The Market Impact of Forward-Looking Policy Statements: Transparency vs. Predictability

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- *Transparency is now considered an essential element of an effective monetary policy framework, and a central bank's communication strategy is key to achieving this. Consequently, central banks continuously strive to improve how they communicate to financial markets and the broader public.*

- *In an effort to increase transparency, the Bank of Canada and other central banks have begun to use forward-looking policy guidance in their communications. The Bank of Canada now includes forward-looking statements in press releases accompanying interest rate decisions and in monetary policy reports.*

- *There is currently a debate over the usefulness of forward-looking statements. The empirical evidence in this article suggests that, to date, the use of forward-looking statements in Bank of Canada communications has made the Bank more predictable, but not necessarily more transparent.*

*D*isclosing more of the Bank's assessment about the outlook, including forward-looking statements about monetary policy actions, is particularly tricky and really tests the limits of transparency. Nevertheless, it is in this area that there may be the most room to increase transparency. But first, we must figure out if it would be beneficial to provide more information for market participants, firms, and individuals. More fundamentally, would it improve the effectiveness of monetary policy? And if we find that it would be beneficial, how can we convey this information so that it would be readily understood? Or more importantly, how can we convey this information in a way that will not be misunderstood? (Kennedy 2008)

It is generally accepted today that transparency is a key component of an effective monetary policy framework, and communication plays an important role in increasing transparency. Over the past few years, several major central banks have sought to further enhance their monetary policy transparency by including guidance on the policy rate in their official communications in the form of either policy-inclination statements (also known as forward-looking statements) or a policy-rate path or forecast. There is an ongoing debate, however, on the value of communicating policy-rate guidance to the public, including strong arguments for and against its use. In this article, we examine the debate from both a theoretical and an empirical standpoint.[1] Our empirical analysis suggests

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1. This article is based on a forthcoming working paper by the authors (Fay and Gravelle 2009).

that forward-looking policy statements in Bank of Canada communications have made the Bank more predictable, but have not necessarily helped market participants improve their understanding of the central bank's monetary policy reaction function.

Transparency, Predictability, and Conditionality

Central bank transparency can make monetary policy more effective in three ways. First, the central bank fosters greater credibility by being clear 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 exposure to 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. Third, and this is the focus of this article, central bank transparency should help market participants improve their understanding of the central bank's monetary policy reaction function, allowing them to better anticipate future changes in the policy interest rate. Thus, although the central bank only has control over 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 and its views on the economic outlook. 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.

The Bank of Canada, like many other central banks, has taken various measures over the years to increase transparency and to communicate its views about the economic outlook to the public. Since 1995, the Bank has published a *Monetary Policy Report* (MPR) in April and October. Beginning in 2000, this has been supplemented by a *Monetary Policy Report* (MPR) *Update*, released in January and July.[2] Since 1994, a press release has also been published with every decision on

the policy rate. Over the years, speeches by the Governing Council (the Governor and the Deputy Governors) have provided an opportunity to impart monetary policy information to the public. Finally, in December 2000, the Bank moved to a system of eight "fixed announcement dates" (FADs) per year, thereby reducing the timing uncertainty of its policy decisions.

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Recently, in line with the trend among other central banks, the Bank began to include forward-looking statements, a form of policy-rate guidance, in the FAD press releases and MPRs.[3] 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 inflation target, holding policy rates constant. The second, "direct qualitative" signals, includes the policy "bias" statements that the U.S. Federal Reserve (the 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 monetary policy meetings, such as those used by the Fed between 2003 and 2006 indicating that accommodation "can be maintained for a considerable period" or "can be removed at a pace that is likely to be measured." 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, Sweden, the Czech Republic, and Iceland have provided.

Based on these definitions, the Bank of Canada has provided direct qualitative signals to markets via the forward-looking statements that have been included

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2. Although the MPR *Update* is shorter than the MPR, we make no distinction between the two publications in the remainder of the text.

