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Estimating the Impact of Monetary Policy Surprises on Fixed-Income Markets*

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- *The Bank of Canada has a keen interest in understanding the impact of changes to its key policy rate on the prices of financial assets.*
- *The impact of policy surprises on asset prices can be used to infer financial markets' interpretation of policy decisions.*
- *A significant movement in yields at the short end suggests that markets are responding to the timing of policy actions, while the absence of a marked change at the long end suggests that markets do not detect a shift in the policy objectives of the Bank.*
- *Measuring the response of asset prices to policy surprises in the periods before and after the introduction of a fixed schedule for announcing interest rate decisions provides some evidence that using fixed announcement dates has enhanced the credibility of the Bank.*

Understanding how its policy actions[1] affect the prices of financial assets is a subject of ongoing importance to the Bank of Canada. In this article, the first to measure the impact of policy surprises on fixed-income markets from a Canadian perspective, three questions are explored: What is the impact of policy actions on bond and bill yields; what is the impact on bond and bill yields when policy actions are decomposed into expected and surprise components; and what, if any, effect did the introduction of fixed announcement dates (FADs)[2] have on these responses. Specifically, we asked whether the greater transparency flowing from the Bank's introduction of the FADs increased the ability of market participants to anticipate changes to the policy rate. To assess the impact of the Bank's shift to the FAD regime, the sample used in this study is split into the pre-FAD and post-FAD periods. To provide an additional perspective, the results are compared with work done in the United States.

Previous Studies

This article examines the impact of monetary policy surprises on fixed-income markets in Canada before and after the introduction of the FADs. In their study

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1. Policy actions are decisions by the Bank that affect its key policy rate, the target for the overnight rate, which is the midpoint of the Bank's operating band for overnight financing.

2. In December 2000, the Bank of Canada implemented a new procedure in which policy actions would typically be considered only on eight pre-announced dates each year. To date, only one change has been made between FADs: on 17 September 2001, the Bank lowered the target for the overnight rate by 50 basis points (bps) following the 11 September 2001 terrorist attacks. That policy action was not included in this study.

of the reaction of U.S. markets to monetary policy actions, Cook and Hahn (1989) find a response that is positive and significant at all maturities, but smaller at the long end of the yield curve. Kuttner (2000) revisits the Cook and Hahn methodology and records responses that are smaller and less notable across the entire curve. Kuttner then decomposes policy-rate changes into surprise and expected components and finds that the response from surprises is significant and uniformly prevalent across the yield curve. This work will be compared with the results presented below.

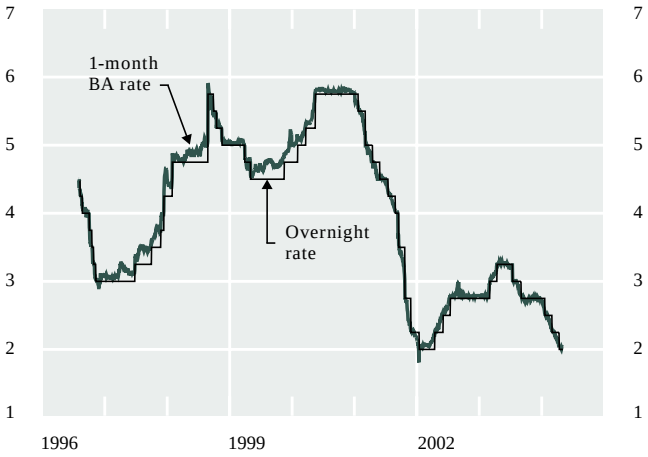
Specifically, we asked whether the increased transparency flowing from the Bank's introduction of the FADs increased the ability of market participants to anticipate changes to the policy rate.

