching supply and demand while still giving predictable information at most auctions. The mini tenders may also be useful for situations of potential short squeeze. The UK and France also have a post-auction option giving winning bidders the right to purchase additional securities. These may be worthy of consideration in Canada if concerns intensify about short squeezes or auction success in an environment of increased supply. Similarly, if auction coverage is a concern, a modest increase in the limits on competitive bids could be considered.

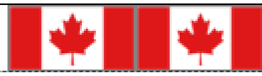
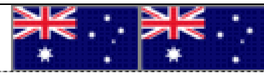
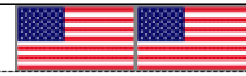
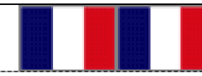
It is worth noting that aspects of the auction process differ across the sovereigns, contributing to the overall efficiency of the process. Modifying one or more aspects of the process should be evaluated in the context of the other aspects, since the various pieces work together as part of the broad process.

	Canada	Australia	United Kingdom	United States	France
Auction Features					
Issuing Authority	The Bank of Canada is the agent of the Department of Finance for the purpose of administering auctions.	Australian Office of Financial Management (AOFM) is an agent of the Australian government, and is part of the Treasury portfolio.	The Debt Management Office (DMO) is the agent of the Treasury. No involvement of the Bank of England.	Bureau of Public Debt is the branch of the US Treasury responsible for debt auctions. The Bureau of Public Debt issues calls for tenders and announces auction results. The Federal Reserve designates Primary Dealers and carries out certain activities associated with auctions.	Agence France Tresor (AFT) defines debt strategy and manages day to day market operations. AFT manages the auction process on behalf of the Ministry of Economy, Industry and Employment (as of 2001), and works in collaboration with the Ministry. Banque de France receives bids on behalf of the Treasury.
Auction Format	Bonds /Treasury Bills - Multiple price RRBs - Single price	Multiple price	Conventional Gilts/Bills– multiple price Index-linked Gilts – single price Syndication in special circumstances.	Single price	Multiple price Syndication in special circumstances.
Securities Auctioned (Type and term)					

					
Bonds/Notes	2, 5, 10, 30 year nominal [37]	Longest maturity is 12 years. 65 auctions in past 12 months, only 1 new issue, all others reopening maturing 1 to 12 years.	Conventional gilts – wide range of maturities, in 2009 – range from 3 to 40+ years with an average maturity of 15 years; maturities to be issued chosen in consultation with market participants	Bonds: 30 year Notes: 2, 3, 5, 7, 10 years	Bonds (OAT): 10, 15, 30, 50-year. Most are fixed rate, some floating rate pegged to 10-year maturity rate. Maturities and interest payments 25th of the month. Notes (BTAN): Negotiable fixed rate medium term notes with annual interest. 2 or 5 years. Maturity and interest payment 12th of the month.
Inflation-linked	30-year RRB	TIBs (Treasury Index Bonds) issuance ceased in 2003; New $4b issue maturing 2025 in Sep 2009 by syndication.	Index-Linked gilts range of maturities from 15 to 40+ years with an average maturity of 28 years; maturity is not according to any set schedule but chosen in consultation with market participants	TIPs 5, 10, 20 year	(OATi): as of 2001 linked to Euro inflation rate, previously French inflation. Long term.
Bills	3, 6, 12 month	Notes: Maturity of up to 1 year (i.e. bills)	1,3,6 month	4, 13, 26, 52 weeks	2, 3, 4, 6, 12 month
Auction Cycle and Timing					

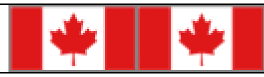
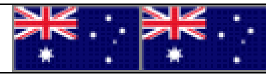
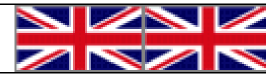
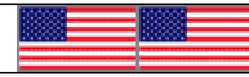
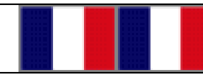
					
Bonds/Notes	2,3,5, 10 year - quarterly 30 year – semiannual Wednesdays June 1 and December 1 maturities Govt of Canada can at its discretion re-open and issue outside the timetable provided by the Quarterly Bond Schedule and the usual cycle for treasury bill issuance.	Bonds: Twice per week on Wednesdays and Fridays, mostly re-openings	Conventional gilts: Avoid dates with market moving data. 2-6 times per month on Tuesdays, Wednesdays or Thursdays, mostly re-openings, also includes mini-tenders to permit re-openings as required.	Notes: 2,3,5,7 year: 12 auctions per year per maturity 10 year: 4 auctions per year + 2 re-openings per issue Bonds: 30yr: four auctions per year + 1-3 re-openings per issue	Monthly. BTANs Third Thursday each month 11:50am. New 2 and 5 year every six months, subsequent monthly issues. 2-year BTANs may be increased via fungible auctions. OATs first Thursday of each month 10:50am
Inflation Linked	RRBs: quarterly	TIBs: New $4b issue maturing 2025 in Sep 2009 by syndication. First issue since 2003.	Index-Linked gilts: 1-2 times per month on Tuesdays, Wednesdays or Thursdays, mostly re-openings	TIPs: 5 year: one auction per year + one re-opening 10 year: two auctions per year + one re-opening 20 year: one auction per year + one re-opening	OATi s first Thursday of each month (same as BTAN) 10:50am

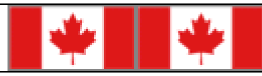
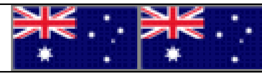
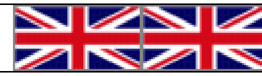
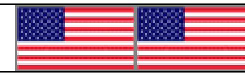
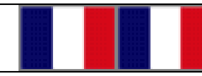
Bills	Biweekly.	Notes: Usually once per week, tenders on Thursdays	Weekly, usually Fridays	4,13,26 week maturity: weekly 52 week maturity: every 4 weeks	BTF - Mondays. 3 month maturities weekly. 6-month and 1-year bills as needed. 4 to 7 week maturities outside calendar as needed.
2009 Typical Auction Size, Total 2009					
Bonds/Notes	Bonds/Notes: approx C$3 billion + re-openings Target benchmarks 2, 3: C$7 to C$10 billion 5: C$9 to C$12 billion 10: C$10 to C$14 billion 30: C$12 to C$15 billion	Bonds: A$60 billion per year, each tender in the range of A$500 million to A$1 billion. Average approx A$600m.	Conventional gilts: recent average is £3 billion per offering (range from approx £1-5 billion), mostly re-openings Record issuance target 2009 - £146 billion	Bonds: US$10-15 billion Notes: 2,3,5,7 year: US$24-42 billion 10 year: US$20-23 billion	Total 30 auctions of BTANs and OATs + 1 syndication and 1 buyback 2008. OATs €370m to 2.2 billion. BTANs > €3 billion. 10- and 30-year approx €13 b. 2008 gross med- and long-term total €132.0bn, fixed-rate OATs €63.9bn, (BTAN€i, OATis and OAT€is) €15.5bn, BTANs €52.6bn (incl €0.8bn of BTAN with remaining maturity <1yr during 21 July 2008 BTF auction)

					
Inflation-linked	RRBs: approx C$500 million	TIBs: At least A$1 billion for new issue in 2009 maturing 20 Sep 2025	Index-linked gilts: Recent average is £1 billion (range up to £5 billion), mostly re-openings	TIPs: 5,10,20 year maturity - US$8 billion	OATi €370 million. BTFs: €317b in 52 auctions, average €1.5 billion to €4.2 billion.
Bills	Approx C$3 billion + re-openings, totalling approx C$15 billion	A$17 billion total expected for 2009-10	1 month - £1 billion 3 month - £1.5 billion 6 month - £1 billion	Average US$30 billion, range US$18-40 billion.	€1.5 to €4.3 billion
Fungibility	Yes	Yes. Most auctions are re-openings. 1 new issue every 9 months with varying maturities.	Yes. Most auctions are re-openings.	Yes. For bonds 7 years and shorter, generally no re-openings. Other bonds and TIPS, re-openings as described above.	Yes. Monthly re-opening of 2- and 5-year BTANs.
Do buybacks occur? If not, when did they?	Yes. Regular cash and switch bond buybacks to maintain liquid new bond issues. Coordinated with auction cycle. Regular cash management bond buybacks. None for inflation-linked.	None 2002 to Sep 2009. Sep 2009 buyback A$700 million (cash A$1.1 billion) of inflation indexed bonds (maturing August 2010) in exchange for new A$4 billion 2025 inflation indexed bond (resumed issuance since 2003) 1997-2002 buybacks of 5 to 7 year bonds to consolidate into fewer lines (budget surplus)	Buybacks and reverse auctions ceased in 2001 and were viewed as helpful for maintaining long issuance and liquidity when they were used.	March 2000 to April 2002.	Yes. First exchange of off-the-run bonds was December 2008. To smooth issuance cost between years (buy back securities maturing within 2 years) and to smooth yield curve and valuation of old off the run bonds.

