Money Talks: How Foreign and Domestic Monetary Policy Communications Move Financial Markets[*]

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Abstract

We provide novel insights into how foreign and domestic monetary policy communications, beyond rate announcements, affect the financial markets of open economies. We construct a high-frequency dataset that documents the impact of Federal Reserve (Fed) and Bank of Canada (BoC) rate announcements, speeches, press conferences and minutes releases to Canadian financial markets between 1997 and 2023. We find that non-rate announcements are a significant source of domestic monetary policy surprises and international spillovers. Across event types, Fed communications are particularly influential for long-term interest rates and stock futures while BoC communications matter more to short-term interest rates. Since BoC communications have little effect on U.S. interest rates, Canadian announcements have a greater impact on the CAD/USD exchange rate by inducing larger changes in the cross-country interest rate differential.

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1 Introduction

Central banks globally track and respond to macroeconomic and financial developments across countries. However, their attention is particularly focused on the actions and communications of the U.S. Federal Reserve (Fed), whose policies disproportionately influence global financial conditions. Fed monetary policy announcements often set the tone for investor expectations, market dynamics, and cross-border capital flows, compelling central banks and financial market participants worldwide to closely monitor and interpret Fed communications.

How do Fed monetary policy announcements compare to domestic policy announcements in shaping financial conditions in open economies? Do they have similar effects across the yield curve? Are U.S. policy announcements more influential for bilateral exchange rates than those issued by domestic central banks? Despite extensive evidence on the global effects of Fed rate announcements, much less is known about the international effects of Fed speeches, press conferences, and minutes releases. Answers to these questions can inform policymakers about their autonomy in monetary policy and the extent to which external developments constrain or amplify their policy effectiveness.

In this paper, we employ a high-frequency event-study framework across two countries to examine the transmission of various Fed monetary policy communications—including speeches by the Chair and Vice Chair, post-FOMC press conferences, and minutes releases—to Canadian financial markets. We compare these international spillovers to the effects of similar domestic monetary policy communications from the Bank of Canada. This approach provides a comprehensive view of how a wide range of U.S. and domestic monetary policy announcements and communications shape financial conditions in open economies like Canada. We analyze the responses of key Canadian financial variables, including short- and long-term interest rates, equity markets, and both spot and forward exchange rates. The dataset spans from January 1997 to July 2023, covering multiple episodes of heightened monetary volatility.

Canada provides an ideal context for this analysis due to its close economic ties and geographic proximity to the U.S. This ensures that Canadian markets are actively trading during most Fed announcements, enabling a clearer identification strategy. The financial links between the two countries help facilitate cross-market comparisons, for example, the Bankers' Acceptance (BAX) futures contracts traded on the Montreal Exchange (TMX) were designed to offer arbitrage opportunities with the 3-month Eurodollar futures contracts on the Chicago Mercantile Exchange (CME) (Harvey, 1996). In addition, Canada's sophisticated financial sector provides ready access to a long history of high-quality tick-level data across a broad range of assets. Finally, Canada has an independent central bank with an inflation target and regularly communicates with the public through speeches, press conferences and detailed policy publications. By contrasting the high-frequency impacts of Fed communications with analogous events from the Bank of Canada, we aim to enhance our understanding of cross-border monetary policy transmission, with insights that can be extended to other open economies.

We identify a consistent pattern in how Federal Reserve and Bank of Canada monetary policy announcements and communications affect Canadian financial markets. Specifically: (i) Fed announcements tend to have a stronger high-frequency impact on long-term interest rates and equity markets; whereas (ii) Canadian announcements drive short-term interest rates and the CAD/USD exchange rate more strongly. This pattern holds across most event types, with the notable exception of press conferences. In investigating the reasons behind this pattern, we show that: (i) Fed monetary policy announcements have an important impact on the risk premia of Canadian bond yields, which tend to account for a higher fraction of long-term bond yield movements. (ii) Canadian monetary policy announcements have no significant impact on U.S. interest rates. Hence, announcements by the BoC exert a larger effect on the CAD/USD exchange rate, as they generate larger responses of interest rate differentials between the two countries.

Next, in the tradition initiated by Gürkaynak, Sack and Swanson (2005), we estimate the forward guidance (FG) component of Federal Reserve and Bank of Canada monetary policy announcements, and assess their effects on Canadian interest rates. We find that, while FG delivered during BoC policy rate announcements has a disproportionately strong effect on Canadian short-term interest rates, the response of both short- and long-term rates to FG from speeches and press conferences is similar whether it comes from the Fed or the BoC. This, once again, demonstrates the dominant role of the Fed in shaping international financial conditions: even in open economies with independent central banks and floating exchange rates, the forward guidance of Fed communications can be as important for Canadian interest rates as forward guidance from the domestic central bank. Despite these similar immediate effects, we find that domestic forward guidance has a more persistent impact.

Finally, this paper makes available the Canadian Monetary Policy Event-Study Database, which we have assembled to the same standards as those constructed for the U.S. (Gürkaynak et al., 2005), the Euro area (Altavilla, Brugnolini, Gürkaynak, Motto and Ragusa, 2019), and the U.K. (Braun, Miranda-Agrippino and Saha, 2024). The dataset collects high-frequency reactions of interest rate futures, Government of Canada bond yields, the stock market and exchange rates, starting from 1997, to the Bank of Canada's interest rate decision announcements, and around the press conferences and speeches given by Bank of Canada Governing Council members.

Related literature A substantial literature has examined the impacts of monetary policy rate announcements on financial markets (e.g., Kuttner (2001), Gürkaynak et al. (2005), Hanson and Stein (2015), Cieslak and Schrimpf (2019), Neuhierl and Weber (2019), Swanson (2021)).

More recently, research has expanded beyond conventional rate announcements to explore other forms of central bank communication. For example, Swanson (2023) and Swanson and Jayawickrema (2023) find that Fed Chair speeches are the most important monetary policy announcement for all but the very short-term interest rate futures in the U.S. Gómez-Cram and Grotteria (2022) show that price changes around the post FOMC meeting statement release strongly predict those during the subsequent press conference. Moreover, Alexopoulos, Han, Kryvtsov and Zhang (2024) find that soft information contained in congressional testimonies by the Federal Reserve Chairs have impacts on financial markets. Research by Mumtaz, Saleheen and Spitznagel (2023) and Istrefi, Odendahl and Sestieri (2022) emphasizes the significance of governor speeches in influencing U.K. and Euro Area markets, respectively.[1] We contribute to this literature by jointly analyzing the high-frequency effects of both foreign (U.S.) and home (Canadian) monetary policy rate announcements and other types of communication events on financial markets.

Our paper also relates to the vast literature examining the spillovers and the dominant role played by U.S. monetary policy in international financial markets. Studies such as Ehrmann and Fratzscher (2009), Ehrmann, Fratzscher and Rigobon (2011), Dedola, Rivolta and Stracca (2017), Albagli, Ceballos, Claro and Romero (2019) and many others. These papers document an important role for conventional U.S. monetary policy in driving international financial markets. Following the global financial crisis, a subsequent literature documents the impact of unconventional FOMC monetary policy, such as forward guidance and asset purchases, on international economies. Bauer and Neely (2014) and Gilchrist, Yue and Zakrajšek (2019), for example, show that these unconventional monetary policy had large international effects. Rey (2015) finds that global capital flows, asset prices, and credit growth co-move strongly with U.S. monetary policy and global risk appetite. We contribute to this literature by offering novel insights into the relative importance of foreign (Fed) communications versus domestic (BoC) monetary policy announcements. We study the interaction between interest rate movements and exchange rate responses, thereby enriching our understanding of how financial markets in open economies are impacted by cross-border and local monetary policies.

Finally, our paper also relates to the growing literature examining the impact of monetary policy in non-U.S. countries using a long history of high quality high-frequency financial market data. Altavilla et al. (2019) studies the financial market and macroeconomic impact of monetary

[1] Various papers also highlight the importance of central bank communication for financial market risk premia. Leombroni, Vedolin, Venter and Whelan (2021) shows that monetary policy communication by the ECB on announcement days (through press conferences) and outside announcement days (through ECB president speeches) can have an important impact on long-term interest rates by affecting risk premia. Cieslak and McMahon (2023) shows that intermeeting communication through speeches and minutes plays an important role in changing financial market risk perceptions.

policy in the Euro area using high-frequency changes in Euro area OIS rates around ECB interest rate announcements and press conferences. Similarly, Braun et al. (2024) constructs a dataset of high-frequency monetary policy shocks for the U.K. and studies the financial market impact of monetary policy. Pirozhkova, Ricco and Viegi (2024) and Lakdawala and Sengupta (2025) measure the effects of monetary policy in South Africa and India, respectively. We contribute to this literature by examining the financial market effects of monetary policy in Canada and, especially, by including the effects of monetary policy announcements beyond interest rate announcements.

The paper is organized as follows. In Section 2, we present the construction of our Federal Reserve and Bank of Canada communication event database, and our high-frequency database of financial market reactions to these events. In Section 3, we show the importance of FOMC communication events in driving Canadian short- and long-term interest rates, future returns of the stock index and compare their effects with similar Bank of Canada communication events. We also analyzes changes in the spot and forward exchange rates and discusses the relative impact of these events on the foreign exchange market. Section 4 constructs forward guidance factors for Fed and Bank of Canada communication events and examines their persistent impacts on the financial market. Finally, Section 5 concludes. The Appendix provides further details.

2 Monetary policy announcements and Canadian financial markets data

We compile four primary datasets for this paper: the date and time stamps of various monetary policy announcements by the Fed and the BoC, along with high-frequency financial market data from both the U.S. and Canada. We discuss various U.S. and Canadian central bank events in subsections 2.1 and 2.2. In these subsections, we also elaborate on the methodology for filtering events that are relevant and selecting the appropriate event window length for the various Federal Reserve and BoC communication events. Our empirical analysis leverages a range of comprehensive high-frequency datasets, covering fixed income, stock indices, and foreign exchange data between the U.S. and Canada. These datasets are constructed from multiple high-quality sources and span the period from January 1997 to July 2023. Descriptions and institutional background of Canadian and foreign exchange data are provided in subsection 2.3. We also collected data for some U.S. financial assets, the details of which are described in Appendix A. For each central bank event, we compute the associated changes in asset prices/yields. Details of this procedure are available in Appendix B.

2.1 Federal Reserve communication events

We focus on four key Fed monetary policy announcement types: FOMC interest rate announcements, press conferences, the release of FOMC minutes, and speeches by the Fed chair and vice chair. This section describes each of these events.[2]

FOMC policy rate announcements The FOMC policy rate announcement communicates changes to the federal funds rate—the rate at which banks lend to each other overnight. The FOMC convenes eight times a year, and the announcements are made at the conclusion of each of these meetings. We cross-referenced the announcement dates and times with data we obtained from Bauer and Swanson (2023). Between 1997 and 2023, our dataset includes 212 scheduled FOMC announcements along with 12 unscheduled intermeeting FOMC announcements, for a total of 228 FOMC announcements.[3] Scheduled FOMC meetings take place at 2:15 p.m. from January 1997 to January 2013, and at 2:00 p.m. starting in March 2013. We follow Gürkaynak et al. (2005) and Nakamura and Steinsson (2018), and use ten minutes before the announcement and twenty minutes after the announcement as the event window.