3. At the Bank of Canada, forward-looking statements have been designed to be conditional statements. That is, any statement regarding the future stance of monetary policy is based on the current state of the economy and may change as new information arrives.

in nearly all FAD and MPR press releases since July 2004. These statements typically begin with the phrase "In line with the projection" and have included wording such as "some increase in the target for the overnight rate may be required in the near (medium) term," "the current level of the target for the overnight rate is consistent with achieving the inflation target over the near (medium) term," or "further reduction of monetary stimulus will be required . . . over the next four to six quarters." Recently, the Bank has also introduced balance-of-risk statements that could be categorized as indirect guidance. In addition, the Bank has provided both indirect and direct qualitative guidance in its MPRs and in speeches.

How Much Information?

Currently, there is a debate around how much information central banks should release to the public with respect to their future intentions for the policy rate.[4] A potential advantage identified by Kahn (2007) and others is that guidance on the policy rate could make monetary policy more effective by better influencing medium- and long-term rates, since these are more likely to react to policy actions that are accompanied by communication about the path of future policy rates.[5] Another possible advantage of providing guidance is that it makes the central bank's future decisions on the policy rate more foreseeable or, equivalently, it may reduce the degree of market uncertainty related to future monetary policy actions. This, in turn, should reduce interest rate risk premiums and thus benefit economic agents by reducing the overall cost of capital.

Kohn (2005), Issing (2005), and others have highlighted some 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 the *conditionality* of this guidance. To be clear, markets do not necessarily perceive the guidance as being fully unconditional but as less conditional, by some amount, than intended by the central bank. Consequently, markets may focus less on their own or other relevant information in formulating their expectations of future decisions on the policy rate (i.e., the market does not do its "homework"), which may reduce the information content of market prices.

A second disadvantage related to any perceived *unconditionality* of the guidance on the policy rate 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.

Greater central bank predictability will not necessarily imply greater monetary policy transparency, but greater transparency does, in general, imply greater predictability.

On the issue of central banks providing policy guidance in their official communications, 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).[6] Conceptually, with a more predictable central bank, market participants can more easily anticipate the next policy decision (or set of policy decisions) *without* necessarily better understanding the reasons for them. 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 decisions based on a clearer understanding of the factors at play. Although policy-makers may provide policy guidance to enhance the markets' understanding of the reaction function and, ultimately, the effectiveness of monetary policy, market participants' focus on the guidance could reduce their incentives to update their understanding of the monetary policy reaction function and to collect and analyze new information. Moreover, if the central bank's policy decisions made following

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

5. To our knowledge, this hypothesis has not been directly tested empirically.

6. Blinder et al. (2008) make the distinction between short-term predictability (i.e., the markets' ability to anticipate correctly the next monetary policy decision) and long-term predictability (i.e., how central bank communications help to anchor inflation expectations). Long-term predictability is related to the first motivation for enhancing transparency discussed in the text: enhancing the central bank's credibility.

the published guidance consistently corroborate the published guidance, this will also reduce market participants' incentives and will push the market to view the guidance as less conditional (via learned behaviour). As a result, the markets' reaction to macroeconomic news could decrease.[7] 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.[8]

It is not clear whether the central banks that publish their target-rate paths or some other form of guidance on the policy rate are necessarily "predictable," since predictability depends on the degree of perceived conditionality (or 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 is implicitly perceived to be, more unconditional than the policy path. For example, 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 the risks. Moreover, central banks that publish a path for the target rate could use it as a tool to animate their communication about their views of the economic outlook, and in particular how the risks to this outlook may manifest themselves, by also providing indepth 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 policy-rate path in central bank communications may in itself make these communications more conditional relative to those central banks that irregularly communicate guidance in the form of 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, in general, it would seem that central banks that provide direct qualitative or quantitative guidance by providing a forward-looking statement or a policy-rate path have more "work" to do to promote understanding of the 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 that is explicitly embedded in, or more importantly, implicitly perceived by the market, in its communications. As highlighted by Kahn (2007, p. 40), 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 guidance provided by the Fed may be perceived by market participants as more unconditional.

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.

