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Abstract

To investigate the extent to which the transparency of the Bank of Canada's monetary policy has improved, the authors examine empirically – over the period 30 October 2000 to 31 May 2007 – the reaction of Canadian financial markets to official Bank communications, and in particular their reaction to the recent inclusion of forward-looking policy-rate guidance in these communications. The authors find evidence that fixed announcement date (FAD) press releases, and, to a lesser extent, speeches by Governing Council members, significantly affect near-term interest rate expectations, indicating that central bank communication conveys important information to market participants. However, the authors' results also show that FAD press releases and speeches do not significantly impact market rates over the more recent period, when forward-looking statements have been used on a regular basis. The authors investigate two explanations for this change in response: (i) market participants better understand the Bank's monetary policy reaction function as they become accustomed to the FAD regime; or, (ii) market participants focus more on the forward-looking statements and less on the Bank's discussion of the economic outlook, and therefore respond less than before to new macroeconomic data releases. The authors find evidence to support the second explanation: forward-looking statements – even though they have been designed to be conditional – have made the Bank's decisions on the policy rate more predictable, but not necessarily more transparent.

JEL classification: E52, E58
Bank classification: Interest rates; Central bank research; Transmission of monetary policy

Résumé

Pour déterminer à quel point la politique monétaire de la Banque du Canada a gagné en transparence, les auteurs étudient de façon empirique – sur la période allant du 30 octobre 2000 au 31 mai 2007 – la réaction des marchés financiers canadiens aux communications officielles de l'institution, et en particulier leur réaction aux indications sur l'évolution future du taux directeur qui sont intégrées depuis quelque temps à ces messages. Ils constatent que les communiqués publiés aux dates d'annonce préétablies et, dans une moindre mesure, les discours prononcés par les membres du Conseil de direction ont une incidence marquée sur les attentes relatives aux taux d'intérêt à court terme, ce qui dénote l'importance de ces éléments d'information pour les intervenants du marché. Cependant, depuis que la Banque inclut régulièrement des déclarations prospectives dans ces communications, celles-ci influent peu sur les taux du marché. Les

auteurs vérifient la valeur de deux hypothèses avancées pour expliquer ce changement : a) les acteurs du marché comprennent mieux la fonction de réaction de la politique monétaire de la Banque, car le régime de dates d'annonce préétablies leur est plus familier; b) les acteurs du marché centrent davantage leur attention sur les déclarations prospectives de la Banque, et moins sur son analyse des perspectives économiques, si bien qu'ils réagissent moins qu'avant à la parution de nouvelles statistiques macroéconomiques. Les auteurs obtiennent des résultats qui corroborent la seconde hypothèse : les déclarations prospectives – même si elles sont conçues comme des énoncés conditionnels – ont donné aux décisions de la Banque sur le taux directeur plus de prévisibilité, mais pas forcément plus de transparence.

Classification JEL : E52, E58
Classification de la Banque : Taux d'intérêt; Recherches menées par les banques centrales; Transmission de la politique monétaire

1 Introduction

Over the past 10 to 20 years, central banks, including the Bank of Canada, have sought to enhance monetary policy transparency in order to improve the effectiveness of the monetary policy transmission mechanism. More recently, central banks have sought to further enhance their transparency by including policy-rate guidance in their official communications. However, there is an ongoing debate about the value of communicating forward-looking policy-rate guidance, since there are both advantages and disadvantages to consider. This paper's main focus is to study the impact of the Bank of Canada's use of forward-looking statements on market participants' behaviour. In particular, we study whether the use of these statements has made the central bank more transparent or simply more predictable. Our study focuses on the period 30 October 2000 to 31 May 2007.

As is well documented in most central banking handbooks, transparency is considered a key component of an effective monetary policy framework (see, for example, ECB 2004). Transparency can be defined as a communications framework in which the central bank communicates to the public, and market participants in particular, all the relevant information regarding its mandate, its monetary policy strategy, and its assessment of the economy and reasons behind its decisions, and does so in an open, clear, and timely manner. Central bank transparency makes monetary policy more effective in three ways. First, the central bank fosters greater credibility by being clear and transparent about its objective, including how it is to be attained and the bank's ability and commitment to achieve it. Second, transparency imposes some degree of accountability through regular public exposure of the central bank's views and its understanding of current and future economic activity. This exposure permits the public to assess the consistency of the central bank's actions, and its monetary policy decision-making process, with the bank's stated objective.

The third way transparency makes monetary policy more effective, and this is the focus of this study, is by helping market participants improve their understanding of the systematic response of monetary policy to economic developments and shocks (i.e., the central bank's so-called monetary policy reaction function), which in turn allows market participants to better anticipate future changes in the policy interest rate. Thus, although the central bank has control over only the short-term (overnight or policy) interest rate, since short-term and long-term rates are linked via the expectations hypothesis, the bank can use its communications to better influence long-term rates by enhancing the market's understanding of the reaction function. This communication would increase the effectiveness of the monetary policy transmission mechanism, the process by which expected changes in monetary policy are incorporated into the movement of other financial variables and, eventually, investment and consumption decisions, which in turn affect inflation. Therefore, in this study, we define monetary policy as being transparent if market participants can anticipate the central bank's official interest rate decisions correctly, based strictly on their understanding of the central bank's reaction function.

The Bank of Canada, like many other central banks, has, over the years, taken a number of measures to increase transparency and to communicate to the public its views about the economic outlook. Specifically, the Bank has, since 1995, regularly published its *Monetary Policy Report* (MPR): from May 1995 to November 1999, inclusive, the Bank published two MPRs per year; from February 2000 to January 2009, inclusive (which our sample period falls within), the Bank published two MPRs plus two *Updates* (MPRUs) per year; since July 2009, the Bank is publishing four MPRs per year, rather than two MPRs and two *Updates*. From 1994 on, a press release has also been published with every decision on the policy rate. Over the years, speeches[1] by Governing Council (the Governor and the Deputy Governors) have provided an opportunity to impart monetary policy information to the public.

One of the most significant steps the Bank of Canada has taken to enhance transparency and increase the effectiveness of monetary policy occurred on 30 October 2000, when it announced its first eight pre-specified "fixed announcement dates" (FADs).[2] As such, our study focuses on Bank communications for the period since FADs were introduced.[3] Another communication measure the Bank had taken in the latter period of our study was the consistent inclusion of forward-looking statements in FAD press releases and MPRs (and MPRUs).[4] In our analysis, we examine the impact, if any, on Bank of Canada transparency over this period, related to this change in its communication strategy.

Empirical work measuring the impact of central bank communication is quite extensive.[5] Comparing the communication strategies of the U.S. Federal Reserve, the Bank of England, and the European Central Bank (ECB), Ehrmann and Fratzscher (2005, 2007a) find that monetary policy communication generally has a significant effect on the short- and medium-term horizons of the yield curve.[6] Looking at a panel of six central banks, including the Bank of Canada, from

[1] Throughout our paper, we define speeches as including official speeches made by Governing Council members as well as press conferences and interviews (unless otherwise stated).

[2] See Appendix B for a discussion of the role of FADs in improving the markets' understanding of the central bank's reaction function, as well as empirical work done at the Bank of Canada on this subject.

[3] Moreover, it would be difficult to control for the markets' uncertainty regarding the timing of the policy decision itself in the empirical tests of the impact of the official communications.

[4] Since the time of this study, the nature of, and forward-looking view of, policy rates in FAD press releases have gone through two distinct periods. The first of these, which coincided with the overnight rate reaching its effective lower bound, was the use of the conditional commitment in which the Bank stated that "Conditional on the current outlook for inflation, the target overnight rate can be expected to remain at its current level until the end of the second quarter of 2010 in order to achieve the inflation target." Following the period where the conditional commitment was used, any forward-looking discussion of the policy rate, when it was included, became less structured and more conditional than those used prior to the conditional commitment.

[5] Using daily data, Kohn and Sack (2003) find that Federal Open Market Committee (FOMC) statements accompanying policy decisions, and congressional testimony given by Chairman Greenspan, have a significant effect on interest rates. Following the latter's methodology, Reeves and Sawicki (2007) study the impact of official Bank of England communications and find that only the publication of the minutes of the Monetary Policy Committee meetings significantly impact market volatility when using daily data. However, when using intraday data, they find that both the minutes and the *Inflation Report* have a significant impact on near-term interest rate expectations.

[6] Ehrmann and Fratzscher also find that statements about the economic outlook have a significant impact on only the medium to long end of the yield curve in the United States. They suggest that this finding is related to differences in the stated monetary policy objectives of the three central banks. The Bank of England and the ECB focus on price stability, whereas the Federal Reserve gives stronger weight to the real economy.

industrialized countries, Connolly and Kohler (2007) find that, across all countries, commentaries accompanying rate decisions have the largest impact. Among Bank of Canada communications, FAD press releases, MPRs and MPRUs,[7] and speeches were the forms that Connolly and Kohler find had a statistically significant impact on interest rates. They also find that, across countries, central bank communication had small explanatory power for movements in interest rates overall relative to the movement of global interest rates, which are proxied by benchmark U.S. interest rates. However, to date, no empirical research has focused on whether the consistent use of forward-looking statements has enhanced Bank of Canada transparency.[8]

Although we find evidence that official Bank of Canada communications over the period 30 October 2000 to 31 May 2007 have a significant effect on near- to medium-term yields, suggesting that they convey important new information that impacts the markets' interest rate expectations, we also find that, over a shorter sample (22 July 2004 to 31 May 2007 – the period over which forward-looking statements are included consistently in FAD press releases), official communications of all forms no longer impact interest rates in a statistically significant manner. When we conduct more direct tests of whether the forward-looking statements have improved central bank transparency, based on the significance of coefficients on dummy variables for dates of FAD press releases that contained these statements, or on cross-dummy variables based on macro news variables over the period since forward-looking statements were consistently used by the Bank, our results indicate a decline in the sensitivity of interest rate changes to FAD press releases or macro news. As we discuss in section 2, this is indicative of greater central bank "predictability," but not of greater central bank transparency in terms of market participants having a better understanding of the monetary policy reaction function.

This paper is organized as follows. Section 2 reviews issues related to central banks providing signals or guidance about future policy rates. Section 3 describes the 2-stage regression model for testing the impact of Bank communications on market interest rates. Section 4 reviews the different types of communications that the Bank employs and the data used for this study. Section 5 reviews our results for the impact of central bank communications over the period 30 October 2000 to 31 May 2007. Section 6 discusses the hypotheses related to the use of forward-looking policy statements and describes two variations on the basic 2-stage regression model used to test these hypotheses; we then summarize our results regarding the publication of forward-looking policy advice. Section 7 offers some conclusions.

[7] When Connolly and Kohler re-estimate their model over the post-FAD period (2000–06), MPRUs no longer have a significant impact on market rates.

[8] The work of Muller and Zelmer (1999) comes closest to ours, given that it studies the impact of MPRs on market interest rates and exchange rates, but their sample period is before the introduction of FADs and forward-looking statements.