Post-FOMC press conferences Starting in April 2011, a FOMC press conference is held by the Federal Reserve Chair following every other scheduled FOMC meeting. During the press conference, the Chair provides context and rationale for the committee's decisions. After 2019, press conferences take place after every FOMC meeting. Initially, the press conferences were held at 2:15 p.m. on the day of the FOMC rate announcement, however, since March 2013, they have been scheduled for 2:30 p.m. They usually last an hour, but can vary from 45 minutes to 1 hour and 15 minutes. We obtain the start time from Bloomberg. In our dataset, there have been 70 such press conferences—four annually from 2011 to 2018, and eight annually since 2019. In 2020, there were 2 unscheduled press conferences which occurred after surprise FOMC rate announcements.[4] We follow Swanson and Jayawickrema (2023) and use a window of 10 minutes

[2]We have recorded surprises for various asset prices and yields in our dataset for completeness, but we excluded specific events from our analysis because unique circumstances make isolating their effects difficult. Specifically, we exclude the BoC and FOMC rate announcements on September 17, 2001, as markets were closed after the 9/11 attacks; the coordinated rate announcements on October 8, 2008, which prevents isolating the foreign and domestic components of the shock; and the March 15, 2020 FOMC announcement and press conference occurring on a Sunday, where our assets lack in-window observations and there were many concurrent developments over that weekend.

[3]These unscheduled meetings are October 15, 1998; January 3, 2001; April 18, 2001; September 17, 2001; August 10, 2007; August 17, 2007; January 22, 2008; March 11, 2008; October 8, 2008; October 11, 2019; March 3, 2020 and March 15, 2020. Following Gürkaynak et al. (2005) and Bauer and Swanson (2023) we exclude the post-9/11 FOMC announcement on 9/17/2001. Financial markets were closed from 9/11/01 until 9/17/01 and the FOMC announcement occurred before the market opened, making it impossible to separate the effects of the FOMC announcement from the effects of the terrorist attacks.

[4]These are March 3, 2020 and March 15, 2020.

before and 80 minutes after the start of the press conference.

FOMC meeting minutes Our sample includes 181 releases of FOMC meeting minutes, starting on February 1, 2001. From 2001 to 2004, minutes releases were approved by vote at the following FOMC meeting and, if approved, were released to the public at 2:00 p.m. ET on the next Thursday. Starting in 2005—in a move towards increased transparency—the releases became more timely. They are now made public roughly three weeks after the meeting, usually on Tuesdays at 2:00 p.m. As in Swanson and Jayawickrema (2023), we use a window of 10 minutes before and 50 minutes after the release time.

Chair and Vice-Chair speeches Throughout the year, the Federal Reserve Board Chair and the vice-Chair deliver various speeches providing their perspectives on monetary policy, the economy, and other pertinent topics for the conduct of monetary policy.

Although they are not formal policy declarations, the content of these speeches can sway market perceptions regarding potential policy shifts in the upcoming rate decisions. We retrieve the starting time of each speech from Bloomberg and also download the complete text from the Fed's website. We obtain the dates of the speech from the Federal Reserve Board website. We verified the exact times of the speech time from Bloomberg and we use the first news article about the speech on Bloomberg to validate. It's worth noting that speeches by the Federal Reserve Board Chair and Vice Chair frequently take place in various U.S. locations or sometimes even internationally. Therefore, we convert the speech times to U.S. Eastern Time.[5]

In our data set that spans 1998 to 2023, the Fed Chair presented 439 speeches, while the Vice Chair delivered 325 speeches. It is our aim, however, to focus on speeches that potentially had implications for the conduct of monetary policy. We follow Swanson and Jayawickrema (2023) and exclude from our dataset speeches by the Fed Chair and Vice Chair that are either ceremonial or on topics other than monetary policy. We identify the speeches rich in monetary policy content by reading the market commentary in The Wall Street Journal and The New York Times either on the day of the speech or the day after. Out of the 439 speeches given by the Fed Chair between 1998 and September 2023, we excluded 228 speeches and used 211 in our analysis. The Fed Vice Chair gave 325 speeches, 76 of which were considered in our analysis. As in Swanson and Jayawickrema (2023), we use a window of 15 minutes before to 75 minutes after the start of the speech.

[5]We plot the histogram of monetary policy related speech times in the left panel of Figure C.1.

2.2 Bank of Canada communication events

We collect the date and time stamp of three types of BoC monetary policy announcement: interest rate announcements, monetary policy report press conferences, and speeches by governing council members. Starting in 2023, the Bank of Canada has published the *Summary of Governing Council Deliberations*. These documents provide insights into the discussions and thought processes of the Bank of Canada's Governing Council preceding their monetary policy decisions, similar to the FOMC meeting minutes. However, as there are only 5 such publications in our sample, we have decided not to include them in our analysis. Below, we provide more details about the Bank of Canada's monetary policy announcements.

Bank of Canada policy rate announcements In December 2000, the Bank of Canada moved to a system of eight fixed announcement dates per year (known internally as FAD dates) for monetary policy decisions, similar to the FOMC's scheduled meetings. Before this system, policy rate changes could, ostensibly, happen at any time. In actuality, they always happened at 9 a.m., and usually on a Thursday. In our sample there were 15 of these Bank of Canada policy rate changes before the introduction of the FAD dates.[6] Since the implementation of the fixed announcement dates through the end of our dataset, there have been 183 scheduled rate announcements and 3 unscheduled emergency announcements.[7] Thus, our sample includes a total of 201 BoC policy rate announcements. We use the same window length around these announcements as for the FOMC policy rate decisions, namely ten minutes before to 20 minutes after the release time.

Press conferences Beginning in 1998, Monetary Policy Report (MPR) press conferences were established and held after every alternate rate announcement, alongside the release of the MPR. Our dataset for press conference events starts in January 2003, when more accurate information on press conference start times became available. Initially, the publication of the MPR was delayed by two days following the rate decision, primarily due to logistical constraints involving printing and distribution. However, with the shift to electronic communication, this delay became obsolete. In 2011, MPRs were released a day after the FAD and by 2013, MPR publications were synchronized with the FAD. We have a total of 82 press conferences in our sample. We use the same window length as used for the FOMC press conference, starting 10 minutes before the press conference and ending 80 minutes after its start.

[6] For more information on the rationale and the effects on financial markets of the introduction of the fixed announcement dates, see Parent, Munro and Parker (2003).

[7] These unscheduled announcements happened on October 8, 2008, March 13, 2020 and March 27, 2020. As mentioned in Footnote 2, we compute surprises for the September 17, 2001 and October 8, 2008 announcements but exclude them from our analysis due to identification issues.

Governing Council speeches Finally, we also collect the speeches by the Governor, Senior Deputy Governor and other members of the BoC's Governing Council.[8] We obtain the dates, times, and full English transcripts from internal sources and validate the dates and times using the first news article published by Bloomberg. Similar to Federal Reserve speeches, BoC speeches occur in various locations, making it essential to align all speech times to Eastern Time (ET) for consistency. Our finalized dataset includes the speaker's title, speech title, location, occasion, release time (ET), start time (ET), duration, and full transcript. Unlike Federal Reserve speeches, many BoC speeches are publicly released fifteen minutes before the scheduled start time. We find that financial markets typically begin reacting at the release time rather than at the start time. During our sample period, Governing Council members delivered a total of 290 speeches: 201 were by the Governor, 29 by the Senior Deputy Governor, and 60 by other council members. As for the Fed Chair and Vice Chair speeches, we use a window starting 15 minutes before the speech release time and ending 75 minutes after. A histogram of monetary-policy-related speech release times is presented in the right panel of Figure C.1.

2.3 Canadian high-frequency financial markets data

We examine the high-frequency impact of the previously discussed monetary policy announcement types by both the Federal Reserve and the Bank of Canada on short- and long-term interest rates, equity futures and currency markets.

Short- and long-term interest rate markets For short-term interest rates, the main instrument considered is the Bankers' Acceptance Futures contracts (BAX). The BAX contracts closely resemble the characteristics (expiration, maturity, and settlement) of the Eurodollar futures (ED) that were traded on the Chicago Mercantile Exchange (CME).[9] BAX are quoted on an index basis: 100 minus the annualized yield of three-month Canadian Dollar Offered Rate (CDOR).[10] The BAX contracts mature two business days prior to the third Wednesday of the month in March, June, September, and December over a two-year period (TMX Montreal Exchange, 2013). These delivery dates correspond to the delivery dates of Eurodollar futures

[8] Speeches by the BoC Governor do not have a disproportional effect relative to the other members of the Governing Council, contrary to the evidence presented in Swanson and Jayawickrema (2023) for the Federal Reserve. Hence, we include speeches by every member of the Governing Council in our analysis.

[9] Eurodollar futures were an essential instrument for gauging market expectations of future interest rates in the US. For additional context on U.S. financial instruments, including Eurodollar and SOFR futures, please refer to Appendix A.

[10] CDOR measures the rate that Canadian banks are willing to lend to clients with existing credit agreements via banker's acceptances. While CDOR served the Canadian dollar market effectively for many years, its publication ceased in 2024 as part of broader interest-rate benchmark reforms in Canada. See Bank of Canada (2020, 2023) for details.

contracts traded on the Chicago Mercantile Exchange. The BAX was designed to offer arbitrage opportunities with the Eurodollar futures contract (Harvey, 1996).

We have obtained tick-by-tick trades and quotes for all BAX contracts from TMX since January 1997. To mitigate unrepresentative trade selection risks, we utilize a five-minute interval rather than the exact minute. The yield change is in percentage points. We rely primarily on traded yields, resorting to midquotes only when trades are unavailable. The second through fourth BAX contracts reflect market expectations regarding the policy rate path over a horizon of roughly 5 to 14 months ahead.

In Canada, the transition from BAX futures to Canadian Overnight Repo Rate Average (CORRA) futures mirrored the U.S. shift from Eurodollar to SOFR futures, though it occurred slightly later. A new three-month CORRA futures contract was introduced for trading in June 2020. By March 2023, the open interest in the CORRA contracts was only 40% of that in BAX contracts, but by July 2023, it had reached 60%. As of September 2023, the open interest in CORRA contracts was rapidly approaching that of BAX contracts. The Montreal Exchange converted its open BAX contracts to CORRA futures in the second quarter of 2024. Our sample period ends in July 2023, so our main analysis only uses BAX futures. However, we conducted a robustness test using CORRA futures starting in January 2023, and our results remain consistent both qualitatively and quantitatively. Both BAX and CORRA futures are financially settled.