		From the early 1990s to 2000-01 regular buybacks of short-dated nominal bonds (< 9 months to maturity) for cash management. Purchased from the Reserve Bank, which had acquired them in open market operations.			
Buyback timing and size relative to auction (when they did occur)	Call for tenders is one week prior to auction. Annual target 09/10 C$2.4 billion, lower than past years. Bonds in maturity bucket near auctioned bond, excluding building benchmarks, current and previous benchmarks and bonds >25 years. Bonds selected in consultation with market. Cash mgmt buybacks (bonds <18 months to maturity, >C$5 billion, not to be reduced	Bond buybacks from 10 per cent to 50 per cent of gross issuance 1997-2002. For short-dated buybacks, up to 70 per cent of the face value amount of the bond on issue. A typical bond line then roughly A$5 billion. No relationship to auction timing – purchased from Reserve Bank.		45 buyback operations; average US$1.5 billion spread over 10 bonds	In 2008, bought back €2.3 billion in OATs and BTANs maturing in 2009 in over-the-counter transactions and €1.1 billion maturing in 2032 as part of the first exchange of an old 30-year bond for a new one on December 4, 2008. Was in response to strong demand for 30-year OATs. Subject to minimum bid ratio for old for new securities. No impact on borrowing program.

	below C$3 billion) to reduce high levels of cash balances needed ahead of large bond maturities Tuesdays 11:15 after most biweekly treasury bill auctions.				
Initial Communication					
Communication from Policy Authority vs. Issuing Authority	Quarterly bond schedule announced by Bank of Canada on behalf of Ministry of Finance.	AOFM makes announcement.	DMO announces annual issuance calendar.	U.S. Department of the Treasury announces Quarterly Refunding Statement.	Calendar announced by AFT annually. Target 10 per cent OATi
Timing relative to auction date	Quarterly	Used to announce issuance program one year in advance; not now.	Annual issuance calendar – once a year – report dates and whether conventional or index-linked Quarterly announcements – which gilts will be issued -announcements are last business day of March, May, August and November at 15:30	Schedule of Treasury securities auctions is released at Treasury's Quarterly Refunding Press Conference (first Wed of Feb, May, Aug & Nov)	OATs: annual calendar BTANs: semi-annual calendar. August, Dec annual amount. May change date or remove auction. BTFs: quarterly calendar

					
Information announced	Term type, call for tender date, auction date, auction method, delivery date, amount maturing.	Broad indications of issuance intentions	For new issues, maturity but not coupon.	Details include maturity, expected announcement dates, auction dates, and settlement date.	May change dates after consulting with SVTs and announce for remainder of year.
Other comments	Quantities are not announced.			Quantities are not announced.	Quantities are not announced.

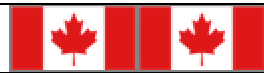
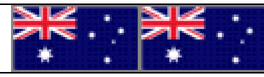
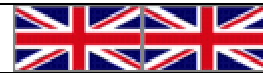
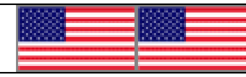
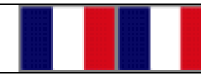
					
Call for Tenders					
Timing relative to auction date	Bonds: Week prior to auction at 3:30pm RRBs: Week prior to auction at 3:30pm Bills: Week prior to auction at 10:40am	Bonds: Noon on Friday of preceding week for tender on Wed and Fri Confirmed one day ahead TIBs: N/A Notes: Wednesday at 4pm for Thursday tender	gilts (conventional and index-linked): Tuesday of week preceding auction (auctions are Tues/Wed/Thurs) Bills: Call for tenders announced with results of tender of previous auction; auctions held weekly for 1/3/6 month bills	Notes/Bonds: 2-7 days ahead of auction TIPs: 5 year – approx 2 weeks in advance; 10 year – one week or less in advance; 20 year – one week or less in advance Bills: 4 week – announced Monday for Tuesday auction 13/26 week – announced Thursday for Monday auction 52 week – announced Thursday for Tuesday auction	Friday preceding auction for OATs, BTANs and inflation linked (i.e. 4 days prior to auction), BTFs: two business days prior to auction
Auction information announced	Quantity is announced Maturity Date	Bonds: -details of bond lines and amounts -coupons are pre-determined and set one business day before auction; this	Quantity is announced	Quantity is announced	BTANs and OATs: List of lines to be issued, range of possible total amounts to be issued, auction and settlement dates.

		info is sent out in final announcement TIBs: N/A Notes: details of tenors and amounts to be offered			BTFs: exact amount of the lines to be issued, in accordance with the quarterly calendar
Other information announced		System sends out announcement to registered bidders		Supplementary details such as amount of maturing debt	
When-Issued /Secondary Market (Bonds, ILBs and Treasury bills)	Yes for nominal bonds and Treasury bills	No WI market for new issues Bond futures market is important for pre-auction price discovery	Gilts can trade WI 7 days prior to auction for new issues Small amount of WI trading Secondary market for reopening	For new issues, WI market starts with announcement WI is very active but not monitored or regulated by Treasury For reopening, very active secondary market exists	OATs: "gray market" 2 to 5 days prior to monthly auctions until settlement. Value date is the auction settlement date, with accrued calculated to that date BTFs WI market same rules as secondary.
Participation					
Central Bank (add-on vs. in the auction)	Yes, without restriction. Not as add on.	Reserve Bank of Australia is the only government participant and the only one who can submit non-competitive bids. This	None	Fed can acquire or replace securities that are maturing up to that amount and no more. Can acquire on behalf of foreign central banks on a	None

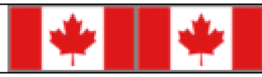
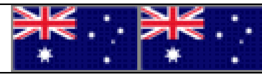
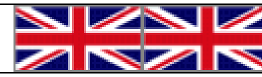
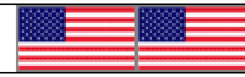
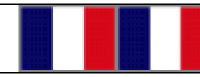
		is done irregularly and currently only for new issues (e.g. A$50 million of new 11-year in April 2009 was the only purchase since October 2008). Participation and amounts is pre-announced. Interviewee felt this was unimportant since the amount is small.		non-competitive basis, but rare now. For its own account, is an add-on so does not affect the auction.	
Primary Dealers	12 primary dealers for bonds. 10 for treasury bills. Significant participation in primary and secondary market for Government of Canada securities.	Registered bidders are only possible bidders. Currently 16.	15 GEMMs (Gilt edged market maker)	18 Primary Dealers designated by the Fed	Currently 18: 4 French institutions and 14 non-resident. Primary Dealers (SVTs) selected by Minister in charge of Economy on recommendation of Chairman of AFT and selection committee. SVT charter (revised June 2006) governs relationship with Primary Dealers valid for 3 year term.
Other Dealers	Other Government Securities Distributors 5.	None	Through GEMMs	Broad participation of dealers	Any institution affiliated to Euroclear France and holding an account with Banque

					de France.
Customers	Through government securities distributor.	Participate in secondary market. Registered bidders are transacting as principal, not brokers or agents. In practice registered bidders do lodge bids that are their customers', but the registered bidder is fully responsible for the bid.	Through GEMMs	Bidding is open to everyone but must be submitted through a broker dealer registered with SEC or depository institution. Also a non-competitive basis through BPD's Treasury Direct System.	Rarely participate. If so, through a dealer.
Pre or Post Auction position reporting					
Requirement by bidder type	All bidders (including customers with bidder identification numbers) must report net position pre-auction, including derivatives and repo.	None	Required reporting by GEMMs for gilts; no requirement for bills.	Any bidder who exceeds 35 per cent limit (of issue) must report.	No pre auction requirement. Any institution obtaining >40 per cent of issued volume (excluding non-competitive bids) must inform AFT.
Level of detail required	Net position is aggregate of security being offered and derivatives.	None	GEMMs must report all trades in week between auction announcement and auction as well as net position pre-auction.	Position reporting – must notify if exceeds 35 per cent limit.	SVTs disclose the identity of main clients or their rationale if the SVT intends to retain a "material fraction" of the obtained volume at auction.

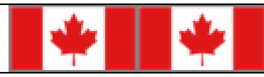
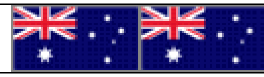
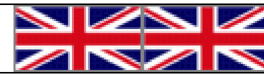
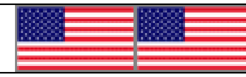
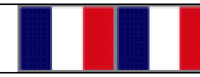
Bidding Requirements					
Non-competitive bids (NCB)	Allowed: See below for limits. Govt securities distributors can submit competitive and non-competitive.	Can only be submitted by Central Bank. Infrequent and only to hold stock of a new bond line.	DMO sets aside 10 per cent of issue for non-competitive bids by GEMMS. DMO's approved group of investors (retail) also may submit non-competitive bids.	A bidder cannot bid both competitively and non-competitively. Primary Dealers are not allowed to bid non-competitively.	Primary Dealers only. Right to submit NCBs may be withdrawn if fail to participate in an auction.
Primary Dealers	Must submit bids for at least 50 per cent of auction limit or calculated value, whichever is less, within 10 bps of cut-off. Over time, must submit accepted bids proportional to secondary market share. Must satisfy all requirements of other dealers below, and: Designated as Primary	Bidding is confined to the 15-16 registered bidders who have signed agreements with Treasury. There are no other participants A$1 million, increments of A$1 million. No other requirements of dealers.	During auction, GEMMs must achieve rolling allocations commensurate with secondary market share and minimum of 2.5 per cent GEMMs must -make secondary market -provide information to DMO about market conditions, positions and turnover, and provide quotes Privileges: -only ones who can bid directly	Federal Reserve sets minimum standards in a variety of areas. Guidelines are intentionally vague (benchmarks rather than absolute levels). Expected to "participate meaningfully", submit auction bids approx commensurate with the dealer's capacity. Should average 1 per cent of market making activity with customers, excluding	No minimum bidding requirements, but SVTs ranked by detailed criteria measuring primary market share, secondary market share weighted by maturity (including repo and strips) and qualitative factors re relationship with AFT. Ranking is used to select syndicate for some issues. Must "materially" participate in every