2 Issues Related to Publishing Policy Interest Rate Guidance: Predictability versus Transparency and Communicating Conditionality

For the purposes of this paper, we define transparency as the communication of central bank information that effectively enhances the markets' understanding of the monetary policy reaction function. Communication about the central bank's current view of how the economy is unfolding is typically summarized in changes to the central bank's view about the future path for output or inflation that often include some form of uncertainty bands (i.e., fan charts). In addition, communication regarding other macroeconomic variables that are being focused upon when formulating current policy, that summarizes how the central bank sees certain alternative scenarios unfolding for the outlook, or that presents updates to the model or the modelling process, should enhance the markets' understanding of the central bank's reaction function and cause a reaction in interest rates, both at the short end of the yield curve and in medium-term and, in some cases, long-term interest rates.

It is important to note that the monetary policy reaction function should not be viewed as a mechanistic function. There are subjective components to it that may vary over time, and therefore it is not possible for the markets to fully or perfectly understand the reaction function. In referring to the reaction function, we are referring to the central bank's systematic reaction to economic developments over the short and longer run. The central bank will at times place greater emphasis on certain macroeconomic news, or the accumulation of a certain set of macro information, depending on the current state of the economic cycle or on the types of shock hitting the economy. Moreover, the central bank carries out research and analysis which lead to updates to its modelling framework underpinning its assessment of future economic conditions. Nonetheless, the objective of the policy-making body should be to increase the markets' understanding of this function, including its evolution, when it seeks to be more transparent, so as to make the market participants' expectations-formation process of future interest rates more efficient.

Recently, a debate has arisen on how much information central banks should release to the public with respect to their future intentions for the policy rate. In particular, should central banks provide to the public their forecast of, or their intention for, the path of future target interest rates? Central banks see both pros and cons in providing policy-inclination signals (including the publishing of the policy-rate path).[9] (Note that we focus only on the pros and cons as they relate to increasing *the effectiveness of the monetary policy transmission mechanism*, while Kahn 2007 and others also include those related to increasing *monetary policy accountability and credibility*.) One of the main advantages of providing policy-rate guidance is that, in principle, it makes monetary policy, via the expectation hypothesis, more effective (i.e., more bang for the

[9] See Kahn (2007) for a summary, as well as Moessner and Nelson (2008).

buck),[10] by better influencing medium- and long-term rates. For example, if a central bank communicates that it will hold policy rates higher for a longer period of time than markets currently expect, then medium- and long-term rates would likely be higher than if the central bank simply communicated the current target for the policy rate (Kahn 2007) without this guidance.[11] Another advantage of providing guidance is that it reduces the degree of market uncertainty related to future monetary policy moves and thus reduces interest rate risk premia.

Rudebusch (2008) identifies three types of forward-looking policy guidance used by central banks. The first, indirect signals, provides implicit information about the policy path through the use of related information, such as a balance-of-risk statement, or the presentation of a risk scenario showing the extent to which inflation would deviate from the target, holding policy rates constant. The second, direct qualitative signals, includes the policy "bias" statements that the U.S. Fed used for a short period beginning in the late 1990s. This type of signal can also include phrases that signal the desired policy stance over an extended number of meeting dates, such as those used by the Fed between 2003 and 2006 indicating that policy accommodation "can be maintained for a considerable period" or "can be removed at a pace that is likely to be measured." The ECB's use of code words such as "strong vigilance" also falls into this category. The final category, direct quantitative signals, best describes the explicit numerical projections for the policy interest rate that the central banks of New Zealand, Norway, Iceland, the Czech Republic, and Sweden have provided.

Based on these definitions, the Bank of Canada has provided direct qualitative signals to markets via its forward-looking statements included in nearly all FAD and MPR press releases in the latter half of our study (beginning July 2004). These statements typically include wording such as "some increase in the target for the overnight rate may be required in the medium (near) term," or "the current level of the target for the overnight rate is consistent with achieving the inflation target over the medium (near) term," or "further reduction of monetary stimulus will be required . . . over the next four to six quarters" (see Table C.1 in Appendix C). Recently, the Bank has also introduced "balance-of-risk" statements that could be categorized as indirect signals. Moreover, over our period of study, the Bank has provided both indirect and direct qualitative signals in its MPRs and in speeches.

Kohn (2005) and others have highlighted that there are notable disadvantages to providing guidance. First, markets might, paradoxically, place too great a weight on the guidance on the policy rate and thus not fully understand or appreciate its *conditionality*. This can result in markets focusing less on their own private information (i.e., the market does not do its "homework") in formulating their own expectations of future decisions on the policy rate. It may

[10] This hypothesis, to our knowledge, has not been directly tested empirically.

[11] An additional advantage is put forward by theorists. When private agents are uncertain about the central bank's inflation objective (particularly where the central bank has a new objective or targeting regime), it helps, in theory, to align the private agents' and the central bank's expectations about future monetary policy, and thereby facilitate the economy's adjustment back to the inflation objective after a shock.

also reduce the information content of market prices (for information-extraction purposes). A second disadvantage related to any perceived *unconditionality* of the policy-rate guidance is that it might cause policy-makers to be less willing to change their policy intentions in light of new information, for two reasons. First, frequent updating of the policy path might undermine the public's confidence in the central bank's forecasting ability. Second, policy-makers may be concerned that financial markets will overreact to a shift in policy stance or guidance, leading to excess volatility, even though the change in circumstance justifies the central bank's reassessment of the appropriate policy action.

King (2006) highlights a third problem with providing policy-rate guidance: it may be difficult to provide given the structure of the monetary policy decision-making process and/or committee. For example, the Bank of England's Monetary Policy Committee's (MPC's) basis for its decision is renewed every month and is therefore very conditional on the new information it has received since its last meeting (i.e., the MPC does not decide in advance what its decision will be at the next (few) meeting(s), but instead meets every time with a relatively clean slate). The MPC is thus averse to potentially fooling financial markets, via its communications, into thinking that there are definite multi-meeting-date plans for the policy rate going forward. King also notes that the added benefit of not providing forward guidance is that there is no need to worry about how to wean markets off their "crutch of spoon fed expectations formation" without causing unintended volatility, when the central bank sees much greater uncertainty about the future path it will take and is no longer able to provide relatively unconditional policy-inclination statements.[12]

In considering the issue of providing policy guidance in official central bank communication, it is important to note that there is a subtle difference between a communication strategy that is transparent and one that is predictable (Moessner, Gravelle, and Sinclair 2005; Jen 2007). Conceptually, with a more predictable[13] central bank, market participants can more easily anticipate the next policy decision (or the next few decisions) *without* necessarily better understanding the reasons for the decision(s) or, alternatively, *without* better understanding the central bank's reaction function. A more transparent central bank, however, is one that effectively conveys to the market its monetary policy reaction function, which allows markets to better anticipate the central bank's monetary policy decisions.[14]

[12] This is roughly what happened to the Fed at the June 2006 FOMC meeting, in which the press release no longer made it explicit that the Fed would continue on a path of policy tightening.

[13] Our definition of predictability is equivalent to Blinder et al.'s (2008) definition of short-term predictability, which they define as the ability of the public to *anticipate* monetary policy decisions over short horizons (a few meetings forward). A number of researchers, however, define predictability in such a way as to link increased predictability to increased transparency. In this case, they would be referring to Blinder et al.'s (2008) concept of long-term predictability, which occurs when the private sector better understands the central bank's monetary policy framework.

[14] Strictly trying to increase the markets' understanding of the monetary policy reaction function (i.e., increasing transparency as defined above), on the other hand, does not lead to the same problems of perceived un-conditionality, and yet still allows for enhanced monetary policy effectiveness. If markets had a perfect understanding of the reaction function, they could, in principle, correctly anticipate the path of future policy rates to the same degree as if the policy guidance on near-term future

Although the aim of policy-makers in providing policy guidance may be, in general, to enhance the markets' understanding of the reaction function and, ultimately, the effectiveness of monetary policy, because of the market participants' excessive (from the policy-makers' perspective, at least) focus on the guidance communicated as described above, it could reduce the markets' reliance on their own private information,[15] decrease their reaction to macro news, and diminish their incentives to update their understanding of the reaction function. Therefore, greater central bank *predictability* will not necessarily imply greater monetary policy transparency, but greater *transparency* (i.e., communication of information that effectively enhances the markets' understanding of the reaction function) does, in general, imply greater predictability.

It is not clear whether the central banks that publish their target rate paths or some other form of policy-rate guidance are necessarily "predictable," since predictability depends on the degree of perceived conditionality (or, in particular, the lack thereof) embedded in the central bank's guidance. It is possible that central banks that provide direct quantitative guidance (i.e., a policy-rate path) could be less predictable (and more transparent) than those that offer direct qualitative guidance, if the forward-looking statement is explicitly presented to be, or implicitly perceived by financial markets to be, less conditional than the policy path. Specifically, these central banks could provide "error," "risk," or "uncertainty" bands around their forecast of key economic variables.[16] Moreover, central banks that publish a path for the target rate could use this as a tool to animate their (conditionality-laden) communication about their views of the economic outlook, and in particular how the risks to this outlook may manifest themselves, by also providing in-depth alternative scenarios and/or risks to their base-case projections for the policy rate.

Moessner and Nelson (2008) argue that the *regular* appearance of a forecast policy-rate path in central bank communications may, in itself, make these communications more conditional relative to those central banks that irregularly communicate guidance (i.e., direct qualitative signals), because the latter may be viewed as doing so for the tactical reason of "massaging" market expectations. The latter central banks' communication guidance may thus look more unconditional. Nonetheless, it would seem that central banks that provide direct qualitative or

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decisions was explicitly provided. By being less explicit about future monetary policy decisions, a central bank would force market participants to draw their own conclusions for future policy stances. Market participants could do this by focusing on the implications of economic and financial developments, rather than by behaving as if the central bank would simply follow through with its previously announced "guidance" or forward-looking statements about the future monetary policy stance. The 10 June 2008 FAD, which was one of the bigger policy surprises since FADs began, provides a striking example of near-term market expectations being potentially "artificially" anchored by a forward-looking statement. Leading up to the decision, economic news caused markets to cut back on easing expectations past the horizon of the June FAD (and, further into the future, priced in some probability of a hike in rates). However, throughout the period leading up to the June 2008 FAD, the expectations for that FAD decision remained relatively anchored at a roughly 80–90 per cent probability of a cut.

[15] A number of researchers have termed this behaviour "rational inattention," which Sims (2003) defines as decision makers optimally choosing what information to focus on, given that individuals have a limited capacity for processing information.

[16] Central banks could indicate that the path is simply the mean or mode of a probability distribution, with confidence bands indicating the level and balance of risks.

quantitative guidance in the form of a forward-looking statement or a policy-rate path have more work to do in order to make clear the high degree of conditionality embedded in their communications.

In sum, the relevant factors for measuring central bank predictability are: (i) the extent to which the central bank conveys the timing and direction of future rate changes, and (ii) the degree of conditionality explicitly embedded in, or more importantly, implicitly perceived by the market, in its communications. As highlighted by Kahn (2007), central banks that restrict themselves to use only "balance-of-risk" statements leave "the markets to interpret any possible implication of these risks for (future) policy rates." In contrast, policy statements like the forward-looking statements used by the Bank of Canada, or the "measured paced" guidance provided by the Fed over an extended period of time, may be perceived by market participants to be more unconditional.

