

***Greater Transparency in Monetary Policy:  
Impact on Financial Markets***

*by Philippe Muller and Mark Zelmer*

Bank of Canada



Banque du Canada

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August 1999

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*Philippe Muller and Mark Zelmer*

Financial Markets Department  
Bank of Canada  
mzelmer@bank-banque-canada.ca  
pmuller@bank-banque-canada.ca

The views expressed in this report are solely those of the authors.  
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ISSN 0713-7931  
ISBN 0-662-28122-5

Printed in Canada on recycled paper

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## **ACKNOWLEDGEMENTS**

This report has benefited from comments by many colleagues at the Bank of Canada, notably Pierre Duguay and David Laidler, and comments from Andrew Filardo of the Federal Reserve Bank of Kansas City, who discussed the paper at the 1999 meeting of the Canadian Economics Association. Any remaining errors and/or omissions should be attributed to the authors. The empirical results in Section 5 of this paper were also presented at the 1998 Bank of Canada–UQAM CREFE workshop.

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## ABSTRACT

Measures have been taken by the Bank of Canada to increase the transparency of Canadian monetary policy. This paper examines whether the greater transparency has improved financial markets' understanding of the conduct of monetary policy. In theory, it should result in reduced conditional uncertainty because investor expectations would be formed with a superior information set. The market's response to releases of the Bank of Canada's *Monetary Policy Report* and to changes in the Bank's operating band for the overnight interest rate is examined. The empirical results suggest that the Bank's efforts at increasing transparency appear to have helped market participants anticipate pending monetary policy actions. Indeed, the amount of uncertainty that surrounds the Bank's actions is now broadly consistent with that reported for other major countries.

The issue of whether there should be limits on the amount of transparency in the conduct of monetary policy is also explored. The paper concludes that there is possibly some merit in the Bank's providing more frequent information on its economic outlook and highlighting the uncertainty that surrounds the Bank's views. However, the paper argues against publishing the detailed results of the Bank's economic projections. It also notes that the element of surprise can be useful on occasion with respect to the Bank's operations in financial markets.

## RÉSUMÉ

La Banque du Canada a pris des mesures afin d'accroître la transparence de la politique monétaire canadienne. L'étude examine si cette plus grande transparence a aidé les marchés financiers à mieux comprendre la conduite de la politique monétaire. En principe, l'incertitude conditionnelle devrait avoir diminué du fait que les investisseurs se fondent sur un ensemble supérieur d'informations pour former leurs attentes. Les auteurs étudient d'abord la réaction des marchés à la parution du *Rapport sur la politique monétaire* et aux modifications de la fourchette opérationnelle fixée par la Banque pour le taux des fonds à un jour. Selon les résultats empiriques qu'ils obtiennent, l'effort de transparence de la Banque aurait eu pour effet d'aider les opérateurs à anticiper les mesures de politique monétaire imminentes. De fait, le degré d'incertitude qui entoure les déci-

sions de la Banque est maintenant à peu près conforme à celui que l'on observe dans les autres grands pays.

Les auteurs tentent également d'établir s'il y a lieu d'assigner des limites au degré de transparence de la conduite de la politique monétaire. Ils concluent que la Banque aurait peut-être avantage à communiquer plus souvent de l'information sur ses prévisions, tout en soulignant l'incertitude qui les caractérise. Les auteurs soutiennent toutefois qu'elle ne devrait pas dévoiler dans le détail la teneur de ses projections économiques. Ils font remarquer également qu'elle pourrait trouver utile à l'occasion de jouer d'un effet de surprise lorsqu'elle prend des mesures qui touchent les marchés financiers.



## 1. INTRODUCTION

The conduct of monetary policy in Canada has evolved significantly in recent years due to efforts to make it more “transparent” to financial market participants and the public at large. This raises the question whether the increased transparency has resulted in more effective policy implementation. One could measure this by examining if the greater transparency has improved the Bank’s ability to achieve its desired monetary policy stance. However, the benefits of transparency may have been delayed by the tactical constraints on the conduct of monetary policy in the first half of the 1990s. These constraints caused the Bank to tread cautiously in pursuit of easier monetary conditions. Therefore, a second approach suggested by the literature is explored in this paper: determining whether greater transparency has been accompanied by reduced uncertainty in financial markets, uncertainty that often accompanied the Bank’s actions in markets in the past. This question is addressed by examining the market’s response to releases of the Bank’s semi-annual *Monetary Policy Report* (MPR) and to changes in the Bank’s operating band for the overnight interest rate (operating band).

The empirical results suggest that the *Monetary Policy Report* contains new information, on occasion, for financial markets about the Bank’s economic outlook and monetary policy intentions. This information is quickly incorporated in interest rates and the value of the Canadian dollar. Moreover, markets appear to anticipate changes in the operating band ahead of time, except when changes have been motivated by the Bank’s desire to maintain investor confidence in Canadian dollar denominated assets. Examination of the limits of transparency suggests that it is not too surprising that markets would have trouble anticipating the magnitude of operating band changes in such circumstances. An unexpected (or larger than expected) change in the operating band can be useful in situations in which the Canadian dollar is under pressure because it signals the central bank’s resolve to maintain investor confidence in a proactive fashion. Transparency in this case would demand only that the Bank explain its actions at the time so that it can be held accountable after the fact.

The paper is organized as follows. Section 2 outlines the evolution of the Bank’s operating procedures in financial markets, with particular emphasis on the improved transparency that ensued. Section 3 reviews the Bank’s efforts to achieve the inflation targets in recent years, noting the tactical constraints in the first half of the 1990s. The theoretical link between transparency and market uncertainty is outlined in Section 4. This relationship is tested empirically for Canada in Section 5. Some thoughts on the limits of transparency are offered in Section 6, and concluding remarks in Section 7.

## 2. EVOLUTION OF THE BANK'S OPERATING PROCEDURES

The Bank has undertaken many initiatives in recent years to reduce uncertainty about the conduct of monetary policy. Its first move was to state clearly in the 1988 Hanson Lecture that price stability is the primary goal of monetary policy. However, no specific time frame for achieving price stability was given in the lecture, thus hindering the clarity and credibility of the commitment. Moreover, inflation expectations at that time were sticky (around 4 to 5 per cent). This reflected Canada's experience with double-digit inflation in the 1970s and early 1980s and then with inflation averaging about 4 per cent through most of the 1980s. In February 1991, the federal government and the Bank publicly introduced inflation-reduction targets that indicated what the Bank would try to achieve.<sup>1</sup>

The next step was to acknowledge that the markets needed to know more about the Bank's planned operations to achieve price stability because of the long lags before the effects of monetary policy actions are felt on inflation. More information would have to be provided on how the Bank viewed the level of monetary conditions. As a result, the Bank published several papers explaining its construction and use of a monetary conditions index (MCI), which is now published on a regular basis.

Then, in May 1995, the Bank began publishing a monetary policy report every six months. This report sketches the analytic framework underpinning the implementation of monetary policy, provides the Bank's assessment of the inflation outlook, and explains recent monetary policy actions. Indeed, the report has become increasingly explicit about the Bank's views on the economy and the implications of these views for future monetary policy stances, given the stated inflation targets.

Finally, the Bank has taken initiatives regarding its operations in financial markets. In March 1980, following the adoption of a floating Bank Rate tied to the 3-month treasury bill rate, the Bank attempted to achieve specific levels for the 3-month treasury bill rate within narrow limits, primarily by affecting the cost-of-carry (the spread between bill and overnight rates). This was done by adjusting the supply of settlement balances provided to the direct clearing members of the Canadian Payments Association (eight chartered banks and four non-bank deposit-taking institutions) on a daily basis to effect changes in the desired level of overnight rates. As a result, overnight rates sometimes moved quite sharply. These operations were supplemented by outright sales of treasury

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1. In December 1993, the 1 to 3 per cent target range for inflation was extended to the end of 1998. In February 1998, it was extended again to the end of 2001.