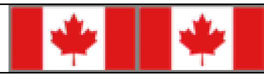
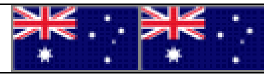
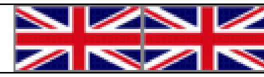
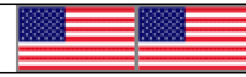
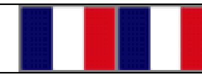
					
	Dealer when its bidding limit reaches 10 per cent based on primary and secondary market shares (if drops below, have 6 months to recover) and has resources and desire to be market-maker.		-only ones who can bid non-competitively -invitation to quarterly consultation meeting with DMO regarding gilts to be scheduled for auction in following quarter	inter-dealer activity. Expected to make markets in govt securities; facilitate the Fed's open market operations; provide Fed with information to assist the Fed in performing its duties.	auction: minimum 12-month rolling average 2 per cent of competitive allotments, average across BTANs, OATs and BTF at least 2.5 per cent.[1]
Other dealers	For all government securities distributors Must not bid in concert with others. Must have "adequate" domestic fixed income trading past 6 months resident in Canada. Must submit weekly reports on trading activities.	Not applicable	No requirements, bid through GEMMs	None	None
Customers	None	Not applicable	No requirements, bid through GEMMs	None	None
Bid Submission					

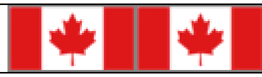
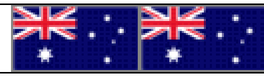
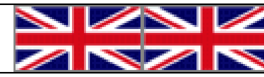
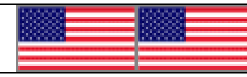
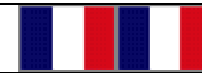
[1] In France, the Primary dealers' status is viewed as a cross-subsidy in multi-pronged commercial relationship with the State which includes IPOs of state-owned firms or securitisation and as signal to end-investors that primary dealers has good information on market flows.

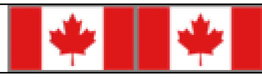
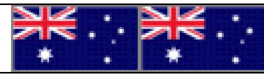
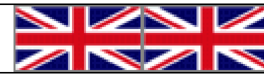
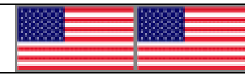
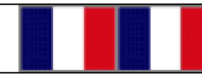
					
Timing for competitive bids	Bonds/RRBs: 12:00 on day of auction Bills: 10:30am on day of auction	15 minute window from 10:15 to 10:30 can change or withdraw bids within window	by 10:30am for gilts and 11:00am for bills	competitive bids by 13:00 (usually)	10 minutes before deadline
Timing for non-competitive bids	Bonds/RRBs: 12:00 on day of auction Bills: 10:30am on day of auction	not applicable	by 10:30am for gilts; no non-competitive bids for bills (or mini-tenders)	non-competitive bids by 12:00 (usually)	
Type of system	Proprietary system (CARS)	Changed from Bloomberg to internet-based in March 2009	Bloomberg (since 2007) for gilts; Telephone system for bills (moving to electronic system later in 2009)	Proprietary system (TAAPS)	Regular bidders use TELSAT. Occasional bidders use SWIFT. Submitted to Banque de France.
How are bids submitted (price/yield, multiple bid, grid)	Yields to 3 decimal places. Up to seven bids.	Yields to 2 decimal places for notes and 3 decimal places (multiples of ½ bp) for bonds.	Price basis for gilts one penny per £100 (i.e. 2 decimal places); yield basis to 3 decimal places for bills.	On a yield basis; 3 decimal places for notes and bonds; 3 decimal places for bills (multiples of ½ bp).	OATs and BTANS: Excluding accrued interest price as percentage of par with two decimals. BTF: money market straight line yield include accrued interest to 3 decimals (ticks of .5c)
Reservation Price	None	None	None	None	None

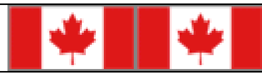
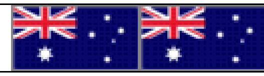
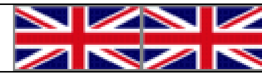
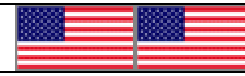
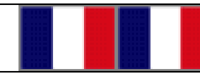
Limits	**Competitive:** Bonds: -Primary Dealers: 10-25 per cent for own account (net of long position). 40 per cent total for own account + customers -Other distributors: 0 to 9 per cent (10 per cent for customers) -Customers: 25 per cent Treasury bills: Primary dealers: 25 per cent for own account (net of long position) and 25 per cent for customers with total of 40 per cent for own + customer. Other Government Securities Distributors: 0 or 10 per cent for own (net of long position); 10 per cent for customers. **Non-competitive:** -Government Securities Distributors own account maximum C$3M. -Customers - C$5M (C$3M for RRBs). -Sum of customers (per government securities distributor) C$3M for RRB and C$10M for nominal bonds and treasury bills.	No maximum on bidding. A$1 million, increments of A$1 million A$2 billion limit on any single bid.	Maximum 25 per cent of issue, net long allocation, for conventional gilts 40 per cent for index-linked gilts No limit for bills	Maximum bid/position is 35 per cent of offering	Maximum: BTAN and fixed rate OAT: €600 million Floating rate OAT: €300 million BTF: €1 billion (does not apply to cash management issues)

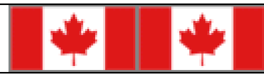
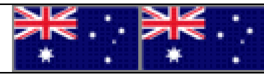
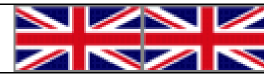
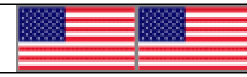
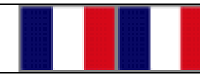
					
Government Right to Reject Bids	Yes Minister of Finance reserves the right to accept or reject any or all bids, in whole or in part, including without limitation the right to accept less than the total amount specified in the final call for tenders.	Yes; no bids have been rejected.	Yes The DMO may, at its own discretion, decline to allot some or all of the stock bid for to an individual institution, particularly if it is deemed likely that a large allocation may lead to post-auction market distortion.	Yes; no bids have been rejected.	Yes. To keep the issued amount within the announced range, Agency France Trésor reserves the right to scale down bids at the lowest accepted price (OATs and BTANs) or rate (BTFs) on a pro rata basis.
Auction Results					
Timing of release relative to auction	Within 5 minutes, usually 2 minutes	Within seconds - more or less automatic	Gilts: within 20 minutes; aim for 10 minutes; typical is 6-8 minutes Bills: target 20 minutes and look to publish within 15 minutes	Released in 2 minutes (+/- 30 seconds)	Within 5 minutes
Bid cover	Yes	Yes. Australia also examines the weighted average yield of all bids, including un-allotted, compared to the weighted average of winning bids. When	Yes. UK had failed auctions in March 2009 (.93 cover for £1.75 billion 40-year gilt), Sep 2002 (Bid/cover .95 for £900 million 30-year gilt) and 1999 on £500	Yes	Yes

					
		these values are close, the coverage ratio is more meaningful.	million 30-year auction.		
Max/min/average /median of winning bids (multiple price reports average, single price reports median)	Yes	Yes	Yes for bills No – only cutoff bid for gilts	Yes	Yes
Post-auction option to purchase additional securities	None	None	As of June 2009, any winning bidder has right to purchase 10 per cent of bonds at published average price. Open 12 to 2pm. Bidders exercise when in the money. GEMM can use customer allotment. Adds to outstanding amount of issue. No option if auction not covered.	None	Post auction option available over 2 days.
Other comments	Bank of Canada purchases are announced as part of auction results.	Public announcement is more limited than what bidder sees.	Competitive and non-competitive auction allocations are not distinguished in Press Notice with gilt auction results.	Bidders receive no more information than public. Fed purchases are part of auction results.	Auction grid – volume and quantity, marginal price/rate. Percent allocation at limit price.

					
					Amount issued is announced within specified range. Published through TELSAT and news services.
Time to Settlement	T+3 for most bonds and RRBs T+2 for 2-year bonds and bills	Bonds: T+3 TIBs: N/A Notes: T+1	T+1 for gilts and bills	Notes/Bonds/TIPs: settlement varies from T+1 to T+6. Settlement (issue) is on a particular day of the month, so settlement time depends on auction date relative to issue date. Bills: 13/26 week: T+3 4/52 week: T+2	T+3 for all auctions (vs. T+1 secondary for BTANs)
Settlement Procedure	CDSX	Austraclear system	CREST	FICC	Euroclear France’s Relit Grande Vitesse (RGV) system.
Settlement Risk	none perceived	none perceived	none perceived	none perceived	none perceived

					
Aftermath / Error checking	System rejects bids that are beyond plausibility range.	AOFM can view bids and chat with dealers in real time. 1/2 bp + increments of A$1 million – system will not accept bids that do not match these parameters Plausibility limits – 10 bp range with warning message issued. No longer do double check beyond system.	Bidder can contact DMO if notice bid input error.	Computer will catch some errors. If bid appears out of line, supervisor contacts bidder before close.	Settlement managed by Treasury Central Accounting Agency (ACCT).