Empirically, central banks that are increasingly predictable without being more transparent should see a decrease in the reliance of financial markets on macroeconomic news to anticipate near-term monetary policy changes. The relatively unconditional nature of the forward guidance provided would negate the need for markets to do their homework in terms of formulating their "shadow" monetary policy reaction functions and calculate the direction and/or timing of the next, or next few, target rate changes. This is, in fact, what Ehrmann and Fratzscher (2007b) find when studying changes in U.S. Federal Reserve communications: since the Fed introduced its policy-inclination statement in 1999, interest rate reactions to macro news were generally smaller and there were fewer macro releases that were statistically significant. Moreover, Ehrmann and Fratzscher find that inter-meeting communications about the future course/timing of monetary policy, rather than about the economic outlook, garnered smaller interest rate reactions after the Fed introduced its policy-inclination statement. In the same spirit as the work done by Ehrmann and Fratzscher (2007b), we investigate whether the inclusion of forward-looking statements in Bank of Canada communication has in fact caused markets to react less to macroeconomic releases because they view the Bank's communication as being less conditional, which would indicate that the Bank has become more predictable but not necessarily more transparent.

3 Methodology

In this section, we outline a method for testing the impact of Bank of Canada communications on market interest rates. Slight variants of the 2-stage methodology introduced in this section form the basis of our tests examining the impact of forward-looking statements; they are presented in section 6.

3.1 Measuring market reaction to various official communications

A number of problems arise when trying to measure the market impact of communications. The first is that it is difficult to quantify and systematically characterize the content of central bank communications, making it hard to benchmark the strength or importance of what is announced, or its direction. Specifically, it would be useful to quantify the direction or implied stance of all Bank communications, by, for example, categorizing them into dovish, neutral, or hawkish statements. But this is, at best, a possibility only for the subset of FAD/MPR press releases that included a forward-looking statement, rather than for the complete set of communications.[17] Second, we cannot easily measure what markets had expected the communications to say, thereby adding to the difficulty of assessing the strength or sign of the signal.

To address these two problems, we follow the methodology of Kohn and Sack (2003) and Reeves and Sawicki (2007), using the squared change[18] of interest rates on days of official Bank communication, which is a good proxy for volatility, thus enabling us to measure the overall importance of the communication event for financial markets without needing to quantify the direction of the event itself. We would therefore expect to see this variable increase on communication days if the communication is passing along new relevant information, since the news is incorporated into market rates.

Another issue when measuring market reaction to communications is that the content or the communication event itself may be endogenous; that is, the central bank may choose to communicate new information, or increase the frequency of its communication, because of a sudden change in the economic conjuncture, or because of some other news. In this case, asset prices would probably be more volatile on the communication days, possibly in reaction to other factors we are unable to control for, thus overstating the impact of the communication. Because the Bank sets and announces its communication dates well in advance,[19] the endogeneity of the communication event can, to a large extent, be ruled out as an issue in our study.

The final complication that occurs when attempting to measure the impact of communications on interest rates is that other events taking place on the same day as these communications may also be relevant to market participants and therefore move interest rates. These factors include macroeconomic news in both Canada and the United States, U.S. and Canadian policy-rate surprises, and U.S. monetary policy communications. We control for U.S. news variables due to the close economic links between Canada and the United States and the fact that changes in U.S. benchmark interest rates tend to move other industrialized country rates. In order to isolate the asset-price movements linked to official Bank communications, we must first take into account

[17] Although it would also be desirable to categorize forward-looking statements into their implied direction (i.e., neutral, easing, or tightening), the size of our sample prohibits this.

[18] See section 3.3 for how this is constructed. Note also that using the absolute change in asset prices could circumvent these issues.

[19] Except in exceptional circumstances, such as following the terrorist attacks of 11 September 2001.

all other relevant information that could move interest rates on communications days. Our analysis therefore takes on two distinct parts.

3.2 Regression equations

To control for the effect of macroeconomic announcements, policy surprises, and U.S. communications on asset prices, we estimate equation (1) using ordinary least squares (OLS),[20] following Kohn and Sack (2003), and Ehrmann and Fratzscher (2005), among others, with modifications for the Canadian economy. The first-stage regression model is as follows:

$$\Delta y_t = \beta_0 + \beta_1 \Delta ON_t + \beta_2 \Delta ff_t + \beta_3 \Delta ef_t + \beta_4 \Delta T2_t + \sum_{i=1}^{n} \alpha_i cmac_{i,t} + \sum_{j=1}^{m} \alpha_j usmac_{j,t} + \varepsilon_t \qquad (1)$$

where the 1-day change in the interest rate of interest, Δy_t, is regressed on the surprise component of Canadian policy announcements, ΔON_t; the surprise component of U.S. policy announcements, Δff_t; FOMC communication control variables, Δef_t and $\Delta T2_t$; and the surprise component of macroeconomic announcements in Canada and the United States, $cmac_{i,t}$ and $usmac_{i,t}$ respectively.[21] We then relate the unexplained change of market prices from this regression, $\varepsilon_{t,}$, to communications variables, as described in section 3.3.

Parent (2002–2003) finds that, relative to the results reported in Gravelle and Moessner (2001), there is an increase in the sensitivity of Canadian interest rates to Canadian macroeconomic news after the introduction of FADs by the Bank of Canada. We expect that this is still the case over a longer sample than Parent (2002–2003), but, as discussed below, if we find that the consistent inclusion of forward-looking statements in FAD press releases has made the Bank more predictable, but not more transparent, we would expect a diminished reaction of Canadian interest rates to macroeconomic news variables ($cmac_{i,t}$) over the latter part of our sample (when forward-looking statements were used consistently).

3.3 Measuring the impact of communications on market rates

Once we have controlled for "other news," we construct our proxy for volatility using the squared residual from equation (1), and measure the impact of official Bank communications on markets by relating this proxy to official Bank communications using the following equation:

$$\varepsilon_{i,t}^2 = \delta_0 + \delta_1 Vix_t + \sum_{j=1}^{n} \gamma_j comm_{j,t} + \eta_{i,t} \qquad (2)$$

where $\varepsilon_{i,t}^2$ is the squared residual from equation (1) for interest rate *i*; $comm_{j,t}$ represents the j^{th} type of communication, which in our study are dummy variables that take the value of 1 on days

[20] We use the Newey-West estimator, which "provides a way to calculate consistent covariance matrices in the presence of both serial correlation and heteroscedasticity" (Johnston and DiNardo 1997, 333).

[21] Please see Appendix A, where we describe each of these controls in detail.

when there are FAD press releases, MPR releases, or speeches (i.e., j = 1, 2, or 3), and zero otherwise. We will compare this proxy, measured on communication days, against the average measure of the same variable on all non-communication days, controlling for the gradual decline in market volatility over our period of study by including the VIX index (Vix_t).[22] The VIX variable is a commonly used measure for overall global financial market volatility (often referred to as the "fear gauge") that is based on the volatility implied from a set of S&P 500 options contract prices. Overall, if Bank communications in fact convey important "market-moving" information, then we expect γ_j to be positive and statistically significant.[23]

4 Data

Our data consist of daily observations over the post-FAD period: 30 October 2000 to 31 May 2007.[24] We exclude the three months following the 11 September 2001 terrorist attacks, in line with the methodology of Kohn and Sack (2003), due to the disruption in financial markets around that period that may lead to distortions. This makes our sample size 2,313 days for each regression.

4.1 Types of central bank communications

We focus on three main types of official Bank of Canada communications, as well as forward-looking policy statements embodied in these communications vehicles. These include: FAD press releases; the *Monetary Policy Report* and the *Monetary Policy Report Update*; and speeches and other communications comprising press conferences and interviews.

4.1.1 FAD press releases

In a press release on 19 September 2000, in an effort to increase transparency, the Bank outlined its plans to move to a FAD regime, whereby it would announce decisions on its target for the overnight policy rate on eight pre-specified dates each year (except in extraordinary circumstances). The first of these FADs occurred on 5 December 2000. On each fixed announcement date, a press release is published at 9:00 a.m. (Eastern Time), announcing the policy decision. The statement includes the reasons underlying the policy decision, an update of the Governing Council's view of the economic outlook, and, more recently, forward-looking policy guidance and a discussion about the balance of risks to the outlook. It is an important form of communication and receives intense scrutiny by market participants.

[22] Kohn and Sack (2003) argue that a comparison of the volatility on FOMC statement days against the level of volatility observed over the week preceding each statement is a superior measure, since it better controls for patterns of volatility over the sample. We find, however, that including a dummy for the week prior to a communication event has little impact on our results. As well, we find, as in Reeves and Sawicki (2007), that estimating equations (1) and (2) using a GARCH methodology (without including the VIX) does not qualitatively change our results.

[23] It is possible, however, that a speech given in a period of high uncertainty and volatility may have a calming effect on markets, thereby reducing volatility.

[24] 30 October 2000 is the date on which the Bank of Canada issued a press release announcing its 2000–01 schedule for FADs.

Between 30 October 2000 and 31 May 2007 (our sample period), there were 53 FADs with accompanying press releases. There was also one inter-meeting policy change with a press release on 17 September 2001, shortly after the 11 September 2001 terrorist attacks. Since we exclude the three months following the terrorist attacks, this implies that our sample includes 51 FADs.

4.1.2 Monetary Policy Reports and MPR Updates

Within our sample period, the *Monetary Policy Report* (MPR) was released two times a year, shortly after every second FAD at 10:30 a.m. (Eastern Time).[25] The briefer *Update* (MPRU) was released two times a year roughly in-between the two MPR releases and, like the MPRs, shortly after the FAD. The main differences between the MPR and MPRU were in their length and the depth of analysis of factors outside the domestic economy. We do not believe that this difference had a significant impact on market reaction. We therefore treat the MPR and MPRU as the same event. Our sample contains 13 MPRs and 13 MPRUs. (Henceforth, we simply refer to the MPR as a reference to both publications.)

The Governing Council uses the MPR as its main method of communicating and updating its detailed views on the current state – and likely evolution – of the economy. Although the main messages of the MPR are summarized in the FAD press release, the MPR elaborates in greater detail the Governing Council's assessment of the factors that shaped the interest rate decision, and puts into context recent developments in terms of the underlying trends over the medium term.

Prior to the release of the MPR, the Governing Council, with substantial input from Bank staff, comes to a consensus view on the future path of the Canadian economy, taking into account any new information since the previous MPR. It is therefore the main vehicle for the Governing Council to communicate, in detail, any significant changes in its view of the economic outlook. It plays a role akin to some central banks' "minutes" in discussing the factors and assumptions underlying the Bank of Canada's economic and inflation outlook. However, since Governing Council's monetary policy decision-making process is consensus-based, the MPR (as opposed to certain central bank minutes) does not provide the views of individual members on the outlook.