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bills on occasion to moderate particularly rapid movements in treasury bill rates. Over the 1987–1994 period, the Bank made growing use of Special Purchase and Resale Agreements (SPRAs) and Sale and Repurchase Agreements (SRAs) to reduce the variability of the overnight rate, and relied more heavily on outright sales of treasury bills to moderate particularly rapid movements in treasury bill rates.<sup>2</sup>

A significant change in the Bank’s operating procedures occurred in the middle of 1994. The Bank decided to be more explicit about the range in which it wanted the overnight rate to fall and to allow 3-month rates to respond to market conditions. Since that time, the Bank has had an operating band for the overnight rate that is 50 basis points wide. It has intervened actively with buyback (SPRA and SRA) operations to hold the overnight rate within this band and to make the limits of the band clear to the market. By making the operating band explicit, the Bank hoped to reduce the uncertainty about its intentions, an uncertainty that had sometimes interfered with the transmission of monetary policy actions to interest rates further out along the yield curve and to the exchange rate.<sup>3</sup> The clarity of the Bank’s policy intentions was further enhanced in February 1996 with the announcement that, henceforth, the Bank Rate would be tied to the upper end of the operating band, and that all future changes in the operating band would be accompanied by a press release announcing the rationale for the action.

Similarly, the Bank has become more open, albeit less predictable, in its intervention in the foreign exchange market—operations that are conducted on behalf of the federal government. In April 1995 and September 1998, the intervention guidelines were changed so the Bank intervenes in this market less frequently, but once engaged, does so more vigorously and typically in a more public fashion.

In February 1999, additional changes to the Bank’s operations in markets were announced to accommodate the introduction of the Large Value Transfer System (LVTS). The operating band is now enforced by publicly announced central bank deposit and lending rates for overnight funds, and the Bank’s operations in the money market will be conducted at the midpoint of the band for the foreseeable future.<sup>4</sup>

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2. Crow (1989) discusses at some length the evolution of the Bank’s operating procedures through this period.
  3. A more complete discussion of the benefits of this approach can be found in Grant (1997) and Zelmer (1996).
  4. For more details on the implementation of monetary policy in the LVTS environment, see Bank of Canada (1999).

### 3. SUCCESS IN ACHIEVING THE INFLATION TARGETS

A starting point for determining whether increased transparency has resulted in more effective implementation of monetary policy is to ask whether this greater transparency has made it easier for the Bank to achieve its inflation targets. The evidence presented in Table 1 is mixed. Although inflation has generally stayed within the target range, it has tended to reside in the lower half of the range.

**Table 1: Economic performance variables (Q4/Q4 percentage change)**

Year	Inflation			Real GDP	GDP output gap (Q4)
	Inflation-control target range (year-end)	Total CPI	Core CPI		
1990	N/A	4.9	3.9	-1.1	- 1.6
1991	4 - 6 (incl. GST)	4.1	2.7	-0.3	- 3.7
1992	2 - 4	1.8	1.6	0.9	- 4.8
1993	1 2/3 - 3 2/3	1.8	1.8	2.9	- 4.2
1994	1 1/3 - 3 1/3	0.0	1.6	5.5	- 1.2
1995	1 - 3	2.1	2.2	1.1	- 2.4
1996	1 - 3	2.0	1.5	1.7	- 3.3
1997	1 - 3	1.0	1.1	4.4	- 1.6
1998	1 - 3	1.1	1.3	2.8	- 1.3

One should not draw any firm conclusions from this evidence. Clinton and Zelmer (1997) note that other factors—especially the rapid growth in government debt, uncertainty about Quebec’s role in Canada, and lingering credibility problems (evident in long-term yield and cross-country term spreads)—undermined confidence in financial markets in the first half of the 1990s. These factors also created tactical difficulties for the Bank; they increased the likelihood that monetary easing might be wrongly interpreted as a sign of weakening commitment to inflation control. As a result, the Bank generally employed cautious tactics through this period, especially during and after the episodes of market turbulence. However, by 1996, it became clear that public finances were improving and that the market was more confident that inflation would stay within the inflation-control range. The Bank could therefore take advantage of the improved environment and of its past efforts to improve the transparency of monetary policy to ease its monetary policy stance. Indeed, the market was able to read the Bank’s intentions very well in the more open environment. Thus, when the Bank acted, it was in essence ratifying market moves. Therefore, increased transparency might have been one of the factors that enabled

the Bank to achieve lower interest rates in Canada than existed in the United States across the maturity spectrum for a period of time.

#### **4. THEORETICAL BENEFITS OF TRANSPARENCY**

Haldane (1997) reviews the assertion that greater central bank transparency is broadly beneficial. He notes that the issue is addressed in two branches of the academic literature, the time-consistency literature and the central bank secrecy literature. The latter is more relevant when examining the impact of transparency on financial markets.

The origins of the central bank secrecy literature date back to a legal enquiry in the United States into the Federal Reserve's need for secrecy (Goodfriend 1986). At the time, the Federal Reserve defended its preference for secrecy on the grounds that this helped stabilize short-term interest rates. Since then, a series of papers have emerged analyzing the theoretical basis of the Fed's defence (Dotsey 1987; Rudin 1988; Tabellini 1987).

The effects of transparency on conditional interest rate and exchange rate volatility seem reasonably clear.<sup>5</sup> Transparency should reduce conditional uncertainty because expectations are formed using superior information. The more the public knows about the conditional expectations of future inflation held by an inflation-targeting central bank, the more it knows about the central bank's feedback variable. Consequently, smaller forecast errors will ensue when forecasting the central bank's policy actions.

The effects of transparency on unconditional interest rate and exchange rate variability are less certain. Dotsey (1987) and Rudin (1988) argue that transparency should increase unconditional volatility for conventional reasons put forth by LeRoy and Porter (1981): the cleaner and more frequent the signal, the greater the responsiveness of asset prices to "news." On the other hand, Tabellini (1987) outlines a model with multiplicative uncertainty about the central bank's reaction function in which transparency reduces unconditional interest rate variability. These predictions are testable empirically. And, while the discussion in the literature to date has been couched in terms of short-term interest rate variability, the same arguments in fact apply along the whole yield curve and for the exchange rate. Transparency reveals information about the future, and current, behaviour of the central bank and hence affects expectations of future as well as current financial market variables.

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5. *Unconditional volatility* is essentially the same thing as the variance (or standard deviation) exhibited by a variable over time. In contrast, *conditional volatility* is a subset of unconditional volatility in that it refers to the portion of volatility that can be explained by other factors, such as its own past behaviour.

## 5. EMPIRICAL EVIDENCE FOR CANADA

Haldane (1997) notes that a direct test of the effects of transparency on financial markets can be found by looking at interest rate (and exchange rate) variability.<sup>6</sup> Consistent with the literature, a distinction is made between conditional and unconditional effects of transparency on interest rates and the exchange rate.

### 5.1 Impact on unconditional volatility

The effects of transparency on unconditional interest rate and exchange rate volatility can be analyzed by event studies around the time of news releases. Since May 1995, the Bank of Canada has formally communicated its economic outlook and the implications for future monetary policy stances in its semi-annual *Monetary Policy Report* (MPR). To determine whether the reports contain new information for financial markets, Chart 1 shows the daily response of changes in 3-month and 10-year interest rate spreads and changes in the bilateral Canada/U.S. exchange rate on the day of, and the days surrounding, MPR releases. The responses in Chart 1 are averaged across the eight MPRs released from May 1995 to November 1998.<sup>7</sup> They measure the absolute daily basis-point change (percentage point change in the case of the exchange rate) in the days surrounding the release of the MPRs.