To capture the immediate reactions of mid- to long-term yields following central bank events, we use high-frequency data on Government of Canada benchmark bonds. We use both trade and quotes data. The trades come from the Market Trade Reporting System 2.0 (MTRS2.0), collected by Investment Industry Regulatory Organization of Canada (IIROC). Our sample contains trade-level information on all bond trades of registered brokers or dealers from 2016 to current. We observe security identifiers (i.e., Committee on Uniform Securities Identification Procedures, hearafter CUSIPs), the timestamp, the price, and the quantity of the trade. From the CUSIPs, we identify the benchmark bond. Our surprises are based on the change in yield. Our quotes data comes from the CanDeal platform. When using quotes, our surprises are based on the change in the midquote of the yield.[11]

Unlike in the U.S., where current-month federal funds futures are used to calculate the surprise component of the policy rate target from policy rate announcements, the Canadian financial markets lack a similar product with a long enough history. We use the daily change in 1-month Treasury bills yields to proxy for the surprise change in the policy rate. Data is obtained from Statistics Canada.[12]

[11] We also have two year, five year, and ten year Government of Canada bond futures data for several years in our sample, but the quotes and transaction data from Candeal and MTRS2.0 has the longer and more complete history. Our results remain robust if we use bond futures' prices instead of the bond transaction prices from MTRS2.0.

[12] https://open.canada.ca/data/en/dataset/d5ffb2fb-3607-4bda-8f74-2f7b264a9a85.

Equity markets We use intraday data on S&P/TSX 60 Index Standard Futures (SXF), obtained from the Montreal Exchange. The underlying for SXF is the S&P/TSX 60 Index, which tracks the performance of 60 large, liquid Canadian companies across various sectors, representing the leading companies in the Canadian equity market. SXF contracts follow a quarterly expiration cycle with maturities in March, June, September, and December, with trading predominantly concentrated in the nearest quarterly contract or the subsequent quarterly contract. Our analysis selects the most liquid contract based on the number of trades.[13] Our surprises are based on the log price change of these contracts between the event windows. The intraday SXF dataset begins in September of 1999.[14]

Currency markets In this section, we detail the CAD/USD exchange rate data, including spot, futures, and forward contracts.

Starting in April 2006, we obtained spot CAD/USD exchange rate data from Refinitiv, specifically from the "Matching Prices with Volumes Daily (D5)" dataset, which provides real-time traded prices and volumes. Refinitiv is the leading inter-dealer platform for CAD/USD foreign exchange trading. For the period beginning in 1997 and extending to April 2006, we sourced five-minute indicative quotes for the best bid and offer from Olsen Financial Technologies.

The CAD/USD futures contract is the fourth-largest currency futures contract traded on the CME Group, following EUR/USD, JPY/USD, and GBP/USD. We acquired trade data from TickData, starting in October 2006. Our analysis focuses on the most active contracts, typically those expiring within one to three quarters, as front-month contracts generally exhibit the highest trading volume and open interest. Additionally, we have bid and ask prices as well as transaction volumes from 2010 onward, providing consistent results. These futures contracts are listed quarterly (March, June, September, December) for 20 consecutive quarters, with serial contracts listed for three additional months. Futures prices and quotes are real-time executable and incorporate the cost of carry, reflecting the implied interest rate differential in the currency market.

We also examine nine-month outright forward foreign exchange contracts. We purchased five-minute data on the nine-month forward basis, including best bid and offer quotes, from Olsen Financial Technologies. Midquotes were calculated from these data. In currency trading, forward points are the number of basis points added to or subtracted from the current spot rate of a currency pair to determine the forward rate for delivery on a specific value date. We calculate

[13] Typically, if an event date occurs in the first two months of a quarter, the most liquid contract is the one expiring in that same quarter. In the final month of a quarter, liquidity generally shifts to the next quarterly contract.

[14] Until September 2009, SXF trading opened at 9:30 a.m. ET. Accordingly, we could not observe the reaction to the BoC rate announcements that occurred at 9:00 a.m. We are able to observe early session quotes starting in January 2008, but prior to that we record missing values for the SXF reaction to all BoC rate announcements.

the outright forward rate by adding the forward points to the spot rate. Our forward data spans from 1997 to July 2023.

3 The transmission of Federal Reserve and Bank of Canada communication to Canadian financial markets

In this section, we study how Fed and Bank of Canada communication events transmit to Canadian fixed-income, equity and exchange rate markets. For each asset class, we analyze cumulative and average absolute changes around different types of communication events, such as policy rate announcements, speeches, press conferences, and minutes releases. We perform a placebo analysis to statistically assess the significance of observed market reactions. To better understand the mechanisms behind these market responses, we employ an affine term structure model to decompose interest rate changes into expectations and term premia components. Lastly, we explore how fixed-income markets in both the home (Canada) and foreign (U.S.) countries relate to the foreign exchange market, focusing on the interaction between interest rate movements and exchange rate responses.

3.1 The response of fixed-income and equity markets

Table 1 presents summary statistics for each event on changes in 1–4 quarter BAX contract yields; benchmark 2-, 5-, 10- and 30-year Government of Canada bond yields; and the log price of the most liquid S&P TSX 60 Index Standard Futures. Panel (A) shows the cumulative absolute change we observed for each asset. This reflects the total observed impact of that communication over our entire sample. To control for the uneven number of events in each category and data availability between assets, Panel (B) reports the mean absolute change. This represents the average effect of an individual event of each type.

For most assets, the Bank of Canada policy rate announcements have generated the largest movements in Canadian interest rates, especially at the shorter end of the yield curve. The impact is greatest for four quarter BAX contracts (10.23 pp cumulative absolute change) and declines steeply for longer maturity GoC benchmark bonds (from 6.96 pp for 2-year to 2.13 pp for 30-year bonds). FOMC rate announcements have also caused large interest rate changes with cumulative absolute changes peaking at 5.89 pp for three quarter BAX contracts. The FOMC effects also decline with maturity but not as steeply as the Canadian effects. For assets with a maturity of less than two years the FOMC rate announcements have had only about half the effect of BoC rate announcements but for 10-year bonds the effects are comparable (3.44 vs 3.54 pp) and for 30-year bonds the FOMC effect is greater (2.50 vs 2.13 pp).

Table 1: IMPORTANCE OF CENTRAL BANK EVENTS TO FIXED INCOME AND STOCK MARKETS

Event	Bankers' Acceptance Futures				GoC Benchmark Bonds				Stock	N
	1Q	2Q	3Q	4Q	2yr	5yr	10yr	30yr	Futures	
(A) Sum of Absolute Changes (pp)										
FOMC Rate Anncmts	3.56	5.29	5.89	5.80	3.54	3.90	3.44	2.50	57.05	223
BoC Rate Anncmts	8.16	9.43	10.02	10.23	6.96	5.49	3.54	2.13	36.95	198
Fed Speeches	2.09	3.00	3.73	3.93	2.43	2.82	2.96	2.31	80.44	266
BoC Speeches	1.75	2.74	3.07	3.30	2.37	2.37	2.09	1.64	36.65	159
FOMC Press Confs	0.69	1.14	1.47	1.66	1.44	1.54	1.67	1.06	23.67	67
BoC Press Confs	0.96	1.62	2.00	2.22	1.60	1.69	1.42	0.99	23.07	82
FOMC Minutes	0.89	1.75	2.10	2.30	1.55	1.91	1.98	1.75	34.10	177
(B) Mean Absolute Change Per Event (bps)										
FOMC Rate Anncmts	1.60	2.37	2.64	2.60	2.00	2.20	1.94	1.41	30.35	223
BoC Rate Anncmts	4.12	4.76	5.06	5.19	4.12	3.25	2.10	1.26	29.10	198
Fed Speeches	0.78	1.13	1.41	1.48	1.20	1.38	1.44	1.13	34.97	266
BoC Speeches	1.10	1.73	1.93	2.09	1.60	1.60	1.41	1.11	25.45	159
FOMC Press Confs	1.03	1.71	2.19	2.48	2.15	2.29	2.50	1.59	35.33	67
BoC Press Confs	1.17	1.98	2.44	2.71	1.95	2.06	1.73	1.21	29.21	82
FOMC Minutes	0.51	0.99	1.19	1.31	0.94	1.16	1.20	1.06	19.94	177

Note: This table displays the cumulative absolute change and average change of Canadian Bankers' Acceptance contracts yields, Government of Canada bond yields, and S&P/TSX 60 Index future returns around each of the announcement types. Sample periods are 1997–2023 for bankers' acceptance futures, 1999–2023 for stock futures, and 2002–2023 for GoC benchmark bonds. N is the greatest number of available observations for any of the assets.

The other forms of communication—speeches, press conferences and minutes—have a more uniform impact across the yield curve. For Canadian events, the impact declines slightly for longer maturities—like the rate announcements—but for U.S. events, the per-event impact increases with maturity. For both countries the cumulative impact is greater for speeches than press conferences but the per-event impact is greater for press conferences due to their smaller number of events. Unlike the rate announcements, the impact of U.S. spillovers is generally comparable to domestic communication across the yield curve.

Although other forms of communication tend to have a smaller impact per event compared to rate announcements, their greater number of occurrences ultimately makes them responsible for a substantial share of the total market reaction to central bank communication. For U.S. spillovers the other communication events have caused more variation in interest rates than rate announcements across the yield curve. For Canadian events, rate announcements still constitute the majority of reactions at the short end but other communication has been more impactful for 10- and 30-year bonds. Thus, to ignore other communication events is to disregard the majority of U.S. monetary policy spillovers and a substantial fraction of domestic monetary policy surprises to Canadian fixed income assets.

Table 1 also highlights the influence of FOMC and BoC monetary policy announcements on Canadian equity markets. Our findings align with previous research emphasizing the global impact of FOMC rate decisions on international equity markets, as shown in Wongswan (2009), Ammer, Vega and Wongswan (2010), and Ehrmann and Fratzscher (2009). We find that FOMC rate announcements have a slightly larger average effect on Canadian stock futures than BoC policy rate announcements (30.35 bps vs 29.1 bps). The same is true for other communication events. Speeches by the Fed Chair and Vice Chair generate an average response of 34.97 bps in Canadian stock futures, while BoC Governing Council speeches lead to an average movement of only 25.45 bps. FOMC press conferences produce an average impact of 35.33 bps per event, compared to 29.21 bps for BoC press conferences. Among all forms of communication studied, FOMC minutes have the smallest per-event impact, at 19.94 bps. Even more so than for fixed income assets, we find that other communication events constitute the majority of U.S. spillovers and domestic monetary policy surprises to Canadian stock futures.

As Swanson and Jayawickrema (2023) highlights in the context of FOMC communications on U.S. financial markets, these findings demonstrate how—beyond rate announcements—other communication events are also a significant source of domestic monetary policy surprises and international spillovers to Canadian financial markets.[15]

[15] The importance of monetary policy announcements has evolved considerably throughout our sample period. See Appendix D for details on how the impacts of various types of central bank communication have changed over time.