4.1.3 Speeches and other communications

All Governing Council members give speeches and, from time to time, the Governor and Senior Deputy Governor give news conferences and interviews. The views expressed in all official

[25] Since the inception of fixed announcement dates, the release of the MPR (and, during our sample period, the MPRU) has always followed the FAD press release. The time lag between these two releases shortened over time (although the content and consistency between the two did not change materially). The MPR and MPRU were initially released two weeks after the FAD. In mid-2001, the Bank began releasing the MPR and MPRU within the same week as the FAD, and, by the end of our sample period, the MPR and MPRU were released two days after the FAD.

Bank communications are representative of, and consistent across, all Governing Council members; they are not the views of individual members. This reflects the fact that the Bank's monetary policy decisions are arrived at by consensus.

Governing Council members speak on a number of topics, which may or may not be of interest to market participants. However, many speeches contain an economic outlook and are followed by a question and answer period. In general, the economic outlook section in a speech is consistent with (and often identical to) the key messages in the MPR and FAD press release, and it is only when there are developments that lead Governing Council to significantly change their views from what was most recently laid out that they would seek to provide a clear signal of this change in a speech. In addition, there is a blackout period during the week preceding the FAD, in which the Bank of Canada does not comment on either the economy or the direction of monetary policy.

In order to include only communications relevant to monetary policy or the economic outlook, as well as capture information that the market actually receives, we include only those speeches, interviews, and news conferences that generate at least one story headline in Bloomberg related to either monetary policy or the economic outlook. Over our sample period, we include 113 speeches or other communications by Governing Council members.

4.1.4 Forward-looking statements

Forward-looking statements began to appear in FAD press releases and MPRs in April 2002.[26,27] It was not, however, until July 2004 that a forward-looking statement was included in nearly all FADs and/or MPRs over our period of study. It is important to note that, over our sample, there have only been either positive or neutral forward-looking statements. This is due to the fact that the second half of our sample, when the Bank of Canada has more consistently included a forward-looking statement, was also a period when there was sustained economic growth and the policy rate was on a relatively consistent upward march. In general, subsequent monetary policy actions have been consistent with these statements, as outlined in Table C.2 in Appendix C.

4.2 Interest rate data

In order to study the impact of communications on short- and long-term interest rate expectations, we use yields of different maturities as the dependent variables. At the short end, we use the 3-month Canadian dealer offered rate (CDOR),[28] because it is the rate to which the bankers' acceptance futures (BAX) contracts settle and is found by Johnson (2003) to be a good

[26] Forward-looking policy statements began to appear in the highlights section of some MPRs and their accompanying press release with the April 2002 MPR, and were included in all MPRs from July 2004 on.
[27] Table C.1 in Appendix C outlines the wording of each forward-looking statement.
[28] The CDOR is tabulated by Reuters at 10:00 a.m., and is a survey of the nine major Canadian dealers. The top and bottom rates are dropped and the rest are averaged. The CDOR is announced at 10:25 a.m.

measure of market expectations. We also include the front three BAX contracts[29] and 2-, 5-, and 10-year Government of Canada benchmark bond yields; however, we first need to make an adjustment to both the BAX and the Government of Canada bond series yields, since they have issues with duration and rollover. That is, for these series, the actual duration of the instrument changes on a daily basis, with big jumps when the contract changes or rolls over. We therefore calculate a 90-, 180-, and 270-day constant-maturity futures-based interest rate by linearly interpolating between the rates on the front four BAX futures contracts. We refer to these constant-maturity contracts as BAX1, BAX2, and BAX3, respectively. Next, consistent with Reeves and Sawicki (2007), we calculate 2-, 5-, and 10-year constant-maturity bond yields using the zero-coupon curve, available on the Bank of Canada's website.

4.3 Macroeconomic announcements data

Using OLS to estimate equation (1), we include in our study the subset of independent macro surprise variables that were significant at the 5 per cent levels over our sample (see Appendix C). Among Canadian releases, this includes releases on both the core and headline consumer price indexes, employment, GDP, housing starts, the Ivey purchasing managers index, leading indicators, manufacturing shipments, and retail sales. The U.S. macroeconomic surprise variables that we find significant at the 5 per cent level include core CPI, GDP, hourly earnings, industrial production, the Institute for Supply Management (ISM) index, non-farm payrolls, the core and headline producer price indexes, the trade balance, and the unemployment release.[30]

5 Results

5.1 Market impact of official Bank of Canada communications

As Table 1 shows, FAD press releases and speeches have a significant impact on the volatility of market rates over the full sample, 30 October 2000[31] to 31 May 2007. The press release that accompanies the FAD decision is significant at the 5 per cent level for the three BAX interest rates and the 2-year Government of Canada bond yield, and has the largest impact on BAX2 and BAX3. This implies that market participants, on average over the sample, find that press releases provide important information for the short- to medium-term outlook. Yields longer than two years do not appear to be significantly impacted by any type of communication.

Interestingly, market rates did not react significantly to the MPR release. This could be due to one of two things. First, in the post-FAD period, MPRs closely follow FAD press releases. It is

[29] Johnson (2003) shows empirically that the front three BAX contracts are among the rates that are most representative of expectations in Canada (under one year), and Harvey (1996) shows that changes in futures prices tend to respond more quickly than (or lead) other money market rates in their reaction to economic news.

[30] The Ivey purchasing managers index begins in January 2001.

[31] We also ran our regressions over the period 30 March 2001 to 31 May 2007, in order to allow for a learning period. This resulted in marginally larger coefficients and slightly higher significance for all yields, but did not significantly change our overall results.

possible that these FAD press releases are "scooping" the new information in the MPR. As discussed earlier, Connolly and Kohler (2007) find that the MPR had a significant impact; however, their sample covers the 1997 to 2004 period. When they run their test over the shorter post-FAD period, they find that the MPR did not have a significant impact. This is consistent with the fact that, in the pre-FAD period, the MPR did not follow the rate decision announcement by any pre-specified time period, since these decisions were made on an as-needed basis.

Another possible explanation is that there is an impact but, because we are using daily data and are unable to control sufficiently for other news that day, this other news is drowning out the impact of the communication event. This theory is supported by Reeves and Sawicki (2007), who find that the Bank of England's *Inflation Report* is not significant at a daily frequency, but is significant when they use intraday data.

Table 1: Full Sample Results

$$\varepsilon_{i,t}^2 = \delta_0 + \delta_1 Vix_t + \sum_{j=1}^{n} \gamma_j comm_{j,t} + \eta_{i,t}$$

	Increase in Var(ε) due to:		
Interest rate	FAD press release	MPR	Speeches
90-day CDOR	0.772 (0.392)	5.944 (0.289)	0.261 (0.776)
BAX1	**14.761** **(0.001)**	17.014 (0.295)	6.431 (0.060)
BAX2	**24.930** **(0.004)**	24.463 (0.212)	**15.586** **(0.021)**
BAX3	**26.570** **(0.010)**	23.963 (0.234)	**16.241** **(0.037)**
2-year bond	**14.975** **(0.023)**	14.333 (0.249)	5.236 (0.177)
5-year bond	5.146 (0.283)	4.547 (0.519)	2.121 (0.460)
10-year bond	-0.251 (0.934)	-0.833 (0.863)	0.432 (0.844)

Note: Bold print indicates significance at the 5 per cent level. The *p*-value is shown in parentheses.

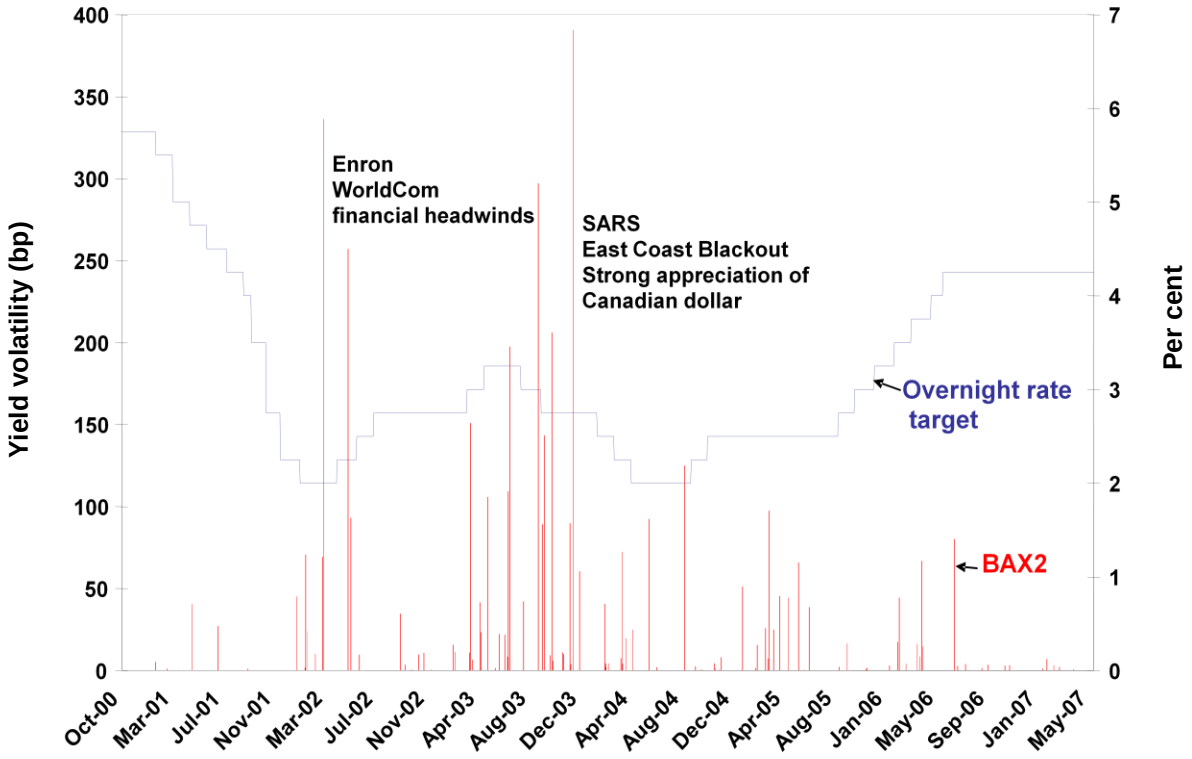
Given that speeches rarely deviate from the messages in the MPR, the finding that speeches had an impact on some markets over the full sample, while the MPR did not, was a bit of a puzzle at first. However, as shown in Figure 1, which displays our volatility measure (the squared

residuals from the estimated equation (1)) for the BAX2 rate over our sample (the red bars), there are two clusters of high-volatility days that help explain this result. Both of these high-volatility periods are marked by higher uncertainty in markets due to either financial headwinds from accounting scandals such as Enron and WorldCom in the earlier period, or from SARS, the East Coast Blackout, and a rapidly appreciating Canadian dollar[32] in the second. These periods are also significant in that a number of speeches included inter-FAD updates to the Bank's views about the future direction of monetary policy (which would cause significant volatility in market prices, since "new" information is incorporated into market prices) and that, during these periods, forward-looking statements were not used in FAD press releases or MPRs. One caveat is that, over these two periods, there were also a number of shocks hitting the market that we are unable to fully control for, which may cause higher volatility on speech days outside of any new information included in those speeches.