The release of the MPRs affects mainly the exchange rate. Unconditional exchange rate volatility often rises on the days these reports are published. Their publication is associated, on average, with a doubling in exchange rate volatility relative to the mean daily volatility estimated over the entire sample period. The result, however, while not statistically significant, is broadly consistent with results contained in Levin, Mc Manus, and Watt (1999). They analyze the impact of MPRs on the higher moments of exchange rate expectations derived from information contained in the prices of Canadian dollar futures options. They find that these moments are most affected by MPRs that signal an inflection point in monetary policy stance, while those that reaffirm previously stated

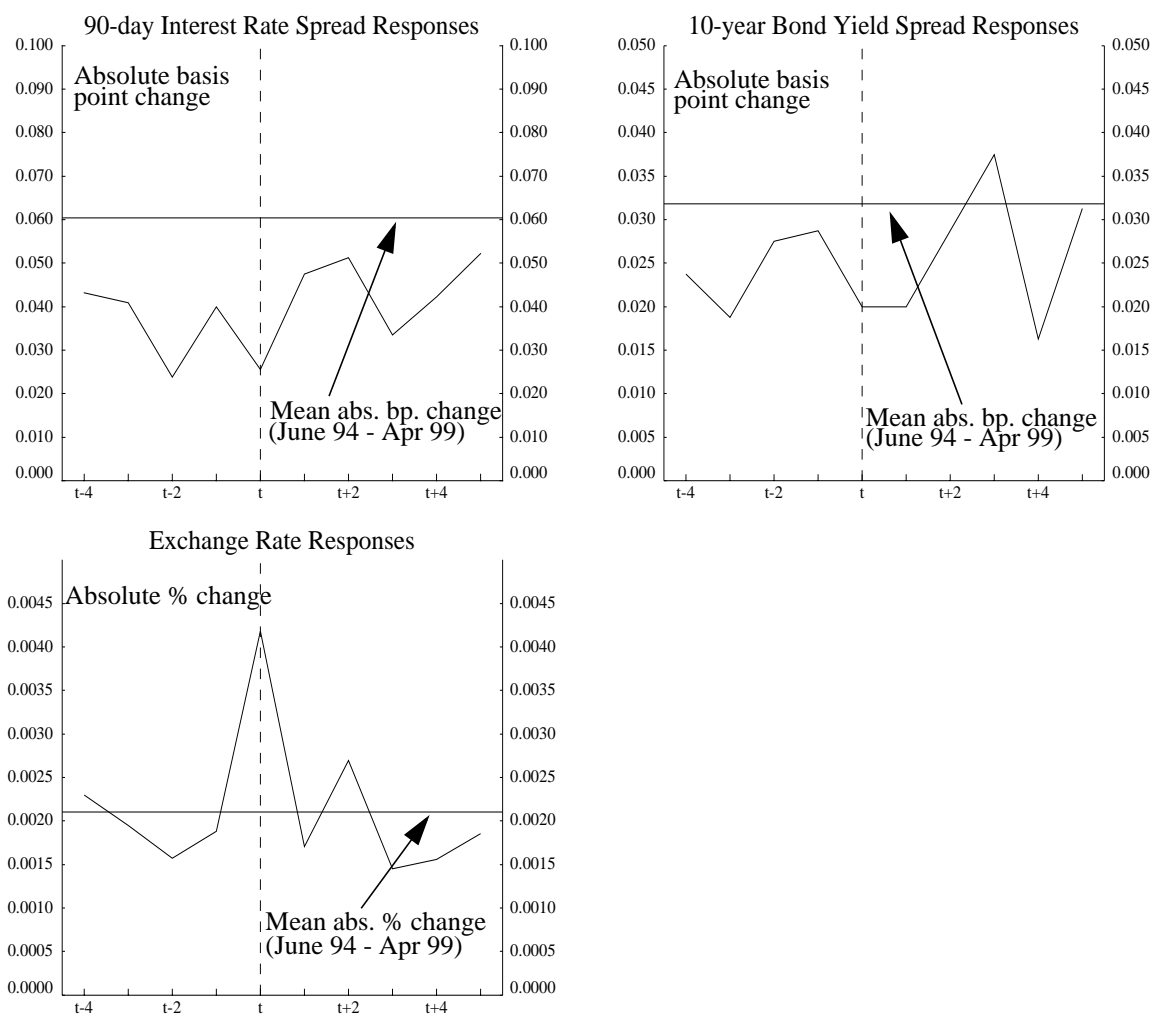
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6. This approach permits comment only on the market's response to changes in the operating band. It does not bring any insight into situations in which the market anticipated a monetary policy action that failed to materialize. Royley and Sellon (1998a) outline a model for examining the market's reaction to monetary policy *non*-announcements. However, their model can be applied only in situations where the dates of policy actions occur at discrete intervals that are known with certainty—as in the United States where monetary policy actions are normally timed to coincide with the Federal Open Market Committee (FOMC) meeting dates. This situation does not apply in Canada, since Canadian monetary policy does not operate in a regime with pre-announced decision dates for monetary policy actions.

7. The Bank of Canada's eight MPRs were released on 3 May 1995; 8 November 1995; 8 May 1996; 14 November 1996; 15 May 1997; 19 November 1997; 13 May 1998; and 16 November 1998.

stances generally have little impact on the higher exchange rate moments. This is not surprising as it suggests that market participants respond mainly to reports that contain new information that was not previously embedded in prices of financial assets. Thus, by affecting expectations, MPRs can provide market participants with additional insight into the Bank's outlook for inflation and future monetary policy stances.

**Chart 1**  
**Daily Market Rate Response**  
Monetary Policy Report release



## 5.2 Impact on conditional volatility: The approach

The really striking effects of transparency are found by examining conditional term structure and exchange rate variability. The focus here is again on a set of events: changes in the operating band since its introduction in mid-1994 (specifically, from June 1994 to May 1999). Descriptive statistics are presented in Table 2. Conditional volatility is measured by looking at the “surprise” or unexpected component of interest rate spreads and the exchange rate at the time of each operating band change. This allows one to take account of information embodied in interest rate spreads and the exchange rate

**Table 2: Summary of operating band changes**

Sample period	Number of operating band changes	Number of “FX”-related operating band changes	Sample mean	Mean absolute change	Average number of days between changes	Number of sign changes
<b>June 94– May 99</b>	<b>41</b>	<b>8</b>	<b>-0.030</b>	<b>0.3110</b>	<b>29.6</b>	<b>5</b>
25bp	33					
50bp	7					
100bp	1					
<b>June 94– Feb. 96</b>	<b>21</b>	<b>5</b>	<b>-0.024</b>	<b>0.3095</b>	<b>19.7</b>	<b>3</b>
25bp	16					
50bp	5					
<b>Feb. 96– May 99</b>	<b>20</b>	<b>3</b>	<b>-0.0375</b>	<b>0.3125</b>	<b>39.5</b>	<b>2</b>
25bp	17					
50bp	2					
100bp	1					



up to the point of an operating band change. Any surprises should therefore reflect news about the central bank's reaction function. For example, in a world in which the Bank's reaction function was known with certainty at every future date and was fully credible, the interest rate and exchange rate surprise should be zero at all points along the yield curve. So improvements in transparency can be measured by the extent to which the market is approaching this first best solution.

Several techniques were used to measure responses along the yield curve and of the exchange rate to operating band changes. However, since they all rendered qualitatively similar results, the results presented are those based on Haldane's (1997) method, adjusted to the Canadian context. The most important changes are noted in italics.

*First, operating band changes that were deemed necessary to address unsettled conditions in the foreign exchange market are distinguished from those that occurred in a "normal" market environment.* When the exchange rate is depreciating rapidly, the Bank has at times chosen to raise the operating band by unexpectedly large steps of 50 basis points or more to signal its resolve to maintain investor confidence in Canadian dollar denominated assets in a proactive fashion.

In such circumstances, one would expect the reaction of market rates to operating band changes to be non-zero and much greater than that found for "normal" monetary policy moves. Differentiating between these two types of operating band changes enables one to measure transparency in a more sensible fashion. Eight operating band changes are identified as having been motivated, at least in part, by the desire to address exchange rate pressures in order to maintain confidence in Canadian dollar denominated assets.<sup>8</sup>

The interpretation of the results relies on the assumption that changes in the operating band cause movements in market rates and not the reverse. This assumption can be defended for operating band changes that were not brought about, in part, by pressure on the Canadian dollar. However, since movements in U.S. interest rates can affect move-

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8. Since February 1996, the Bank has released a press report explaining the rationale for each Bank Rate change. These press releases were therefore used to differentiate the motivation behind Bank Rate moves. Prior to that date, internal notes documenting the rationale for operating band changes were used. Five operating band changes occurring between 11 January 1995 and 1 February 1995 and the three Bank Rate increases between 12 December 1997 and 27 August 1998 were deemed to have been, in part, exchange rate related. The size of "FX"-related operating band changes has been greater than or equal to 50 basis points, while those changes deemed "normal" at the time have all been 25 basis points.