					
Monitoring and consultation					
Frequency of formal consultation	Annual with dealers and customers. Topics vary, and include feedback on issue size, frequency, liquidity. Report published based on consultations.	None.	Quarterly with GEMMs includes discussion of maturity of gilts to be auctioned	Quarterly consultation with market participants, including questionnaires to all Primary Dealers, interviews with half of the Primary Dealers, and discussions with an advisory committee of representatives of firms that trade and invest in Treasury securities. Questionnaire asks for estimates of the government's borrowing needs and estimates of future issue sizes; seeks suggestions on maturity structure for conventional and index-linked securities; and asks about current market conditions and impact on related markets.	Annual. Weekly prior to each BTF auction, teleconf or meeting. Weeks preceding each BTAN and OAT auction, in person meeting at AFT, or exceptionally teleconference. Semi-annual meeting of SVTs (sales, trading, origination) to assess market developments. May include investors and Ministry or Banque de France. SVTs must share research with AFT. AFT informs SVTs of topics that require specific support. SVT MUST have economist based in Paris who regularly visits AFT.
Informal consultation	Ongoing. Regular calls with primary dealers	Ongoing informal dialogue with market		Continuous communication with	"Close continuing relationship".

					
	and customers prior to each auction.	participants. Typically speak to each dealer that submits bids in auctions at least once a week. This dialogue assists the AOMF in deciding which securities to issue the following week.		major participants ”Frequent, ongoing and efficient – market knows what to expect”. Predictability is important.	Presence in France is important (must have a branch in France if not an investment service provider in France). SVTs are expected to keep AFT informed of decisions concerning multilateral trading systems in which they participate. SVTs contribute daily to informing AFT of market developments, trading volume, and when relevant, nature of customers and their own positions.
Other comments	Periodic external reviews.			Solicitation of comment when rule changes are proposed.	Regular opinion surveys jointly by AFT and SVTs with investors. Strategic committee of AFT meets twice per year.

Appendix B - Literature Review Summary

For a summary and discussion of recent changes to the auction process in the U.S. see Garbade and Ingber (2005), but they do not delve into the academic rationales or evidence for the changes.

For reviews of the general auction theory literature, we guide the reader to Klemperer (1999), and Wolfstetter (1996). Some of the key papers in auction theory are collected in Klemperer (2000). For more recent surveys that include applications, see Milgrom (2004) and Klemperer (2002). We caution that the reader should focus on theories of common value (or affiliated value) auctions which are appropriate for modeling goods with resale markets, such as treasury securities, rather than the more ubiquitous models of private-value auctions which are inappropriate in the context of marketable securities. The seminal paper on the theory of affiliated value auctions is Milgrom and Weber (1982). A good and intuitive starting point is Milgrom (1989).

The theoretical auction literature addresses the conditions under which auctions are most appropriate. Milgrom (2004) argues that auctions are appropriate for homogenous securities. Similarly, Habib and Ziegler (2007) develop a theory that shows that auctions are better than a posted price when there is little information to be gathered. This would be the case for treasuries, especially in the presence of a WI market which publicly reveals much of the price relevant information. In Bulow and Klemperer (1996) it is shown that auctions are usually better than negotiations (which could be taken as a model for syndication), and in those cases in which negotiations are superior, it is only by a small amount. In our interviews, Rocholl reported that in Germany auctions appear to be revenue superior to syndication. Nyborg stressed the importance of distribution and suggested that an auction could be optimal in the presence of numerous bidders and an active secondary market.

Recent literature models the auction participants as being asymmetric. Armantier and Sbai (2006) estimate such a model using French data, and show that there are significant asymmetries. Therefore, they argue that a first-price auction would be revenue superior in France. In a related paper, Armantier and Lafhel (2009) show that there are few such asymmetries in Canadian treasury auctions, and thus recommend a continuation of the multiple-price format.

One theme that repeats throughout the theoretical literature is that auction revenue increases when more value relevant information is publicly revealed in advance or in the auction itself. This is an important justification for the WI market which gives bidders a very close estimate of the secondary market value of the security at the time they bid. The importance of information revelation is central to Milgrom and Weber's (1982) model of affiliated value auctions. ("Affiliation" means that if one bidder has a higher value of the good, then the other bidders are likely to also have higher values. It is reasonable to assume that this property holds for treasury auctions.) As a result, auction prices are higher when the winning bid incorporates more information from other bids. Milgrom and Weber refer to this as the "Linkage Principle". A similar concept is the "Publicity Effect" in Milgrom (2004). The public revelation of information prior to the auction also reduces the incentives of participants to make (possibly wasteful) investments in information acquisition. This argument was first put forward by Friedman (1960) and developed by Chari and Weber (1992). Thus, information revelation (again, most notably through the WI market) would improve the auction outcome. Empirically, Berg, Boukai, and Landsberger (1998) use a logistic model show that WI trading affects the auction outcome regardless of the auction format.

In an analysis of Swedish treasury auctions, Nyborg, Rydqvist, and Sundaresan (2002) show that the bids (including the bid prices, the dispersion of bids, and the quantities) are affected by uncertainty at the time of the auction. This suggests that volatility in the WI market or any other source of uncertainty would have a detrimental effect on the auction. Similarly, Goldreich (2007) finds that a wider dispersion of bids leads to more underpricing in U.S. treasury auctions.

In an empirical examination of dealers' positions around the time of auctions, Fleming and Rosenberg (2007) find that dealers leave much of their auction position unhedged. This suggests that volatile market conditions could increase risk to dealers and would thus be detrimental to the auction.

Literature Review References

Armantier, O. and N. Lafhel, 2009, Comparison of auction formats in Canadian government auctions, working paper, Bank of Canada.

Armantier, O. and E. Sbai, 2006, Estimation and comparison of treasury auction formats when bidders are asymmetric, *Journal of Applied Econometrics* 21, pp. 745-779.

Back, K. and J.F. Zender, 1993, Auctions of divisible goods: on the rationale for the Treasury experiment. *Review of Financial Studies* 6, pp. 733–764.

Bartolini, L. and C. Cottarelli, 1997a, Designing effective auctions for treasury securities, *Current Issues in Economics and Finance,* Federal Reserve Bank of New York, *3(9).*

Bartolini, L. and C. Cottarelli, 1997b, Bartolini, Leonardo and Carlo Cottarelli, Treasury Bill Auctions: Issues and Uses, in Mario I. Blejer and Teresa Ter-Minassian, eds., Macroeconomic Dimensions of Public Finance: Essays in Honour of Vito Tanzi, London: Routledge, 1997, pp. 267-336.

Berg, S.A., Boukai, B., Landsberger, M., 1998. Bidding for treasury securities under different auction rules: the Norwegian experience. Working paper, Haifa University.

Bikhchandani, S., P. Edspar, and C Huang, 2000, The Treasury Bill Auction and the When-Issued Market: Some Evidence, Working Paper, MIT.

Bulow, J. and P. Klemperer, 1996, Auctions versus Negotiations, *American Economic Review,* 86, 180-194.

Cammack, E., 1991, Evidence on Bidding Strategies and the Information in Treasury Bill Auctions, *Journal of Political Economy*, 99(1), February, 100-130.

Chari, V., and R. Weber, 1992, How the U.S. Treasury Should Auction its Debt *Quarterly Reviews*, Federal Reserve Bank of Minneapolis.

Fleming, M., 1997, The Round-the-Clock Market for U.S. Treasury Securities. *Federal Reserve Bank of New York Economic Policy Review*, 3, pp. 9-32.

Fleming, M., 2002, Are larger treasury issues more liquid? Evidence from bill reopenings, *Journal of Money Credit and Banking* 34, pp. 707-735.

Fleming, M., 2007, Who buys treasury securities at auction? *Current Issues in Economics and Finance* 13, pp. 1-7.

Fleming, M. and J. Rosenberg, 2007, How do treasury dealers manage their positions? Working paper, Federal Reserve Bank of New York.

Friedman, M., 1960, *A Program for Monetary Stability,* New York: Fordham University Press.

Garbade, K., and J. Ingber, 2005, The Treasury Auction Process: Objectives, Structure, and Recent Adaptations *Federal Reserve Bank of New York: Current Issues in Economics and Finance*, 11, pp. 1-11.

Gordy, M., 1999, Hedging Winner's Curse with Multiple Bids: Evidence from the Portuguese Treasury Bill Auction, *Review of Economics and Statistics,* 448-465.

Goldreich D, 2007 Underpricing in Discriminatory and Uniform-Price Treasury Auctions, *Journal of Financial and Quantitative Analysis* Vol. 42, No. 2, June, 443-466.

Goldreich, D., B. Hanke, and P. Nath, 2007, The Price of Future Liquidity: Time-Varying Liquidity in the US Treasury Market *Review of Finance,* 9, pp 1-32.

Goswami, G., T. Noe and M. Rebello 1996, Collusion in Uniform-Price Auctions: Experimental Evidence and Implications for Treasury Auctions, *Review of Financial Studies,* 9, 757-785.

Habib, M. and A. Ziegler, 2007, Why Government Bonds are Sold by Auctions and Corporate Bonds by Posted Price, *Journal of Financial Intermediation* 16, pp. 343-367.

Hortacsu, A., and S. Sareen, 2005. Order Flow and the Formation of Dealer Bids: Information Flows and Strategic Behavior in the Government of Canada Securities Auctions. NBER Working Paper.

Jaganathan, R., and A. Sherman, 2006, Why Do IPO Auctions Fail? working paper, Northwestern University.

Jegadeesh, N., 1993, Treasury Auction Bids and the Salomon Squeeze, *The Journal of Finance*, Vol. 48, No. 4, pp. 1403-1419.

Klemperer, P., 1999, Auction Theory: A Guide to the Literature, *Journal of Economic Literature,* 13, pp. 227-286.

Klemperer, P., 2000, *The Economic Theory of Auctions,* Cheltenham, UK: Edward Elgar.