To test the hypothesis that only a few speeches led to these results, we conducted a sensitivity analysis by removing, one by one, the speeches that had the largest impact on our market rates. By removing only two speeches (2 per cent of our sample), our results were no longer significant at the 5 per cent level, thus providing support to our theory that it is only a handful of speeches that impact market rates.

[32] For instance, a couple of the speeches that had the largest impact on market yields were given on 20 November 2003 and 8 December 2003, where comments made by then-Governor Dodge with regards to the appropriate level of the Canadian dollar, as well as concerns over the sharp appreciation of the Canadian dollar, led to Bloomberg headlines such as "the rising Canadian dollar may force rate cut."

Figure 1: Volatility of BAX2 on Speech Dates



Finally, as we noted earlier, FAD press releases have a significant impact on the volatility of short- to medium-term rates; however, we find that the 90-day CDOR was not impacted significantly by any official Bank of Canada communication. This, we believe, is due to two factors. The first relates to the nature of the historical data for this rate. The CDOR is a survey rather than a traded rate, and therefore may not represent fully where the market is trading. The other historical rate for 90-day bankers' acceptances (BAs) suffers from a similar problem, since it is a quote, or average of quotes, taken at a pre-specified time.

The second factor, discussed in Harvey (1996), relates to differences in the nature of the BA and BAX markets. Harvey explains that, due to the higher degree of flexibility provided by the BAX market,[33] market participants may deal with the BAX market before dealing with the spot market when new information arrives. Furthermore, estimating the relationship between treasury bill rates[34] and the prices for BAX contracts, Harvey's findings suggest that the BAX market responds to new information faster than the treasury bill market, and it appears to take about two days for about 90 per cent of the price gap between BAX contracts and treasury bills to disappear.

[33] The spot market has higher transaction and investment costs and a more restrictive nature for short positions.
[34] Treasury bill rates are used over BA rates since the rates on treasury bills are highly correlated with those on BAs and the treasury bill market over this period is the most liquid and important money market instrument.

6 Impact of Forward-Looking Statements on Asset Prices: Are Markets Viewing These as Unconditional Commitments?

6.1 Methodology

In this section, we examine empirically whether the use of forward-looking statements has reduced perceived conditionality, thus making the central bank more predictable, but not necessarily more transparent. This would show up in two ways. First, markets would focus less on the information that surrounds the Bank's outlook. In this case, we should see longer-term market rates moving less on FADs. Second, markets would react less to macroeconomic news announcements.

We examine these issues in three ways. First, we examine the hypothesis that interest rates, particularly those whose maturity is past the following FAD or the following two FADs, will react less during the period when the Bank more consistently includes forward-looking statements in FAD press releases and MPRs. To do so, we split our sample in two at 22 July 2004, the point at which forward-looking statements began being used consistently, and examine the communication coefficient estimates from equation (2) over the period 22 July 2004 to 31 May 2007, in order to determine whether the coefficients remain significant over the latter period. Second, using the full sample, we create cross-dummy variables that take the value of 1 on FADs when the FAD press release contained a forward-looking statement, and zero otherwise. (Although most of the forward-looking statements appeared since 22 July 2004, some did appear in FAD press releases in an inconsistent manner prior to 22 July 2004.) Specifically, an additional explanatory variable is added to the second-stage regression and the coefficient on this cross-dummy represents the change in the markets' reaction on FADs that include forward-looking statements relative to all FAD press releases. Thus, equation (2) is modified to yield equation (3):

$$\varepsilon_{i,t}^2 = \delta_0 + \delta_1 Vix_t + \gamma comm_{1,t} + \beta comm_{1,t} * FLS_t + \eta_{i,t} \qquad (3)$$

where $comm_{1,t}$ takes the value of 1 on FADs and zero otherwise, while FLS_t takes the value of 1 on those FADs that include a forward-looking statement and zero otherwise.[35] We estimate equation (3) over the full sample. The sum of the estimates for γ and β represents the average reaction of the market to FADs (i.e., the average impact on the variance of interest rates on those days) that include forward-looking statements, while the estimate for γ alone represents the markets' average reaction on FADs over the entire sample. If markets are ignoring information

[35] The other two communications variables that were included in equation (2) can be included in equation (3), but we found that this has little impact on the coefficient estimates of the variables of interest, or on their own estimates relative to those found when estimating equation (2).

on the outlook contained in the FAD press release outside of the forward-looking statement itself, we would expect the coefficient on this additional cross-dummy variable (β) to be negative and significant.

Finally, we test to determine whether there has been a decline in the impact of macroeconomic news announcements on changes in interest rates since the regular inclusion of forward-looking statements in the FAD press release. To do so, we create cross-dummy variables for macroeconomic news and add these variables to equation (1). The new cross-dummy variables multiply the macroeconomic news variables by a dummy that takes the value of 1 over the period 22 July 2004 to 31 May 2007, and zero otherwise. Equation (1) is modified slightly to include these additional variables, as follows:

$$\Delta y_t = \beta_0 + \beta_1 \Delta ON_t + ... + \sum_{i=1}^{n} \alpha_i cmac_{i,t} + \sum_{j=1}^{m} \lambda_j usmac_{j,t} + \sum_{i=1}^{n} \gamma_i cmac_{i,t} * Dum_t + \sum_{j=1}^{m} \delta_j usmac_{j,t} * Dum_t + \varepsilon_t \qquad (4)$$

where Dum_t takes the value of 1 during the period 22 July 2004 to 31 May 2007, and zero otherwise. If markets understand the central bank's reaction function better (less well), Canadian macro surprise cross-dummy tests should yield significant positive (negative) coefficients (γ_i and δ_j) as market participants react more (less) fully to new domestic economic information as it arrives.

6.2 Results

Tables 2a and 2b provide estimates of the communications coefficients over the first and second samples, respectively. In the first sample, a period where the forward-looking statement was used inconsistently and sparingly, the FAD and speeches are significant for various maturities of interest rates. Table 2b shows that, for all but one interest rate, there are no longer any communication events that are significant.[36]

[36] Although the MPR has a significant impact on the 10-year bond, the coefficient is negative, which may at first seem strange. The Bank, however, attempts to set MPR dates when there are no other major economic events; therefore, it is possible that, if the MPR has no impact on the volatility of 10-year yields, MPR dates may have a lower variance than other non-communication dates, on average.

Table 2a: Results for 30 October 2000 to 21 July 2004 Sample			
	Increase in Var(ε) due to:		
Interest rate	FAD press release	MPR	Speeches
90-day CDOR	1.137 (0.442)	11.486 (0.278)	-0.010 (0.995)
BAX1	**18.345** **0.004**	30.053 (0.297)	11.264 (0.079)
BAX2	**31.538** **(0.013)**	37.011 (0.270)	**27.197** **(0.036)**
BAX3	**34.880** **(0.026)**	34.532 (0.304)	27.055 (0.071)
2-year bond	19.596 (0.058)	23.584 (0.280)	4.779 (0.491)
5-year bond	5.942 (0.448)	12.222 (0.336)	0.392 (0.933)
10-year bond	-1.299 (0.775)	3.955 (0.651)	-0.799 (0.827)
Note: Bold print indicates significance at the 5 per cent level. The *p*-value is shown in parentheses.			

Table 2b: Results for 22 July 2004 to 31 May 2007 Sample			
	Increase in Var(ε) due to:		
Interest rate	FAD press release	MPR	Speeches
90-day CDOR	0.308 (0.441)	-0.124 (0.733)	1.100 (0.199)
BAX1	8.423 0.070	1.348 (0.760)	1.417 (0.581)
BAX2	13.509 (0.121)	9.329 (0.485)	1.597 (0.680)
BAX3	13.798 (0.175)	12.077 (0.462)	1.389 (0.753)
2-year bond	7.956 (0.161)	4.607 (0.528)	3.020 (0.409)
5-year bond	3.007 (0.415)	-2.803 (0.193)	2.814 (0.450)
10-year bond	0.113 (0.969)	**-4.942** **(0.001)**	0.952 (0.727)
Note: Bold print indicates significance at the 5 per cent level. The *p*-value is shown in parentheses.			

These findings seem to support the idea that markets focus almost solely on the forward-looking statement and view it as a rough pre-commitment because, in contrast to our earlier results, FAD press releases are no longer significant at the 5 per cent level. However, it could also be the case that the reduced reaction to FAD press releases is the result of a better or increased understanding of the reaction function of the Bank as markets become accustomed to the new FAD regime. That is, there are fewer information asymmetries between the central bank and markets about the reaction function, and therefore less "new" information in central bank communication.

Before we look at each of these explanations in turn, two factors should be noted that may somewhat reduce the robustness of our results. First, because we split our sample, our sample size is halved, thereby reducing the statistical strength of the test. Second, there are significantly fewer periods of uncertainty in the second half (and fewer macroeconomic turning points in monetary policy), and therefore market participants perhaps have less "new" or less "important" information to react to, relative to the earlier sample.

Table 3 provides the coefficients and their significance level for the full sample and cross-dummy for both the current FAD press release and the subsequent FAD press release scenarios. The table shows that the coefficients on the cross-dummies are, in general, negative and, at least in the first scenario, significant at the 10 per cent level for all but one of the yields. This supports

our hypothesis that the Bank of Canada has become more predictable over the second half of our sample.

Table 3: FAD FLS Cross-Dummy Regressions

	Testing the impact of the FLS on FAD press release days	
Interest rate	FAD press release coef. (γ)	FAD press release cross-dummy coef. (β)
90-day CDOR	2.631 (0.098)	**-3.875** **(0.021)**
BAX1	**22.098** **(0.001)**	**-15.633** **0.060**
BAX2	**41.124** **(0.003)**	**-34.205** **(0.036)**
BAX3	**49.141** **(0.003)**	**-46.766** **(0.016)**
2-year bond	**26.548** **(0.019)**	**-23.285** **(0.070)**
5-year bond	13.558 (0.104)	**-16.551** **(0.078)**
10-year bond	3.889 (0.437)	-7.979 (0.180)

Note: Bold print indicates significance at the 10 per cent level. The *p*-value is shown in parentheses.

In the macro surprise cross-dummy test, we find that, for all yields, the majority of the macro surprise dummies were negative,[37] suggesting that markets reacted less to Canadian macroeconomic releases in the second half of our sample, thus lending further support to our increased-predictability hypothesis.

7 Conclusion

The forward-looking behaviour of economic agents and the fact that central banks control typically only the overnight interest rate implies that financial market expectations are important determinants of the effectiveness of monetary policy. The Bank of Canada's efforts in publishing its views about the economic outlook, including policy-rate guidance, is driven in large part by the desire to enhance the effectiveness of monetary policy. However, as noted by several recent

[37] A number of these negative cross-dummies were also significant at the 5 per cent level. As well, none of the cross-dummies with positive coefficients was significant at the 5 per cent level.

theoretical and empirical studies, there may be some disadvantages to enhancing central bank transparency beyond a certain threshold (see van der Cruijsen, Eijffinger, and Hoogduin 2008; Walsh 2008).

Our analysis provides some indication that the inclusion of policy-rate guidance over the second half of our study period may not yet have yielded an improvement in market participants' understanding of what key economic information goes into the Bank of Canada's interest rate decisions. Indeed, our study suggests that forward-looking statements – even though they have been designed to be conditional – have made the Bank's decisions on the policy rate more predictable but have not necessarily enhanced the markets' understanding of the Bank's monetary policy reaction function.