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.[9] In the section below, we investigate whether the inclusion of forward-looking statements in Bank of Canada communications has in fact caused markets to react less to macroeconomic releases because they view the Bank's communication as less conditional, which could be an indication that the Bank has become more predictable, but not necessarily more transparent.

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7. Several researchers have termed this behaviour "rational inattention," which Sims (2003) defines as economic agents, or in this case, market participants optimally choosing what information to focus on, given that individuals have a limited capacity for processing information.

8. Many papers that examine central bank transparency study all or multiple dimensions of this concept. This article, however, focuses on only one aspect of transparency, and therefore uses a narrower definition than that employed in other work.

9. Put another way, for central banks that are successfully more transparent, one should observe both an enhanced ability of the market to anticipate the central bank's move, measured in most cases by a reduction in the surprise component of monetary policy decisions (see Poole and Rasche 2003, for example), and either no reduction of, or a rise in, the sensitivity of market interest rates in response to macroeconomic news.

Empirical Evidence

In our empirical work, we test 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, using daily data, we measure the reaction of market rates to Bank of Canada communications from 30 October 2000 to 31 May 2007, following the adoption of the FADs.[10] We then split our sample in two at 22 July 2004, the date at which the Bank began to consistently use forward-looking statements, to see if there is any change in the markets' reaction to these communications and, separately, to macroeconomic news announcements. Next, to control for FADs that included a forward-looking statement prior to our sample break, we measure the reaction of market rates to the FAD press release on dates where the FAD contained a forward-looking statement against those that did not.

Methodology and Results

Several issues arise when trying to measure the markets' reaction to central bank communications.[11] First, not being able to quantify and systematically characterize the content of central bank communications makes it difficult to benchmark the strength or importance of the communication, as well as its direction, measured in terms of its monetary policy stance. Moreover, we cannot easily measure what markets had expected these communications to say, making it hard to assess the strength or sign of any communication surprise. Because of these issues, we do not attempt to qualitatively measure what is being said. Rather, we simply test whether markets perceived important new information in the communication, which would be reflected in higher volatility in market rates on communication dates relative to non-communication dates. Another complication is

that market participants could react to other events that occur on the same day as the release of a Bank communication, causing interest rates to change as a result. To isolate the impact of Bank of Canada communications on market rates, we run a two-stage regression model in which we first control for other market-moving news, as described below. Thus,

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

In equation 1, we control for other news by regressing the 1-day change in various key Canadian interest rates (Δy_t) on the surprise component of Canadian policy announcements (ΔON_t), the surprise component of U.S. policy announcements (Δff_t), Federal (Reserve) Open Market Committee (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 $usmac_{j,t}$, respectively).[12]

Once we have controlled for these other events, we relate the unexplained variance of our interest rates (i.e., the squared residual of equation 1) to communications. We do this using the following regression equation:

$$\varepsilon_{i,t}^2 = \delta_0 + \delta_1 Vix_t + \sum_{j=1}^{3} \gamma_j comm_{j,t} + \eta_{i,t}, \quad (2)$$

where $\varepsilon_{i,t}^2$ is the squared residual from equation 1 for interest rate i, $comm_{j,t}$ represents the jth type of communication, which are modelled as dummy variables that take the value of 1 on days when there are FAD press releases, MPR releases, or speeches (i.e., j = 1, 2, or 3) and zero otherwise. We then compare the variance of the market rates on communication days against the average variance 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).[13]

We run this set of equations for each of our key interest rates. These include the 3-month Canadian dealer

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10. Our sample begins with the first release of the FAD schedule. We do not include the data for the three months following the September 11, 2001, terrorist attacks, owing to possible distortions in the data.

11. In terms of the methodology used to measure the markets' reaction to Bank of Canada communications, we follow Reeves and Sawicki (2007).

