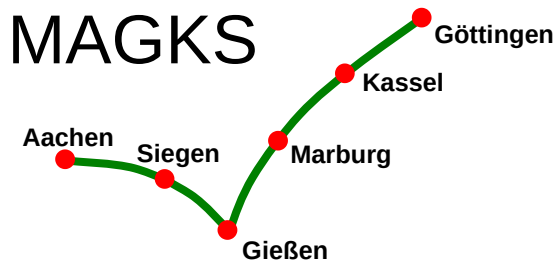

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Domestic or U.S. News: What Drives Canadian Financial Markets?

Abstract

Using a GARCH model, we study the effects of Canadian and U.S. central bank communication and macroeconomic news on Canadian bond, stock, and foreign exchange market returns and volatility. First, central bank communication and macro news from both countries have an impact on Canadian financial markets. Second, Canadian central bank communication is more relevant than its U.S. counterpart, whereas in the case of macro news, that originating from the United States dominates. Third, we find evidence that the impact of Canadian news reaches its maximum when the Canadian target rate departs from the Federal Funds target rate (2002–2004) and thereafter. The introduction of fixed announcement dates (FAD) initially does not cause a noticeable break in the data. Finally, Canadian and U.S. target rate changes lead to higher price volatility, and so does other U.S. news. Other Canadian news, however, lowers price volatility.

JEL: E52, G14, G15

Keywords: Bank of Canada, Central Bank Communication, Federal Reserve Bank, Financial Markets, Macroeconomic News, Monetary Policy

1. Introduction

Canada, as a small open economy, depends to a large extent on global economic developments. Trade and capital flow linkages to its major trading partners, as well as the foreign interest rate level, are important for the Canadian economy. In our sample period, about two-thirds of total portfolio investments in Canada are made by U.S. investors. The trade share with the United States is also quite large (77 percent in 1998, 68 percent in 2006). In 95 percent of all currency transactions involving Canadian dollars, these are converted into U.S. dollars and vice versa.[1] These figures indicate that economic developments in the United States and its monetary policy should play a particularly important role in the development of the Canadian economy and its financial markets. There has even been discussion of creating a monetary union between Canada and the United States or unilaterally adopting a U.S. dollar peg. For instance, Buiter (1999) concludes that economic arguments favour a full, formally symmetric monetary union.

Therefore, when studying Canadian financial markets, one needs to consider economic events occurring in the United States. Gravelle and Moessner (2001) state that throughout the 1990s, Canadian market participants tended to put greater emphasis on U.S. macroeconomic data releases than on Canadian ones. Thus, one should expect U.S. macroeconomic news and monetary policy to have a significant impact on Canadian financial markets. In addition, it is important to study monetary policy communication in a broad sense, and not only target rate changes, as market participants also adjust to news conveyed in speeches and testimony by Federal Open Market Committee (FOMC) members. As U.S. financial markets react to informal channels of monetary policy (see, e.g., Ehrmann and Fratzscher, 2007; Hayo et al., 2008), we expect Canadian markets will, too.

Our sample period, 1998 to 2006, includes several formal and informal changes in Canadian monetary policy. Ever since September 1998, the Bank of Canada (BOC) has intervened in the foreign exchange market only under "exceptional circumstances." In September 2000, it introduced fixed announcement dates (FAD); previously, target rate changes could effectively occur on any business day.[2] With the introduction of FADs, the BOC became more "independent" from the Federal Reserve Bank (Fed). The BOC does not explicitly refer to any prior decisions by the Fed in its post-meeting statements after May

[1] Sources: IMF Coordinated Portfolio Investment Survey, IMF Direction of Trade Statistics, BIS Triennial Central Bank Survey (2007), and own calculations.

[2] The Bank of Canada had four key objectives when it introduced the new system for announcing target rate decisions: reduced uncertainty in financial markets, more emphasis on medium-term monetary policy, increased transparency regarding the BOC's interest rate decisions, and *greater focus on the Canadian rather than the U.S. economic environment* (Parent et al., 2003).

2000. For instance, between April 2002 and September 2004, the BOC target rate deviates substantially from the Federal Funds target rate (see Figure 1 in the Appendix).

This is the first paper to study the effects of formal and informal communication by the BOC as well as by the Fed on Canadian financial markets using a novel set of data. In this paper, we address four research questions:

1. Does U.S. and Canadian central bank communication (including target rate changes) and macroeconomic news have an impact on Canadian financial market returns?
2. Which type of news, U.S. or Canadian, is relatively more relevant?
3. Does the introduction of the FAD system change agents' sensitivity to Canadian news? In particular, is there a stronger reaction to Canadian news in the April 2002 to September 2004 subsample, a period during which the course of BOC monetary policy was different from that of the Fed, compared to reactions in other periods? This is of particular interest as the BOC followed the U.S. interest rate path closely even after introduction of the FAD system.
4. Does U.S. and Canadian news exert an influence on financial market volatility?

The remainder of this paper is organised as follows. In the next section, we summarise previous work in this area and outline the contributions of this paper. Section 3 describes the construction of the news dummies and explains our data set. Section 4 introduces the econometric methodology. Section 5 reports our empirical results for bond market returns; Section 6 focuses on stock and foreign exchange market returns. Section 7 presents the impact on financial market volatility. Some robustness checks and alternative specifications are discussed in Section 8. Section 9 concludes.

2. Related literature and our contribution

Relevant studies in this strand of the literature typically assess the impact of U.S. *or* Canadian macroeconomic news or the influence of U.S. *or* Canadian target rate changes on financial markets in Canada, thereby neglecting (informal) central bank communication. The most closely related paper is by Gravelle and Moessner (2001) and covers the period January 1995 to August 2000. The authors statistically quantify the adjustment of Canadian interest rates to *macroeconomic news* released in *Canada and the United States* and detect that the rates react very little to domestic shocks but are significantly affected by U.S. news. Moreover, they find little evidence that Canadian interest rates have become more sensitive to Canadian news over time. The authors hypothesise that the lack of FADs in Canada prior to December 2000 and

the BOC's efforts to smooth destabilising fluctuations in foreign exchange rates contribute to the difficulty of understanding monetary policy reactions in Canada. Parent (2003) extends the Gravelle and Moessner sample to September 2002. He concludes that under the FAD system, publication of Canadian data on short-term interest rates has an increased impact. In addition, the number of U.S. indicators having a significant impact on the interest rate has declined, though U.S. data are still important.