3.1.1 Are these effects statistically significant?

A large literature has documented and leveraged the increased volatility in financial markets during days of FOMC rate announcements to identify the effects of monetary policy, the so-called identification through heteroskedasticity (Rigobon, 2003). It remains unclear, though, for the remaining monetary policy communication announcements, whether the changes in asset prices captured by Table 1 are statistically larger than the changes that occur in the absence of monetary policy communication.

We conduct a placebo analysis to test whether the observed interest rate and stock market future changes during both FOMC and BoC monetary policy rate announcements and communications are statistically different from random market fluctuations. To construct the placebo events, we use the following approach: (i) for policy rate announcements, press conferences, and FOMC minutes, we take asset price changes from the same time of day exactly one week prior to the actual event, as in Narain and Sangani (2025)[16]; (ii) for speeches, we adopt the approach of Ehrmann, Gnan and Rieder (2023), generating a placebo distribution that mirrors both the year-month distribution of actual speeches and their intra-day timing. We exclude placebo dates that overlap with actual monetary policy communication events, treasury auctions or macroeconomic news releases. Further details on the construction of the speech placebo distribution are provided in Appendix E.

To test for the significance of these differences, we estimate the following regression:

$$|\Delta y_{a,i,t}| = \alpha_{a,i} + \beta_{a,i} \mathrm{D}_{it}^{\text{actual}} + \epsilon_{a,i,t} \tag{1}$$

where $|\Delta y_{a,i,t}|$ is the absolute change associated with the event i at time t for asset a; $\mathrm{D}_{it}^{\text{actual}}$ is a dummy variable equal to 1 for actual events and 0 for placebo events.

Table 2 reports the estimates for $\beta_{a,i}$. The overwhelming majority of these coefficients are positive and statistically significant, indicating that central bank monetary policy announcements by either the Fed or the BoC generate substantially larger market reactions of Canadian interest rates than placebo events. Across the various types of monetary policy announcements, the relative patterns of the $\beta_{a,i}$ coefficients mirror those in Table 1. Specifically, domestic monetary policy announcements (BoC) tend to have larger effects on short-term bond futures and bond yields, whereas Fed announcements exert relatively greater influence on longer-term yields, such as 10-year bonds. For example, FOMC rate announcements lead to an impact of 1.91 basis points

[16] This placebo design is consistent with methods in the literature that emphasize matching weekdays to control for weekday-specific market effects; see, for example, Rosa (2013), Känzig (2021), and Dupraz, Guilloux-Nefussi and Penalver (2023).

above the placebo at the four-quarter-ahead horizon, compared to 4.38 basis points for BoC announcements. However, at the 10-year bond yield, the FOMC has a slightly larger effect—1.18 basis points versus 1.15 for the BoC. A similar pattern emerges when comparing speeches by the Fed Chair and Vice-Chair with those of the BoC Governing Council: the Fed's influence is relatively stronger at longer maturities. As noted in the previous section, the FOMC press conference is an exception to this pattern, producing comparable effects over the placebos to the BoC on short-term bond futures, but exerting a notably larger impact at the 2-year yield horizon.

Table 2: PLACEBO REGRESSION RESULTS FOR CANADIAN FIXED INCOME AND STOCK MARKETS

Event	Bankers' Acceptance Futures				GoC Benchmark Bonds				Stock
	1Q	2Q	3Q	4Q	2yr	5yr	10yr	30yr	Futures
FOMC Rate Anncmts	1.2***	1.72***	1.89***	1.91***	1.51***	1.44***	1.18***	0.75***	10.78*
	(0.2)	(0.23)	(0.23)	(0.22)	(0.17)	(0.25)	(0.21)	(0.15)	(5.87)
BoC Rate Anncmts	3.64***	4.06***	4.12***	4.38***	3.51***	2.36***	1.15***	0.49***	-2.53
	(0.43)	(0.4)	(0.42)	(0.42)	(0.35)	(0.27)	(0.17)	(0.11)	(6.86)
Fed Speeches	0.18	0.1	0.32***	0.29**	0.28***	0.16	0.23**	0.13	3.81
	(0.16)	(0.1)	(0.12)	(0.13)	(0.1)	(0.11)	(0.1)	(0.08)	(3.06)
BoC Speeches	0.65***	0.94***	0.99***	1.07***	0.76***	0.3*	0.21*	0.02	-0.03
	(0.17)	(0.18)	(0.19)	(0.22)	(0.18)	(0.17)	(0.12)	(0.11)	(3.54)
FOMC Press Confs	0.62**	1.02***	1.47***	1.68***	1.57***	1.48***	1.37***	0.77***	12.32
	(0.27)	(0.36)	(0.41)	(0.42)	(0.36)	(0.39)	(0.4)	(0.2)	(7.74)
BoC Press Confs	0.54**	1.21***	1.52***	1.76***	1.19***	0.93***	0.58***	-0.06	2.24
	(0.22)	(0.28)	(0.31)	(0.36)	(0.25)	(0.26)	(0.21)	(0.2)	(4.65)
FOMC Minutes	0.05	0.34***	0.38***	0.47***	0.41***	0.21	0.4***	0.18	2.84
	(0.06)	(0.11)	(0.14)	(0.14)	(0.1)	(0.2)	(0.1)	(0.21)	(1.96)

Note: This table displays the regression βs of monetary policy events on Canadian fixed income yields and stock index prices. Heteroskedasticity-consistent standard errors are reported in parentheses. The regression specification is (1). Sample: Jan 1997–Jul 2023. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

3.1.2 Are the changes in interest rates due to expectation or term premium?

We have quantified the impacts of central bank events on Canadian interest rates ranging from 1-quarter-ahead rate futures to 30-year bond yields. These results raise important questions about the underlying drivers of market reactions: to what extent are the observed changes driven by shifts in expectations about future policy rates versus changes in risk premia? To address this, we apply an affine term structure model (ATSM) to high-frequency yield curve movements, decomposing them into changes in risk-neutral rates and term premia. Below, we provide a brief overview of the methodology; further details are presented in Section Appendix F.

Let F_t denote a $K \times 1$ vector of variables whose dynamics are characterized by a Gaussian vector autoregression (VAR):

$$F_{t+1} = c + \rho F_t + \Sigma u_{t+1}$$

with $u_t \sim$ i.i.d. $N(0, I_K)$. This VAR process generates a '$\mathbb{P}$-measure' and the implied dynamics are referred to as the '$\mathbb{P}$-dynamics'.

The short rate is assumed to be related to the K factors through affine mapping:

$$r_t = \delta_0 + \delta_1' F_t$$

and that there exists a unique stochastic discount factor given by

$$M_{t+1,t} = \exp\left[-r_t - (1/2)\lambda_t'\lambda_t - \lambda_t' u_{t+1}\right]$$

where the risk prices λ_t measure the additional expected return required per unit of risk in each of the shocks. Following Duffee (2002), we assume λ_t is an affine function of the factors,

$$\lambda_t = \Sigma^{-1}(\lambda_0 + \lambda_1 F_t).$$

The risk-neutral dynamics are given by

$$F_{t+1} = c^{\mathbb{Q}} + \rho^{\mathbb{Q}} F_t + \Sigma u_{t+1}^{\mathbb{Q}}$$

where $u_{t+1}^{\mathbb{Q}} = u_{t+1} + \lambda_t$, $u_t^{\mathbb{Q}} \sim N(0, I_K)$, $c^{\mathbb{Q}} = c - \lambda_0$, and $\rho^{\mathbb{Q}} = \rho - \lambda_1$.

Let $p_{t,n}$ represents the price of an n-period zero coupon bond. Starting with $p_{t,0} = 1$, bond prices are computed recursively by $p_{t,n} = \mathbb{E}_t(M_{t+1,t}\, p_{t+1,n-1})$. With the definition of the discount factor $M_{t+1,t}$, the state dynamics of F_t and the dynamics of the short rate r_t, we can write prices of bonds at different maturities as $p_{t,n} = \exp(\mathscr{A}_n + \mathscr{B}_n' F_t)$, where the coefficients $\mathscr{A}_n$ and $\mathscr{B}_n$ are solved recursively.

The continuously compounded yield $y_{t,n}$ on an n-period zero coupon bond is given by

$$y_{t,n} = -\frac{1}{n}\log p_{t,n} = A_n + B_n' F_t$$

where $A_n = -n^{-1}\mathscr{A}_n$ and $B_n = -n^{-1}\mathscr{B}_n$.[17] The arbitrage-free loadings A_n and B_n are non-linear,

[17] Note that yields are affine functions of the state F_t, so that the above equation can be interpreted as being the observation equation of a state space system.

recursive functions of the model parameters $\delta_0, \delta_1, c^{\mathbb{Q}}, \rho^{\mathbb{Q}}$, and Σ, i.e., $A_n = -n^{-1}\mathscr{A}_n(\delta_0, \delta_1, c^{\mathbb{Q}}, \rho^{\mathbb{Q}}, \Sigma)$, $B_n = -n^{-1}\mathscr{B}_n(\delta_1, \rho^{\mathbb{Q}})$.

Risk-neutral yields are the yields that would prevail if investors were risk-neutral. They reflect policy expectations over the life of the bond. Risk-neutral yields can be calculated using

$$\text{yrn}_{t,n} = A_n^{\text{rn}} + B_n^{\text{rn}\prime} F_t$$

where $A_n^{\text{rn}} = -n^{-1}\mathscr{A}_n(\delta_0, \delta_1, c, \rho, \Sigma)$, $B_n^{\text{rn}} = -n^{-1}\mathscr{B}_n(\delta_1, \rho)$.

The yield term premium is defined as the difference between actual and risk-neutral yields, $\text{ytp}_{t,n} = y_{t,n} - \text{yrn}_{t,n}$.