Klemperer, P., 2002, What Really Matters in Auction Design, *Journal of Economic Perspectives,* 16, pp 169-189.

Lengwiler, Y. 1998, The multiple unit auction with variable supply, Working Paper, Federal Reserve Board of Governors.

Lu, D., and J. Yang, 2003, Auction Participation and Market Uncertainty: Evidence from Canadian Treasury Auctions, working paper, Industry Canada and Bank of Canada.

McAfee, RP and J McMillan, 1987, Auctions and Bidding, *Journal of Economic Literature*, Vol. XXV, pp. 699-738.

Merrick J., N. Naik, and P. Yadav, 2005, Strategic trading behavior and price distortion in a manipulated market: anatomy of a squeeze, *Journal of Financial Economics*, 77, pp 171-208.

Milgrom, P. 1989, Auctions and Bidding: A Primer, *The Journal of Economic Perspectives*, Vol. 3, No. 3, pp. 3-22

Milgrom, P., 2004, *Putting Auction Theory to Work*. Cambridge University Press.

Milgrom, P. and R. Weber, 1982. A Theory of Auctions and Competitive Bidding. *Econometrica* 50: 1089–1122.

Nyborg, K., K. Rydqvist, and S. Sundaresan, 2002, Bidder behavior in multiunit auctions – Evidence from Swedish treasury auctions, *Journal of Political Economy* 110, 394-424.

Nyborg, K., and S. Sundaresan, 1996, Discriminatory versus Uniform Treasury Auctions: Evidence from When-Issued Transactions, *Journal of Financial Economics,* Vol. 42.

Pesendorfer W. and J. Swinkels, 1997, The Loser's Curse and Information Aggregation in Common Value Auctions *Econometrica,* 65, pp. 1247-1281.

Rocholl J., 2005, Discriminatory Auctions in which the Seller has Discretion, Working Paper, European School of Management and Technology.

Simon, D., 1994, Markups, Quantity Risk, and Bidding Strategies at Treasury Coupon Auctions, *Journal of Financial Economics*, 35, 43-62.

Tenorio R., 1993, Revenue Equivalence and Bidding Behavior in a Multi-Unit Auction Market: An Empirical Analysis, *Review of Economics and Statistics*, 75, 312-314.

Weber, R., 1983, Multiple Object Auctions In *Auctions Bidding and Contracting: Uses and Theory,* R. Englebrecht-Wiggans, M. Shubick, and R. Stark, eds. New York, NYU Press.

Wilson, R., 1979, Auctions of Shares. *Quarterly Journal of Economics* 93, pp. 675–698.

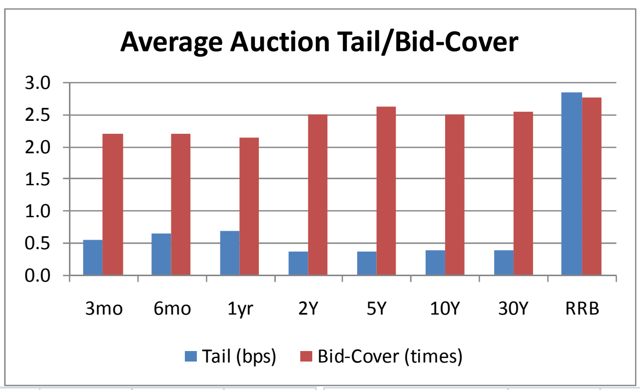
Wolfstetter, E., 1996, Auctions: an Introduction, *Journal of Economic Surveys*, 10, pp. 367-420.

Zheng, Charles Z., 2001, High Bids and Broke Winners, *Journal of Economic Theory*, vol. 100(1), pages 129-171.

Appendix C - Data and Market Analysis Summary

One focal point for this evaluation is the 'effectiveness' of auctions. One measure of auction effectiveness is the auction Tail (for multiple-price auctions, the difference between the highest accepted yield and the average yield of the auction). Tail is generally below 1 basis point for most products covered in this report, reflecting the relatively high liquidity of Government of Canada debt obligations and indicating an overall high level of effectiveness of these auctions. However, during unstable markets the tail for nominal bonds or treasury bill auctions can increase significantly above 1 basis point. We calculated a 'tail' for real-return bond auctions, which are single-price auctions, using the same methodology as for multiple-price auctions. Due to the behaviour of bidders in a single-price auction, this tail calculation will naturally be higher because bidders will bid aggressively to have their order filled knowing that they will only have to pay the cut-off yield of the auction.

A second measure of auction effectiveness, the Bid-Cover ratio, defined as the ratio of total bids submitted to auction size, is usually over two times for all auctions as seen in the chart below on the right. In addition, in some sections of this report, we calculate an adjusted bid-cover ratio which is defined as the ratio of total bids, less the Bank of Canada allotment, to total auction size.



Tail (bps)					Bid-Cover (times)				
	Avg	Std Dev	Min	Max		Avg	Std Dev	Min	Max
3mo	0.6	0.5	0.1	4.1	3mo	2.2	0.2	1.8	2.6
6mo	0.6	0.4	0.2	3.1	6mo	2.2	0.2	1.8	2.7
1yr	0.7	0.4	0.2	2.1	1yr	2.1	0.2	1.6	2.6
2Y	0.4	0.2	0.1	0.8	2Y	2.5	0.1	2.3	2.7
5Y	0.4	0.2	0.0	0.7	5Y	2.6	0.1	2.4	3.0
10Y	0.4	0.2	0.1	0.7	10Y	2.5	0.1	2.2	2.8
30Y	0.4	0.2	0.1	0.7	30Y	2.5	0.2	2.3	2.7
RRB	2.8	1.0	1.4	5.6	RRB	2.8	0.3	2.2	3.3

Financial market conditions varied significantly over the data period. The period begins in 2003 the last time credit spreads were wide and ends in 2008 well after the current credit crisis began in mid 2007. We measure financial market conditions using the following three factors and examine their effect on the auction Tail and Bid-Cover ratio jointly. Individual effects were also analysed but the evidence does not alter any conclusions drawn from the analysis of joint effects.

Bond yield volatility:

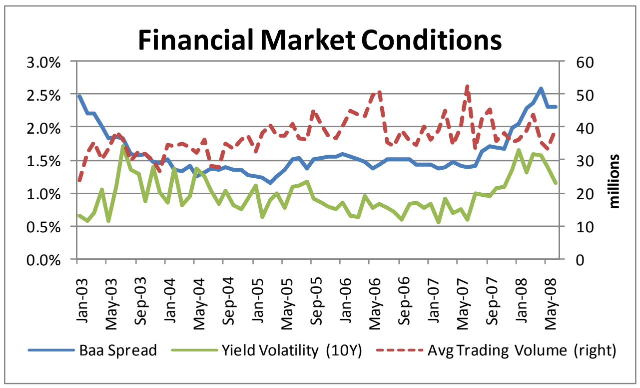
- specific to the term of each auction, measured by the standard deviation of the per cent change in the yield in the previous 20 days
- tends to decline with term-to-maturity of the bond (this is due to higher duration risk with longer term-to-maturity bonds) and increases with term-to-maturity of treasury bill

Credit conditions:

- measured by the Baa Credit Spread

Liquidity:

- measured by the monthly trading volume (billions of dollars, except RRBs in millions)
- tends to decline with the term to maturity of the bond or treasury bill, RRBs have the lowest liquidity



Summary statistics for the measures of financial market conditions are listed in the tables below. Yield volatility was calculated for each corresponding point on the yield curve. While yield volatility increases with the term-to-maturity of treasury bills, it decreases with the term-to-maturity of bonds. This is due to the higher duration risk associated with longer term bonds, i.e. price volatility increases with maturity but yield volatility decreases. As mentioned previously, liquidity is measured as the average monthly trading volume of various instruments. Due to data limitations, total volume is combined for treasury bills since it is not reported separately by term. The table below shows that the liquidity of 30-year nominal bonds and RRBs is relatively lower than other instruments. Their longer term-to-maturity and higher duration risk means they experience a greater price change for a given change in yield. Finally, the Baa spread is not distinguished by term in this analysis since credit conditions reflect an overall market variable. Other measures of volatility and credit conditions could be used, but we suspect that results will not differ significantly for other measures. There is generally little statistical evidence of the impact of market conditions on auction characteristics.

Yield Volatility				
	Avg	Std Dev	Min	Max
3mo	0.7%	0.4%	0.1%	3.2%
6mo	0.9%	0.5%	0.2%	2.5%
1yr	1.2%	0.6%	0.3%	2.8%
2Y	1.5%	0.6%	0.5%	2.5%
5Y	1.2%	0.4%	0.5%	2.0%
10Y	0.9%	0.3%	0.5%	1.5%
30Y	0.8%	0.2%	0.6%	1.1%
RRB	0.7%	0.1%	0.5%	1.0%

Liquidity ($ billions)				
	Avg	Std Dev	Min	Max
3mo/6mo/1yr	24.0	3.9	16.8	33.4
2Y	38.0	6.3	26.9	49.7
5Y	51.8	12.1	35.1	83.0
10Y	50.2	9.2	35.1	69.0
30Y	10.4	1.7	7.9	13.0
RRB	0.5	0.1	0.3	0.7
Baa Spread				
All	1.5%	0.2%	1.1%	2.6%

Customer participation in debt auctions depends on the product area and term. Customers tend to participate more in RRB auctions, treasury bill auctions and 30-year nominal bond auctions. As a result, over this period, average customer allotment for RRBs is over 40 per cent, treasury bills vary between 5-10 per cent depending on term, and 7 per cent of 30-year nominal bonds are allotted to customers.