Andreou (2005) and Kearns and Manners (2006) examine the impact of unexpected *policy actions* by the *BOC* on bond and foreign exchange markets, respectively. Surprise in target rate setting had a significant effect on bond market rates at the shorter end of the yield curve between August 1996 and May 2004, with the effect dissipating as maturity increased. In the period from October 1996 to June 2004, surprises causing a revision of future policy expectations have a larger impact on the exchange rate (1.69 percent per 100 bps) than surprises with respect to the timing of anticipated changes in policy (0.84 percent). Both findings imply that policy actions indicate only a change in timing of interest rate movements and do not signal a switch in the BOC's longer-term policy goals. A second result from Andreou (2005) is that the impact on longer-term interest rates has diminished since the introduction of FADs.

Bailey (1989) and Deaves (1991) document significant associations between weekly surprises in the announced level of *U.S. M1* and unanticipated changes in the *Canadian money supply* as well as in Canadian financial markets during the periods of monetary targeting by the U.S. and Canada, respectively. In case of U.S. news, the Toronto stock index, bond prices, and short-term interest rates adjust after surprises, while the CAD/USD exchange rate is not affected. Canadian monetary news, in turn, significantly affects foreign exchange and bond markets.

Beattie and Fillion (1999)[3] and Doukas and Switzer (2004)[4] examine the impact of *macroeconomic news* from *both countries* on intraday volatility of the CAD/USD exchange rate and Canadian dollar futures prices, respectively. Gradojevic and Neely (2008)[5] and Lucey et al. (2008)[6] assess the influence of *U.S. macro surprises* on joint dynamics of Canadian dollar order flows and the CAD/USD exchange rate and the returns and conditional volatility of Canadian stock returns, respectively. Of the Canadian variables, only target rate changes by

[3] Sample length: April 1995–January 1998.
[4] Sample length: 1998–2001.
[5] Sample length: 1990–2004.
[6] Sample length: August 1999–August 2007.

the BOC are shown to be consistently important, whereas in case of the United States, several variables can be identified: target rate changes by the FOMC, housing starts, PPI, and CPI.

In this paper, we study the effects of all types of *BOC and FOMC communication* (including target rate movements) as well as *Canadian and U.S. macroeconomic news* on bond, stock, and foreign exchange market returns and volatility in Canada. The communication events are coded into dummy variables on the basis of their written content. We differentiate between news regarding monetary policy and that concerning economic outlook in our examination of post-meeting statements, monetary policy reports, speeches, and testimony. The macroeconomic news dummies are constructed from widely watched business cycle and price indicators. Our analysis focuses on immediate responses, i.e., the reaction on the day the news actually hits the respective market.

Our sample period (1998–2006) is particularly well-suited to our purpose as it includes the above-mentioned change in Canadian monetary policy. Econometrically, we employ a GARCH specification of daily financial returns to capture the autoregressive conditional heteroscedasticity that characterises many financial series. Our approach extends the existing literature in several ways. First, ours is a pioneering study of the effects of formal and informal communication by the BOC on Canadian financial markets. Previously, only actual target rate changes by the BOC have been studied. Second, we assess the hitherto neglected channel of communication by the Fed in this context. Third, we introduce a newly constructed data set on FOMC and BOC communications to the literature that is based on original sources, not just media reports. Fourth, this is the first study that examines the period of *de facto* different interest rate paths (2002–2004) between Canada and the United States. Fifth, we encompass many studies presented in the literature review, as we focus on a broad set of macroeconomic news *and* monetary policy from both countries. Previous work focuses *either* on news originating from one country—the United States or Canada—*or* employs only a small sample of macroeconomic news, thereby neglecting the informal channels of central bank communication. Sixth, we use this broad set of news to identify the most important categories of news from an economics perspective by incorporating the frequency of the announcements. Seventh, this paper provides the first application of a GARCH approach to Canadian financial market returns and volatility in the context of macroeconomic and monetary policy news. Finally, our inferences are derived within the context of a rigorous and consistent general-to-specific model-reduction process.

3. Data

Our analysis takes advantage of a new data set introduced by Hayo et al. (2008), which includes indicator variables for 663 speeches and 151 congressional hearings, thereby covering all members of the Federal Reserve's Board of Governors (BOG), as well as 68 post-meeting statements and 20 monetary policy reports (MPR). Following the literature (see, e.g., Ehrmann and Fratzscher, 2007), we sort the communication content into either a "monetary policy" or "economic outlook" category. Coding for the U.S. economic outlook news is either "positive" (EO+) or "negative" (EO–), whereas "tightening" (MP+) or "easing" (MP–) are the categories for the Fed's monetary policy stance. In the analysis, we employ separate dummy variables for positive and negative news to take into account possible asymmetric reactions of financial markets. In total, there are 16 communication dummies as all four types of communication (statements, MPR, testimony, speeches) can be coded into four different categories: EO+, EO–, MP+, or MP–.

Extending the data set to Canada, we examine BOC communication, which is comprised of 61 post-meeting statements, 32 monetary policy reports, 5 testimonies, and 115 speeches. We categorise the data in an analogous way; we checked the coding at two different points in time to ensure stability in our interpretation of the contents. The number of events is similar to the U.S. data for statements and monetary policy reports and, in fact, these ways of communicating with the public are organised similarly in both countries (see Table A1 for a more detailed comparison between the BOC and the Fed). However, U.S. BOG members talk to the public much more frequently via speeches and testimonies than do their Canadian colleagues.

Estimated Taylor rules show that the Fed puts more weight on both inflation and output than does the BOC (see Nikolsko-Rzhevskyy (2008), who uses real-time forward-looking Taylor rules; Collins and Siklos (2001), who calculate optimal reaction functions). It is likely that a more active monetary policy requires more frequent communication. Different monetary policy strategies can also play a role in explaining the differences in communication. The BOC has three monetary-policy-related goals in its current mission statement: *low and stable inflation, a safe and secure currency, and financial stability*. Its specific internal goal is to keep the inflation rate between 1 and 3 percent. Therefore, it has a rather clear inflation-targeting mandate. The Fed has *to achieve the sometimes conflicting goals of maximum employment, stable prices, and moderate long-term interest rates*. Thus, the Fed does not have a clearly quantified objective and—at least officially—is more focused on promoting growth (while keeping inflation under control) than is the BOC. With a

relatively more output-oriented target and no clearly quantified objective, the Fed has to more frequently communicate about its economic projections and future monetary policy. Finally, whereas the size of the respective committees should not play an important role as the BOG consists of seven members and the Canadian Governing Council has six governors, in Canada only speeches by the Governor are documented (except in 2006).