As with any empirical study, there are important caveats. First, there are issues related to the smaller sample size. By largely focusing on the second half of the sample, we reduce the number of FAD communications and in turn likely reduce the robustness of our empirical methodology. There are also a number of issues related to the different economic environments between the first and second half of the full sample; for instance, there are only a few policy turning points over our full sample and none in the second half of the sample, the period when forward-looking statements were used consistently. Therefore, there is less uncertainty and fewer macroeconomic shocks and/or less news to react to, possibly contributing to some of our second-half results in which macroeconomic variables become less important movers of interest rates. As well, empirical work suggests that the pre-existing shape of the yield curve at the time of the communication will impact how markets react to news along the yield curve.

Another related caveat is that the sample period in which the forward-looking statements were consistently included in FAD press releases is one where there has not been a sharp change in the Bank of Canada's view about the economic outlook for inflation. Moreover, the Bank stressed in its communications during this period that it does not react to any one macroeconomic shock or surprise. The smaller reaction of market rates to macroeconomic news in the second half of our sample may, in part, reflect the market's better understanding of how the Bank reacts to the accumulation of macroeconomic data. Consequently, instead of reacting substantially to one-off macroeconomic shocks, there is more of a gradual shift in policy-rate expectations from market participants, who have an accumulation of data that we are unable to control for in our methodology.

Finally, using data at a daily frequency may also affect our results because it is not possible to control for all other shocks hitting the market on the same day. Further study at an intraday trading frequency, currently under way, might yield different answers.

There is agreement among central bankers that, in general, issues relating to the incorporation of conditionality and uncertainty around this form of policy guidance remain. The debate focuses

on the weighting of the risks versus the benefits of policy-rate guidance, and the various views on how conditionality can be incorporated into the communications strategy. Consequently, a full spectrum of communication strategies is employed in determining how much of the policy outlook to reveal, ranging from not including policy guidance except by being more explicit about how prospective changes in key macroeconomic variables will affect the balance of risks to the central bank's outlook,[38] to regularly publishing a policy-rate forecast. There may be no "ideal" communications strategy that sufficiently mitigates the risk that markets perceive a lack of conditionality and uncertainty surrounding the published policy guidance.[39] However, in deciding to provide policy signals or guidance, it should be remembered that the goal is to enhance the market participants' – if not all economic agents' – understanding of the central bank's typical monetary policy reaction function, rather than the more narrow aim of increasing the markets' ability to anticipate future monetary policy actions. By adjusting its communication strategy in this way, the central bank will be better placed to achieve the desired increase in monetary policy transparency that should enhance the effectiveness of the monetary policy transmission mechanism.

[38] Walsh (2008) argues that there exists a related distinction between *better* and *more* central bank information about its economic outlook, in which *better* information is found to always be welfare improving while *more* has an ambiguous effect on welfare.

[39] van der Cruijsen, Eijffinger, and Hoogduin (2008) show that there is likely to be an optimal intermediate degree of central bank transparency beyond which markets might: (i) start to attach too much weight to the conditionality of their forecasts, or (ii) become confused by the large and increasing amount of information they receive.

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Appendix A: Control Variables

A.1 Macroeconomic Surprises

Gravelle and Moessner (2001) and Parent (2002–2003), among others, find that the surprise component of macroeconomic announcements has a statistically significant impact on a number of Canadian market rates. Following Gravelle and Moessner (2001) and Reeves and Sawicki (2007), we calculate standardized[40] macroeconomic surprises as:

$$mac_{i,t}^{\mu} = \frac{(X_{i,t} - X_{i,t}^{e})}{\Omega_i^X} \qquad \text{(A1)}$$

where $X_{i,t} - X_{i,t}^{e}$ is the actual minus the market expected value of the i^{th} macroeconomic release on day *t*, and Ω_i^X is the sample standard deviation of surprises for the i^{th} macroeconomic release. This is set to zero on days when no announcements are made.[41]

Financial market expectations or forecasts of the macroeconomic data release used in calculating the surprise component are provided by Bloomberg surveys conducted prior to each announcement. We use Bloomberg market poll surveys as our market expectations, instead of Money Market Services International, since this latter source has data limitations in the more recent period; however, both polls survey a similar group of economists.[42,43]

A.2 Policy Surprises

As pointed out in Kohn and Sack (2003) and empirically shown through factor analysis in Gürkaynak, Sack, and Swanson (2004), the market response to a policy announcement consists of two distinct factors. The first is the difference between where markets expect the central bank

[40] We standardize the macroeconomic surprises in order to make the coefficients comparable across indicators.

[41] Another factor that would influence yields would be revisions to macroeconomic releases. However, we do not have a full sample of data for this, and so we do not include it in our study. Since the macro revision is released at the same time as the current-period macro release, not including the revisions may make the result marginally noisier, if anything.

[42] Although Gravelle and Moessner (2001) and Parent (2002–2003) use S&P MMS survey data for their full sample, we are unable to do this, since the survey becomes inconsistent after mid-2003. Recent empirical work has faced this same challenge and has found that, where the two surveys overlap, the two data sources agree very closely. Comparison of our data confirms this.

[43] Reeves and Sawicki (2007) also split their macroeconomic survey data sample between MMS and Bloomberg, due to data limitations. Other researchers who have dealt with this issue include Robitaille and Roush (2006); Gürkaynak, Levin, and Swanson (2006); Gürkaynak and Wolfers (2005).

to set its policy rate and the action the central bank *actually* takes on one particular policy date. This is the "surprise" component. The second is linked to the press release that accompanies the policy action, and is the perceived change in the future path of policy.

Since we want to focus on the communications aspect, the press release, we will need to control for any impact that the "surprise" component of the Bank's policy action has on Canada's key rates. Given Canada's close links with the United States, we will also test for Canadian market reaction to U.S. policy surprises.

A.2.1 Canadian policy surprises

Following the methodology of Andreou (2005), we will take the 1-day difference in the 1-month BA rate[44] on Canadian monetary policy decision days:

$$\Delta ON_t^u = ba_t - ba_{t-1} \qquad \text{(A2)}$$

where ba_t- ba_{t-1} is the surprise component of policy. We set this equal to zero on non-policy days.

A.2.2 U.S. policy surprises

Consistent with the work of Kuttner (2000), we measure U.S. policy surprises as

$$\Delta ff_t^u = \left[D/(D-d)\right] \cdot \Delta ff1_t \qquad \text{(A3)}$$

where D is the total number of days in the month, d is the day of the month of the FOMC decision, and $\Delta ff1_t$ is the change in the futures rate on the day of the policy decision (including inter-meeting actions). We set this equal to zero on non-policy days.

[44] Johnson (2003) shows empirically, by testing the expectations hypothesis, that 1-month BAs are the best proxy for market expectations (over our period of study). A number of studies use the Reuters survey of market economists as their proxy for market expectations. We find this measure in Canada to not be statistically significantly different from our measure; however, we choose our measure for a number of reasons, including the shorter time lag between the survey and the actual announcement.

A.3 U.S. Communications

As pointed out by Gravelle and Moessner (2001) and shown empirically in Connolly and Kohler (2007), "Because Canada is a small open economy, with direct links to the U.S. economy in terms of trade and capital flows, it should be of no surprise to find that Canadian debt instruments are significantly influenced by U.S. interest rates. . . . a more direct way to control for the effects from U.S. interest rate movements is to examine the Canadian yields' reactions to U.S. macroeconomic announcements" (Gravelle and Moessner 2001, 6–7). Although we have already included U.S. macro announcements and policy surprises, we have not controlled for another major factor that influences U.S. interest rates (and, in turn, Canadian rates): FOMC communications.

To control for the impact of FOMC communications on Canadian rates, we will include the 1-day change in the second eurodollar futures contract,[45] as well as the 1-day change in the on-the-run 2-year Treasury on dates of FOMC press releases, testimonies, and minutes.[46]

[45] The second eurodollar futures contract is tied to the 3-month London Interbank Offered Rate on the date of expiration – a rate that is primarily influenced by the expected federal funds rate over the subsequent three months.

[46] Reinhart and Sack (2006) test both short- and medium-term expectations using these rates and find FOMC press releases, testimonies, and minutes (following the change in release time) to be significant. We will therefore include only these Fed communications in our regression.

Appendix B: The Role of FADs in Enhancing Market Participants' Understanding of the Monetary Policy Reaction Function

As argued in Gravelle and Moessner (2001) and Moessner, Gravelle, and Sinclair (2005), FADs are key to enhancing market participants' understanding of the monetary policy reaction function. Without FADs, market participants find it difficult to accumulate and distill the macroeconomic data in a fashion that roughly simulates the way the Bank uses them for its economic outlook, and find it difficult to properly understand the central bank's monetary policy reaction function. The transparency advantages of FADs become apparent when one considers that, in a regime without fixed dates, a day that the central bank does not change rates looks the same as any other day, but, in a regime with fixed dates, a day that the central bank does not change its policy rate on the designated date is news. In addition to information generated by the announcement itself (of moving the target rate or not), FADs also provide the central bank with a means of communicating to the public, through the press release that accompanies the monetary policy decision, its views about the economic outlook and what drives any revision to it, as well as its policy stance or any guidance that results from the outlook.

Previous empirical work undertaken at the Bank of Canada by Muller and Zelmer (1999), Gravelle and Moessner (2001), Parent (2002–2003), and Andreou (2005) has studied whether the move to FADs has increased central bank transparency. Parent (2002–2003), extending the work of Gravelle and Moessner (2001), shows empirically that Canadian market interest rates react to more Canadian macro announcement "surprises" and fewer U.S. macro announcement "surprises" in the post-FAD period than in the pre-FAD period. This work suggests that the introduction of the FAD regime has increased transparency by shifting the focus of markets to Canadian rather than U.S. economic conditions; it finds support for the idea that FADs have contributed significantly to the improvement of the markets' understanding of the Bank's reaction function. Andreou (2005), following closely the work of Kuttner (2000), measures empirically the impact of policy surprises on Canadian government treasury bill and bond yields. He finds that the impact of a surprise action on the long end of the yield curve has diminished since the introduction of the FAD process, suggesting that the Bank's long-term policy goals are better understood and more credible.