The data suggest that the buyback program does not impact auction effectiveness for 2 and 5 year auctions. For 10-year auctions, larger buybacks are associated with wider tails for switch buybacks, but there is no other evidence of an impact on effectiveness for 10-year auctions. For the impact on Bid Cover, the only statistically significant relationship was for the 30-year bond auctions with buybacks on a cash basis. The relationship has an R^2 of 40 per cent and the coefficient is negative suggesting that Bid-Cover declines (effectiveness decreases) as buyback amounts increase.

For the impact on auction Tail, the relationships vary in significance with R^2 from 0 per cent to 37 per cent and all the coefficients are positive, providing weak evidence that as buyback amounts increase, the Tail increases (effectiveness decreases). Note that the buybacks are intended to increase auction size and liquidity of the auctioned bonds, which might be expected to contribute to *more* effective auctions.

The Bank of Canada participates up to 15 per cent in nominal bond auctions and 25 per cent in treasury bill auctions. The general evidence is that the Bank of Canada's participation does not impact auction effectiveness for any of the types of auction securities.

For nominal bonds, the multiple-regressions below suggest that the three factors jointly impact nominal bond auction effectiveness for maturities up to 10 years (R^2 in the range of 25 per cent to 43 per cent). Most individual coefficients have marginal statistical significance in the multiple regression but individual regression results in Appendix C offer further supportive evidence.

There is little evidence that RRB auction effectiveness is influenced by changes in financial market conditions.

Multiple regressions for treasury bills support the conclusion that higher volatility, wider credit spreads, and lower liquidity are related to wider auction Tails, i.e. less effective auctions. The coefficients are statistically significant and consistent across all three maturities of treasury bill auctions, although the impact of credit spreads is somewhat weaker for 3-month treasury bills. The effect of the financial market condition factors on Bid-Cover is greatest for the 1-year treasury bill auction. Higher Yield Vol is associated with lower Bid-Cover for treasury bill auctions (in particular the 1-year treasury bill auction). Wider Baa spread increases Bid-Cover, likely reflecting a flight-to-quality phenomenon, i.e. as credit conditions worsen, market participants bid more aggressively for high quality liquid assets such as treasury bills (this is consistent with the evidence for short term bonds). Finally, the negative relationship between Bid-Cover and Liquidity suggests that when liquidity is high there is confidence in the secondary market, and thus little incentive to bid aggressively at auction.

Overall, treasury bill and nominal bond auction Tails ranged from 0.1 to 4.1 bps and 0.1 to 0.8 bps, respectively. Bid-Cover ratios for most treasury bill and nominal bond auctions are between 1.8 and 3.0. Under normal market conditions prior to March 2007 treasury bills have slightly wider Tails and lower Bid-Cover than nominal bonds. The Tails and Bid-Cover are also more variable for treasury bills than for nominal bonds. This same general pattern is also observed after March 2007 with the Tail and Bid-Cover for treasury bills increasing significantly (see p-values in table) from the period prior to March 2007. There is a significant increase in Tail for treasury bills after March 2007. For example, average tail for 3-month treasury bills increased from .4 to .9 bps, suggesting that the auctions were less effective in the later period. However, Bid-Cover was higher for treasury bills after March 2007, so tails were wider during that period, the auctions were effective in terms of covering the auction size.

For 2-year and 5-year auctions, in aggregate and individually, primary dealers generally have net long positions prior to auctions where the bond is a reopening of an existing issue and have neutral or net short positions prior to auctions where the bond is a new issue. While this general pattern is observed for 2- and 5-year auctions, it is not for 10- and 30-year auctions for which they tend to maintain net short positions for reopening as well as new issues. This may reflect the higher duration risk and relatively lower liquidity associated with longer term bonds, particularly for new issues, and the desire by dealers not to be long when auction supply is anticipated.

Dealers appear to position themselves for RRB auctions in a similar fashion as for 30-year nominal bonds, i.e. they tend to be short or neutral but more recently have shifted to being slightly long which has also coincided with an increase in auction size. The dealer net position in RRBs does not appear to be related to changes in real yields.

We measure dealer Willingness to Bid as the percentage (of total auction size) of dealer bid amounts with bid yield less than the auction average yield. We find no significant relationships between this Willingness to Bid and Yield Volatility, Baa credit spread and Auction Size for any securities. For RRBs, dealer willingness to bid is positively related to auction size but must be carefully interpreted.

Customer participation, which ranges from 0 to 8 per cent of nominal bond auctions, has little impact on auction effectiveness for 2- 10- and 30-year auctions. The effectiveness of 5-year auctions seems to be impacted favourably by customer participation and is statistically significant; however, this relationship is influenced by two extreme data points with high percentages of customer bids. Likely due to significantly larger customer participation in RRB auctions (representing 10 to 40 per cent of total bids), Bid-Cover and Tail are both favourably affected by increased customer participation. Further, the R^2 is higher for auctions that occur near coupon payment dates.

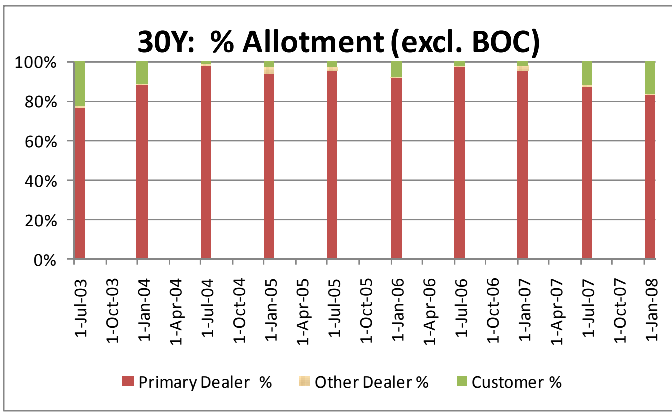
Customer participation in treasury bill auctions ranges from 0 to 25 per cent of total bids. There is a significant positive relationship between Bid-Cover and Customer bids per cent for 6-month and 1-year treasury bill auctions (R^2 greater than 30 per cent) and a weaker positive relationship with 3-month auctions (R^2 = 8 per cent). There is no significant relationship between auction Tail and Customer bids per cent.

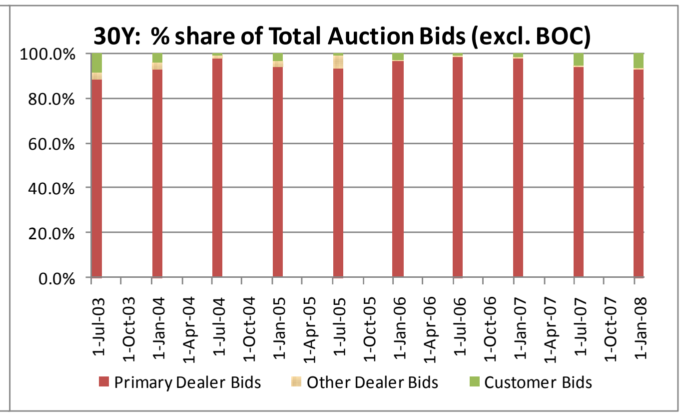
Appendix D - Primary Dealers' Role

Primary Dealers dominate nominal bond and treasury bill auctions, and Customer participation is greatest for RRB auctions.

Nominal bond auctions:

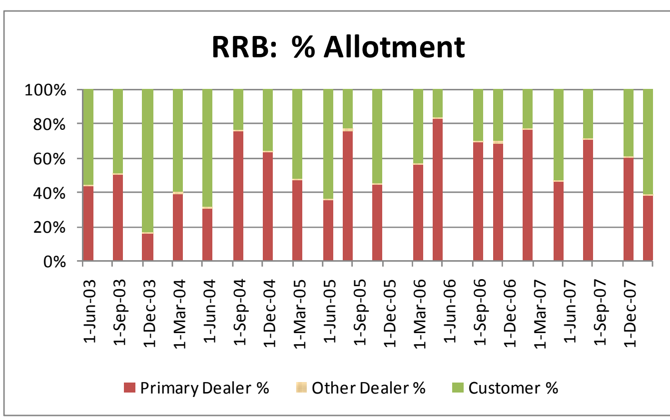
Primary Dealers dominate bidding and generally capture 60 per cent of the auction. Other government securities distributors have less than 5 per cent participation. Customer participation is low for shorter term auctions, and higher for 30-year auctions, sometimes as high as 10 per cent of these auctions (see chart below).

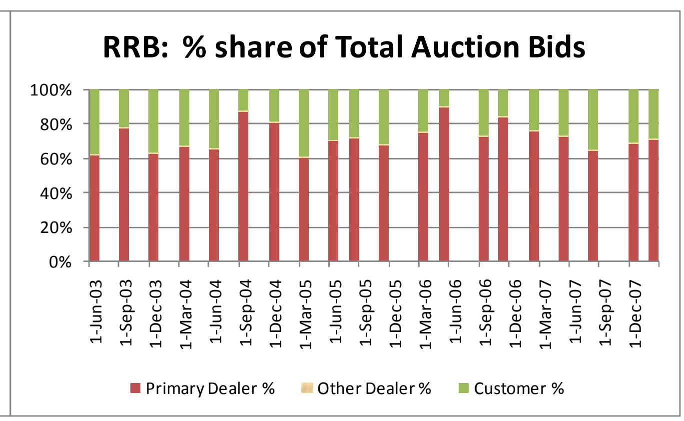




Real Return Bond auctions:

Customers play an integral role in RRB auctions, taking up to 83 per cent of some auction allotments. This reflects the nature of the buy-and-hold demand for RRBs among customers and the relatively lower liquidity of these bonds in the secondary market. Customers bid through government securities distributors and their share of RRB auction bids ranges from 10 per cent to 40 per cent.