Table 1 presents the frequency of the categorised news dummies. Here, we discuss only the top half of the table, which covers Canada, as a detailed explanation of the U.S. results can be found elsewhere (Hayo et al., 2008). More BOC announcements refer to the EO than to the MP stance. Positive economic outlooks and hawkish comments occur far more often than negative economic outlooks or indications of an expansionary monetary policy. The finding on the EO can be related to the shape of the business cycle during our sample period, which includes only two quarters of negative GDP growth in Canada (Q3/2001 and Q2/2003). A similar situation explains the small number of MP easing communications: one of the easing cycles is characterised by sharp rate cuts (2001; 350 bps), whereas the tightening cycles are rather moderate. As cheaper liquidity tends to cause few problems for market participants, the central bank does not have to explain as carefully a rate cut as it would a rate hike.

Table 1: Number of nonzero values for the dummy variables

Canada	**MP Tightening**	**MP Easing**	**Positive EO**	**Negative EO**
Post-Meeting Statement	13	3	22	16
Monetary Policy Report	9	0	15	10
Testimony	0	0	1	3
Speech	14	1	31	10
United States				
Post-Meeting Statement	35	0	24	17
Monetary Policy Report	6	1	15	5
Testimony	4	2	17	3
Speech	31	6	92	31

Also included in our data set are selected macroeconomic announcements from both countries. We choose, from the list in Ielpo and Guégan (2009), the surprise components of 11 U.S. news items typically watched by financial market participants: advance GDP, industrial production, and trade balance to capture the business cycle phase; the ISM manufacturing index and the Conference Board consumer confidence rating for producer and consumer confidence; housing starts for real estate effects; nonfarm payroll and the

unemployment rate to proxy labour market conditions; retail sales for actual consumption; and the consumer price index and producer price index for inflation.

Twelve types of Canadian macroeconomic announcements are taken from the lists of Gravelle and Moessner (2001) and Doukas and Switzer (2004): real GDP, capacity utilisation rate, current account, and merchandise trade balance to control for business cycle; the Ivey Purchasing Managers Index for producer confidence; housing starts for real estate markets; net change in employment and the unemployment rate to proxy labour market conditions; retail sales for actual consumption; and the consumer price index, industrial product price index, and raw materials price index for inflation. These 23 (11 for the United States; 12 for Canada) indicators enter the equations as 46 dummies for positive and negative news, which allows for an asymmetric adjustment on financial markets depending on the sign of the shocks.[7]

Finally, target rate changes by the Bank of Canada and the Federal Reserve Bank are captured by including indicator variables, separating rate hikes and cuts for each central bank, respectively. The coding is 1 for a 25 bps move, 2 for 50 bps, and so on. Target rate change surprises, which occur either after an unscheduled meeting or as an unexpected outcome of a meeting,[8] are captured by separate indicators.

Our Canadian financial market indicators comprise daily closing interest rates on government securities, as well as daily returns on stock and foreign exchange markets over the period 2 January 1998 through 29 December 2006. As bond market indicators, we employ daily changes of three-month, six-month, and one-year Treasury bills and two-year Treasury notes. On stock and foreign exchange markets we examine daily returns measured as the rates of change of the Toronto Stock Exchange Index (TSX), the Canadian dollar/U.S. dollar (CAD/USD) spot rate, and the Canadian dollar/Euro (CAD/EUR) spot rate, respectively.[9] We choose daily data instead of intraday data for two reasons. At a conceptual level, we are interested in whether there are economically important effects that persist over time, instead of just short-term blips in the data. At a practical level, it is impossible to time the central bank news precisely in, say, 10-minute intervals.

[7] Data source for surveys of macroeconomic announcements: Bloomberg newswire. The respective positive (negative) dummy variable takes the value 1 when the announcement is larger (smaller) than the survey.
[8] Bloomberg surveys are used to identify surprises from scheduled meetings.
[9] Data sources: bond and foreign exchange market series: Federal Reserves' Statistical Releases H15 and Bank of Canada's statistical database; stock market series: Datastream. Due to different holidays and different nontrading days for the various assets, some days are excluded. After adjusting the dataset, there are 2,170 observations. The returns are calculated after these adjustments.

4. Econometric methodology

Descriptive statistics show that all financial market series exhibit excess kurtosis (see Table A2 in the Appendix) and diagnostic testing of preliminary OLS estimations reveals significant ARCH effects.[10] GARCH models increase estimation efficiency by modelling this volatility clustering and providing explicit estimates of the parameters describing the time-varying nature of the conditional variance (Engle, 1982). We start with a generalised version of the GARCH specification as proposed by Bollerslev (1986) and apply a testing-down process to further increase estimation efficiency.

$$(1)\ Returns_t = \gamma + \sum_{r=1}^{6} \delta_r\ Control\ Variables_{t-r} + \zeta\ 9/11$$
$$+ \eta\ Macroeconomic\ Announcements + \theta\ Target\ Rate\ Movements$$
$$+ \iota\ Communication\ Dummies + \mu_t,$$
$$\mu_t = \epsilon_t h_t^{1/2},$$
$$h_t = \alpha_0 + \alpha_1 \mu_{t-1}^2 + \beta_1 h_{t-1},$$

where α_0, α_1, β_1, μ, , γ, δ, ζ, η, θ, and ι are parameters or vectors of parameters and $\varepsilon_t|\Gamma_{t-1} = t(v)$; with Γ_{t-1} capturing all information up to t-1, and t(v) a t-distribution with v degrees of freedom.

The general specification of Equation (1) is an autoregressive-distributed lag model with six lags. The vector of control variables consists of past returns of the dependent variable, returns on the other Canadian markets (e.g., stock and foreign exchange market returns when examining the bond market), and returns of U.S. bond and stock markets. Contemporaneous returns on other markets and U.S. returns are excluded to avoid potential simultaneity problems. An impulse dummy is added on the first trading day after 11 September 2001. The variables of interest enter the equation when they actually hit the market, i.e., a speech after market closure hits the market on the subsequent day. Model (1) allows for student-t distributed errors (Bollerslev, 1987); these provide a better approximation of residuals that are not normally distributed.

After estimating these rich GARCH(1,1) models, we exclude all insignificant variables in a consistent general-to-specific approach (see Hendry, 1995). The extensive lag structure of financial control variables is intended to capture the effects of omitted variables and potential inefficiencies in Canadian financial markets. As in the case of communication and

[10] For both foreign exchange market series there is only mild evidence of excess kurtosis.

macroeconomic news variables, we increase estimation efficiency by applying rigorous exclusion tests to these controls. Diagnostic testing of the reduced models provides no evidence in favour of higher order GARCH(p,q) processes for all markets. Despite using student-t distributed errors, nonnormality appears to be present in all series and, consequently, we use robust standard errors as suggested by Bollerslev and Wooldridge (1992).