Kohn and Sack (2003) examine whether certain central bank communications have an impact on financial variables. Beyond the empirical work, which demonstrates that statements from members of the Federal Open Market Committee (FOMC), as well as congressional testimony, have an impact on short- and medium-term interest rates, they offer a framework for analyzing these effects that differentiates between surprises resulting from the timing of policy changes and more fundamental surprises concerning the direction of monetary policy, with specific reference to the goals and credibility of the central bank. Movements in shorter-term interest rates are generally classified as responses to the *timing* (i.e., as happening this month vs. next month) of policy changes (independent of the near-term economic outlook).[3] Movements in longer-term rates are classified as responses to the longer-term *economic outlook* of monetary policy and reflect expectations about changes to the direction of policy or, more fundamentally, changes to the goals or credibility of the central bank. Although Kohn and Sack's study includes policy actions, testimony, and speeches, in this article their framework will be used to better understand only the information content of policy actions.

3. Kohn and Sack refer to these changes as policy-inclination changes, but in this article we will describe them as policy-timing changes.

Chart 1

One-Month Banker's Acceptance Rate



Methodology

Work in the United States (Kuttner 2000; Bernanke and Kuttner 2003) typically uses movements in the federal funds futures contract to measure market expectations of future changes in the federal funds rate. This instrument is generally preferred because it is valued at the expected average federal funds rate over the holding period.[4] Since a similar market-based proxy of interest rate expectations is not available for Canadian markets, [5] the 1-month banker's acceptance (BA) rate is used in our study. The 1-month BA is a tradable corporate obligation that is backed by a line of credit and is guaranteed by the accepting banks. Johnson (2003) finds that it is the 1-month instrument that best correlates with movements in the overnight rate;[6] as Chart 1 shows, the yield on the 1-month BA closely tracks the overnight rate.

4. Rigobon and Sack (2002) and Poole and Rasche (2003), among others, use eurodollar futures as market-based measures of expectations of changes to the policy rate.

5. The overnight repo rate futures contract (ONX) is modelled after the U.S. federal funds futures contract. Pricing of this instrument is based on the expected average overnight rate during the contract period as measured by CORRA (the Canadian overnight repo rate average), which is based on inter-dealer broker data. The ONX contract is relatively new, and trading is not as liquid as it is with other money market instruments.

6. Johnson tested six different money market instruments and found that the 1-month BA is the best instrument for measuring implied expectations. Based on his model of the expectations hypothesis, a theory of interest rates that states that a longer-term single-yield interest rate is the geometric average of expected future short-term rates plus a risk premium (see Johnson 2003), Johnson found that, in the 1-month sector, BAs had the highest adjusted R^2 and the lowest term premium (in absolute values).

Although the 1-month BA is not directly linked to the overnight rate in the same way that the federal funds futures contract is to the federal funds target rate, 1-day changes to the 1-month BA can be used to decompose changes in the policy rate into expected and surprise components. We follow Kuttner's methodology and assume that the 1-day change in the 1-month BA rate that occurs on the day when the policy rate is moved reflects the surprise component of the move. This is based on the assumption that a portion of the policy move is anticipated by market participants and is priced into the BAs before the policy change occurs. In equation (1), $\Delta\tilde{r}_t$ is the actual policy change, and Δr_t^s is the surprise component. The difference between the actual move and the surprise component is the expected move:

$$\Delta\tilde{r}_t^e = \Delta\tilde{r}_t - \Delta r_t^s \qquad (1)$$

However, two considerations influence the results that follow. First, the analysis is limited to the 1-day changes in asset prices that accompany a policy action, and it is assumed that market participants are aware of all policy actions as they occur. During the pre-FAD period, policy rates could change on any date, and thus there was no clear means of distinguishing between true surprises (i.e., actual changes to the policy rate) and the absence of a policy change on a specific date. Therefore, in the pre-FAD period, only actual changes in the overnight rate are considered to be policy actions. In the post-FAD period, every FAD date is considered a policy action, whether or not the policy rate was changed.[7]

During the pre-FAD period, policy rates could change on any date . . . and thus there was no clear means of distinguishing between true surprises and the absence of a policy change on a specific date.

The second consideration is that the simple equation used to explain the 1-day movement in asset prices assumes that the policy-rate change was the significant factor affecting the 1-day movement on that date. That is, other factors, such as a data release or other market events, are subsumed into the error term of equation (2) (below). A possible concern with this approach is that there may be a shock to the 1-day change in the 1-month BA rate that is correlated with the change in market yields—the dependent variable in equation (2). This is unlikely, given the nature of the BA and the fact that the policy-rate decision is likely to be the dominant event on the days examined.[8] (FADs are planned so as not to occur on the same day as the release of major economic data or other known important events.)