Treasury bill auctions:

Similar to nominal bond auctions, Primary Dealers dominate bidding and allotments in treasury bill auctions but there is a very gradual decline in Primary Dealer participation offset by a gradual increase in customer participation.

Appendix E - Endnotes

[1] The 2009 study of debt issuance procedures in OECD countries provides a summary of changes to issuance procedures that occurred during the crisis. http://www.oecd.org/dataoecd/2/31/43002712.pdf

[2] http://laws.justice.gc.ca/en/F-11/index.html

[3] Approved Orders in Council are available on the Privy Council Office website at http://www.pco-bcp.gc.ca/oic-ddc.asp?lang=eng&Page=secretariats

[4] http://www.fin.gc.ca/pub/dms-sgd/index-eng.asp. As circumstances warrant over the course of the fiscal year, the Minister approves significant initiatives or major changes to strategies.

[5] http://www.fin.gc.ca/pub/dmr-rgd/index-eng.asp

[6] http://laws.justice.gc.ca/en/B-2/

[7] http://www.fin.gc.ca/treas/Goveev/TMGF_1-eng.asp

[8] http://www.fin.gc.ca/access/fininst-eng.asp#treasury

[9] http://www.bankofcanada.ca/cars/bd_auction_schedule.html

[10] http://www.bankofcanada.ca/en/markets/markets_auct.html

[11] Broadly speaking, the Canadian government debt auction process and those of the other sovereigns we surveyed are similar. However, there are differences worth noting. First, although regular auctions are the primary issuance method, some sovereigns use non-auction methods when there is reason to believe that price discovery will be difficult. There are different approaches to the trade-off between predictability and transparency, especially in times of market turmoil, and the frequency of new issues compared to re-openings varies. Every sovereign is aware of the possibility of abusive practices by bidders but they approach this problem differently. Participation and non-competitive bidding also vary. Transparency and communication with participants is at least as effective in Canada as it is in other sovereigns. Canada succeeds at rapidly releasing relevant information to participants after the auction, and the information released is similar to that of other sovereigns. Modifying one or more aspects of the process should be evaluated in the context of the other aspects, since the various pieces work together as part of the broad process. In 2009, the Survey of the OECD Working Party on Debt Management was conducted (endnote 1). That study notes that "…the principal issuing procedures are auction and tap. The responses show that all OECD countries use auctions for issuing new long-term debt, while 26 countries also use auctions for issuing short-term debt. Syndication is used by a number of (mostly smaller) countries (usually from the euro-zone) for selling benchmark bonds. It enables achieving very rapidly a high initial outstanding volume, thereby boosting liquidity and achieving greater placing certainty with lower borrowing costs. In addition issuers (also from larger countries) are using syndication for the first-time issuance of new instruments such as linkers or ultra-long bonds."

[12] While the ultimate decision-making authority rests with the Minister of Finance, the design of key strategies, policies and oversight of operations, and the coordination of funding, investment and liquidity management activities are largely delegated to several key committees, working groups and teams. Ministerial decisions are sought on issues such as strategic plans, investment policies and levels, and debt structure targets. The Funds

Management Coordinating Committee (FMCC) meets regularly (typically once per month) or as needed to discuss key issues, develop policy advice and provide ongoing coordination of work on wholesale debt, cash management, and issues that involve both the domestic debt program and foreign currency management. In addition, the Domestic Debt and Cash Management Working Group meets regularly (typically once a month) to provide a forum for discussion and updates on a wide range of current issues associated with the implementation of funds management activities. The working group is responsible for reporting on ongoing activities and developing policy analysis and recommendations for the FMCC, in the lead-up to the FMC meetings.

[13] We understand that Germany has a process that is similar to Canada's current approach, but the sovereigns selected for this study in conjunction with the Department of Finance and Bank of Canada did not include Germany.

[14] In an empirical study of newly issued 26-week US treasury bills with 26-week bills that are re-openings of old 52-week bills, re-openings cause lower prices. This indicates that the supply effect more than offsets the liquidity effect and in this instance, re-openings can be inferior to new issues.

[15] A detailed analysis of the buyback process is beyond the scope of this analysis. The focus here is on the impact on auction effectiveness.

[16] In Australia all communication and execution of auctions was previously conducted using a Bloomberg platform. It is now conducted through the same trading system that is used in the secondary market so all market participants are aware of auction details and results simultaneously and efficiently.

[17] The literature notes that while the information revealed in the WI market can affect the auction outcome, the auction also affects the WI market. Research documented in the literature suggests that traders hesitate to trade in the WI market prior to auction for fear of revealing information to their competitors, and when-issued trading volume decreases and bid-ask spreads widen in the few minutes prior to the auction. This may be due to a reluctance to reveal information that could be potentially valuable in the auction itself. The potential for a short squeeze is a negative consequence of the existence of the when-issued market. Issuer flexibility, such as the ability to reject bids, to reduce supply, and especially to re-open the issue can prevent short squeezes.

[18] The empirical literature examining treasury auction outcomes does not directly focus on the process, but it does have some relevant results. Bid prices, the dispersion of bids, and the quantities are detrimentally affected by uncertainty and volatility at the time of the auction. There is empirical evidence that wider dispersion of bids leads to more underpricing in US treasury auctions.

[19] The US encourages broad access, even having a system that allows direct customer participation. At the other extreme, Australia limits participation to a specific list of institutions. The remaining countries are in the middle. All of the sovereigns we interviewed have a category of bidder similar to primary dealers. Other than in Australia, primary dealers have auction participation requirements to maintain primary dealer status.

[21] See Endnote 1.

[22] In Australia, volatility in futures spreads to bonds has the most impact on willingness to bid since it affects hedging ability. A recent development (September 2009) in the Australian market has affected willingness to bid and coverage ratios. The commonwealth government announced a guarantee to state government debt for a fee. As a result, investors can buy state debt at a higher yield with a sovereign guarantee. This has affected auction results. For example coverage ratios have been around 1.9 compared to averages of 3 or higher beforehand. The

government had previously provided guarantees to banks but this did not impact auctions since the guarantee was limited to debt up to 5 years and banks were issuing offshore.

[23] In both Canada and the US, the system for accepting bids is proprietary to the issuing authority. In France, regular bidders use TELESAT and occasional bidders use SWIFT. In the UK, a Bloomberg system has been used for gilts since 2007, but bills are auctioned using a telephone system, with an anticipated move to an electronic system for bills later in 2009. Australia used a Bloomberg system for accepting bids, but switched to an internet-based system in March 2009 which is integrated with the bond trading platform used by all primary dealers. This is possible and effective since Australia allows only primary dealers to participate in auctions.

[24] The UK is the extreme of the sovereigns we surveyed in this dimension, requiring that dealers submit records of all bond trades for the week prior to the auction as well as the pre-auction net position. There are no pre-auction reporting requirements for bills in the UK. France requires ex post reporting if certain auction limits are met. Australia has no requirements regarding position reporting and, while it feels confident it could resolve any problems that might arise from excessive post-auction concentration of ownership, has never needed to act. Australia does not believe that reporting requirements would improve auction effectiveness in their market. The US requires pre-auction reporting only if the 35 per cent limit will be violated and so is less resource intensive than, for example, the pre-auction reporting requirements in the UK for gilts.

[25] For example, in June 2009, the UK announced a post-auction option facility open from 12 to 2pm (starts an hour after the auction closes) where dealers can take down an additional 10 percent of the auction amount at the auction price i.e. they make a profit if the secondary market price rises . The option does not apply if the auction is not covered. The post-auction option facility was the result of a 2008/2009 UK consultation on supplementary issuance methods, which looked at a variety of alternative issuance methods.

[26] We measure the relative participation of dealers compared to investors as relative bid, defined as the natural logarithm of the ratio of total dealer bids to customer bids. The log of the ratio is used because there are many instances where investor participation is very small relative to dealer participation.

[27] The number of bidders at nominal bond auctions ranges from 16 to 23 and does not vary significantly over time. There is little effect of market conditions, except that as yield volatility has increased recently there has been a small decline in the number of bidders. There is a weak positive relationship between Number of Bidders and Baa Credit Spread for all but the 5-year auction. This might reflect a flight-to-quality effect increasing the number of bidders at auctions for government securities as credit conditions worsen. Consistent with greater customer participation in these auctions, there is a relatively higher number of bidders in RRB auctions. The number of bidders ranges from 20 to 30 compared to 18 to 21 for 30-year nominal bond auctions. Similar to nominal bond auctions however, there is no significant relationship between the number of bidders and market conditions. The number of bidders at treasury bill auctions has gradually declined from about 20 bidders in 2003 to 16 in 2008. There is little impact of market conditions on the number of bidders.

[28] With regard to short squeezes, there are tradeoffs involved in re-openings. While re-opening can alleviate a squeeze, there are difficulties. Because it is difficult to measure exactly when a squeeze is occurring, a re-opening would have to be done at the discretion of the Bank of Canada rather than by a fixed formula (which is the approach in Australia). However, this possibility adds uncertainty to the market (which may impact auction prices). The number of primary dealers in itself does not appear to be a concern with respect to potential irregular practices. Given the number of auction participants, some sovereigns prevent concentration of ownership through rules, while others take a less rules-based approach and would deal with a potential concentration of ownership by re-opening an issue at any time (e.g. Australia).