ments in Canadian interest rates, *there is a departure from Haldane and regressions are performed within an interest rate spread format as follows:*

$$\Delta SpR_{tj} = \alpha_j + \beta_j(L)\Delta SpR_{tj} + \beta_{4j}\Delta OBfx_t + \beta_{5j}\Delta OB_t + \beta_{6j}\Delta CAD/USD_{t-1} + \beta_{7j}\Delta FF_t + \varepsilon_{tj}$$

where  $j$  indexes for the market rate and  $t$  indexes for time. The endogenous variables  $\Delta SpR_{tj}$  are daily changes in the Canada/U.S. spread in seven interest rates. These are the spot 1-month Canadian bankers acceptances (BAs) rate minus the 1-month euro/dollar rate; 2-month BAs minus the 2-month euro/dollar; 3-month BAs minus the 3-month euro/dollar; and the 2-, 5-, 10-, and 30-year Government of Canada benchmark yields minus the corresponding maturity yields of U.S. Treasuries.<sup>9</sup> The effects of operating band changes on the CAD/USD bilateral exchange rate are also estimated.<sup>10</sup>  $\beta_j$  is the polynomial in the lag operator ( $L$ ). Three lagged dependant variables are included to mop up any remaining residual autocorrelation. For “normal” official interest rate changes ( $\Delta OB_t$ ) and “FX”-related operating band changes ( $\Delta OBfx_t$ ), changes in the midpoint of the operating band for the overnight interest rate are used. The  $\Delta CAD/USD_{t-1}$  variable denotes the lagged change of the natural logarithm of the CAD/USD bilateral exchange rate (CAD per USD). This variable is added to take account of feedback effects from the exchange rate on interest rate spreads.<sup>11</sup> Further, the change in the Federal Funds target variable,  $\Delta FF_t$  is included to account for the effects of U.S. monetary policy moves.

The key coefficients are  $\beta_4$  and  $\beta_5$ .  $\beta_4$  measures the mean reaction of market rate  $j$  to “FX”-related operating band changes, while  $\beta_5$  measures market reaction to “normal” operating band changes. If official interest rate changes are fully anticipated in existing market rates, then both  $\beta_4$  and  $\beta_5$  should equal zero. There would be no reaction to policy changes. In fact, if the Bank of Canada’s perceived reaction function were unaffected by the policy action at any point in time, then  $\beta_{4j}=0$  and  $\beta_{5j}=0$  for all  $j$ . Transparency would be deemed perfect. However, given that  $\Delta OBfx_t$  are operating band changes in which the Bank of Canada responded to shocks by purposely changing the operating band by a larger-than-expected amount,  $\beta_{4j}$  is likely to be non-zero and large.

9. Government of Canada treasury bills are not used as these rates are increasingly influenced by technical factors. See Boisvert and Harvey (1998) for more details.

10. In estimating the reaction of the exchange rate to operating band changes, the  $\Delta FX$  variable is dropped from the right-hand side of equation 1.

11. A 1-day lag on this variable is used to ensure that a simultaneity bias is not introduced into the equation.

Interest rates of differing maturities across the yield curve tend to move together. As such, the residuals  $\varepsilon_j$  are likely to be correlated with each other. *To control for this, the seven (interest rate maturities) regressions were estimated in a system of equations using the technique of Seemingly Unrelated Regressions (SURE).* This computes the ordinary least-square (OLS) estimates of the equations and uses the estimated covariance matrix of the residuals as given to compute the  $\beta$  estimates.<sup>12</sup>

### 5.3 Impact on conditional volatility: First sample (June 1994 to February 1996)

Results for the subsample period June 1994–February 1996, during which the Bank Rate was tied to the 3-month treasury bill rate, are presented in Table 3.

The coefficients of “FX”-related operating band changes  $\beta_{4j}$  are significant at the 5 per cent level across the yield curve, while “normal” policy moves  $\beta_{5j}$  are significant for maturities ranging from 30 days to 5 years inclusively.<sup>13</sup> Not surprisingly, the magnitude of the coefficients is decreasing in maturity  $j$ . As one might expect, the size of the market surprise to operating band changes is considerably larger when the policy move is partially related to exchange rate concerns— $\beta_{4j}$  are much larger than  $\beta_{5j}$  for all  $j$ . In fact, hypothesis tests whose null is  $\beta_{4j} = \beta_{5j}$  are rejected for market rates of 30-day and 2-year maturities.<sup>14</sup>

Further, the 1-day lagged change in the natural logarithm of the exchange rate is found to be significantly correlated to the change in interest rate spreads across the maturity spectrum. This implies that instability in the foreign exchange market through

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12. Ordinary least squares was used to estimate the regressions measuring the impact of operating band changes on the exchange rate. The robust-errors procedure was used to compute consistent estimates of the covariance matrix after allowing for heteroscedasticity and serial correlation.

The interest rate spread equations in Tables 3 and 4 were also estimated using ordinary least-square regressions and generated results similar to those reported in the tables. Thus, one is confident that the SURE system is not misspecified.

13. The reported  $R^2$  are fairly low. This is not too surprising as our model simply aims to illustrate the effect of operating band changes on interest rate spreads, not to explain most of the day-to-day variation in interest rate spreads.  $R^2$  values ranging up to 0.40 in the first sample and up to 0.86 in the second (Table 4) are found if one uses the methodology outlined in Roley and Sellon (1998a), which focuses the analysis on the market reaction on the day of a change in the operating band. The results using this latter approach are qualitatively consistent with those presented in this study.

14. Chi-squared tests with 1 degree of freedom  $[(\beta_4 - \beta_5)^2 / (\sigma_4^2 + \sigma_5^2 - 2\sigma_{4,5})]$ .

**Table 3: Market reaction to operating band changes: multivariate estimates**

Measuring interest rate surprises, June 94–21 February 1996 <sup>a</sup>										
$\Delta SpR_{tj} = \alpha_j + \beta_j(L)\Delta SpR_{tj} + \beta_{4j}\Delta OBfx_t + \beta_{5j}\Delta OB_t + \beta_{6j}\Delta CAD/USD_{t-1} + \beta_{7j}\Delta FF_t + \varepsilon_{tj}^b$										
$\Delta$ spread of $R_t$	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	$\beta_5$	$\beta_6$	$\beta_7$	$\bar{R}^2$	DW
BA-ED 30	-0.005	<b>-0.108</b>	-0.028	-0.003	<b>0.938</b>	<b>0.604</b>	<b>5.39</b>	-0.121	0.24	1.97
					(0.092)	(0.103)	(1.70)	(0.093)		
BA-ED 60	-0.003	<b>-0.087</b>	0.032	0.006	<b>0.843</b>	<b>0.659</b>	<b>8.54</b>	-0.091	0.28	1.92
					(0.083)	(0.094)	(1.55)	(0.084)		
BA-ED 90	-0.005	<b>-0.159</b>	-0.051	-0.001	<b>0.824</b>	<b>0.576</b>	<b>7.48</b>	-0.070	0.16	1.86
					(0.104)	(0.117)	(1.95)	(0.105)		
2yr bd	-0.004	<b>-0.168</b>	-0.043	-0.051	<b>0.388</b>	<b>0.192</b>	<b>4.50</b>	-0.137	0.02	1.67
					(0.073)	(0.083)	(1.41)	(0.074)		
5yr bd	0.002	<b>-0.177</b>	-0.047	-0.026	<b>0.299</b>	<b>0.131</b>	<b>3.81</b>	<b>-0.178</b>	0.03	1.62
					(0.056)	(0.063)	(1.05)	(0.056)		
10yr bd	0.001	<b>-0.152</b>	<b>-0.063</b>	-0.040	<b>0.219</b>	0.063	<b>3.23</b>	<b>-0.122</b>	0.01	1.65
					(0.046)	(0.052)	(0.85)	(0.047)		
Long bd	0.000	<b>-0.084</b>	<b>-0.066</b>	-0.037	<b>0.175</b>	0.055	<b>2.62</b>	<b>-0.084</b>	0.03	1.68
					(0.040)	(0.040)	(0.73)	(0.040)		
CAD/USD <sup>c</sup>	-0.000	0.028	0.028	-0.044	<b>0.008</b>	0.002	na	0.001	0.01	1.99
					(0.003)	(0.004)		(0.003)		

a. Includes 454 observations during which there were 21 changes in the operating band from June 1994 to 21 February 1996.

b.  $SpR_{tj}$  refers to the spread between Canadian rates and the equivalent American market rate. The  $\Delta CAD/USD_{t-1}$  is the change in the log of the exchange rate. Bold coefficients are significant at the 5 per cent level. Numbers in parenthesis are standard errors.

c. This market rate is not estimated in a spread format. The  $\Delta CAD/USD_{t-1}$  on the right-hand side is omitted.

this period often spilled over into the domestic fixed-income market. It also appears that U.S. monetary policy actions affected interest rate spreads only at the long end of the yield curve, as the  $\Delta FF_t$  variable is significant (negative) only at maturities of 5, 10, and 30 years. The following is one way of interpreting these negative coefficients. Tightening of monetary policy in the United States in early 1994 (the bulk of the fed funds changes were during this period) was associated with an upward ratcheting in U.S. inflation expectations

(as suggested by rising long-term yields in the United States). However, long-term Canadian interest rates did not move up in a parallel fashion, perhaps because Canada was at an earlier stage in the economic cycle, and/or possibly because Canadian inflation expectations were anchored by the inflation targets.