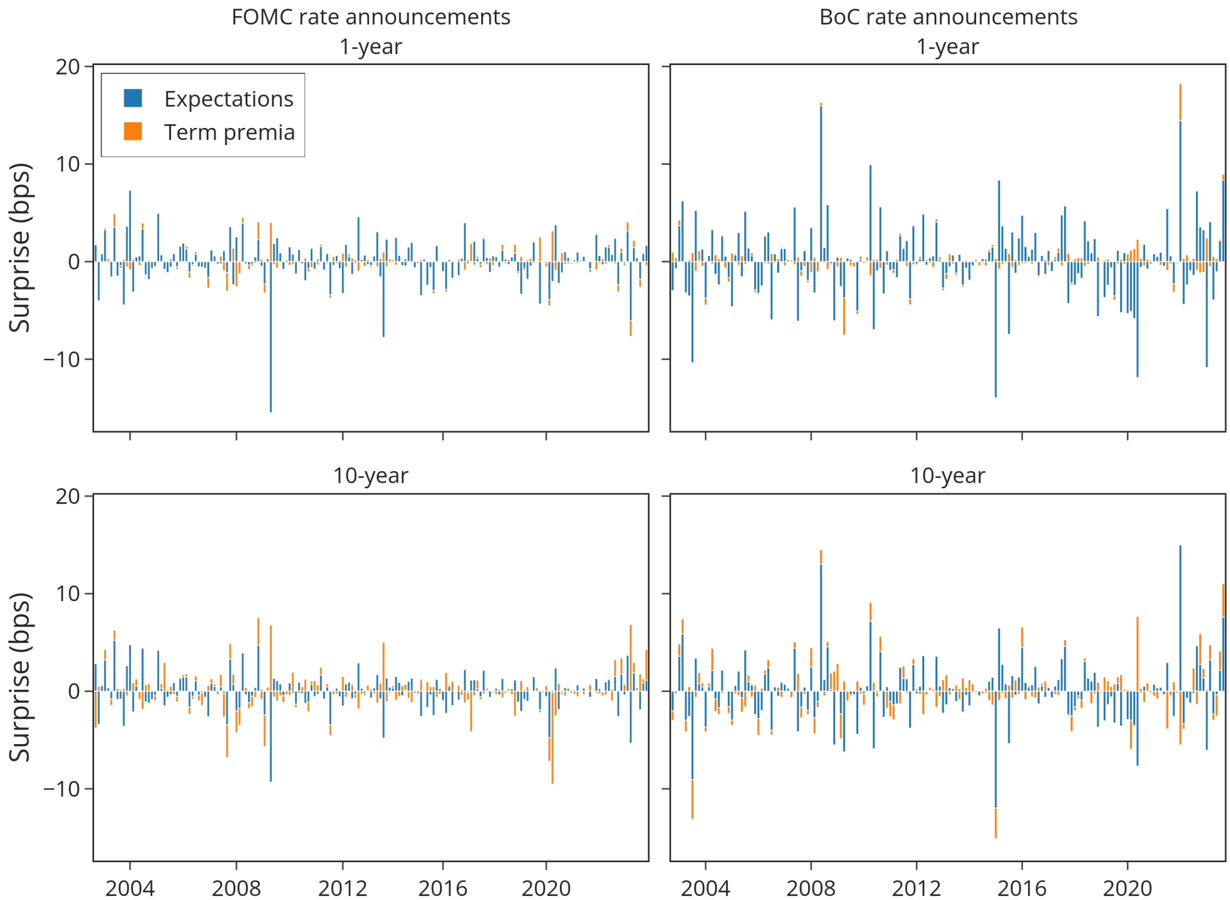
We first estimate the model using monthly data for Canadian zero-coupon yields at maturities of 3, 6 and 9 months and 1 through 10 years. The data are obtained from the Bank of Canada's website. The sample runs from January 1986 to December 2019. For identification, we employ the normalizing restrictions of Joslin, Singleton and Zhu (2011), leading to their canonical representation. We follow Bauer (2018) to impose restrictions on risk prices. The details can be found in Appendix F. We obtain the median estimates.

We then follow Kaminska, Mumtaz and Šustek (2021) and assume that B_n and B_n^{rn} remain constant within a narrow window, e.g., 10 minutes before and 20 minutes after central bank policy rate announcements. The estimated values of B_n and B_n^{rn} from the monthly ATSM are then applied to project the high-frequency changes in the yield curve.

Specifically, we obtain the vector of high frequency changes in the risk factors, denoted as $\Delta\tilde{F}_t$, by taking the first four principal components of the changes in the yields of the 2- and 4-quarter BAX contracts and the 2-, 5-, and 10-year GoC benchmark bonds. Let Y_t be a vector of J yields, and B and B^{RN} be the corresponding matrices that are composed of the estimated B_n and B_n^{rn} associated with these yields. We calculate $\Delta\widetilde{\text{YRN}}_t = \text{B}^{\text{RN}}\Delta\tilde{F}_t$ to capture the expected changes and $\Delta\widetilde{\text{YTP}}_t = (B - \text{B}^{\text{RN}})\Delta\tilde{F}_t$ to account for changes in the term premium.

The contributions to the HF changes in 1-year yield (BAX4 as a proxy) and 10-year yield around FOMC and BoC rate announcements are illustrated in Figure 1. Our time series start in 2002 due to the availability of the intraday government bond yield data. During Canadian interest rate announcement events, both the 1-year and 10-year yields are influenced by the expectation and term premium channels, with expectations playing a more significant role than the risk premium in both cases. However, the expectation channel has a relatively greater impact on the 1-year yield compared to the 10-year yield. Specifically, from 2002 to 2023, the estimated total absolute changes in the 1-year yield during BoC announcement are 4.56 pp for the expectation term and 0.73 pp for the risk premium, while for the 10-year yield, the total absolute changes are 3.51 pp for the expectation term and 1.57 pp for the risk premium.

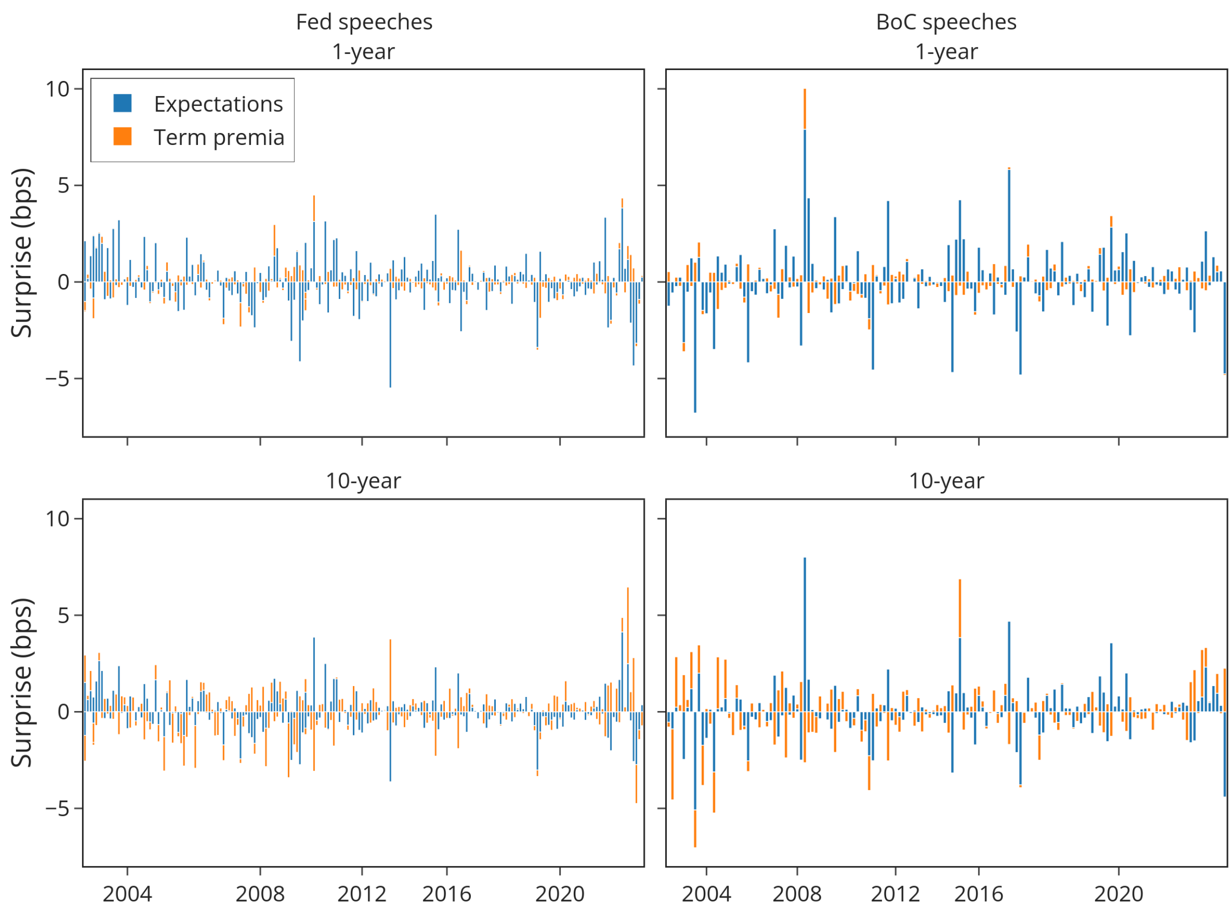
Figure 1: DECOMPOSITION OF HIGH-FREQUENCY CHANGES IN CANADIAN BOND YIELDS AROUND FOMC AND BOC POLICY RATE ANNOUNCEMENTS (2002-2023)



Note: This figure plots the high-frequency changes in the expectations (blue) and term premium (orange) components of 1- and 10-year yields in Canada around FOMC and BoC policy rate announcements. Sample starts in 2002 and ends in 2023.

Figure 2 shows the decomposition for Fed and BoC speeches.[18] In these events, the 1-year yield changes are also primarily driven by expectations, even for U.S. events. For the 10-year yield, on the other hand, the term premium channel plays an equally important role, regardless of whether the event takes place in the U.S. or Canada, and regardless of whether it involves a speech, press conference, or minutes release. For example, during Fed speeches between 2002 and 2023, the estimated total absolute changes in the 1-year yield are 1.99 pp for the expectation term and 0.56 pp for the risk premium, while for the 10-year yield, they are 1.49 pp for the expectation term and 1.31 pp for the risk premium.

Figure 2: DECOMPOSITION OF HIGH-FREQUENCY CHANGES IN YIELDS AROUND FED CHAIR AND VICE-CHAIR AND BOC SPEECHES (2002-2023)



Note: This figure plots the high-frequency changes in the expectations (blue) and term premium (orange) components of 1- and 10-year yields in Canada around Fed Chair and Vice-Chair and BoC Governing Council speeches. Sample starts in 2002 and ends in 2023.

Table 3 reports the ratio of the total absolute change in expectations to the total absolute

[18] Additional results showing the contributions of expectations and risk premium to the high-frequency changes in yields from FOMC and BoC press conferences and FOMC minutes releases are illustrated in Appendix Figures F.3 and F.4.

change in term premium for 1-year, 5-year, and 10-year Canadian benchmark bond yields across different types of announcements. This ratio provides a measure of the dominant channel driving yield changes for each event type. At the 1-year horizon, changes in expectations account for a significantly larger share of yield movements—especially in response to BoC policy rate announcements. However, as the maturity increases, particularly at the 10-year horizon, the contribution of term premium changes becomes more pronounced, nearly matching that of expectations in explaining the high-frequency yield responses to both Fed and BoC announcements.

Table 3: Relative contribution of expectation vs. risk premium channel, by Event and Maturity

Event	1-year	2-year	10-year
FOMC Rate Anncmts	3.8	2.5	1.4
BoC Rate Anncmts	6.3	4.7	2.2
Fed Speeches	3.5	2.2	1.1
BoC Speeches	3.5	2.3	1.2
FOMC Press Confs	2.8	2.0	1.3
BoC Press Confs	4.9	2.9	1.4
FOMC Minutes	3.8	2.4	1.3

Note: This table presents the ratio of total absolute changes in expectations to total absolute changes in risk premium across each event type for the 1-year, 2-year, and 10-year yields, respectively.