Appendix C

Table C.1: Use of Forward-Looking Policy Language in Bank of Canada FAD Press Releases and MPRs

Date	Event	Change in the target ON rate	Near-term direction of ON rate implied by FLS	Balance of risk	Forward-looking policy statement (FLS)	Balance-of-risk statement
29 May 2007	FAD	0	Higher ON rate	Slight tilt to upside	… some increase in the target for the overnight rate may be required in the near term…	On balance, the Bank judges that there is an increased risk that future inflation will persist above the 2 per cent inflation target…
26 Apr 2007	MPR		Unchanged ON rate	Slight tilt to upside	The current level of the target for the overnight rate is judged, at this time, to be consistent with achieving the inflation target over the medium term.	The Bank continues to judge that the risks to its inflation projection are roughly balanced, although there is now a slight tilt to the upside.
24 Apr 2007	FAD	0	Unchanged ON rate	Slight tilt to upside	The current level of the target for the overnight rate is judged, at this time, to be consistent with achieving the inflation target over the medium term.	The Bank continues to judge that the risks to its inflation projection are roughly balanced, although there is now a slight tilt to the upside.
6 Mar 2007	FAD	0	Unchanged ON rate	Balanced	In line with the Bank's outlook, the current level of the target for the overnight rate is judged, at this time, to be consistent with achieving the inflation target over the medium term.	Despite recent volatility in global financial markets, the Bank continues to judge that the risks to its inflation projection are roughly balanced
18 Jan 2007	MPRU		Unchanged ON rate	Balanced	The current level of the policy interest rate is judged, at this time, to be consistent with achieving the inflation target.	The risks around the Bank's inflation projection continue to be judged to be roughly balanced, but the main upside and downside risks have diminished somewhat since the October *MPR*.
16 Jan 2007	FAD	0	Unchanged ON rate	Balanced	In line with the Bank's outlook, the current level of the target for the overnight rate is judged, at this time, to be consistent with achieving the inflation target over the medium term.	The Bank continues to judge that the risks to the inflation projection are roughly balanced, but the main upside and downside risks outlined in the October *MPR* have diminished

						somewhat
5 Dec 2006	FAD	0	Unchanged ON rate	Balanced	In line with the Bank's outlook, the current level of the target for the overnight rate is judged at this time to be consistent with achieving the inflation target over the medium term.	The Bank judges that, overall, risks around the inflation projection are roughly balanced.
19 Oct 2006	MPR		Unchanged ON rate	Balanced	The current level of the policy interest rate is judged, at this time, to be consistent with achieving the inflation target.	The Bank judges that the risks to its inflation projection are roughly balanced.
17 Oct 2006	FAD	0	Unchanged ON rate	Balanced	In line with this updated outlook, the current level of the target for the overnight rate is judged at this time to be consistent with achieving the inflation target over the medium term.	It is the Bank's judgment that, overall, risks around the inflation projection are roughly balanced.
6 Sep 2006	FAD	0	Unchanged ON rate	Balanced	In line with this outlook, the current level of the target for the overnight rate is judged at this time to be consistent with achieving the inflation target over the medium term.	While both these risks appear to be a little greater than they were in July, the Bank continues to judge that, overall, risks are roughly balanced.
13 Jul 2006	MPRU		Unchanged ON rate	Small tilt to downside later in projection	The current level of the policy interest rate is judged at this time to be consistent with achieving the inflation target	the Bank continues to judge that these risks are roughly balanced, with a small tilt to the downside later in the projection period because of the possibility of a disorderly resolution of global imbalances.
11 July 2006	FAD	0	Unchanged ON rate	Small tilt to downside later in projection	In line with the Bank's largely unchanged outlook, the current level of the target for the overnight rate is judged at this time to be consistent with achieving the inflation target over the medium term.	Risks to the projection remain roughly balanced, with a small tilt to the downside later in the projection period related to global imbalances.
24 May 2006	FAD	+25bp	Unchanged ON rate	Short term risks balanced. Small tilt to downside later in projection	With today's increase, the target for the overnight rate is now at a level that is expected to keep the Canadian economy on the base-case path projected in the April *Monetary Policy Report* (*MPR*) and to return inflation to the 2 per cent target.	The Bank continues to assess the risks to this projection to be as presented in the *MPR*.

27 Apr 2006	MPR		Higher ON Rate	Short term risks balanced. Small tilt to downside later in projection	In line with the Bank's outlook, some modest further increase in the policy interest rate may be required.	The Bank judges that these risks are roughly balanced, with a small tilt to the downside later in the projection period.
25 Apr 2006	FAD	+25bp	Higher ON Rate	Short term risks balanced. Small tilt to downside later in projection	In line with the Bank's outlook for the Canadian economy, some modest further increase in the policy interest rate may be required to keep aggregate supply and demand in balance and inflation on target over the medium term.	The Bank judges that the risks to its projection are roughly balanced, with a small tilt to the downside later in the projection period.
7 Mar 2006	FAD	+25bp	Higher ON Rate	Short term risks balanced. Risks tilted to downside later in projection	Consistent with this view, some modest further increase in the policy interest rate may be required to keep aggregate supply and demand in balance and inflation on target over the medium term	Recent data do not alter the Bank's outlook for growth and inflation, including its assessment of risks, as set out in the January *Update*
26 Jan 2006	MPRU		Higher ON Rate	Short term risks balanced. Risks tilted to downside later in projection	In line with the Bank's outlook, some modest further increase in the policy interest rate would be required.	Risks to the Bank's projection remain balanced for 2006. Through 2007 and beyond, risks are tilted to the downside, as the unwinding of global imbalances could involve a slowdown in world economic activity.
24 Jan 2006	FAD	+25bp	Higher ON rate	Short term risks balanced. Risks tilted to downside later in projection	In line with the Bank's base-case projection and current assessment of risks, some modest further increase in the policy interest rate would be required to keep aggregate supply and demand in balance and inflation on target over the medium term.	Risks to the Bank's projection remain balanced for 2006 and tilted to the downside through 2007 and beyond.
6 Dec 2005	FAD	+25bp	Higher ON rate	Short term risks balanced. Risks tilted to downside later in	In line with the outlook, some further reduction in monetary stimulus will be required to maintain a balance between aggregate supply and demand over the next four to six quarters and	The Bank continues to judge that the risks to the outlook are balanced over the short term, but are tilted to the downside through 2007 and beyond.

				projection	keep inflation on target.	
20 Oct 2005	MPR		Higher ON rate	Short term risks balanced. Risks tilted to downside later in projection	In line with the Bank's outlook, some further reduction of monetary stimulus will be required.	Short-term risks to this projection appear to be balanced. But looking further out to 2007 and beyond, there are increasing risks that the unwinding of global economic imbalances could involve a period of weak world economic growth.
18 Oct 2005	FAD	+25bp	Higher ON rate	Short term risks balanced. Risks tilted to downside later in projection	In line with the Bank's outlook, and given that the Canadian economy now appears to be operating at capacity, some further reduction of monetary stimulus will be required to maintain a balance between aggregate supply and demand over the next four to six quarters, and to keep inflation on target.	Short-term risks to this projection appear to be balanced. But as we look further out to 2007 and beyond, there are increasing risks that the unwinding of global economic imbalances could involve a period of weak global growth.
7 Sep 2005	FAD	+25bp		Short term risks balanced. Risks tilted to downside later in projection	None	Despite developments associated with higher energy prices, risks to the Bank's outlook for the Canadian economy through 2006 still appear to be reasonably balanced. Over the medium term, however, there is increasing risk that the correction of global current account imbalances could involve a period of weakness in world aggregate demand.
14 Jul 2005	MPRU		Higher ON rate	Tilted to downside later in projection	In line with this outlook, some reduction of monetary stimulus will be required in the near term.	These risks appear to be balanced. Over the medium term, however, there is increasing risk that the correction of global current account imbalances could involve a period of weakness in world aggregate demand.
12 Jul 2005	FAD	0	Higher ON rate	Tilted to downside later in projection	However, in line with the Bank's outlook, some reduction in the amount of monetary stimulus will be required in the near term to	The risks to the outlook through 2006 appear balanced, but over the medium term risks related to global

					keep aggregate demand and supply in balance and inflation on target.	imbalances are increasing.
25 May 2005	FAD	0	Higher ON rate		In line with this outlook, a reduction of monetary stimulus will be required over time.	None
14 Apr 2005	MPR		Higher ON rate		In line with this outlook, a reduction of monetary stimulus will be required over time.	None
12 Apr 2005	FAD	0	Higher ON rate		In line with this outlook, a reduction of monetary stimulus will be required over time.	None
1 Mar 2005	FAD	0	Higher ON rate		…the implications for the pace of reduction in monetary stimulus are essentially unchanged from those that the Bank presented in January's *Update*	None
27 Jan 2005	MPRU		Higher ON rate (but at a slower rate than anticipated at the time of the MPR)		The pace of reduction in monetary stimulus is likely to be slower than envisioned in the October *Report*.	None
25 Jan 2005	FAD	0			None – refers to MPRU	None
7 Dec 2004	FAD	0			None	None
21 Oct 2004	MPR		Higher ON rate		This base-case projection assumes further reduction of monetary stimulus over time to keep the economy near its production capacity and achieve the inflation target.	None
19 Oct 2004	FAD	+25bp	Higher ON rate		Further reduction of monetary stimulus will be required over time to keep inflation on target, with the pace depending on the Bank's continuing assessment of the prospects for factors that affect pressures on capacity and, hence, inflation.	None
8 Sep 2004	FAD	+25bp	Higher ON rate		None	None
22 Jul 2004	MPRU		Higher ON rate		Monetary stimulus will have to be removed to avoid a buildup of inflation pressures. The pace of the	None

					withdrawal will depend on the evolving prospects for inflation and for capacity pressures	
20 Jul 2004	FAD	0			None – refers to MPRU	None
8 Jun 2004	FAD	0			None	None
15 Apr 2004	MPR			Balanced	None	Overall, the risks to the outlook appear balanced.
13 Apr 2004	FAD	-25bp		Balanced	None	The risks to the outlook now appear balanced
2 Mar 2004	FAD	-25bp			None	None
22 Jan 2004	MPRU				None	None
20 Jan 2004	FAD	-25bp			None	None
2 Dec 2003	FAD	0			None	None
22 Oct 2003	MPR				None	None
15 Oct 2003	FAD	0			None	None
3 Sep 2003	FAD	-25bp			None	None
17 Jul 2003	MPRU				None	None
15 July 2003	FAD	-25bp			None	None
3 June 2003	FAD	0			None	None
23 Apr 2003	MPR		Higher ON rate		The Bank believes that further reductions in monetary stimulus over time will be necessary, but the timing and pace will depend on the evolution of inflation expectations and the strength of domestic and external demand.	None
15 Apr 2003	FAD	+25bp			None	None
4 Mar 2003	FAD	+25bp	Higher ON rate		As indicated in the *MPR Update*, further reductions in monetary stimulus will be required to return inflation to the target over the medium term.	None
23 Jan 2003	MPRU		Higher ON rate		With the stance of monetary policy currently very stimulative, a reduction of stimulus will be required in order to return inflation to	None