Results also indicate that operating band changes that were, at least in part, motivated by Canadian dollar concerns during the Mexican crisis did not seem to provide support for the currency on the day of the policy move, and seemed to be associated with an upward shift in the whole yield curve. Table 3 also indicates that, on average, about 60 per cent of “normal” operating band change has been a surprise at the short end of the yield curve. These results suggest that transparency was far from perfect in Canada between June 1994 and February 1996.

#### **5.4 Impact on conditional volatility: More recent sample (February 1996 to May 1999)**

Table 4 reports results for the more recent period—22 February 1996 to 5 May 1999—during which the Bank Rate was tied to the upper end of the operating band and the Bank issued a press release explaining the rationale behind every policy move. During this subsample period, the coefficients of “FX”-related operating band changes  $\beta_{4j}$  are significant at the 5 per cent level across the yield curve. The coefficients of “normal” policy moves  $\beta_{5j}$  are also significant across the maturity spectrum. However, the degree of market surprise to operating band changes over the most recent period is considerably smaller when the policy move is not partially related to exchange rate concerns. Indeed, Chi-squared tests indicate that the null hypothesis,  $\beta_{4j} = \beta_{5j}$ , is rejected for spreads of maturities from 30 days to 2 years inclusively. Most importantly,  $\beta_5$  coefficients for spreads of these same maturities also appear to be considerably smaller during this recent subperiod than those estimated over the previous subsample (Table 3); at least three-quarters of a change in the operating band is now anticipated ahead of time.<sup>15</sup> Regressions on equation 1, adjusted to include a regime-shift dummy variable ( $\Delta OB_t$ ) that takes the value of zero in the first subsample and one thereafter, were performed over the complete sample period of June 1994 to May 1999. These results confirm that money market responses to “normal” operating band changes are significantly smaller since February 1996; the  $\Delta OB_t$  dummy variable is significant at the 5 per cent significance level for 30-, 60-, and 90-day maturities.

15. Similar results are found if one replaces the 3-month interest rate spread with the spread between BAX (3-month bankers’ acceptances futures) and euro/dollar futures contract prices (to take account of the fact that the BAX market is now more active than the traditional money market).

It is worth noting that these results differ from the findings of Paquet and Pérez (1995) for Canada. Specifically, Paquet and Pérez found that, between January 1987 and August 1994, daily changes in overnight interest rates were significantly correlated only with changes in 1- and 3-month treasury bills and bankers' acceptances (BAs). Further, they found that the influence of corresponding U.S. interest rates on Canadian rates was larger than that of the contribution of Canadian monetary policy for instruments whose maturity exceeded one month. In contrast, this paper finds that, after controlling for the influence of American rates, monetary policy actions since the summer of 1994 have a significant impact across the yield curve.<sup>16</sup>

Consistent with the argument put forth by Grant (1997), the results in this paper seem to suggest that the Bank's most recent efforts at increasing transparency—introducing the operating band for the overnight interest rate, disseminating its outlook about the economy in its semi-annual *Monetary Policy Report*, setting the Bank Rate at the upper end of the operating band, and issuing a press release explaining the rationale behind every policy move—have helped financial markets anticipate pending monetary policy actions. One must concede, however, that the reduced uncertainty associated with the improvement in public finances since 1996 might have also helped market participants anticipate pending monetary policy actions.

The significant and declining nature of the coefficients found in Tables 3 and 4 is consistent with the results found by Haldane (1997) for the United Kingdom between January 1985 and March 1997; by Hardy (1996) for Germany for the period 1985 to 1995; and by Cook and Hahn (1989) and Roley and Sellon (1998a) for the United States between September 1974 and 1979, and 1987 and 1995 respectively.<sup>17</sup> Table 5 compares this paper's results with the results in these studies. It appears that the reaction of Canadian interest rates to the Bank of Canada's "normal" policy changes during the 1996–1999 period is broadly in line with those found in the United Kingdom, Germany, and the United States.

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16. The market's response to operating band changes was also estimated, similarly to Paquet and Pérez (1995), in a non-spread format while controlling for American interest rates. It was found that operating band changes have a much larger influence on Canadian short-term rates than do corresponding American rates. In fact, over the complete sample, only 3-month euro/dollar rates appear to have a significant influence on corresponding Canadian rates, though slight (3 per cent) in comparison with changes in the operating band (60 per cent).

17. Hardy (1996), Cook and Hahn (1989), and Roley and Sellon (1998a) perform regressions on the pooling of observation studies occurring on the days surrounding changes in official interest rates. Applying this technique to Canadian data produces results that are qualitatively consistent with those reported in the main text for Canada.

**Table 4: Market reaction to operating band changes: multivariate estimates**

Measuring interest rate surprises, 22 February 1996 to 5 May 1999 <sup>a</sup>										
$\Delta SpR_{ij} = \alpha_j + \beta_j(L)\Delta SpR_{ij} + \beta_{4j}\Delta OBfx_t + \beta_{5j}\Delta OB_t +$										
$\beta_{6j}\Delta CAD/USD_{t-1} + \beta_{7j}\Delta FF_t + \varepsilon_{ij}$ <sup>b</sup>										
$\Delta$ spread of $R_t$	$\alpha$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	$\beta_5$	$\beta_6$	$\beta_7$	$\bar{R}^2$	DW
BA-ED 30	-0.002	<b>-0.350</b>	<b>-0.164</b>	<b>-0.062</b>	<b>0.826</b>	<b>0.251</b>	<b>2.99</b>	<b>0.366</b>	0.24	2.02
					(0.066)	(0.078)	(0.93)	(0.183)		
BA-ED 60	-0.003	<b>-0.249</b>	<b>-0.183</b>	<b>-0.066</b>	<b>0.758</b>	<b>0.191</b>	<b>4.12</b>	0.302	0.19	1.98
					(0.068)	(0.081)	(0.96)	(0.166)		
BA-ED 90	-0.002	<b>-0.299</b>	<b>-0.188</b>	<b>-0.160</b>	<b>0.685</b>	<b>0.237</b>	<b>4.15</b>	0.248	0.17	2.02
					(0.076)	(0.090)	(1.07)	(0.184)		
2yr bd	-0.002	<b>-0.100</b>	-0.023	-0.005	<b>0.621</b>	<b>0.151</b>	1.02	-0.164	0.14	1.87
					(0.052)	(0.062)	(0.75)	(0.126)		
5yr bd	-0.003	<b>-0.118</b>	<b>-0.049</b>	-0.031	<b>0.376</b>	<b>0.150</b>	0.66	<b>-0.228</b>	0.11	1.89
					(0.038)	(0.045)	(0.54)	(0.092)		
10yr bd	<b>-0.003</b>	<b>-0.102</b>	-0.034	-0.022	<b>0.241</b>	<b>0.112</b>	0.50	<b>-0.258</b>	0.08	1.91
					(0.031)	(0.037)	(0.44)	(0.075)		
Long bd	<b>-0.003</b>	<b>0.079</b>	0.013	-0.029	<b>0.097</b>	<b>0.069</b>	0.43	<b>-0.187</b>	0.02	1.90
					(0.027)	(0.031)	(0.37)	(0.064)		
CAD/USD <sup>c</sup>	0.000	0.020	-0.006	<b>0.101</b>	0.001	<b>-0.007</b>	na	-0.009	0.01	1.99
					(0.006)	(0.003)		(0.014)		

a. Includes 832 observations during which there were 20 changes in the operating band from 22 February 1996 to 5 May 1999.

b.  $SpR_{ij}$  refers to the spread between Canadian rates and the equivalent American market rate. The  $\Delta CAD/USD$  is the change in the log of the exchange rate. Bold coefficients are significant at the 5 per cent level. Numbers in parenthesis are standard errors.

c. This market rate is not estimated in a spread format. The  $\Delta CAD/USD$  on the right-hand side is omitted.