3.2 The response of the spot and forward CAD/USD exchange rates

Having established the impact of FOMC and BoC monetary policy announcements and communication events on Canadian interest rates across different maturities, we now turn to their effects on the CAD/USD exchange rate. In this subsection, we extend our analysis to examine how these announcements influence exchange rate markets, including spot, futures, and forward CAD/USD contracts.

Table 4 reports the total absolute changes (Panel A) and the average absolute change per announcement (Panel B) in the CAD/USD exchange rate for each type of monetary policy event by the FOMC and the BoC. While announcements from both central banks lead to sizable movements in spot and futures exchange rates, a clear pattern emerges: BoC announcements tend to have a larger average impact on both spot and futures CAD/USD exchange rates. For instance, BoC policy rate announcements lead to an average change of approximately 33.66 basis points in the spot CAD/USD rate, compared to just over 20 basis points for FOMC federal funds rate announcements. Similarly, BoC Governing Council speeches produce an average change of 16.08 basis points, exceeding the 12.34 basis point average from Fed Chair and Vice-Chair speeches. This relative pattern holds for the 1- and 3-quarter-ahead CAD/USD futures contracts as well. The sole exception occurs with press conferences: FOMC press conferences generate slightly larger average exchange rate movements than their BoC counterparts. FOMC press conferences are notable for having become much more important to Canadian financial markets since the Covid-19 pandemic.[19] Finally, FOMC minutes have the smallest impact on exchange rates, consistent with the findings for the interest rate and equity futures markets.

We perform a similar placebo analysis as in subsection 3.1.1 to test for the statistical significance of the central bank events on exchange rate markets. In particular, we estimate equation (1) using the asset price surprises from the true events and the placebo events, and we report the results in Table 5. The estimated βs are positive and highly statistically significant for all Fed and BoC monetary policy announcements. Again, with the exception of press conferences, coefficients associated with BoC policy rate announcements and Governing Council speeches are significantly larger than their Fed counterparts, reflecting the stronger impact of BoC monetary policy announcements on the CAD/USD exchange rate markets. For example, while FOMC rate announcements are associated with approximately 14 basis points larger movements in the CAD/USD spot exchange rate relative to placebo events, BoC rate announcements generate even stronger effects—around 24.5 basis points larger than placebo events.

[19] We discuss the time variation of each event in Appendix D.

Table 4: IMPORTANCE OF CENTRAL BANK EVENTS TO FOREIGN EXCHANGE MARKET

Event	CAD/USD			N
	Spot	1Q	3Q	
(A) Sum of Absolute Changes (pp)				
FOMC Rate Anncmts	45.06	35.92	40.46	225
BoC Rate Anncmts	66.97	52.73	58.63	199
Fed Speeches	34.30	24.27	30.18	278
BoC Speeches	25.90	21.04	23.36	161
FOMC Press Confs	16.67	16.65	16.79	68
BoC Press Confs	18.45	15.57	18.30	82
FOMC Minutes	19.90	15.54	16.67	181
(B) Mean Absolute Change Per Event (bps)				
FOMC Rate Anncmts	20.03	24.95	17.98	225
BoC Rate Anncmts	33.66	38.49	29.46	199
Fed Speeches	12.34	15.17	11.10	278
BoC Speeches	16.08	16.57	14.51	161
FOMC Press Confs	24.51	24.84	24.69	68
BoC Press Confs	22.50	23.24	22.31	82
FOMC Minutes	10.99	11.51	9.31	181

Note: This table presents the cumulative absolute changes and average absolute changes in the log price of CAD/USD spot rates, CAD/USD futures, and the 9-month outright CAD/USD forward exchange rates, measured around various types of central bank communication events. Spot and three-quarter samples are from Jan 1997–Jul 2023. One-quarter sample is from Oct 2006 (earliest available date) to Jul 2023. N is the greatest number of available observations among the three assets.

Table 5: PLACEBO REGRESSION RESULTS FOR FOREIGN EXCHANGE MARKET

Event	CAD/USD		
	Spot	1Q	3Q
FOMC Rate Anncmts	14.11***	17.55***	12.6***
	(1.48)	(2.24)	(1.55)
BoC Rate Anncmts	24.54***	28.8***	20.36***
	(2.19)	(2.77)	(2.03)
Fed Speeches	1.96**	4.1***	1.89**
	(0.88)	(1.31)	(0.91)
BoC Speeches	5.82***	6.18***	5.4***
	(1.46)	(1.69)	(1.39)
FOMC Press Confs	16.91***	15.93***	15.79***
	(2.49)	(3.05)	(3.11)
BoC Press Confs	8.01***	9.43***	8.56***
	(2.69)	(3.04)	(2.65)
FOMC Minutes	3.54***	4.01***	3.34***
	(1.02)	(1.24)	(1.01)

Note: This table displays the regression βs of monetary policy events on Canadian foreign exchange rates. Heteroskedasticity-consistent standard errors are reported in parentheses. The regression specification is (1). Sample for spot and 3Q is Jan 1997–Jul 2023. Sample for 1Q is Jun 2006–Jul 2023. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.

3.3 Tying it all together: Interpreting interest and exchange rate reactions to Fed and BoC announcements

At first glance, it may seem counterintuitive that Bank of Canada monetary policy announcements have a stronger impact on both spot and forward CAD/USD exchange rates. To shed light on this result, we turn to the covered interest rate parity (CIP) condition—a foundational relationship in international economics and finance. CIP links interest rates and exchange rates by equating the forward premium of a currency over its spot rate to the interest rate differential between domestic and foreign interest rates. Specifically,

$$\left(s_t - f_{t,t+n}\right)/n = \left(y_t^{(n)} - y_t^{*(n)}\right). \tag{2}$$

where s_t and $f_{t,t+n}$ are the spot and the forward CAD/USD exchange rates, and $i_t^{(n)}$ and $i_t^{*(n)}$ are the nominal interest rate at maturity n in Canada and the U.S.

Swanson and Jayawickrema (2023) documents that FOMC monetary policy announcements exert a substantial influence on U.S. interest rates. As shown in Section 3.1, these same announcements also significantly affect Canadian interest rates. As a result, both right-hand-side terms of equation 2 respond to FOMC announcements. Given the relative size of the two economies, it is reasonable to expect that Bank of Canada policy announcements, by contrast, have little to no effect on U.S. interest rates.

We test this assumption using the placebo methodology described in Section 3.1.1. This time we consider whether BoC monetary policy events have a statistically significant impact on U.S. interest rates, ranging from 1-quarter ahead Euro-Dollar futures (ED1) to 10-year Treasury note futures. Table 6 presents the β estimates from the placebo test shown in equation (1).

Table 6: PLACEBO REGRESSION RESULTS FOR CANADIAN MONETARY POLICY ANNOUNCEMENTS ON U.S. FIXED INCOME MARKETS

	ED1	ED2	ED3	ED4	10-year
BoC Rate Anncmts	0.09	0.08	0.21*	0.24*	0.1
	(0.07)	(0.08)	(0.11)	(0.13)	(0.08)
BoC Speeches	0.06	0.08	0.02	-0.01	0.01
	(0.07)	(0.09)	(0.1)	(0.12)	(0.07)
BoC Press Confs	0.03	0.27	0.35	0.36	0.06
	(0.15)	(0.18)	(0.21)	(0.25)	(0.13)

Note: This table displays the regression βs testing the significance of BoC monetary policy announcements on U.S. fixed income yields. Heteroskedasticity-consistent standard errors are reported in parentheses. The regression specification is (1). Sample: Jan 1997–Jul 2023. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

The analysis reveals that the effect of BoC announcements on U.S. interest rates is indistinguishable from market noise. Consequently, BoC announcements lead to larger shifts in the U.S.–Canada interest rate differential than comparable FOMC announcements. For example, we compute the absolute changes in the 1-quarter maturity interest rate differential around rate announcements and average these across events. We find that Canadian rate announcements generate an average absolute change of about 4.15 basis points, whereas U.S. rate announcements generate only 1.78 basis points; this difference is statistically significant. Similar patterns hold for maturities of 2 quarters (4.54 bps vs. 1.85 bps), 3 quarters (4.75 bps vs. 2.15 bps), and 4 quarters (4.88 bps vs. 2.63 bps).[20] This disparity explains why BoC monetary policy announcements exert a stronger influence on the CAD/USD exchange rate. In contrast, the more muted exchange rate response to FOMC announcements does not reflect weaker market relevance; rather, it stems from their broader cross-border spillovers to interest rates, which reduce the need for exchange rate adjustments.

In Appendix G, we test whether CIP holds around monetary policy announcements by the Fed and the BoC. We exploit a high-frequency dataset of interest rates and exchange rates, along with a comprehensive set of Fed and BoC monetary policy events—including speeches and press conferences.[21] This allows us to closely examine deviations from CIP around announcements by both the foreign (Fed) and domestic (BoC) central banks. As shown in Table G.1, we reject the null hypothesis that CIP holds in our sample around most of these announcements, across the 3-month, 9-month, and 10-year horizons.

4 Foreign and domestic central bank communication and forward guidance

A literature pioneered by Gürkaynak et al. (2005) (hereafter GSS) studies changes in interest rates around FOMC monetary policy announcements, breaking them down into two components: unexpected changes in the policy rate (the "target factor") and unexpected changes in forward guidance (the "path factor"). Swanson (2021) expands this approach to identify surprise changes in the Federal Reserve's large-scale asset purchases. Swanson and Jayawickrema (2023) shows that the effects of forward guidance on U.S. interest rates are broadly similar across different types of Fed communication—such as FOMC announcements, Chair speeches, press conferences, and minutes—differing primarily in magnitude rather than in their qualitative effect.

In this section, we employ similar methods to decompose changes in Canadian interest rates around each of our Fed and BoC monetary policy announcements and communication events. We then assess the immediate response of Canadian financial markets to these components, with a particular focus on forward guidance, for both Fed and BoC communication events. Finally, we

[20] When examining press conferences, Canadian press conferences generally produce slightly larger changes to the absolute interest rate differentials than their U.S. equivalents, but these differences are not statistically significant. In the case of speeches, Canadian speeches produced larger changes in the absolute interest rate differentials than U.S. speeches, with statistically significant differences at the 2-quarter (1.72 bps vs 1.23 bps) and 3-quarter maturities (1.90 bps vs 1.42 bps). The differences are not statistically significant for the 1-quarter maturity (1.25 bps vs 1.04 bps) and 4-quarter maturity (2.05 bps vs 1.72 bps).

[21] Cerutti, Obstfeld and Zhou (2021) study the macrofinancial factors that are associated over time with the evolution of covered interest parity. Ceballos, Albagli, Claro and Romero (2023) study uncovered interest rate parity and conduct an event study based on changes in long-term interest rates and exchange rates within a two-day bracket around specific events.

use these factors to analyze the persistence of forward guidance shocks driven by both Fed and BoC communication events on Canadian financial markets.

4.1 Identification of BoC policy rate and forward guidance factors around Fed and BoC communication events

We begin by discussing how we identify the target and forward guidance factors for each of our monetary policy announcements and communication events. Changes in the BoC policy rate target always take place with a BoC rate announcement. None of the other central bank communication events result in a change in the policy rate. We thus define the surprise change in the BoC policy rate to be zero for all Fed and BoC communication events.