					the 2 per cent target over the medium term.	
21 Jan 2003	FAD	0	Higher ON rate		However, with the stance of monetary policy currently very stimulative, a reduction of stimulus will be required in order to return inflation to the 2 per cent target over the medium term.	None
3 Dec 2002	FAD	0	Higher ON rate		timely removal of monetary stimulus will be required to achieve the inflation target over the medium term	None
23 Oct 2002	MPR		Higher ON rate		Going forward, further removal of monetary stimulus will be required, with the pace and extent of the tightening depending on unfolding developments and on their implications for pressures on capacity and inflation in Canada.	None
16 Oct 2002	FAD	0	Higher ON rate		It remains the Bank's view, going forward, that timely removal of monetary stimulus will be required to achieve the inflation target over the medium term.	None
4 Sep 2002	FAD	0	Higher ON rate		Looking forward, it remains the Bank's view that, as the Canadian economy continues to expand and to approach its production capacity, further measured reductions in monetary stimulus will be necessary in order to achieve the inflation control target of 2 per cent over the medium term.	None
24 Jul 2002	MPRU		Higher ON rate	Balanced	It remains the Bank's view that the underlying economic situation will require further reductions in the amount of monetary stimulus (PR)	At this time, the risks to our projected rate of growth of 3 to 4 per cent growth appear to be balanced. (PR)
16 Jul 2002	FAD	+25bp			None	None
4 Jun 2002	FAD	+25bp	Higher ON rate		None	None
24 Apr 2002	MPR		Higher ON rate		As the economy approaches its capacity, the task for monetary policy is to gauge economic strength and the implications for future	None

					inflation. This means reducing the substantial amount of stimulus in place in a timely and measured manner.	
16 Apr 2002	FAD	+25bp			None	None
5 Mar 2002	FAD	0			None	None
23 Jan 2002	MPRU				None	None
15 Jan 2002	FAD	-25bp			None	None
27 Nov 2001	FAD	-50bp			None	None
7 Nov 2001	MPR				None	None
23 Oct 2001	FAD	-75bp			None	None
17 Sep 2001	Inter-meeting	-50bp			None	None
28 Aug 2001	FAD	-25bp			None	None
1 Aug 2001	MPRU				None	None
27 Jul 2001	FAD	-25bp			None	None
29 May 2001	FAD	-25bp			None	None
1 May 2001	MPR				None	None
17 April 2001	FAD	-25bp			None	None
6 Mar 2001	FAD	-50bp			None	None
6 Feb 2001	MPRU				None	None
23 Jan 2001	FAD	-25bp			None	None
5 Dec 2000	FAD	0			None	None
9 Nov 2000	MPR				None	None

Table C.2a: Consistency of BOC Forward-Looking Policy Statements and Monetary Policy Decisions: Post-FAD full sample excluding 3 months following 11 September

	Monetary Policy Decision (following meeting)			
Direction of Forward looking Policy Statement in Press Release or MPR	**Easing**	**No Change**	**Tightening**	**All**
Easing	0	0	0	0
Neutral	0	8	0	8
Tightening	0	10*	12	22
No Forward Looking Statement	12	6	2	20
All	12	25	14	50

*on one occasion there was no change in the following meeting but an ease in the next meeting

Table C.2b: Consistency of BOC Forward-Looking Policy Statements and Monetary Policy Decisions: Post-FAD second half (22 July 2004–31 May 2007)

	Monetary Policy Decision (following meeting)			
Direction of Forward looking Policy Statement in Press Release or MPR	**Easing**	**No Change**	**Tightening**	**All**
Easing	0	0	0	0
Neutral	0	8	0	8
Tightening	0	5	10	15
No Forward Looking Statement	0	0	0	0
All	0	13	10	23

Table C.3: Canadian Interest Rate Response to Surprises: Pre- and Post-FAD Subsamples

Rate	Significant surprises, post-FAD (31 Oct. 00–31 May 07)	R^2	Significant surprises,[47] post-FAD 1st half (31 Oct. 00–21 July 04)	R^2	Significant surprises, post-FAD 2nd half (22 July 04–31 May 07)	R^2
Front BAX	c_cpixfe (2.2660, 0.0000); c_emp (2.2210, 0.0006); c_gdp (0.8430, 0.0110); c_ivey (0.8356, 0.0224); c_rtl_sls (1.6918, 0.0022) us_gdp (1.0231, 0.0058); us_nfp (2.7792, 0.0000)	0.3024	c_cpixfe (2.8758, 0.0002); c_emp (3.0365, 0.0016); c_rtl_sls (2.4350, 0.0035) us_gdp (1.5311, 0.0001); us_nfp (3.2642, 0.0000);	0.3585	c_cpixfe (1.4575, 0.0080); c_gdp (1.4019, 0.0002); c_ivey (0.7757, 0.0373); c_raw_mat (-0.4882, 0.0429) us_nfp (3.1476, 0.0000); us_ppixfe (0.4860, 0.0421); us_unemp (-2.2254, 0.0050)	0.2199
2nd BAX	c_cpixfe (2.5208, 0.0008); c_emp (3.9619, 0.0000); c_gdp (1.7439, 0.0080); c_ivey (1.2418, 0.0384); c_rtl_sls (2.7664, 0.0014) us_cpixfe (1.0142, 0.0292); us_gdp (1.8894, 0.0054); us_mich (0.8012, 0.0389); us_nfp (5.1355, 0.0000); us_unemp (-1.7781, 0.0073)	0.2694	c_cpixfe (2.4025, 0.0123); c_cpi (1.8341, 0.0318); c_emp (4.8005, 0.0010); c_rtl_sls (3.5724, 0.0079); us_cpixfe (1.6574, 0.0260); us_gdp (2.5225, 0.0009); us_hr_earn (2.0707, 0.0469); us_ind_prod (1.9635, 0.0218); us_ism (2.6915, 0.0440); us_mich (1.3477, 0.0163); us_nfp (5.6011, 0.0000)	0.3091	c_cpixfe (2.6606, 0.0063); c_emp (2.7756, 0.0049); c_gdp (2.3579, 0.0005); c_rtl_sls (1.6396, 0.0405) us_nfp (6.1014, 0.0000); us_ppixfe (1.5567, 0.0002); us_unemp (-4.0079, 0.0075)	0.2394
3rd BAX	c_cpixfe (2.8916, 0.0023); c_emp (4.3766, 0.0000); c_gdp (1.7828, 0.0182); c_rtl_sls (3.0025, 0.0010) us_cpixfe (1.4655, 0.0074); us_gdp (2.2557, 0.0039); us_hr_earn (2.1960, 0.0179); us_ism (2.3627, 0.0376); us_nfp (6.4945, 0.0000); us_unemp (-1.9770, 0.0111)	0.2568	c_cpixfe (3.0472, 0.0194); c_emp (4.6898, 0.0062); c_rtl_sls (3.8159, 0.0083) us_cpixfe (2.4493, 0.0034); us_gdp (2.7636, 0.0059); us_hr_earn (2.8730, 0.0178); us_ind_prod (2.1186, 0.0276); us_ism (3.1486, 0.0277); us_mich (1.5479, 0.0252); us_nfp (6.9083, 0.0000)	0.2899	c_cpixfe (2.6648, 0.0103); c_emp (3.9098, 0.0001); c_gdp (2.9563, 0.0006); c_rtl_sls (1.7852, 0.0196) us_nfp (7.6713, 0.0000); us_ppixfe (2.0647, 0.0000); us_unemp (-4.8649, 0.0093)	0.2500
2-year bond	c_cpixfe (2.5352, 0.0009); c_emp (3.2099, 0.0004); c_gdp (1.6745, 0.0048); c_rtl_sls (2.3064, 0.0041) us_cpixfe (1.1361, 0.0171); us_gdp (1.6855, 0.0151); us_hr_earn (1.9372, 0.0079); us_ind_prod (0.9930, 0.193); us_ism (2.2035, 0.0131); us_nfp (5.4516, 0.0000); us_unemp (-1.8403, 0.0066)	0.2634	c_cpixfe (2.4617, 0.0257); c_emp (3.1078, 0.0311); c_ivey (2.0236, 0.0400); c_rtl_sls (2.7872, 0.0332) us_cpixfe (1.6800, 0.0147); us_gdp (2.0822, 0.0190); us_hr_earn (2.5396, 0.0147); us_ind_prod (2.2551, 0.0004); us_ism (3.6300, 0.0079); us_nfp (5.6645, 0.0000); us_unemp (-1.6721, 0.0421)	0.2909	c_cpixfe (2.5743, 0.0036); c_emp (3.3618, 0.0000); c_gdp (2.2952, 0.0024); c_rtl_sls (1.6200, 0.0106) us_nfp (6.1859, 0.0000); us_ppixfe (0.8722, 0.0437); us_unemp (-3.2702, 0.0167)	0.2706
5-year bond	c_cpixfe (1.8511, 0.0055); c_emp (2.4162, 0.0027); c_hsg_sts (-0.9512, 0.0149); c_ivey (1.2873, 0.0474); c_rtl_sls (1.6627, 0.0195) us_cpixfe (1.4323, 0.0053);	0.2056	c_cpixfe (1.9462, 0.0419); c_curr_acct (-1.9733, 0.0144); c_hsg_sts (-1.3573, 0.0185); c_ivey (2.4559, 0.0084) us_cpixfe (1.9551, 0.0163);	0.2234	c_curr_acct (3.0674, 0.0187); c_emp (3.0067, 0.0000); c_rtl_sls (1.2659, 0.0380) us_nfp (5.3438, 0.0000); us_ppixfe (1.2387, 0.0045)	0.2251

[47] The first number in parentheses is the coefficient; the second number represents the significance level. Estimated using a Newey-West adjusted covariance matrix.

	us_gdp (1.4152, 0.0414); us_hr_earn (1.6987, 0.0268); us_ind_prod (0.8430, 0.0433); us_ism (1.5801, 0.0218); us_nfp (5.0138, 0.0000); us_ppixfe (0.9790, 0.0108); us_unemp (-1.2933, 0.0409)		us_ind_prod (1.8255, 0.0034); us_ism (2.5423, 0.0327); us_nfp (5.1961, 0.0000)			
10-year bond	c_cpixfe (1.3067, 0.0255); c_emp (1.6305, 0.0224); c_hsg_sts (-0.8984, 0.0231) us_cpixfe (1.0933, 0.0304); us_ism (1.2955, 0.0099); us_nfp (3.8224, 0.0000); us_ppi (-0.8034, 0.0283); us_ppixfe (0.9975, 0.0072)	0.1579	c_curr_acct (-2.6186, 0.0018); c_hsg_sts (-1.5156, 0.0063); c_ivey (2.2252, 0.0084) us_ism (1.8670, 0.0387); us_nfp (3.8319, 0.0003)	0.1692	c_curr_acct (3.3261, 0.0256); c_emp (2.5218, 0.0000) us_ism (1.0035, 0.0186); us_nfp (4.1649, 0.0000); us_ppi (-0.8990. 0.0087); us_ppixfe (1.4020, 0.0031)	0.1982
Can$/ US$ excha-nge rate	c_emp (0.2264, 0.0000); c_lead_ind (0.0785, , 0.0026); c_manu_ship (0.0870, 0.0395); c_rtl_sls (0.1672, 0.0007) us_ppi (0.0717, 0.0496); us_trd_bal (-0.1123, 0.0025)		c_emp (0.1716, 0.0108); c_lead_ind (0.0857, 0.0019); c_rtl_sls (0.1733, 0.0085)	0.0944	c_cpixfe (0.1636, 0.0116); c_emp (0.3016, 0.0000); c_manu_ship (0.1671, 0.0353); c_mrch_trade (0.1315, 0.0245); c_rtl_sls (0.1614, 0.0357) us_hr_earn (-0.1204, 0.0206); us_ppi (0.1135, 0.0148); us_trd_bal (-0.0941, 0.0355)	0.1160