The sample period for the study, August 1996 until May 2004, includes 49 days when announcements about the policy rate were made. Throughout this period, the Bank used the target for the overnight rate as the monetary policy instrument. The sample is divided into two subsets: the 21 announcements that occurred before the FADs were introduced and the 28 announcements made on FADs. The 28 post-FAD observations include all announcements, whether the policy rate was changed or not. Table 1 shows the dates of the policy-rate announcements, along with the actual policy actions, as well as the expected and surprise components, as defined by equation (1).

Results

Full sample

The format employed by Kuttner (2000), which applied the methodology of Cook and Hahn (1989), was used to estimate the following linear equation in order to examine the 1-day response of market rates to policy actions.[9] The 1-day change in yields, ΔR_i, was regressed using ordinary least squares on the change in the target for the overnight rate, $\Delta\tilde{r}$, such that

$$\Delta R_i = \alpha^i + \beta^i \Delta\tilde{r}_t + \varepsilon_t^i \qquad (2)$$

where the market rates are 1-day changes in yields of Government of Canada treasury bills and benchmark

7. For example, on 4 September 2002, markets had expected an increase of 21 bps, but the Bank kept the key policy rate constant. This resulted in a surprise of -21 bps—the Δr_t^s component in equation (1).

8. One means of reducing the likelihood of this coincidence of events would be to shorten the event window. Bauer and Vega (2004) use intraday data to estimate high-frequency monetary policy shocks in the United States and then show that these shocks have an effect on the cross-section of international equity returns.

9. The full sample of policy decisions is shown in Table 1.

Table 1

Actual Policy Actions Decomposed into Expected and Surprise Components (bps)

Date	Actual	Expected	Surprise
09 Aug 96	-22	-18	-4
22 Aug 96	-25	-19	-6
02 Oct 96	-25	-10	-15
17 Oct 96	-25	-24	-1
28 Oct 96	-25	-24	-1
08 Nov 96	-25	-24	-1
26 Jun 97	25	7	18
01 Oct 97	25	24	1
25 Nov 97	25	12	13
12 Dec 97	50	21	29
30 Jan 98	50	15	35
27 Aug 98	100	15	85
29 Sep 98	-25	-32	7
16 Oct 98	-25	-30	5
18 Nov 98	-25	-23	-2
31 Mar 99	-25	-7	-18
04 May 99	-25	-6	-19
17 Nov 99	25	19	6
03 Feb 00	25	26	-1
22 Mar 00	25	24	1
17 May 00	50	48	2
05 Dec 00	0	0	0
23 Jan 01	-25	-22	-3
06 Mar 01	-50	-33	-17
17 Apr 01	-25	-28	3
29 May 01	-25	-28	3
17 Jul 01	-25	-23	-2
28 Aug 01	-25	-25	0
23 Oct 01	-75	-49	-26
27 Nov 01	-50	-47	-3
15 Jan 02	-25	-48	23
5 Mar 02	0	0	0
16 Apr 02	25	20	5
04 Jun 02	25	24	1
16 Jul 02	25	25	0
4 Sep 02	0	21	-21
16 Oct 02	0	0	0
3 Dec 02	0	0	0
21 Jan 03	0	1	-1
04 Mar 03	25	20	5
15 Apr 03	25	23	2
3 Jun 03	0	3	-3
15 Jul 03	-25	0	-25
3 Sep 03	-25	-26	1
15 Oct 03	0	-1	1
2 Dec 03	0	-2	2
20 Jan 04	-25	-24	-1
02 Mar 04	-25	-25	0
13 Apr 04	-25	-25	0

bonds. The results reported in Table 2a show the relationship between changes in the market rates and policy actions over the sample period. Table 2b shows the results for the United States, which are taken from Kuttner (2000).