12. See the Appendix for more detail on these controls.

13. The VIX index is a commonly used measure of overall global financial market volatility (often referred to as the "fear gauge"). It is based on the volatility implied from a set of S&P 500 options contract prices.

offered rate (CDOR), the 90-, 180-, and 270-day constant maturity bankers' acceptance future (BAX) rates calculated from the front four BAX contracts; and 2-, 5-, and 10-year constant-maturity Government of Canada benchmark bond yields calculated from the zero coupon curve.[14,15]

Over the full sample (Table 1), we find that FAD press releases have a significant impact on the volatility of short- to medium-term market rates, suggesting that, on average, these statements contain important "new" information for the short- to medium-term outlook. This is not surprising, since this statement contains the policy-rate decision, the reasons behind the decision, an update of the Governing Council's view of the economic outlook, and, more recently, forward-looking policy guidance and a discussion of the balance of the risks to the outlook.

An interesting result is that market rates do not react significantly to the MPR, even though it is the main method of communicating and updating the Bank's detailed views on the current state and likely evolution of the economy (as illustrated by the statistically non-significant coefficients in column 2, Table 1). This can be explained by the fact that the MPR is published quite soon after the FAD press release. Since the two are consistent by design, the MPR may not contain much incremental market news compared with the FAD press release. Another interesting result is that speeches are found to have a significant effect on some market rates. Since speeches rarely deviate from the discussion presented in the published MPR, we did not expect markets to react significantly to speeches over our sample. To test the robustness of this result, we ran a sensitivity analysis and found that by removing only two speeches—the two that drew the largest market reaction—from our sample of 98, our results were no longer significant at the 5 per cent level, thus suggesting that, in general, speeches do not have a significant impact on market rates over our sample.

To address the issue of whether the inclusion of forward-looking statements has in fact enhanced the Bank's monetary policy transparency, we rerun these

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14. The 3-month CDOR is the rate to which the BAX futures contracts settle and was found by Johnson (2003) to be a good measure of market expectations.

15. Johnson (2003) shows empirically that the front three BAX contracts are among the rates that are most representative of expectations in Canada (under 1 year). 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. For a fuller discussion of the BAX market, see Johnson (2003) and Harvey (1996).

Table 1

Impact of Bank of Canada Communications on Market Volatility

$$\varepsilon_{i,t}^2 = \delta_0 + \delta_1 Vix_t + \sum_{j=1}^{3} \gamma_j \, comm_{j,t} + \eta_{i,t}$$

Interest rates	Fixed announcement date press release (γ_1)	*Monetary Policy Report* (γ_2)	Speeches (γ_3)
3-month Canadian dealer offered rate (CDOR)	0.772 (0.392)	5.944 (0.289)	0.261 (0.776)
90-day bankers' acceptance (BAX)	**14.761** **(0.001)**	17.014 (0.295)	6.431 (0.060)
180-day BAX	**24.930** **(0.004)**	24.463 (0.212)	**15.586** **(0.021)**
270-day BAX	**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: Boldface indicates significance at the 5 per cent level. The *p*-value is shown in parentheses.

regressions over a split sample (split at 22 July 2004, the point at which forward-looking statements began being used consistently) and compare the results for each of the shorter samples with those from our full sample. We find that in the first subsample (October 2000–July 2004), a period when forward-looking statements were used inconsistently and sparingly, the FAD press releases and speeches are significant for various maturities of interest rates (consistent with our full-sample results). In the second subsample, however, except for one interest rate, no communication events are significant. These findings seem to support the idea that markets focus 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 that the reduced reaction to FAD press releases is the result of a better or increased understanding of the monetary policy reaction function of the Bank as markets became 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. We examine the latter possibility in the following analysis.

These findings suggest that markets focus on the forward-looking statement and view it as a rough pre-commitment.

For our second test, we modify equation 2 by incorporating a cross-dummy variable that takes the value of 1 on FADs when the FAD press release contained a forward-looking statement, and zero otherwise. 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 statements. Thus,

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

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. 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 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. We find that coefficients on the cross dummies (in each key interest rate regression) are in general negative and significant. This supports our hypothesis that the Bank of Canada has become more predictable over the second half of our sample (Table 2).