5. Impact on bond market returns

In this section, we examine the impact of news on Canadian bond market returns. Table 2a (for Canadian news) and 2b (for U.S. news) show the reaction of three-month, six-month, one-year, and two-year maturities for the entire sample.[11]

Table 2a: Regression estimates for bond market returns on Canadian news (full sample)

	3 Month	6 Month	1 Year	2 Year
Interest Rate Decisions				
Target Rate Hike		0.020 **		
Target Rate Hike Surprise	0.088 **	0.096 **	0.071 **	0.104 **
Target Rate Ease Surprise	-0.267 **	-0.207 **		-0.098 *
Macroeconomic News				
Real GDP -	-0.012 **	-0.017 **	-0.031 **	-0.037 **
Current Account Balance -				-0.035 **
Retail Sales +			0.015 *	0.017 *
Housing Starts -		0.010 **		
Employment Change +	0.016 **	0.027 **	0.036 **	0.046 **
Employment Change -		-0.030 **	-0.031 **	-0.038 **
Consumer Price Index +				0.020 **
Central Bank Communication				
Statement EO +			0.033 **	0.038 **
Statement EO -		-0.036 **	-0.063 **	-0.052 **
Monetary Policy Report EO +				0.023 **
Monetary Policy Report EO -	-0.022 **	-0.035 **	-0.047 **	-0.046 **
Testimony EO +	0.019 **	0.008 **	0.018 **	
Testimony EO -		-0.031 *	-0.050 **	-0.069 **
Speech MP +		0.022 **	0.036 **	0.043 **
Speech MP -	-0.010 **	-0.026 **	-0.022 **	-0.016 **
Speech EO -		-0.024 *	-0.037 **	-0.038 **

[11] The coefficients can be interpreted as follows. All target rate variables are coded as multiples of 25 bps. For example, the coefficient 0.089 implies an increase of 8.9 bps after a 25 bps surprise hike in the Canadian target rate. All macroeconomic variables enter the equation as news dummies (the actual announcement is higher than the survey). For example, a coefficient of -0.011 represents a decrease of 1.1 bps after negative (worse than expected) GDP news. In case of central bank communication, a coefficient of -0.036 denotes a decrease of 3.6 bps after a negative economic outlook in a statement.

Table 2b: Regression estimates for bond market returns on U.S. news (full sample)

Interest Rate Decisions				
Target Rate Ease	-0.015 **		-0.028 **	
Target Rate Ease Surprise	-0.046 **	-0.057 **	-0.035 **	
Macroeconomic News				
Advance GDP -				0.016 **
Consumer Confidence +		0.014 **	0.020 **	0.024 **
Manufacturing Index +				0.024 **
Manufacturing Index -				-0.020 **
Retail Sales +	0.007 **	0.012 **	0.019 **	0.023 **
Housing Starts -				-0.016 *
Nonfarm Payroll -	-0.017 **	-0.028 **	-0.044 **	-0.050 **
Unemployment Rate +	0.010 **	0.018 **	0.026 *	0.038 **
Central Bank Communication				
Statement EO -		-0.020 **		-0.041 *
Monetary Policy Report MP -	0.061 **	0.092 **	0.110 **	0.079 *
Monetary Policy Report EO -	-0.017 **	-0.045 **	-0.078 **	-0.066 *
Testimony MP +				-0.039 *
Testimony MP -	0.015 **			
Speech EO +	-0.004 *			
Speech EO -			0.014 **	0.022 **

Notes: * (**) indicates significance at a 5 percent (1 percent) level. Standard errors are heteroscedasticity-consistent. Only the variables of interest of the reduced model resulting from the testing-down process ($Chi^2(99) = 112.8$; $Chi^2(95) = 113.2$; $Chi^2(92) = 113.6$; $Chi^2(87) = 80.7$, respectively) are listed. Full tables are available upon request. EO = Economic Outlook and MP = Monetary Policy.

Shocks in either of the U.S. price indicators (CPI and PPI) do not explain Canadian bond returns. Thus, our results suggest that financial market participants believe that Canada is fully insulated from U.S. price shocks by the flexible exchange rate. This finding somewhat contradicts previous literature, which found CPI and PPI news to be significant. Unanticipated rate hikes and, even more strongly, unanticipated rate cuts[12] by the BOC have the largest economic impact across all maturities. U.S. MP easing surprises also have a negative influence up to a one-year maturity, but the size of this effect is significantly smaller than for surprising Canadian rate cuts.[13]

The most relevant Canadian macro news is negative GDP shocks and both types of movements in net employment, which are significant across all maturities. Positive U.S. consumption news (measured by actual retail sales and consumer confidence) and U.S. labour market conditions (measured by negative nonfarm payroll and positive unemployment rate shocks) also play an important role in explaining bond yields.

[12] $Chi^2(1) = 1691$** (3 month), $Chi^2(1) = 51.1$** (6 month).
[13] $Chi^2(1) = 1226$** (3 month), $Chi^2(1) = 101$** (6 month).

Concerning the communication variables, the estimations reveal a greater number of significant Canadian variables. Moreover, some U.S. communication variables have unexpected signs, whereas all Canadian variables have the expected sign (this holds for target rate changes and macro news, too). Again, the coefficient sizes are roughly equal across both countries. Canadian monetary policy news only matters when it is communicated in its least formalised category, namely, speeches. All other forms (post-meeting statements, monetary policy reports, and testimony) move markets only when they contain news about the economic outlook. In only one case do we find statistical evidence for an asymmetric reaction to good and bad news: two-year bonds react significantly more strongly to positive MP news than to negative MP news.[14]

Hayo et al. (2008) conclude that in the United States, the impact of communication tends to increase with its degree of formality. For Canadian bond markets, we find some evidence of this same phenomenon based on point estimates (particularly for all types of Canadian negative EO news), but these differences are not statistically significant . We also detect that the impact of news generally tends to increase with maturity. The only exception is the reaction to unexpected Canadian rate cuts which is more indicative of a timing surprise than of a reversion in future monetary policy (cf. Kearns and Manners, 2006). Statistical testing generally supports these conclusions.[15]

In terms of financial market impact, the coefficient estimates presented above could be slightly misleading, in as much as some types of news typically occur more often than others. Therefore, we compare the impact of interest rate changes, macroeconomic news, and central bank communication by taking into account the frequency of news. Table 3 shows the 10 variables that exert the largest cumulative absolute effects on each maturity over the whole sample.