The coefficients decline in magnitude as the maturity increases for both countries. This result is consistent with the expectations hypothesis of interest rates (see footnote 6), considering that policy-rate changes would

Table 2a

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Policy Actions*

Maturity	Intercept	Response	R^2
3-month	2.5 (1.0)	36.5 (3.2)	0.50
6-month	2.4 (1.1)	29.7 (3.4)	0.46
1-year	2.1 (1.2)	26.5 (3.9)	0.42
2-year	2.1 (1.5)	21.2 (4.8)	0.33
5-year	1.2 (0.9)	10.3 (2.6)	0.13
10-year	-0.2 (-0.2)	5.9 (2.0)	0.09
30-year	-0.4 (-0.5)	2.4 (1.1)	0.02

* Bracketed terms are *t*-statistics.

Table 2b

The One-Day Response of Yields on U.S. Bonds and Treasury Bills to Changes in the Target for the Federal Funds Rate*

Maturity	Intercept	Response	R^2
3-month	-3.0 (2.4)	23.8 (6.2)	0.49
6-month	-5.0 (3.5)	18.4 (4.0)	0.29
1-year	-5.5 (3.4)	21.6 (4.3)	0.32
2-year	-5.2 (3.4)	18.2 (3.7)	0.26
5-year	-4.5 (2.9)	10.4 (2.1)	0.10
10-year	-4.0 (2.9)	4.3 (1.0)	0.02
30-year	-3.6 (3.2)	0.1 (0.0)	0.00

* Bracketed terms are *t*-statistics.
Source: Kuttner (2000)

be expected to have their strongest impact at the shortest maturity. The coefficients on the Canadian results are generally higher than those reported by Kuttner for U.S. market rates.

In the U.S. study, the shortest maturities present something of an anomaly: the response of the American 6-month Treasury bill is less than that of the 1-year bill. In addition, the response of the 3-month Canadian treasury bill was substantially higher than that of its U.S. counterpart. A possible explanation may be found in the institutional structure of the U.S. Treasury bill market, where many of the large participants in the market, particularly foreign central banks, use these short-term bills as cash-management tools, thus rendering them relatively price insensitive.

We can interpret this lack of response in longer rates as a signal that market participants are reacting to policy-timing changes . . . and not to policy-direction changes.

The results for both countries suggest that, beyond the 5-year maturity, the response of market rates to changes in the policy rate is not significant. Following Kohn and Sack (2003), we can interpret this lack of response in longer rates as a signal that market participants are reacting to *policy-timing* changes (i.e., information about the timing of interest rate moves; in the Canadian case in particular, those seen as necessary to achieve the inflation target), and not to *policy-direction* changes (i.e., information about the economic outlook—specifically the central bank's long-term policy goals). Policy-timing changes affect short-term rates, while policy-direction (or economic-outlook) changes affect longer-term rates. Nevertheless, it is worth noting the general direction of monetary policy over the sample period. For the Canadian study, 25 of the 49 policy actions were decreases in the policy rate, and in fact, the overall period can be considered one of policy easing.[10] From the beginning to the end of the sample, the policy rate declined from 4.5 per cent to 2.25 per cent. To the extent that market participants were aware of the economic outlook and of the general direction of monetary policy, one would not expect to see a reaction at longer maturities. Although the sample used in the U.S. study contains periods of both easing and tightening of policy rates, the easing is more pronounced, since 30 of the 42 rate changes were decreases in the policy rate.

Split sample

Beginning in December 2000, the Bank of Canada adopted a policy of announcing decisions concerning the target overnight rate on eight pre-announced dates each year. One of the purposes of this article is to examine whether the increased transparency resulting from the Bank's introduction of the FADs has increased the ability of market participants to anticipate changes to the policy rate. A caveat is that the two samples (21 and 28 observations, respectively) are small and suffer from the possible biases associated with small samples. The results of the split sample are presented in Tables 3 and 4.