[29] http://www.bankofcanada.ca/en/markets/markets_auct.html

[30] According to the Bank of Canada, there is no operational issue internally. See also http://www.ccma-acmc.ca/en/key_priorities/national24101.html

[31] In Canada, as long as dealers are willing to live up to their obligations as primary dealers, the bidding rules guarantee the Bid Cover is at least one, and the chance of a failed auction is remote. Likely causes are extreme market events, natural disaster, failure of major financial institutions, or similar extreme conditions.

[32] Execution risk is measured primarily as the likelihood of a Bid-Cover ratio less than one. The actual Bid-Cover for each auction is monitored by Debt Management and by Risk Management and reported to senior management and the Department of Finance. Execution risk is controlled through primary dealer selection criteria, minimum bidding requirements, consultation with market participants, transparency of the Debt Management Strategy, and selection of auction size and terms of the calls for tender.

[33] Enforcement of net position reporting is through various channels. If customers do not sign off on their compliance certificate, they are removed from the CARS system and no longer permitted to bid. The compliance framework in the Debt Management Group is used to impose consequences for dealers. At the time of the auction, if a large net position is reported, the CARS system limits or stops access to an auction automatically. If there is suspicion of a squeeze on an issue, IIROC could request a net position report (rule 2800, formerly IDA rule 5, governs irregular trading practices). However, the threshold that constitutes a squeeze is vague. The Bank of Canada uses 25 per cent of amount outstanding. The Bank of Canada, IIROC, and Department of Finance have a right to ask for net positions at any time, not just at auction or on formal review dates.

[34] Bonds and bills settle three days after the auction (T+3), and 2-year auctions are T+2. All auctions are settled through the third-party CDSX settlement system. The CDSX system has controls that require irrevocable simultaneous exchange of cash for assets. The CDSX settlement system is key to the reduction of settlement risk. Each sovereign in our study uses similar standardized third-party settlement systems. None of the sovereigns surveyed expressed any concern regarding settlement risk, and no concerns were expressed by any Canadian market participants or by the Bank of Canada. Dealers and customers said that the settlement procedure is good overall.

[35] Specific to the auction process, the CARS system is proprietary to the Bank of Canada and uses dedicated computers at each dealer site. This minimizes the risk of failure due to external systems related failures, but is still subject to its own structural integrity, and disaster. In contrast to some other sovereigns (e.g. Australia), the systems supporting the auction do not depend on third-party systems, such as Bloomberg, or trading systems.

[36] Note that detailed evaluation of alternatives to an auction is not within the scope of this study. This question is addressed at a very high level. Government Evaluation Policy requires us to examine issues around program relevance, which is an assessment of the persistence of the issue/problem that the program has been established to address.

[37] 3-year re-introduced in 2009 to provide added flexibility re increased funding requirements and smooth debt maturity profile.

Appendix F – Management Response and Action Plan

PROLOGUE

The Department is pleased to note that the report submitted by Twist Financial Corp concludes that the current debt auction process structure works well, and supports the transparency, effectiveness and efficiency of debt auctions. Twist reports that the auction process has been successful in its immediate, intermediate, and ultimate goals of raising necessary funding at a low cost, and that it has helped sustain a liquid and efficient secondary market for Government of Canada debt.

The report finds that the major global issuers of debt tend to use broadly similar issuance procedures and debt management policies and that the many similarities between Government of Canada debt auctions and those of other sovereigns suggest limited ways in which other sovereigns' practices might be used to improve Canada's auctions.

Twist concludes that the debt auction process can continue to achieve its objectives in its current form. That said, the report suggests marginal changes which could be made to improve the process.

Recommendation	Management Response	Planned Action	Lead	Target Date
Measures to improve communications and reporting between debt managers at the Department of Finance and the Bank of Canada:				
• For potential improvements in efficiency, consider changing the interaction between the Department of Finance and the Bank of Canada occurring ahead of bond auctions to a reporting function rather than an approval process. (p. 15)	The Department **disagrees** with this recommendation. **Comment**: With respect to the suggestion that consideration be given to changing the interaction between the Department of Finance and the Bank of Canada ahead of bond auctions, the current framework has proven to be effective. The Department believes that the active involvement of both the Bank of Canada and the Department of Finance in decisions surrounding each bond operation ensures that due consideration is given to the evolving borrowing requirements of the Government within the context of the overall debt strategy.	None	None	None

• Replace authorization letters for debt auction operations with more informative, timely reporting and accountability to senior management. (p.15)	The Department **agrees** with this recommendation. **Comment**: The delegation of borrowing authority and how that authority is recorded and communicated to the Bank of Canada needs to be improved. A small task force composed of individuals from the Debt Management Section, Internal Audit, Public Debt Reporting, Justice and the Bank of Canada will be charged with moving the issue forward.	A system for providing internal quarterly debt reporting is currently under development. Under this new reporting system, authorization letters would no longer be required.	Department of Finance	By the end of 2010-11

Recommendation	Management Response	Planned Action	Lead	Target Date
Measures to improve communications with market participants:				
• Increase the frequency of consultations with a larger sample of current and potential customers utilizing a mix of communication formats (including more frequent telephone conference calls and multi-lateral discussions in addition to the traditional bi-lateral visits with individual dealers). (p.17)	The Department **agrees** with this recommendation.	Measures have already been taken to enhance the effectiveness of the on-going dialogue with market participants. For example, a broader array of participants and customers were included during 2009-10 consultations. More frequent consultation meetings have been conducted since 2008-09, with some on specific issues (e.g., treasury bill program, long bonds). Multi-lateral consultations were found to be especially useful during the financial crisis, with special meetings held with primary dealers in November 2008 and June 2009.	Department of Finance and the Bank of Canada	On-going
• Obtain detailed and more consistent feedback from a larger number of market participants, including large and small customers, prior to and following auctions of Real Return bonds and 30-year nominal bonds. (p. 17)	The Department **agrees** with this recommendation.	The Bank has had a long-standing process in place to obtain feedback from market participants, including customers, prior to and following auctions, however, the procedure will be reviewed.	Bank of Canada	By the end of 2010-11

• Release auction results simultaneously on the Bank of Canada pages on Reuters and Bloomberg and through CanDeal and other relevant trading systems used by Canadian market participants. (p. 24)	The Department **agrees** with this recommendation. However, the Department notes that timely auction results are already available on some trading systems. **Comment**: The Bank of Canada offers email notifications whenever the Bank releases new information, such as auctions results (http://www.bank-banque-canada.ca/en/messenger/index.html).	The process used to disseminate information regarding auction operations will be reviewed.	Bank of Canada	By the end of 2010-11
Recommendation	**Management Response**	**Planned Action**	**Lead**	**Target Date**
Measures to improve participation at auctions:				
• Encourage all market participants to play a more active role in the design of the debt strategy, such as through an annual workshop in addition to the standard consultation process. (p.17)	The Department **agrees** with this recommendation.	The Bank of Canada and the Department of Finance will review the possibility and benefits of holding workshops with market participants as part of the debt strategy consultations exercise.	Department of Finance and the Bank of Canada	By the end of 2011-12
• Promote greater participation of customers already holding a bidder identification number, and identify and actively solicit potential new customers. Large customers should be offered direct access to the Communication, Auction and Reporting System (CARS). (p.19)	The Department **agrees** that any measures taken to encourage greater participation by customers would be beneficial to the federal debt program. The Department will need time to assess how this recommendation fits within the broader debt distribution framework.	The Department, in conjunction with the Bank of Canada, will continue to promote participation at auctions. It is agreed that any measures taken to encourage greater participation by customers would be beneficial to the federal debt program.	Department of Finance and the Bank of Canada	By the end of 2011-12

• Relax the upper limit on bids and emphasize the government's right to re-open a security at any time through something like the United Kingdom mini-tender facility, or similar to the Australian approach of re-opening at its discretion, which will both support participation and counteract the possibility of a participant attempting to exert undue influence on the price of a security. (p.21)	The Department **disagrees** with this recommendation at this time. **Comment**: Debt management practices in Canada have evolved over time to respond to the specific needs of our domestic marketplace; initiatives used in other countries may or may not be applicable for Canada. In view of the overall results of the treasury evaluation of the Debt Auction Process and the success of debt operations throughout the financial crisis, this recommendation will not be pursued at this time.	None	None	None
• Encourage Government Securities Distributors to strive to become Primary Dealers (who are subject to more stringent minimum bidding requirements) by attaching more visibility and prestige to the primary dealer status (e.g., as in France). (p. 23)	The Department **agrees** with this recommendation.	Government Securities Distributors and Primary Dealers in particular, are essential to the continued success of Canada's debt distribution framework. The report's suggestions on how to better promote Primary Dealer status, including establishing an annual multi-lateral forum, will be examined carefully.	Department of Finance and the Bank of Canada	By the end of 2011-12
Recommendation	**Management Response**	**Planned Action**	**Lead**	**Target Date**
Measures to support the transfer of corporate knowledge:				
• Review and update annually detailed guidelines at the management level at both the Bank of Canada and Department of Finance. (p. 26)	The Department **agrees** with this recommendation.	Departmental practices and documentation will continue to be strengthened to support the transfer of corporate knowledge and reduce potential operational risks related to employee turnover.	Department of Finance and the Bank of Canada	By the end of 2011-12