When taking into account the frequency of news, labour market announcements from both countries (Canadian employment change, U.S. nonfarm payroll, U.S. unemployment rate) turn out to be the most important drivers of Canadian bond returns. For example, negative U.S. nonfarm payroll news drives the two-year returns down by 2.93 percentage

[14] $Chi^2(1) = 6.6^{**}$.
[15] Canadian Testimony EO–: 6m vs. 2y: z = 2*.
Canadian Rate Cut Surprise: 3m vs. 6m: z = -4.2**; 3m vs. 2y: z = -3.5**; 6m vs. 2y: z = -2.2*.
Canadian GDP–: 3m vs. 1y: z = 2.5*; 3m vs. 2y: z = 2.9**; 6m vs. 2y: z = 2.2*.
U.S. Target Rate Cut: 3m vs. 1y: z = 2.2*.
U.S. Nonfarm Payroll–: 3m vs. 1y: z = 2.2*; 3m vs. 2y: z = 2.8**.
U.S. Unemployment Rate+: 3m vs. 2y: -2.3*.
U.S. Monetary Policy Report EO–: 3m vs. 6m: z = 2.3*; 3m vs. 1y: z = 2.5*.

points over the whole sample. This is a new finding as prior studies always highlight a broad set of important variables from several categories of macroeconomic news.

Table 3: Top-10 cumulative returns for bond markets

	3 Month	6 Month	1 Year	2 Year
Canadian News				
Interest Rate Decisions				
Target Rate Hike		0.50		
Target Rate Ease Surprise	-0.80	-0.62		
Macroeconomic News				
Real GDP -	-0.37	-0.53	-1.00	-1.19
Employment Change +	0.72	1.21	1.61	2.07
Employment Change -		-0.82	-0.83	-1.02
Central Bank Communication				
Statement EO -		-0.57	-1.02	-0.83
Statement EO +			0.72	0.83
Monetary Policy Report EO -	-0.22			
U.S. News				
Interest Rate Decisions				
Target Rate Ease	-0.37		-0.70	
Target Rate Ease Surprise	-0.42	-0.52		
Macroeconomic News				
Consumer Confidence +		0.76	1.06	1.29
Manufacturing Index -				-1.07
Retail Sales +	0.29		0.75	0.92
Nonfarm Payroll -	-0.99	-1.60	-2.55	-2.93
Unemployment Rate +	0.43	0.82	1.15	1.72
Central Bank Communication				
Speech EO +	-0.38			

Note: The figures are calculated by taking the estimates from Table 2, which are then multiplied by the respective frequency of news. For each maturity, the 10 types of news exerting the largest impact are shown. EO = Economic Outlook and MP = Monetary Policy.

In general, macroeconomic news plays a larger role in terms of size than central bank communication and target rate changes. Concerning the origin, U.S. macroeconomic news is more important than Canadian. The opposite is found for interest rate changes (at least for the magnitude of the effects) where Canadian news is predominant. In the case of central bank communication, U.S. variables do not play a remarkable role as only speeches enter the top 10 in one case, while Canadian variables show up eight times.

In a next step, we check whether our findings are driven by particular subsamples. Gravelle and Moessner (2001) conclude that prior to the introduction of fixed announcement dates, market participants paid more attention to U.S. macroeconomic news than they did to the same type of Canadian news. Our results indicate that news from both countries has approximately the same impact over the full sample period, which contradicts Parent (2003), who finds that Canadian news has a much stronger impact after the introduction of FADs.

We use the day the BOC announced the introduction of the FAD system (19 September 2000) as a first break point. We also pay special attention to the period during which Canadian interest rates were markedly different than U.S. rates. The BOC's target rate hike on 16 April 2002 hit the market as a surprise (according to the Bloomberg survey) and therefore we use this date as the beginning of a monetary policy phase. This period ended on 8 September 2004 when the BOC became more closely aligned with the Fed's tightening cycle. The four subsamples are defined in Table 4.

Table 4: Different phases of Canadian monetary policy

	Start Date	**End Date**	**Description**
I	02/01/1998	18/09/2000	No FAD, following U.S. MP course officially announced
II	19/09/2000	15/04/2002	FAD, following U.S. MP course
III	16/04/2002	07/09/2004	FAD, departing from U.S. MP course
IV	08/09/2004	29/12/2006	FAD, following U.S. MP course

Notes: MP = Monetary Policy and FAD = Fixed Announcement Dates.

We examine these subsamples for all markets using Equation (1) (without GARCH features) applying OLS, as we do not find significant ARCH effects in subsamples II–IV. Again, we reduce the model size following the general-to-specific approach. For this purpose, we rely on the Autometrics algorithm described in Doornik (2008). Table 5 contains a summary of the results for the four subsamples for the three-month and two-year maturities.[16] To simplify the presentation, we counted the number of significant coefficients and allocated them to different categories of the variables: target rate changes, real macro news, housing and price news, MP communications, and EO communications. The frequency of unexpected signs is given in parentheses.

In the last two periods, we find more Canadian news with expected signs across all maturities. The impact of U.S. news is largest before and shortly after FADs were introduced, both in absolute terms and in relation to Canadian news. Thus, Canadian market participants

[16] Results for six-month and one-year maturities are omitted to conserve space but are available on request.

did not put more weight on Canadian news immediately after the introduction of FADs. Instead, Canadian news becomes more important (when looking at correct signs) in Period III, when the BOC target rate actually moved away from the Federal Funds target rate. In Period IV, during which the BOC became more closely aligned with the Fed's tightening cycle, the impact of Canadian news is still larger than the impact of U.S. news.

Table 5: Regression estimates for bond market returns (subsamples from Table 2)

	3 Month				2 Year			
Canadian News	**I**	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**
Target Rate Change Variables	1	1	2	1	1			
Real Macro News	1 (1)	1	3	3	4 (2)	2	3	6
Housing and Price News	2 (1)	3 (1)	2	1	2			
Communication MP	1 (1)		1	1			1	
Communication EO	3 (1)	2	3	2	4 (2)	3	3	4
Sum	8 (4)	7 (1)	11	8	11 (4)	5	7	10
U.S. News	**I**	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**
Target Rate Change Variables	1	2	2 (1)			1		
Real Macro News	2 (1)	2	3	3	4 (1)	3	3	3
Housing and Price News		3 (1)		1	1 (1)	1		
Communication MP	2 (1)	1 (1)			3 (1)			
Communication EO	1	1 (1)	1 (1)	2 (1)	1	1	1 (1)	
Sum	6 (2)	9 (3)	6 (2)	6 (1)	9 (3)	6	4 (1)	3

Notes: The figures denote the number of variables significant at the 5 percent level after the testing-down process. In parentheses is the number of unexpected signs. EO = Economic Outlook and MP = Monetary Policy.

Some trends are evident in several categories. The impact of target rate changes in Canada declines over time. Arguably, the BOC becomes more predictable in Period IV. Canadian real macro news, in turn, seems to drive the overall results as its impact is clearly ascending (cf. Parent, 2003). The impact of communication is roughly the same over time, with EO announcements dominating MP inclinations. The existence of an inflation target (starting in 1991) may explain why there are so few monetary surprises and we find no evidence that introducing FADs significantly increases the transparency of BOC communication.