The response of market rates is greater in the pre-FAD period (Table 3) for all maturities, compared with the results for the full sample (Table 2a) and those for the post-FAD period (Table 4). As well, the coefficient on the response to a policy-rate change is significant in the pre-FAD sample through all maturities except the 30-year bond. For the post-FAD sample, the coefficient is significant only until the 1-year maturity, after which the response is not significantly different from zero.[11]

A possible explanation for this result is that policy-rate changes have become more widely anticipated in the post-FAD sample than in the pre-FAD sample, for two reasons. First, the introduction of the FADs removed much of the timing uncertainty associated with rate changes. Second, research at the Bank (Gravelle and Moessner 2002; Muller and Zelmer 1999) suggests that, before the FADs, the goals of monetary policy may not have been clearly understood. For example, although the Bank has had an inflation target since 1991, there were occasions during the mid-to-late 1990s when the Bank appeared to increase policy rates to support the currency when the Canadian dollar was falling relative to the U.S. dollar. Thus, it seems that, in the pre-FAD period, market participants interpreted policy-rate changes as signifying both the policy

10. There were 25 incidents of decreases in the overnight rate, 15 increases, and 9 dates on which the target did not change.

11. Despite the apparent differences when the sample is split, a Chow test for a structural break is not significant for any maturity. The result is the same if we run the full sample regressions with a dummy variable for the post-FAD period.

Table 3

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Changes in the Overnight Rate (pre-FAD sample, 21 observations)*

Maturity	Intercept	Response	R^2
3-month	2.2	45.9	0.59
	(0.63)	(3.30)	
6-month	2.5	35.6	0.54
	(0.78)	(3.17)	
1-year	2.3	30.9	0.57
	(1.02)	(4.97)	
2-year	2.5	26.0	0.46
	(1.05)	(4.05)	
5-year	-0.1	16.1	0.39
	(-0.05)	(3.46)	
10-year	-1.5	10.0	0.24
	(-1.03)	(2.47)	
30-year	-2.0	5.8	0.12
	(-1.56)	(1.63)	

* Bracketed terms are *t*-statistics.

Table 4

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Policy Actions (post-FAD sample, 28 observations)*

Maturity	Intercept	Response	R^2
3-month	0.5	20.6	0.29
	(0.27)	(3.25)	
6-month	0.8	19.3	0.27
	(0.49)	(3.07)	
1-year	0.8	18.4	0.19
	(0.40)	(2.48)	
2-year	0.5	12.0	0.10
	(0.25)	(1.73)	
5-year	0.9	3.0	0.01
	(0.50)	(0.42)	
10-year	0.2	1.6	0.01
	(0.18)	(0.41)	
30-year	0.5	0.2	0.00
	(0.64)	(0.06)	

* Bracketed terms are *t*-statistics.

timing and the policy goals of Canadian monetary policy (since there was significant movement in both short- and long-term rates).

The results for the post-FAD sample indicate that monetary policy appears to have been better anticipated during this period. The magnitude of the response is lower than in both the full sample and the pre-FAD sample, and the coefficient on the response to a change in the overnight rate is not statistically significant at the 2-year maturity and beyond. These results are consistent with those from Parent, Munro, and Parker (2003) with respect to the increasing transparency surrounding the Bank's policy-rate decisions. Interpreting this within the Kohn and Sack (2003) framework, this may imply that, post-FAD, financial markets now interpret policy-rate decisions as containing information only about the timing of policy actions and not as signals of changes to policy goals.

These results are also similar to those of Kuttner (2000) and Roley and Sellon (1995), who observe that, for the United States, the response of market rates to policy-rate changes has diminished relative to those observed in earlier studies. This is consistent with changes made by the U.S. Federal Reserve to increase the transparency of their monetary policy actions.[12]

Expected and surprise components of policy-rate actions (full sample)

Using the 1-month BA rate to measure expectations, and using these expectations to decompose policy-rate changes into expected and surprise components, a test is performed to determine whether the response of interest rates to the two components differs and what differences arise compared with our initial results. Following the methodology of Cook and Hahn (1989), the 1-day change in the yields was regressed on the two components of the policy-rate change,

$$\Delta R_i = \alpha^i + \beta_1^i \Delta \tilde{r}_t^e + \beta_2^i \Delta \tilde{r}_t^s + \varepsilon_t^i . \qquad (3)$$

The Canadian results are shown in Table 5a, while Kuttner's results for the United States are shown in Table 5b.[13]

Isolating the expected and surprise components alters the results significantly. As would be expected, the coefficient on the expected portion of the policy-rate change is statistically insignificant from zero for all maturities in the Canadian sample, while the surprise component is significant for all maturities except the 30-year bond. This is consistent with the notion that

12. For more information on these changes in the United States, see Poole and Rasche (2003).

13. Equation (3) introduces a problem concerning an error in the variables, since the decomposition is inferred rather than measured. An examination of the residuals from equation (3) suggests that this problem is minor and can be assumed away.