Finally, we test to see if 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 macro-

Table 2

Impact of Forward-Looking Statements in FAD Press Releases

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

Interest rates	FAD press release coefficient (γ)	FAD press release cross-dummy coefficient (β)
3-month Canadian dealer offered rate (CDOR)	2.631 (0.098)	**-3.875** **(0.021)**
90-day bankers' acceptance (BAX)	**22.098** **(0.001)**	-15.633 (0.060)
180-day BAX	**41.124** **(0.003)**	**-34.205** **(0.036)**
270-day BAX	**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: Boldface indicates significance at the 5 per cent level. The *p*-value is shown in parentheses.

economic news variables by a dummy that takes the value of 1 over the period from 22 July 2004 to 31 May 2007, and zero otherwise. Equation 1 is modified slightly to include these additional variables, as follows:

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

where Dum_t takes the value of 1 during the period from 22 July 2004 to 31 May 2007, and zero otherwise. If markets understand the central bank's reaction function better (less well), Canadian macroeconomic news cross-dummy tests should yield significant positive (negative) coefficients (γ_i) as market participants react more (less) fully to new domestic economic information as it arrives. We find that for all key interest rates, the majority (11 of 14) of the Canadian macroeconomic surprise cross dummies (γ_i) were negative, suggesting that markets reacted less to Canadian macroeconomic releases in the second half of our sample,

thus lending further support to our increased-predict-ability hypothesis.[16]

Conclusion

Our analysis provides some indication that the recent inclusion of guidance on the policy rate 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, however, there are some 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 consistently used. As such, there is less uncertainty as well as fewer macroeconomic shocks and 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 affect 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 of Canada 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 reflect, in part, the market's better understanding of how the Bank of Canada reacts to the accumulation of macroeconomic data. Consequently, instead of reacting substantially to one-off macroeconomic shocks, there is a more 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 might yield different answers.

That said, there is general agreement among central bankers that 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 guidance on the policy rate, and the various views on how conditionality can be incorporated into the communications strategy. Consequently, a full spectrum of communications strategies is employed in determining how much of the policy outlook to reveal. These strategies range from not including policy guidance except by being more explicit about how perspective changes in key macroeconomic variables will affect the balance of risks to the central bank's outlook to regularly publishing a forecast for the policy rate. 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.[17,18] In deciding to provide policy signals or guidance, however, it should be remembered that the goal is to enhance markets' understanding of the central bank's typical monetary policy reaction function, rather than the more narrow aim of increasing markets' ability to predict future monetary policy actions. By adjusting its communications 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.

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16. Several of these negative cross dummies were also significant at the 5 per cent level. As well, of the few cross dummies with positive coefficients, none was significant at the 5 per cent level.

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

18. Research by van der Cruijsen, Eijffinger, and Hoogduin (2008) shows 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 their forecasts, or ii) become confused by the large and increasing amount of information they receive.

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Appendix: Description of Controls

We calculate the surprise component of macroeconomic announcements using the following formula:

$$mac_{i,t}^{u} = \frac{(X_{i,t} - X_{i,t}^{e})}{\Omega_{i}^{x}}, \qquad (1)$$

where $X_{i,t} - X_{i,t}^{e}$ are the actual minus the market expected value of the ith macroeconomic release on day t, and Ω_{i}^{x} is the sample standard deviation of surprises for the ith macroeconomic release. This is set to zero on days where no macroeconomic announcements are made.

Financial market expectations or forecasts of the macroeconomic data release used in calculating the surprise component are provided by Bloomberg surveys conducted before each announcement. We include in our study the subset of independent macroeconomic surprise variables that were significant at the 5 per cent levels over our sample. Among Canadian releases, this includes releases on both the core and headline consumer price indexes, and on employment and the gross domestic product, 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 consumer price inflation, gross domestic product, 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.

Canadian policy surprises are calculated as the 1-day change in the 1-month bankers' acceptance rate on Canadian monetary policy decision days. This is set to zero on non-policy days.

U.S. policy surprises are calculated using the following formula:

$$\Delta ff_{t}^{u} = [D/(D-d)] \cdot \Delta ff1_{t}, \qquad (2)$$

where D is the total number of days in the month, d is the day of the month of the Federal Open Market Committee (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.

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