For the BoC policy rate announcement, we follow the methodology outlined by GSS and use five instruments in our analysis. For the first instrument, GSS use the current-month federal funds future contract (FF1) to construct the surprise component of the change in the federal funds rate target. However, due to the absence of a similar financial product in Canadian financial markets, we measure the near-term policy surprises using daily change of one-month Treasury bills yields.[22] This is our proxy for the surprise change in the policy rate.

For the target and forward guidance components, we adopt the GSS methodology. Let X represent a T by five matrix of short- and medium-term interest rate futures responses to FAD announcements. Each row in this matrix corresponds to an individual FAD announcement, and the columns represent the unexpected changes in the yields of 1-month Treasury bills, BAX1, BAX2, BAX3, and BAX4, respectively. We extract the first two principal components from X and rotate them so that the second component has no impact on policy target changes. The first factor corresponds to the surprise change in the BoC policy rate, while the second factor captures the surprise change in forward guidance, reflecting changes in expectation about interest rate path unrelated to the current policy rate. Finally, we normalize the scale of each factor to have a standard deviation of unity.

There is no BoC rate change associated with the BoC press conferences and speeches, and the Fed events. Thus, to identify the forward guidance component for each of these events, we follow Swanson and Jayawickrema (2023) and construct a matrix X^{type} with dimensions $T^{\text{type}} \times 4$, where T^{type} represents the number of announcements of that type. The four columns correspond to the BAX1–BAX4 yields, with the surprise change in the BoC policy rate being zero. We then extract

[22] We construct an alternative data series to proxy the surprise component of the change in the policy rate target using Bloomberg survey data. For scheduled meetings, we calculate the difference between the realized policy rate and the median Bloomberg forecast. For unscheduled meetings, we use the actual policy rate change since the last announcement. We repeat the exercises conducted in this section. Our results are robust and available upon request.

the first principal component of X^{type}, defining it as the change in forward guidance—mirroring the concept applied to BoC rate announcements without changes to the BoC rate. Finally, we normalize the scale of the forward guidance from each type of monetary policy announcement to have a standard deviation of unity.

4.2 Forward Guidance effects for Fed and BoC communication events

We then estimate the following high-frequency event-study regression for each type of Fed and BoC monetary policy communication event:

$$\Delta y_t = \alpha + \beta F_t^{type} + \epsilon_t \tag{3}$$

where, Δy_t denotes the change in Canadian interest rates, stock futures return, or CAD/USD spot exchange rate return during a narrow time window surrounding the different types of Fed and BoC monetary policy announcements and communication events. F_t^{type} captures the policy rate or forward guidance factors associated with each type of announcement.

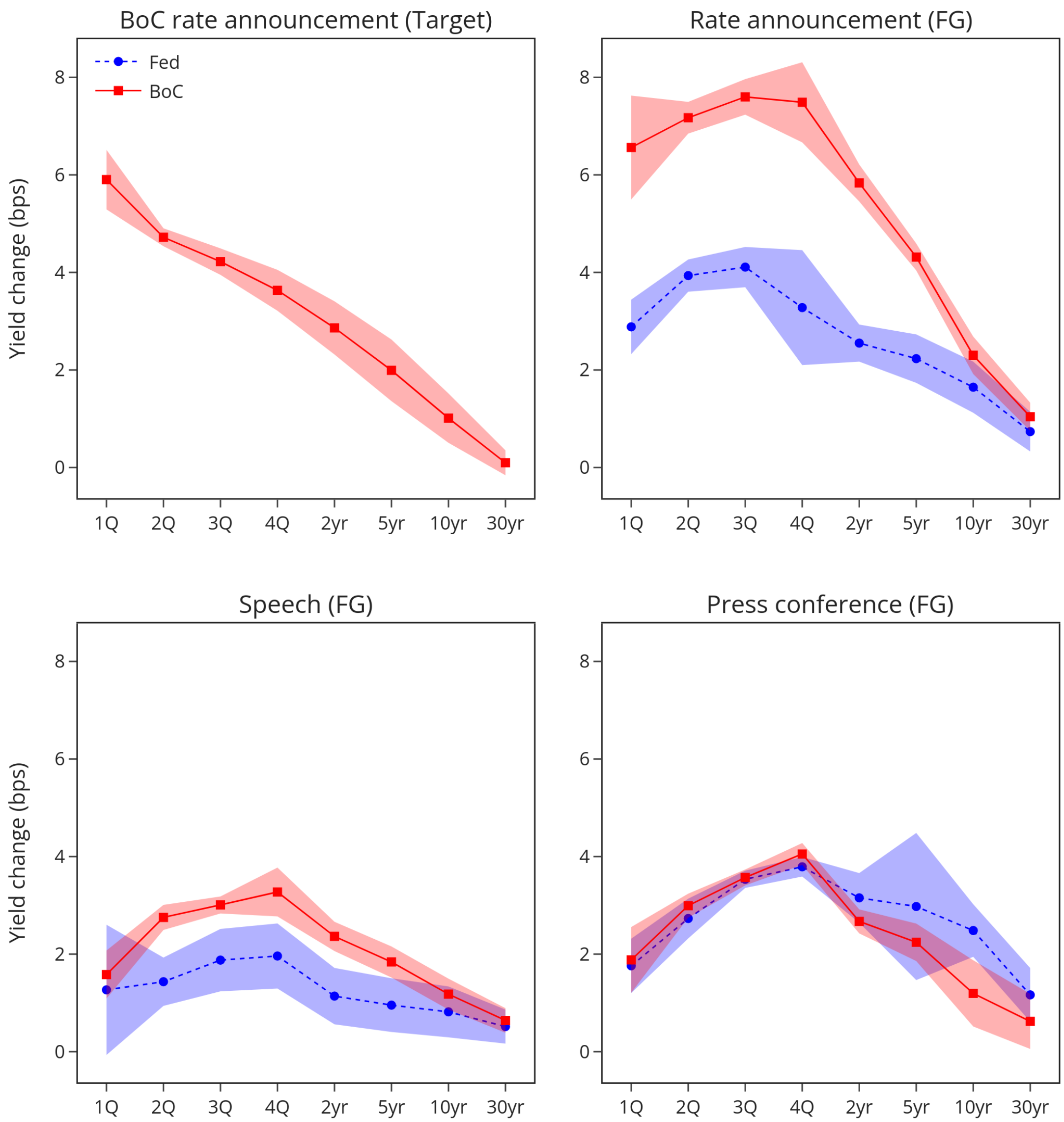
Figure 3 presents the estimated β coefficients along with their 95% confidence intervals from the regression described above, covering Canadian interest rates with maturities from one quarter to 30 years. The top-left panel shows the impact of the target factor around BoC monetary policy announcement windows. Consistent with GSS and Swanson (2021), the influence of the target factor is strongest at the short end of the yield curve, diminishing with longer maturities. A one-standard deviation shock to the BoC target factor is associated with a highly significant change of about 6 bps in the 1-quarter-ahead BAX contract (BAX1), but no statistically significant impact on the 30-year bond yields.

The remaining panels of Figure 3 display the impact of forward guidance factors on Canadian interest rates, estimated around various types of communications: Fed and BoC policy rate announcements (top right), speeches by the Fed Chair/Vice Chair and BoC Governing Council members (bottom left), and press conferences following FOMC and BoC meetings (bottom right). The forward guidance factor extracted from BoC policy announcements has the strongest impact on short-term Canadian interest rates, with a peak at the 3-quarter BAX—somewhat earlier than the peak observed for the equivalent FOMC guidance in the U.S., as reported by GSS and Swanson (2021). Interestingly, the shape of the impact curve on Canadian interest rates for forward guidance delivered via FOMC rate announcements is similar but weaker for Canadian short-term rates. Forward guidance factors estimated around speeches by Fed leadership and BoC Governing Council members also exhibit similar profiles, peaking around the 4-quarter BAX contracts, with domestic speeches having a relatively larger effect on the short end of the yield curve. Finally, forward guidance delivered through press conferences by the FOMC and BoC yields impacts of comparable shape and magnitude on Canadian interest rates, though FOMC press conferences tend to exert a slightly stronger effect at longer maturities.

Taken together, these results suggest that outside of formal policy rate announcements, forward guidance affects Canadian interest rates in broadly similar ways—regardless of whether it originates from the domestic central bank or the Federal Reserve.

Table H.1 in Appendix H complements these results by reporting the estimated coefficients and standard errors for the CAD/USD spot exchange rate and TSX stock market futures, in addition to those for Canadian interest rates. It shows that forward guidance delivered through rate announcements by both the FOMC and BoC has a large and statistically significant negative impact on Canadian stock market futures. A one-standard-deviation shock to forward guidance around FOMC rate announcements leads to a 19.5 basis point decline in futures, while the corresponding shock around BoC announcements results in a 21.7 basis point drop. The largest effect is observed for forward guidance communicated during FOMC press conferences, which reduces Canadian stock market futures by 23.1 basis points.

Figure 3: EFFECTS OF BOC TARGET AND FORWARD GUIDANCE FOR DIFFERENT TYPES OF FED AND BOC COMMUNICATION EVENTS



Note: This figure plots the β coefficients of equation (3) and their 95% confidence bands for yields ranging from 1-Quarter to 30-year. The top left plot shows the β coefficients associated with the BoC target factor, while the top right plot shows the β coefficients associated with forward guidance delivered during FOMC (blue) and BoC (red) rate announcements. The bottom left and right plots show the β coefficients associated with forward guidance delivered during Fed Chair/Vice-Chair (blue) and BoC Governing Council (red) speeches and FOMC (blue) and BoC (red) press conferences, respectively.

4.3 The persistence of foreign and domestic monetary policy announcements

The regressions above estimate the immediate responses of yields and asset prices to BoC and Fed communication events. In this subsection, we investigate their persistent effects on the Canadian financial market. Following Swanson (2021), we run a series of regressions at multiple horizons, indexed by h, with the following specification:

$$y_{t-1+h} = \alpha_h + \beta_h y_{t-1} + \gamma_h F_t + \varepsilon_t^{(h)}$$

where t is the day of an event and y_{t-1+h} is the h-day ahead yield or asset price. For BoC rate announcements, F_t is a vector of target and path factors; for all other events, F_t is the path factor. The γ^h is a parameter or a vector of parameters that can vary between regressions, and $\varepsilon_t^{(h)}$ is the residual.