**Table 5: Comparison of transparency results: country by country**

	Canada: <sup>a</sup> Muller and Zelmer (1999)		U.K: Haldane (1997)	U.S: Roley and Sellon (1998a) <sup>b</sup>	Germany: Hardy (1996)
Sample period	June 94– Feb. 96	Feb. 96– May 99	Jan. 85– Mar. 97	1987–1995	1985–1995
Number of official interest rate changes	16	17	na	48	33
Maturity of market rate					
1-day	na	na	na	na	0.21
1-month	0.60	0.25	0.47	na	0.16
2-month	0.66	0.19	na	na	na
3-month	0.58	0.24	0.30	0.28	0.14
6-month	na	na	0.35	0.27	0.13
12-month	na	na	na	0.24	0.13
2-year	0.19	0.15	0.24	na	0.07
5-year	0.13	0.15	0.14	0.17	0.03
10-year	0.06	0.11	-0.13	0.09	0.00
20-year	na	na	-0.08	na	na
30- year	0.06	0.07	na	na	na

a. Since it is assumed that the United Kingdom, Germany, and the United States have not faced tactical constraints related to maintaining investor confidence in assets denominated in their currencies,  $\beta_5$  coefficients are used.

b. Two-day response, from the day before to the day after a policy change. Note that, in Canada, results from the pooling-of-observations method indicated that the market response to an operating band change occurs on the day of the operating band change.



## 5.5 An alternative test of anticipated changes in the operating band

The preceding results indicate that interest rates and the exchange rate now respond less to “normal” changes in the operating band than they did in the past. However, it is also worth examining whether movements in interest rate spreads from the day after the preceding change in the operating band to the day before the current change are related in direction and magnitude to the current operating band change. Such a test provides a direct indication of the market’s ability to anticipate a change in the policy interest rate. The case-pooling methodology, outlined in Roley and Sellon (1998a), is used and adjusted to the Canadian situation as follows :

$$\Delta SpR_j = c_j + \beta_{1j} \Delta OBfx + \beta_{2j} \Delta OB + \beta_{3j} \Delta CAD/USD_j + \beta_{4j} \Delta FF + v_j$$

The results for the two subperiods are given in Tables 6 and 7. While not conclusive, a comparison of the  $\beta_1$  and  $\beta_2$  coefficients over the two periods suggests that interest rates across the yield curve are now more inclined to anticipate changes in the operating band regardless of whether the operating band change was “normal” or deemed necessary to address unsettled conditions in financial markets.<sup>18</sup>

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18. These results should be treated with some caution. There is an underlying assumption in this methodology that changes in market rates between operating band changes mainly reflect changes in market participants’ expectations regarding future operating band changes rather than changes in risk preferences or term premiums. This assumption is reasonable for some countries, such as the United States, where term premiums are small and fairly stable over short periods of time. In contrast, Canadian term premiums have tended to be large and highly variable, particularly in the first sample period (see Gravelle, Muller, and Stréliski [1999]). Moreover, there are econometric concerns in using the Roley and Sellon approach with Canadian data due to the widely varying intervals between operating band changes in Canada.

**Table 6: Market anticipation of operating band changes: first sample**

Market anticipation to changes in the operating band from the day after the previous change to the day before the current change, June 1994 to 21 February 1996 <sup>a</sup>							
$\Delta SpR_j = C_j + \beta_1 \Delta OBfx + \beta_2 \Delta OB + \beta_3 \Delta CAD/USD + \beta_4 \Delta FF + v_j^b$							
$\Delta$ spread of $R_t$	$C$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	$\bar{R}^2$	D.W.
BA-30	<b>-0.196</b>	<b>0.459</b>	<b>-0.794</b>	<b>14.18</b>	<b>-0.288</b>	0.32	2.63
BA-60	<b>-0.103</b>	0.276	-0.471	<b>13.77</b>	<b>-0.570</b>	0.44	2.52
BA-90	<b>-0.139</b>	0.339	<b>-0.657</b>	<b>18.47</b>	<b>-0.384</b>	0.62	2.51
2-year bond	-0.097	0.157	-0.293	<b>12.69</b>	<b>-0.736</b>	0.44	2.29
5-year bond	-0.089	0.136	-0.358	<b>9.76</b>	<b>-0.547</b>	0.44	2.27
10-year bond	-0.052	0.086	-0.189	<b>7.31</b>	<b>-0.422</b>	0.44	1.85
Long bond	-0.029	0.016	-0.154	<b>6.55</b>	<b>-0.251</b>	0.31	1.79
CAD/USD <sup>c</sup>	0.008	-0.015	<b>0.044</b>	na	-0.012	0.01	2.05

a. Includes 21 changes in the operating band from June 1994 to 21 February 1996.

b.  $\Delta SpR_j$  refers to the change in the spread between Canadian rates and the equivalent American market rate from the day after the previous operating band change to the close on the business day before the current operating band change. The  $\Delta CAD/USD$  is the change in the log of the exchange rate (Canadian dollars per U.S. dollar) over the same period. Bold coefficients are significant at the 5 per cent level.

c. This market rate is not estimated in a spread format. The  $\Delta CAD/USD$  on the right-hand side is omitted.

**Table 7: Market anticipation of operating band changes: second period**

Market anticipation to changes in the operating band from the day after the previous change to the day before the current change, 22 February 1996 to 5 May 1999 <sup>a</sup>							
$\Delta SpR_j = C_j + \beta_1 \Delta OBfx + \beta_2 \Delta OB + \beta_3 \Delta CAD/USD + \beta_4 \Delta FF + v_j^b$							
$\Delta$ spread of $R_t$	$C$	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	$\bar{R}^2$	D.W.
BA-30	-0.009	0.430	<b>0.783</b>	-2.67	-0.624	0.38	2.36
BA-60	0.004	<b>0.739</b>	<b>0.849</b>	-5.44	0.226	0.47	2.36
BA-90	0.036	<b>0.603</b>	<b>0.966</b>	<b>-4.72</b>	-0.120	0.53	2.11
2-year bond	-0.062	<b>0.601</b>	<b>0.742</b>	1.34	-0.698	0.58	2.70
5-year bond	<b>-0.114</b>	<b>0.696</b>	<b>0.401</b>	1.39	<b>-0.961</b>	0.64	2.59
10-year bond	<b>-0.136</b>	<b>0.586</b>	0.120	0.900	<b>-0.53</b>	0.54	2.72
Long bond	<b>-0.147</b>	<b>0.516</b>	0.029	0.597	<b>-0.659</b>	0.47	2.72
CAD/USD <sup>c</sup>	0.007	<b>0.051</b>	<b>0.073</b>	na	-0.028	0.51	2.21

a. Includes 20 changes in the operating band from 22 February 1996 to 5 May 1999.

b.  $\Delta SpR_j$  refers to the spread between Canadian rates and the equivalent American market rate (same as in Table 6). The  $\Delta CAD/USD$  is the change in the log of the exchange rate (Canadian dollars per U.S. dollar). Bold coefficients are significant at the 5 per cent level.

c. This market rate is not estimated in a spread format. The  $\Delta CAD/USD$  on the right-hand side is omitted.

## 5.6 The speed with which markets respond to operating band changes

In the finance literature, the speed with which financial market prices respond to the arrival of new information is considered an indicator of market efficiency. The faster a market responds to new information, the less opportunity there is for market participants to profit from news in the public domain. Thus, increased transparency in monetary policy should contribute to more efficient markets if it increases the speed with which interest rates and the exchange rate respond to the Bank's actions in financial markets.

Two papers presented at the Bank's 1995 economic conference shed some light on this issue. Farahmand (1996) compares the response of the overnight interest rate to the Bank's daily cash setting and other financial market operations before and after the introduction of the operating band. Similarly, Barker (1996) analyzes the impact of the Bank's operations on the monetary conditions index (MCI) and its components before and after the introduction of the operating band.