Table 5a

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Expected and Surprise Components of Policy Actions*

Maturity	Intercept	Expected	Surprise	R^2
3-month	-0.2	3.7	92.1	0.92
	(-0.25)	(0.96)	(24.81)	
6-month	0.1	1.7	77.3	0.89
	(0.10)	(0.57)	(18.86)	
1-year	0.1	2.7	66.8	0.78
	(0.14)	(0.69)	(12.23)	
2-year	0.2	-1.0	59.0	0.70
	(0.21)	(-0.25)	(10.13)	
5-year	0.1	-2.2	31.7	0.33
	(0.11)	(-0.49)	(9.53)	
10-year	-0.6	0.9	14.3	0.16
	(-0.66)	(0.25)	(2.78)	
30-year	-0.4	1.8	3.4	0.03
	(-0.55)	(0.58)	(0.78)	

* Bracketed terms are *t*-statistics.

Table 5b

The One-Day Response of Yields on U.S. Bonds and Treasury Bills to Expected and Surprise Components of Changes in the Target for the Federal Funds Rate*

Maturity	Intercept	Expected	Surprise	R^2
3-month	-1.5	12.3	50.4	0.60
	(1.2)	(2.5)	(5.7)	
6-month	-2.9	2.1	56.3	0.51
	(2.2)	(0.4)	(5.7)	
1-year	-2.6	-0.3	72.7	0.63
	(2.0)	(0.1)	(7.6)	
2-year	-2.8	-0.4	61.4	0.52
	(2.0)	(0.1)	(6.0)	
5-year	-2.4	-5.8	48.1	0.33
	(1.6)	(0.9)	(4.3)	
10-year	-2.4	-7.4	31.5	0.19
	(1.8)	(1.3)	(3.1)	
30-year	-2.5	-8.2	19.4	0.13
	(2.2)	(1.7)	(2.3)	

* Bracketed terms are *t*-statistics.
Source: Kuttner (2000)

market rates react only to new information that comes available on the date of an event.

Another key result is that, for each maturity, the coefficient of the surprise component is larger than the coefficient on the actual change (see Table 1). This is to be expected, since the initial regression results are contaminated by the inclusion of the expected component, whose coefficient is not significantly different from zero. As well, the responses are larger than the results obtained by Kuttner for the United States.[14]

The difference between the response estimated by Kuttner and our results is evident. At the shortest maturity, the results suggest that a surprise increase of 100 basis points (bps) in the overnight rate is associated with an increase of 92 bps in the yield on the 3-month treasury bill, while the same change in the federal funds target rate would lead to an increase of only 50 bps in the yield on the U.S. 3-month Treasury bill. As well, 92 per cent of the variation in the 3-month bill that is observed on days when the policy rate moves are explained by the expected and surprise components of the policy-rate change. This is considerably larger than the U.S. results.

The results support the notion that the Bank's policy goals are well understood by market participants, since policy-rate surprises do not have much impact on the yields of longer maturities.

The results suggest that Canadian long yields are less sensitive to surprises than U.S. long yields. This finding supports the notion that the Bank's policy goals are well understood by market participants, since policy-rate surprises do not have much impact on the yields of longer maturities.