Turning to U.S. news, Canadian bonds have become less sensitive to target rate movements over time, suggesting that the Fed's predictability improved. The impact of Fed communication and, in particular, MP news, declines over time, another indication that U.S. news matters less. The same applies to housing and price news. In contrast, news on real U.S.

macro indicators exerts roughly the same influence over the full sample period, reflective of the fact that the United States remains Canada's most important trading partner. This finding can be interpreted as supporting Gravelle and Moessner's (2001) argument that the lack of FADs is responsible for the relative unimportance of Canadian news. However, we find that the markets' focus toward Canadian news emerges only after a sustained period of deviation from the U.S. interest rate path. Therefore, it is unclear whether the reform of monetary announcements, the noteworthy deviation from U.S. interest rate paths, or a combination of both factors strengthens the importance of Canadian news.

6. Further evidence from foreign exchange and stock markets

We now assess the foreign exchange market in more detail using both the CAD/USD and the CAD/EUR exchange rates. Table 6a (for Canadian news) and 6b (for U.S. news) summarises the impact of news on these markets. We expect that good U.S. news will depreciate the CAD/USD exchange rate; however, due to tight trade relations and financial integration, good U.S. news is expected to appreciate the CAD/EUR spot rate.

Table 6a: Regression estimates for the foreign exchange market returns[17] on Canadian news

	CAD/USD		CAD/EUR	
Interest Rate Decisions				
Target Rate Hike	0.267	**		
Target Rate Hike Surprise	-0.426	**		
Target Rate Ease			-0.216	*
Macroeconomic News				
Current Account Balance +	-0.290	*		
Retail Sales +			-0.173	*
Employment +	-0.232	**		
Employment -			0.537	**
Unemployment Rate -	0.215	**		
Consumer Price Index -	0.130	*		
Central Bank Communication				
Statement MP -	-0.496	**	0.617	**
Statement EO +	-0.221	*		
Testimony EO +	0.201	**	-0.848	**
Testimony EO -	-0.271	**		
Speech MP -	-0.552	**		
Speech EO +			-0.203	*
Speech EO -	-0.196	*		

[17] Note that the foreign exchange rate series is in price notation, so a negative sign implies an appreciation.

Table 6b: Regression estimates for the foreign exchange market returns on U.S. news

Interest Rate Decisions				
Target Rate Hike	-0.211	*		
Target Rate Hike Surprise	0.203	**		
Target Rate Ease Surprise	0.166	**	0.367	**
Macroeconomic News				
Industrial Production -	0.123	*	0.234	*
Non-farm Payroll +			-0.619	**
Unemployment Rate -			0.482	**
Central Bank Communication				
Statement EO -	-0.240	**		
Monetary Policy Report MP -	0.554	**	1.155	**
Testimony EO -			-0.497	*

Notes: * (**) indicates significance at a 5 percent (1 percent) level. Standard errors are heteroscedasticity-consistent. Only the variables of interest of the reduced model resulting from the testing-down process ($Chi^2(96) = 119.2$; $Chi^2(103) = 102.8$, respectively) are listed. Full tables are available upon request. EO = Economic Outlook and MP = Monetary Policy.

News originating from both countries has an impact on both markets. The reaction of the U.S. dollar exchange rate is dominated by a higher frequency of Canadian compared to U.S. shocks.

An unexpected depreciation against the U.S. dollar after Canadian target rate hikes is offset by an appreciation after rate surprises, with the sum of the two opposite effects being statistically insignificant.[18]A similar situation occurs regarding U.S. target rate hikes and the U.S. dollar exchange rate: appreciation after a hike is offset by the surprise component and statistically insignificant.[19] Also unexpected is the appreciation against the euro after rate cuts. Thus, target rate changes have neither a clear-cut impact on the CAD/USD nor on the CAD/EUR exchange rates.

In contrast, all macroeconomic news variables from both countries have the expected sign. Positive (negative) real Canadian macroeconomic variables appreciate (depreciate) both exchange rates. As to U.S. news, positive retail sales news has a depressing impact on the dollar exchange rate (positive U.S. news is automatically bad news for the exchange rate), whereas positive (negative) news appreciates (depreciates) the euro exchange rate via spill-over effects.

BOC communication variables have puzzling coefficients for the CAD/USD spot rate, but the ones for the CAD/EUR spot rate conform to our expectations. A possible explanation

[18] $Chi^2(1) = 2.3$.
[19] $Chi^2(1) = 0.01$.

is that good (bad) news triggers higher (lowers) imports from the United States, thereby depreciating (appreciating) the exchange rate. U.S. communication shows the expected signs on the U.S. dollar exchange rate, while the euro rate is not much affected. Finally, robustness tests show that omitting the first nine months of 1998, which are characterised by interventions in the foreign exchange market, does not change the results.

Table 7 presents evidence that news from both countries also matters for the Canadian stock market, as measured by the TSX index. Target rate changes have an impact only when they are issued by the Fed and surprise the markets with unexpectedly loose monetary policy. Canadian macro news does not matter for the index, apart from a surprisingly positive reaction to bad GDP news. Five different categories of U.S. macro news are significant in explaining stock returns, for instance, a higher than expected consumer price index (indicating future rate hikes by the Fed) and a negative U.S. trade balance depress returns.

Table 7: Regression estimates for stock market returns

Canada		**U.S.**	
Interest Rate Decisions			
		Target Rate Ease Surprise	1.901 **
Macroeconomic News			
GDP -	0.285 *	Trade Balance -	-0.239 *
		Manufacturing Index +	0.560 **
		Manufacturing Index -	0.361 **
		Nonfarm Payroll -	0.180 *
		Consumer Price Index +	-0.333 *
Central Bank Communication			
Monetary Policy Report EO -	-0.829 **		
Testimony EO +	2.242 **	Testimony EO +	0.332 *
		Testimony EO -	-1.392 *
Speech EO -	-0.690 **		

Notes: * (**) indicates significance at a 5 percent (1 percent) level. Standard errors are heteroscedasticity-consistent. Only the variables of interest of the reduced model resulting from the testing-down process ($Chi^2(103) = 127.3$) are listed. Full tables are available upon request. EO = Economic Outlook and MP = Monetary Policy.