The conclusions of these two studies are consistent. They suggest that the increased transparency in the Bank's monetary policy operations has improved the efficiency of financial markets. The results presented in Farahmand (1996) can be interpreted as suggesting that, prior to the introduction of the operating band, there was "noise" in the cash setting, which slowed the response of the overnight interest rate to changes in the cash setting. In contrast, in the new regime, overnight rates respond immediately to changes in the operating band; and the cash setting, in and of itself, no longer has any policy significance. Similarly, Barker (1996) finds that the MCI and its components now respond mainly to changes in the operating band rather than daily "noisy" movements in the overnight rate. Indeed, anyone who has witnessed first-hand the market's response to changes in the operating band can confirm that markets respond almost immediately to these changes.

## **6. LIMITS TO TRANSPARENCY**

Although markets are now better able to anticipate the Bank of Canada's monetary policy actions, some observers believe the media and market participants have not appreciated the conditional nature of the Bank's pronouncements on the medium-term outlook for monetary conditions. This raises the question of whether a central bank can be too transparent in the conduct of monetary policy.

### **6.1 Transparency at the Bank of Canada relative to other central banks**

If financial markets have trouble processing information of a conditional nature, this might imply that such information should not be disclosed for fear of disrupting market conditions. However, the finance literature has not been able to clearly refute the view that markets are efficient processors of information, or at least more efficient processors than any of the alternatives examined. Moreover, there is evidence that some central banks, which are even more explicit than the Bank of Canada in sharing their economic outlook with the public, have not encountered significantly worse problems with conditional statements than the Bank. It could be that the Bank of Canada does not

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release *enough* information for market participants to appreciate the conditional nature of its views.<sup>19</sup>

To provide a sense of how transparent the Bank of Canada is relative to some of its counterparts in other countries, it is useful to compare the inflation reports or monetary policy statements published by the central banks in New Zealand, Sweden, and the United Kingdom with the Bank of Canada's *Monetary Policy Report*. Two main features stand out that are relevant for this discussion.

First, the reports prepared by these central banks are more explicit with respect to their economic outlook and, in the case of New Zealand, the implications of the risks associated with the outlook for its desired monetary policy stance. Indeed, one could state categorically that the Reserve Bank of New Zealand is the most transparent of the three: it publishes the results of its economic projections every three months and devotes a section in its quarterly *Monetary Policy Statement* to a discussion of the risks associated with its economic outlook and their implications for the desired path of monetary conditions. The Sveriges Riksbank and Bank of England provide quantitative projections of inflation (and real output in the case of the Bank of England) for the next two years in their quarterly *Inflation Reports*, assuming stable official interest rates. These two banks also provide stylized probability distributions around these estimates to illustrate the conditional nature of their economic outlooks. However, unlike the New Zealand central bank, they do not discuss the implications of their outlooks for the desired future stance of monetary policy. In contrast, the Bank of Canada's *Monetary Policy Report* discusses the outlook for inflation and output over the next 12 months in general terms (e.g., in the May 1998 issue, core CPI inflation is projected to range between 1 1/2 and 2 per cent over the balance of 1998 and the first half of 1999) with only a short qualitative discussion of the risks to the outlook.

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19. Or perhaps other central banks are more tolerant of exchange rate variations. Grant (1997) suggests that, by adjusting the operating band to address confidence issues in financial markets, the Bank might have clouded market participants' understanding of the Bank's policy intentions. This confusion could arise if market participants perceive that the Bank has a second implicit policy goal—maintaining investor confidence—that, in the short run at least, might not be consistent with the Bank's stated objective of achieving the inflation targets.

The clarity of the Bank's intentions is not helped by the fact that the Bank's communications are scrutinized by two audiences: financial markets and the general public. The interests of these audiences do not always coincide. For example, while both may have an interest in domestic price stability, financial market participants also advocate, on occasion, that the Bank maintain investor confidence. This can lead to communications challenges for the Bank because tailoring messages to address the specific concerns of different audiences can be difficult in an open environment.

The second point worth noting is the frequency with which information is provided to the public.<sup>20</sup> The more frequently information is updated, the easier it is for a central bank to get any reassessment of the economic situation into the public domain in a more gradual way. And, there would be less risk that the information, which was available, would become stale, or worse, a misleading indicator of the bank's intentions. The Bank might wish to consider following the lead of these three central banks and publish its *Report* on a quarterly basis.

A central bank should not, however, go so far as to update its views in response to the arrival of each new piece of information. Since the lags in the effect of monetary policy on the economy are generally believed to be long and variable, there is a potential conflict between being too concerned about each new piece of information and the attainment of a specific monetary policy objective. Siklos (1999) argues that this could lead to a risk that monetary authorities either would become myopic or would suffer from tunnel vision and possibly overreact to what appears to be random or inexplicable events from the perspective of the overall policy objectives. There are other ways of dealing with this. For example, introducing a pre-announced schedule of fixed dates for policy-makers to review economic and financial conditions and to set monetary policy might be one way for a central bank to keep the public informed of its views and intentions on a reasonably frequent basis without being seen to be responding to the arrival of a specific piece of data.

Taken together, the foregoing observations suggest that there could be merit in making the conduct of Canadian monetary policy more transparent by providing more information on a quarterly basis about the Bank's economic outlook and by explicitly highlighting the uncertainty that surrounds it. This could be accomplished by a discussion of the risks and their implications for the Bank's outlook for inflation and real output. However, the Bank would need to make it clear to market participants that this outlook was based on the assumption either of a continuation of then-current monetary conditions, or of some form of market consensus regarding the future path of monetary conditions.

Stressing the conditional nature of the Bank's outlook might offer an added advantage: it would enable the monetary authority to become more accountable *ex post*. Indeed, by illustrating the risks to the Bank's outlook, future *Reports* could then begin with a comparison between previously stated nuanced views and what actually transpired.

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20. The *Inflation Reports* published by the Reserve Bank of New Zealand, Sveriges Riksbank, and the Bank of England are released every three months. In contrast, the Bank of Canada's *Monetary Policy Report* is published every six months, although the economic commentary published in the winter and summer editions of the *Bank of Canada Review* update the Bank's assessment of economic conditions.

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Such an approach is not without risks; it implies increased uncertainty pertaining to policy stances that will be required in the future. In fact, by allowing the Bank's judgments surrounding its economic outlook to become more nuanced, the Bank implicitly concedes a wider range of inflation outcomes and possible policy reactions.

## 6.2 Commenting on future monetary policy stances

The Bank has offered qualitative views on the implications of its inflation outlook for future monetary policy stances in previous *Monetary Policy Reports*. However, it is recommended that the Bank refrain in the future from such a discussion, i.e., from transforming the *Monetary Policy Report* into an *Inflation Report*. Four reasons are put forth to support this recommendation.

First, there appears to be a dissonance between the time horizons of the Bank and the market. Past experience suggests that “medium term” seems a much shorter time horizon for market participants who are constantly monitoring markets than for the central bank. A good example is the market's response to the release of the May 1997 *Monetary Policy Report*. The conclusion of the *Report* indicated that the Bank would need to promote a less stimulative path for monetary conditions “over the medium term” in order to maintain Canada's low trend rate of inflation. This led to a brief upward blip in the value of the Canadian dollar as market participants concluded that the *Report* was signalling an imminent rise in the operating band for the overnight interest rate. Once it became clear that such an increase would not be immediately forthcoming, the Canadian dollar retreated.

Second, the Bank should bear in mind that, all things being equal, the market tends to interpret a view regarding future monetary conditions as an implicit view on the future path of the exchange rate. (This perhaps reflects the fact that, in the short run at least, fluctuations in monetary conditions mainly reflect shifts in the exchange rate.) Expectations regarding appropriate levels for the exchange rate are often weakly grounded, and it is not clear ex ante what a central bank can do to provide such an anchor beyond committing to achieve a pre-announced inflation target. This is particularly true when the exchange rate is being buffeted by international shocks.

Third, a publicly expressed opinion about the future path of monetary conditions, no matter how qualified, might provide markets with a false sense of certainty regarding this path. Indeed, the path is subject to regular re-evaluation as new information on the

state of economic and financial conditions arrives.<sup>21</sup> A case in point was the period following the release of the November 1997 *Monetary Policy Report*. The Bank indicated in that *Report* that it seemed likely further action to reduce monetary stimulus would be required over the following six months. The Bank's assessment of the economy evolved as the crisis in Southeast Asia deepened and spread to Korea. It would not have been appropriate for markets to assume that the Bank's previously stated intentions would not adjust to the evolving international economic situation.