Expected and surprise components of policy-rate actions (split sample)

The impact of the FADs is again examined by splitting the sample into pre- and post-FAD periods. Tables 6 and 7 display the results. The magnitudes of the coefficients are not noticeably different from the full sample results, and the pattern of responses is similar to what was seen when the initial regression was divided

14. Before making a comparison between the Canadian and U.S. studies, the caveat must be noted that each study uses a different measure of expectations. However, the patterns are still similar to what was observed in the previous section. At the short end, greater magnitude of response is seen in the Canadian data, but this declines sharply as the maturity of the market instrument increases. As before, we see an anomaly in the U.S. data, in that the surprise component initially increases as the maturity increases, up to one year.

Table 6

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Expected and Surprise Components of Changes in the Overnight Rate (pre-FAD sample, 21 observations)*

Maturity	Intercept	Expected	Surprise	R^2
3-month	-1.0	-0.8	94.8	0.92
	(-0.69)	(-0.12)	(14.12)	
6-month	-0.3	-4.9	78.0	0.93
	(-0.28)	(-0.95)	(14.56)	
1-year	0.1	-0.5	63.7	0.88
	(0.10)	(-0.10)	(11.02)	
2-year	0.2	-6.1	59.6	0.85
	(0.17)	(-1.03)	(9.71)	
5-year	-1.4	-2.7	35.8	0.67
	(-1.05)	(-0.46)	(5.88)	
10-year	-2.2	0.2	20.3	0.37
	(-1.54)	(0.03)	(3.08)	
30-year	-2.2	3.5	8.2	0.13
	(-1.60)	(0.57)	(1.30)	

* Bracketed terms are *t*-statistics.

Table 7

The One-Day Response of Yields on Canadian Bonds and Treasury Bills to Expected and Surprise Components of Policy Actions (post-FAD sample, 28 observations)*

Maturity	Intercept	Expected	Surprise	R^2
3-month	0.6	7.4	91.6	0.90
	(0.94)	(2.81)	(14.88)	
6-month	1.0	6.9	85.3	0.82
	(1.15)	(2.03)	(10.62)	
1-year	0.9	6.0	84.5	0.64
	(0.69)	(1.09)	(6.51)	
2-year	0.6	2.5	62.8	0.43
	(0.43)	(0.42)	(14.68)	
5-year	1.0	-1.1	24.6	0.07
	(0.76)	(-0.16)	(4.34)	
10-year	0.2	1.9	0.2	0.01
	(0.17)	(0.43)	(0.02)	
30-year	0.5	1.5	-7.3	0.05
	(0.62)	(0.51)	(-1.03)	

* Bracketed terms are *t*-statistics.

into two samples. The coefficients on the pre-FAD surprise components are significant at all maturities except the 30-year bond, while the coefficients on the post-FAD surprise components lose significance after the 5-year bond. Conclusions similar to those noted for the full sample are derived on this divided sample.[15] In the pre-FAD sample, the fact that the surprise component remains significant as maturities increase may suggest that, in this period, the reaction of market participants to policy-rate changes reflected an understanding of both the policy-timing decisions and the policy goals of the Bank. In the post-FAD sample, the results suggest that market participants are reacting only to the timing aspect of a policy action, such that surprises may be more a question of timing than of direction. Again, it is worth noting that, in the post-FAD period, the majority of policy actions were decreases in policy rates, and the period can be considered one of policy easing. Thus, the direction may have been more apparent to market participants even without the introduction of the FADs.

Conclusion

The purpose of this article was threefold: to estimate the impact of raw policy-rate actions on fixed-income markets; to estimate the impact of surprise policy-rate actions on fixed-income markets; and to assess whether the introduction of the FADs has affected these results, including markets' perceptions. The main finding is that unexpected policy actions by the Bank of Canada have a significant effect on market rates at the shorter end of the yield curve, with the effect dissipating as the maturity increases. This finding implies that policy actions signal only the timing of interest rate changes necessary to achieve the Bank's inflation target and do not signal its longer-term policy goals. A second finding is that the impact on longer-term interest rates of a surprise action by the Bank has diminished since the introduction of the FADs. This suggests that the Bank's long-term policy goals are well understood and credible, since the lack of movement in the long end indicates that market participants do not view surprises as inconsistent with the Bank's inflation target.

15. As with the full sample, a Chow test for a structural break between the two periods is rejected at the 5 per cent level for all maturities.

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