In both countries, central bank communication indicating a change in monetary policy has no influence on the stock market; only EO announcements matter. Positive Canadian testimony exerts a significantly larger impact than negative monetary policy reports and

negative news in speeches.[20] Finally, positive Canadian testimony moves the markets more than positive U.S. testimony.[21]

7. Impact on market volatility

In this section, we study the impact of our news variables on financial market volatility. The specification of Equation (1) is too demanding for analysing the effects of news variables on the conditional variance. The large number of dummy variables in the models prevents convergence in the estimation procedures (see Doornik and Ooms, 2008). Therefore, we simplify the specifications, as shown in Equation (2):

$$(2)\ Returns_t = \gamma + \sum_{r=1}^{6} \delta_r\ Returns_{t-r} + \zeta\ 9/11 + \ \eta\ Target\ Rate\ Movements + \mu_t,$$

$$\mu_t = \epsilon_t h_t^{1/2},$$

$$h_t = \ \alpha_0 + \alpha_1 \mu_{t-1}^2 + \beta_1 h_{t-1} + \theta\ Event\ Dummies,$$

where the parameters are defined as above. Some of the control variables used in Equation (1) are omitted as we only include lags of the dependent variables. From our variables of interest, we include only target rate movements by both central banks in the mean equation. We run two sets of regressions for each of the financial market series. (i) We include four dummy variables in the conditional variance equation distinguishing between good and bad news originating from the United States and Canada. (ii) We differentiate between target rate changes, macro news, and communication events in the United States and Canada, resulting in six dummies. After estimating these models, we exclude all insignificant variables using a general-to-specific approach. In Tables 8a–8c we report on only those markets significantly affected by news in the conditional variance equation.

Table 8a shows the impact of good and bad news in each country. Only the stock market is affected; positive news from Canada reduces uncertainty and thereby lowers price volatility. More significant coefficients are revealed when differentiating between target rate changes, macro news, and communication events for each country (see Table 8b). On the one hand, market participants increase trading activity when the BOC or the Fed changes its target rate. On the other hand, Canadian communication and macro news lower price volatility.[22]

[20] $Chi^2(1) = 69^{**}$, $Chi^2(1) = 46^{**}$.
[21] $Chi^2(1) = 137^{**}$.
[22] In the three-month regression, the absolute effects of rate changes dominate those of macro news ($Chi^2(1) = 14.1^{**}$). Statistical testing shows that the impact of BOC rate changes on the FX market is significantly smaller than it is across all bond maturities (CAD/EUR vs. 3m: $z = 4.6^{**}$; vs. 6m: $z = 2.4^{*}$; vs. 1y: $z = 2.54^{*}$). Based on point estimates, we find that volatility increases with ascending maturity.

This is consistent with Hayo et al. (2008), who conclude that Fed communications have a calming effect on financial markets.

Table 8a: Conditional variance dependent on positive and negative news

	TSX
CDN Positive News	-0.000005*

Table 8b: Conditional variance dependent on different types of news

	CAD/EUR	**3 Month**	**6 Month**	**1 Year**	**2 Year**
CDN Rate Change	0.00001**	0.000314**	0.000591*	0.000881*	
CDN Comm.	-0.000006**				
CDN Macro		-0.000065**			
U.S. Rate Change		0.00023**			
U.S. Macro					0.000271**

Table 8c: Conditional variance dependent on rate change surprises and nonsurprises

	CAD/EUR	**3 Month**	**6 Month**	**1 Year**	**2 Year**
CDN Surprise			0.003327*	0.004868*	0.004692**
CDN Nonsurprise	0.000009**				

Notes: * (**) indicates significance at a 5 percent (1 percent) level. Standard errors are heteroscedasticity-consistent. Only the variables of interest of the reduced model resulting from the testing-down process are listed. Full tables are available upon request.

Table 8c shows the influence of Canadian target rate surprises and nonsurprises on the volatility of financial markets. The results for the longer maturities suggest that unexpected changes lead to more volatility as the coefficients here are larger than the ones in Table 8b.

8. Further specifications and robustness checks

This section explores the robustness of our findings. First, we apply several different specifications to the macroeconomic news dummies. We test whether the actual values and the standardised shocks have an impact on our financial market indicators. Only the shocks turn out to be significant, thereby confirming the efficient market hypothesis. The same outcome occurs when including actual values and news dummies instead of shocks. Thus, it is only the news component of macroeconomic announcements that matters to market participants. We also discover that the results using news dummies statistically dominate the ones using standardised shocks and, therefore, we employ news dummies as in the analysis presented above.

Second, we include additional communication variables in the model. Variables containing information from speeches given by the 12 regional Fed presidents, who are also members of the FOMC, are inserted into Equation (1). In one set of regressions, we check for the impact of this group as a whole; in another we split the group into voting presidents and nonvoting presidents. Neither specification reveals anything of note, so we retain our more parsimonious design.

Third, we systematically split the sample at different dates. We consider two alternatives for the break point between Periods I and II: (1) the day the schedule of FADs was published (30 October 2000) and (2) the first FAD itself (5 December 2000). The break point between Periods II and III is less ambiguous, as the target rate hike by the BOC is a surprise, at least according to Bloomberg. We also conduct regressions with 20 July 2004 as a break point between Periods III and IV, as it was on this day that the BOC indicated a possible rate hike in the near future for the first time since 2002. These various specifications did not reveal big differences and we feel confirmed in our choice of subsamples. The results presented above are based on the most reliable statistical models and the corresponding set of splitting dates generates subsamples with similar numbers of observations in each. In a different approach, we apply impulse and step dummies to a pooled data set to capture the periods of different market activities instead of splitting the data set into four subsamples. It turns out to be impossible to robustly estimate Equation (1) within such an encompassing framework.

Fourth, we try several specifications to deal with unexpected signs for FOMC communication variables emerging in the bond markets. Hayo et al. (2008) conclude that not all FOMC communication is of particular interest to financial market agents. Therefore, we alternatively use the indicators constructed by Ehrmann and Fratzscher (2007), which are based on Reuter newswire reports. These regressions reveal fewer significant coefficients and also contain unexpected signs. In addition, employing this set of data would shorten our sample period and we could not utilise the broader base of news used in our examination above. Therefore, we decided to remain with the approach presented above.

Fifth, we control for volatility spillovers from U.S. to Canadian financial markets. For this purpose, we rely on the conditional volatility estimates in Hayo et al. (2008) and include these in the volatility equations of models (1) and (2). As none of the Canadian markets is significantly affected by U.S. volatility, we retain our more parsimonious approach.

Sixth, we extend Equation (1) by some additional GARCH features. The variance enters the main equation (Engle et al., 1987) and asymmetric effects of nonmodelled shocks

(Engle and Ng, 1993) as well as asymmetry thresholds (Glosten et al., 1993) are captured in the variance equation. These additional features do not change the results, so for simplicity we rely on our baseline GARCH specification. Finally, we explore anticipation and persistence or reversion effects by including one-period lead and lagged Canadian and U.S. target rate changes, macroeconomic news, and communication variables. For the most part, this procedure overburdens the models; we rarely achieve convergence and the results are inconclusive.