Moreover, from time to time, the Bank has tolerated tighter monetary conditions for tactical reasons in order to maintain investor confidence in financial markets, particularly in periods in which the markets are trying to cope with major shocks. Two recent examples are the Bank Rate increases announced in January and August 1998. These actions were taken, in part, to preserve confidence in Canadian dollar denominated assets as markets struggled to cope with the Asian and Russian financial crises.

And fourth, by not stating explicitly the implications of its economic outlook for the future stance of monetary policy, the 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 (and perhaps by paying more attention to the rest of the *Report*), rather than by simply speculating on whether and when the Bank will follow through with its previously announced "forecast" for monetary conditions.

### **6.3 Other ways of communicating conditional views**

Are there other ways of conveying to market participants (and the public at large) the conditionality and uncertainty that surrounds a central bank's economic outlook? The U.S. Federal Reserve's experience is an interesting case because it does not publish a formal inflation or monetary policy report. There, the sense of uncertainty (or dispersion in possible outcomes) is conveyed in two ways: (a) Chairman Greenspan is quite adept at conveying the conditionality that exists in the Fed's outlook by providing a qualitative sense of the range of possible outcomes in his pronouncements on economic and financial conditions; and (b) different Fed officials frequently make pronouncements on economic and financial conditions that are not necessarily consistent with one another, thus

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21. This is becoming more pertinent since the exchange rate is more likely to be buffeted in the future by economic shocks than by confidence shocks now that Canada's public finances are improving. The usefulness of the MCI as a communications device in such circumstances would decline accordingly, a point that the Bank has implicitly recognized by signalling to markets its willingness to tolerate much wider variations in the MCI.



conveying to the public a sense of the range of views that exist among individual FOMC members.<sup>22</sup> The latter course might not be practical in Canada, given the different governance structure at the Bank of Canada and the emphasis on consensus in the deliberation of monetary policy among members of its Governing Council. However, the market's ability to process conditional statements could be helped by the Bank's ensuring that its officials' public pronouncements on economic conditions are sufficiently nuanced to provide a sense of the risks looking forward.

#### 6.4 Publication of the staff's economic projection

Should the Bank follow its New Zealand counterpart's lead and publish detailed results from the staff economic projection?<sup>23</sup> At first glance, such a course might appear attractive because it would enable the central bank to rationalize any breach of the inflation target range in terms of forecast errors. Moreover, it would have the obvious benefit of exposing the results of the economic projections to informed outside observers; over time, this should lead to even higher quality projections.

There are, however, a couple of key points that would argue against this course.<sup>24</sup> First, there is a risk that the integrity of the advice contained in the staff projection might be impaired by exposing it to the public limelight. There is a natural tendency among public forecasters to follow the herd because the cost of being wrong as one of the pack is less than that of being wrong by oneself. Thus, knowing that the projection would be subject to public scrutiny might subconsciously bias those involved towards the mean, particularly if the results would otherwise be provocative. Perhaps the most important reason for not publishing the projection, though, is that the Bank's Governing Council need not set policy solely on the basis of the staff projection, although it is an important input into the monetary policy deliberation process. Consequently, the staff projection would not provide market participants with a sense of Council's view of the economic

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22. This is applicable to the Bank of England and the European Central Bank as well, following recent changes in their monetary policy frameworks.

23. The focus here is on whether the Bank should publish the *results* of the projection on a regular basis. The mechanics of the Bank's Quarterly Projection Model (QPM) were made public in a series of technical reports published in 1994 through 1996. See Black et al. (1994), Armstrong et al. (1995), Coletti et al. (1996), and Butler (1996). Publishing the details of the model is clearly beneficial because it facilitates the gathering of useful feedback on how the model can be improved over time, and it helps those outside the Bank better understand the way in which the Bank thinks about the economy.

24. Unless, of course, the Governing Council was prepared to contemplate major changes to the projection process, such as more distance between itself and the projection. Even then, it is possible that external audiences would have trouble distinguishing the views of the staff from those of the Governing Council.

outlook, and it might provide an undesirable incentive for the staff to communicate an economic outlook it thinks Council would like to hear.

Bearing in mind the foregoing, we would favour the status quo and thus not recommend publishing the staff projection.<sup>25</sup> The Governing Council's need for objective policy advice outweighs any potential benefits that might accrue from publishing the projection. Indeed, some of the benefits of public scrutiny might be realized indirectly if the Bank were to follow the lead of other central banks and become more forthcoming in its publications about its outlook for inflation and the associated risks. Over time, if the Bank's published comments on the economic outlook and associated analysis were found wanting, public criticism of the quality of the Bank's economic analysis would result. In turn, this would place pressure on the staff to improve the quality of the projection and policy advice supplied to Governing Council.

## **6.5 Tactical considerations**

There are also limits to transparency when it comes to policy implementation, specifically, the timing and magnitude of monetary policy operations such as foreign exchange intervention and Bank Rate changes. Typically, the Bank has been reluctant to wait for expectations to fully anticipate prospective Bank actions when the Canadian dollar was under pressure, in part due to a loss of investor confidence in Canadian dollar denominated assets. In such circumstances, an unexpected (or larger-than-expected) change in the Bank Rate has been deemed useful by the Bank because it signals the central bank's resolve to restore investor confidence in a proactive fashion. Conversely, waiting until markets have fully priced in a Bank Rate change might be interpreted by market participants as a signal that the central bank is reluctant to adjust its official interest rate and is only doing so under pressure from market participants. Obviously, the former is a much more appropriate signal to send when decisive action is deemed necessary to demonstrate the Bank's commitment to restoring confidence in domestic financial markets. Thus, the central bank should always reserve the right to act without warning to address confidence issues in financial markets. In such circumstances, Enoch (1998) notes that transparency should demand only that the central bank explain the rationale for its actions immediately afterwards so that it can be held accountable.

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25. An alternative could be to publish the projection with a lag. If the lag were sufficiently long, the projection process could be reviewed in a rigorous fashion without encouraging observers to focus on the current policy environment. An obvious question is how long should the publication lag be. It should be long enough to extend beyond the current economic cycle, but not so long as to become stale due to the introduction of new projection models. One possibility could be a lag of seven years. This would offer the convenient feature that Bank management would not be held accountable for actions of the current mandate but could learn from the experiences of the previous one.

## 7. CONCLUDING REMARKS

Looking back over the 1990s, it is clear that the Bank has made significant progress in opening up the monetary policy process in Canada to outside scrutiny. Thus, financial market participants and the public at large now have a much better appreciation of the objectives of monetary policy and the framework and mechanisms used to conduct policy. The evidence presented in this paper, albeit tentative, suggests that initiatives such as the *Monetary Policy Report* have facilitated the dissemination of additional information that is quickly incorporated in prices of financial assets. Moreover, the empirical results suggest that the Bank's intentions have become sufficiently clear that financial asset prices are now able to adjust more fully ahead of time in anticipation of a pending monetary policy action—except in periods when the Bank has chosen to consciously surprise markets to demonstrate its resolve to maintain investor confidence in Canadian dollar denominated assets. Even then, the evidence suggests that increased transparency might have improved the efficiency of markets by facilitating more rapid adjustment in interest rates and the exchange rate. However, further research will be required to ensure the following: (a) that the empirical results in this paper have not been clouded by the assumption that the Bank of Canada's reaction function has not changed materially in recent years; and (b) that the results do not, in fact, reflect a response to an unidentified common factor across countries—a factor not associated with an improvement in the transparency of central bank operating procedures.

This does not mean that there is no room for improvement in the way monetary policy is conducted in Canada. The approaches and publications of other central banks offer suggestions of how the Bank could better communicate information of a conditional nature to an external audience. On the other hand, there appear to be some justifiable limits on how open a central bank should be. For example, one would caution the Bank against being too explicit in discussing the implications of its economic outlook for the desired stance of monetary policy. And, while publication of the staff economic projection might seem attractive, the risks to the integrity of the projection process appear to outweigh the benefits unless there is a significant lapse of time before publication.



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