9. Conclusions

In this paper, we study the effects of all types of BOC and FOMC communication, as well as Canadian and U.S. macroeconomic news, on bond, stock, and foreign exchange market returns and volatility in Canada. Econometrically, we employ a rich GARCH specification of daily financial returns to capture the autoregressive conditional heteroscedasticity that characterises many financial series. We address the following four research questions.

First, *does U.S. and Canadian central bank communication (including target rate changes) and macroeconomic news have an impact on Canadian financial market returns?* Central bank communication and macro news from both countries have an impact on all financial markets. This is a new finding, as (1) the impact of U.S. and Canadian central bank communication on Canadian financial markets is neglected in the literature and (2) previous studies (e.g., Gravelle and Moessner, 2001) address only a limited subset of the news variables included in this survey. Analysing different categories of news reveals that target rate changes in both countries matter, particularly when they come as a surprise to the markets. Canadian price shocks do not play a role when looking at the whole sample. The same applies (to a somewhat lesser extent) to monetary policy inclinations communicated by both central banks, whereas economic outlook announcements draw more reaction. Perhaps the inflation targeting regime introduced in 1991 leaves little room for policy surprises. When taking into account the frequency of the announcements, macroeconomic news dominates interest rate decisions and central bank communication. In particular, labour market news from both countries is the most important news category.

Second, *which type of news, U.S. or Canadian, is relatively more relevant?* Canadian communication is more relevant than its U.S. counterpart, particularly for bond markets, where U.S. variables are rarely significant with an expected sign. Target rate changes in both countries are of similar relevance. U.S. macro news is particularly relevant to the bond and

stock markets, arguably reflecting the large degree of real economic integration between the two countries.

Third, *does the introduction of the FAD system change agents' sensitivity to Canadian news? In particular, is there a larger reaction to Canadian news in the April 2002 to September 2004 subsample, a period during which the course of BOC monetary policy was different from that of the Fed, compared to reactions in other periods?* To address this question, we assess the bond market in more detail and split the sample into four subsamples. We find evidence that the greatest impact of U.S. news occurs well after the FAD system was introduced. This suggests that the reform in monetary announcements had only a limited effect on financial markets' perceptions of Canadian monetary policy. Instead, Canadian news becomes more important during the period when the BOC target rate deviated from the Federal Funds target rate. However, in Period IV, during which the BOC became more closely aligned with the Fed's tightening cycle, the impact is still larger than in earlier periods. To some extent, this finding supports a claim by Gravelle and Moessner (2001), who blame the lack of FADs for the relative unimportance of Canadian news. However, the enlarged focus toward Canadian news emerges only after a period of noteworthy deviations from U.S. interest rate paths. So, it is unclear whether the reform of monetary announcements, the strong deviation from U.S. interest rate paths, or a combination of both factors strengthens the importance of Canadian news.

Finally, *does U.S. and Canadian news exert an influence on financial market volatility?* Canadian financial market volatility is positively affected by those Canadian target rate changes that hit the markets as a surprise. U.S. rate changes and Canadian nonsurprises also lead to increased price volatility, whereas all other types of Canadian variables lower price volatility.

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Appendix

Figure A1: Federal Funds Target Rate vs. Bank of Canada Target Rate

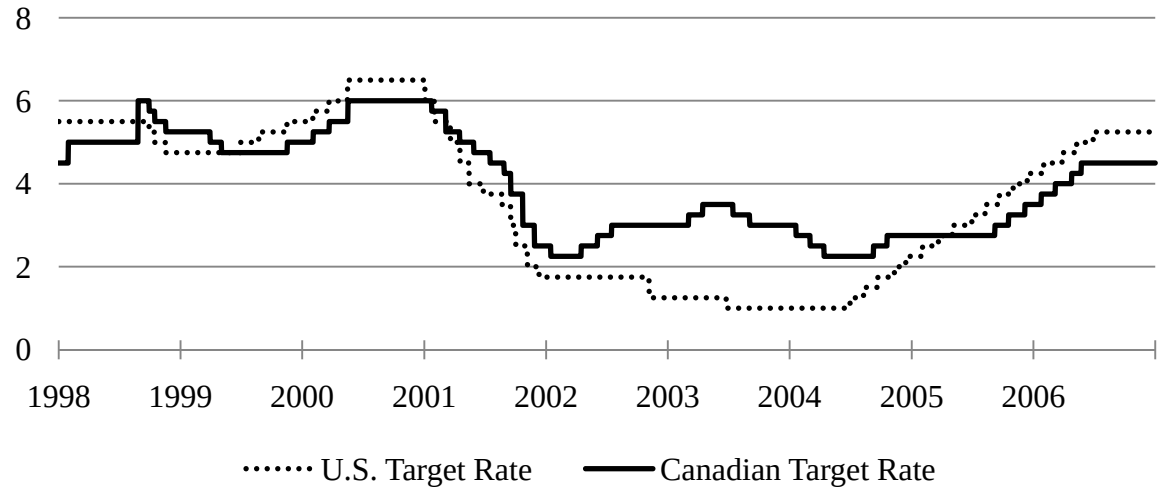

Table A1: Federal Reserve Bank vs. Bank of Canada

	Federal Reserve Bank	Bank of Canada
Accountability		
Quantitative inflation objectives	no	point target with tolerance interval
Reports to legislature	reports/testimony to Congress	reports/testimony to Parliament
Policy decisions		
Decisions announced immediately	yes	yes
Press conferences	no	no
Press releases	yes	yes
Minutes published	yes (five- to eight-week lag)	no
Voting result published	yes	no
Economic assessments		
Reports on monetary policy	semi-annual*	quarterly
Forecasts released	semi-annual	quarterly
Quantitative risk assessments	no	no
Forecast		
Variables	nominal and real GDP/ inflation	GDP expenditure/ inflation
Frequency	semi-annual	quarterly
Time horizon	12–18 months	18–24 months
Presentation	range	point
Policy assumption	no change	endogenous

*Beige book: eight times a year.
Sources: BIS (2004); Edey and Stone (2004).

Table A2: Descriptive Statistics of Financial Market Returns

	Mean	Std. Dev.	Skewness	Exc. Kurtosis	Minimum	Maximum
3 Month	0	0.0367	4.79	145.59	-0.43	0.85
6 Month	-0.0001	0.0413	1.47	42.07	-0.42	0.68
1 Year	-0.0003	0.0497	0.2698	9.8	-0.38	0.53
2 Year	-0.0003	0.0589	0.4883	6.54	-0.4	0.53
CAD/USD	-0.0001	0.0044	0.0283	0.9917	-0.0176	0.0182
CAD/EUR	-0.00001	0.0065	0.2303	1.27	-0.0272	0.0303
TSX	0.0003	0.0107	-0.7142	6.26	-0.0963	0.0468

Number of observations: 2,163