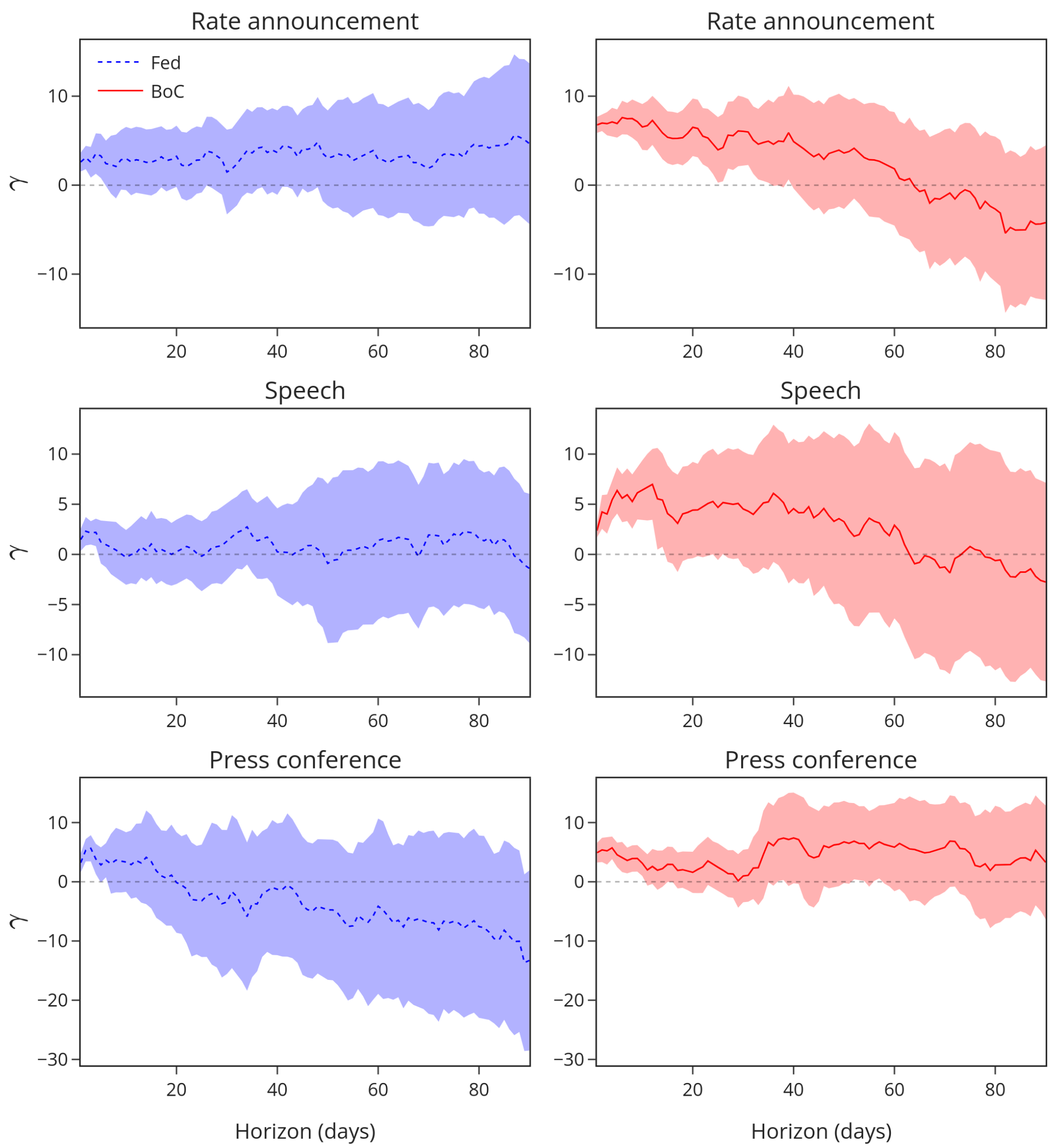
Then we impose α =0 and β =1 following Swanson (2021), so the regression becomes:

$$y_{t-1+h} - y_{t-1} = \gamma_h F_t + \epsilon_t^{(h)} \tag{4}$$

where $y_{t-1+h} - y_{t-1}$ is the h-day change of yields or asset prices, and $\epsilon_t^{(h)}$ is the residual. We use heteroskedasticity-consistent standard errors (HC1) to construct the 95 percent confidence interval.

In Figure 4 we show how forward guidance factors for various Fed and BoC communication events affect 4-quarter bankers' acceptance futures in the days following a one standard deviation increase of forward guidance. Whether delivered by the Fed or the BoC, forward guidance from each event has a significant and persistent impact on BAX4. For the Fed, press conferences have the greatest impact after one day (3.2 bps) followed by rate announcements (2.6 bps) and then speeches (1.5 bps). The persistence is similar for each Fed event, at around 5 days. For the BoC, rate announcements have the greatest impact (6.7 bps), then press conferences (4.9 bps) and speeches (2.3 bps). The forward guidance from BoC rate announcements is highly persistent, lasting around 40 days. Even though the one-day effect of forward guidance from speeches and press conferences is not radically different between the Fed and the BoC, the BoC's effects are twice as persistent, lasting around 10 days. The results for other assets and for the target factor are available in Appendix H.

Figure 4: THE PERSISTENCE OF FOREIGN (FED) AND DOMESTIC (BOC) FORWARD GUIDANCE EFFECTS ON CANADIAN BAX4



Note: Estimated effects of the forward guidance from Fed and BoC monetary policy announcements and communication events on 4-quarter BAX contracts yields. Effects are measured as yield changes in basis points (bps) over horizons h ranging from 1 to 90 business days. The estimated coefficients γ and $\pm$ 1.96-robust-standard errors are from regression equation (4).

5 Conclusion

We provide new evidence on the importance of central bank communication—beyond policy rate changes—in shaping financial market outcomes in an open economy. Using a novel high-frequency dataset of monetary policy announcements from the Federal Reserve and Bank of Canada, we show that pre-scheduled communication events such as speeches, press conferences, and minutes releases are significant drivers of Canadian interest rates, equity prices, and exchange rates. While Bank of Canada announcements have larger effects on short-term Canadian rates, Fed communications exert greater influence on long-term yields and Canadian equities, underscoring the global reach of U.S. monetary policy.

Our results also reveal that Bank of Canada announcements generate stronger reactions in the CAD/USD exchange rate than analogous Fed announcements. We attribute this to the asymmetric impact of these events on the U.S. versus Canadian yield curves: whereas FOMC announcements affect interest rates in both countries, BoC announcements do not move U.S. rates. As a result, Canadian policy actions induce larger shifts in bilateral interest rate differentials, triggering greater exchange rate adjustments.

By systematically quantifying the effects of various communication channels, our findings call for a broader perspective on monetary policy transmission. Ignoring scheduled communication events leads to an incomplete understanding of both cross-border monetary policy spillovers from the Fed and domestic monetary policy transmission in open economies. Finally, we make available a new dataset of Canadian monetary policy shocks that can serve as a tool for future research in international macro-finance. These insights are especially relevant for open economies whose financial conditions are shaped in large part by the actions and signals of U.S monetary policy.

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Online Appendix

Appendix A U.S. financial markets data

We obtained tick-by-tick data on Eurodollar futures from the CME Group (owner of the Chicago Board of Trade and Chicago Mercantile Exchange). Eurodollar futures were an essential instrument for gauging market expectations of future interest rates. These contracts were cash-settled based on the three-month U.S. dollar ICE LIBOR wholesale funding rate, determined two London bank business days prior to the third Wednesday of the contract's delivery month. LIBOR, the London Interbank Offered Rate, served as a benchmark interest rate at which major global banks lent to each other in the international interbank market for short-term loans. It was a critical reference rate for numerous financial products before being phased out due to reliability concerns, culminating in the cessation of U.S. dollar LIBOR publication in June 2023.

The first, second, third, and fourth Eurodollar futures contracts in our data typically had 0.25, 0.75, 1.25, and 1.75 years to expiration, respectively. For instance, the second Eurodollar futures contract could have between 0.5 and 1 year to expiration, with an average horizon of 0.75 years over our sample. Upon expiration, Eurodollar futures settled at a price derived from the spot three-month LIBOR rate, which closely reflected market expectations for the federal funds rate over the subsequent ninety-day period. Thus, these contracts were instrumental in gauging federal funds rate expectations for periods ranging from 0.5 to 1.75 years ahead.

With the phaseout of LIBOR, the Chicago Mercantile Exchange transitioned Eurodollar futures to SOFR (Secured Overnight Financing Rate) contracts. SOFR, introduced in 2017 as the recommended alternative to U.S. dollar LIBOR, reflects the cost of borrowing cash overnight, collateralized by Treasury securities. By 2022, liquidity had significantly shifted from Eurodollar to SOFR futures due to regulatory guidance and market preparations for the end of LIBOR. While CME continued to support both instruments during this transition, SOFR futures increasingly became the preferred tool for interest rate hedging. As of June 30, 2023, with the final publication of U.S. dollar LIBOR rates, Eurodollar futures were officially discontinued. In this paper, we utilize Eurodollar futures data from 1997 to 2021 and SOFR contracts from 2022 onward, although we refer to Eurodollar futures throughout the discussion for simplicity. The choice of starting year for the use of SOFR futures is consistent with the recommendation of Acosta, Brennan and Jacobson (2024). Both Eurodollar and SOFR futures are financially settled.

Careful alignment of SOFR and Eurodollar futures contracts is necessary for continuity in data analysis. While Eurodollar futures were based on expected interest rates over the three months following the settlement date, SOFR futures are based on interest rates over the three months preceding the settlement date. This difference necessitates adjustments when transitioning between the two contract types. For instance, the first-outstanding Eurodollar future aligns with the second-outstanding SOFR future. Such careful alignment ensures that the analysis of interest rate expectations remains consistent over time.

Appendix B Calculation of asset reactions

When an event occurs at time t, we use data from a minutes prior to the event and b minutes after the event to assess price movements. However, trades can be sparse, and we also would like to avoid price changes driven by a single transaction. To address this, we take the average price in the 5-minute interval from $t-(5+a)$ to $t-a$ and in the 5-minute interval from $t+b$ to $t+(b+5)$ to smooth out price fluctuations.

Even when using a 5-minute interval, there are still cases where there are no pre- or post-event observations within our windows. The following rules outline how we handle these situations.

First, we lack intraday data for certain assets on specific days, particularly in the early part of our sample. For these asset-date combinations, we will record missing values.

Second, if data is available for an asset on the day of an event starting at time t_1, but there is no observation in the pre-event window, we do the following:

1. Search for an observation between $t_1 - a$ and t_1. If any is found, we use the closest one to $t_1 - a$.

2. Otherwise, we use the last observation before $t_1 - (5+a)$.

Third, if data is available for an asset on the day of an event, for an event that ends at time t_2, but there is no observation in the post-event window, we do the following:

1. Search for an observation between t_2 and $t_2 + b$. If any is found, we use the closest one to $t_2 + b$.

2. If no observation is found and t_2 is before 3:30 p.m., we record zero as the surprise.

3. Otherwise, if t_2 is after 3:30 p.m., we use the first observation after $t_2 + (b+5)$.

When we have both trades and quotes data for an asset we apply the procedure described above separately to generate a series of quote surprises and a series of trade surprises. If both a trade surprise and quote surprise are available for an event, we use:

1. The trade surprise if the time between the pre- and post-event trades is less than 12 hours.

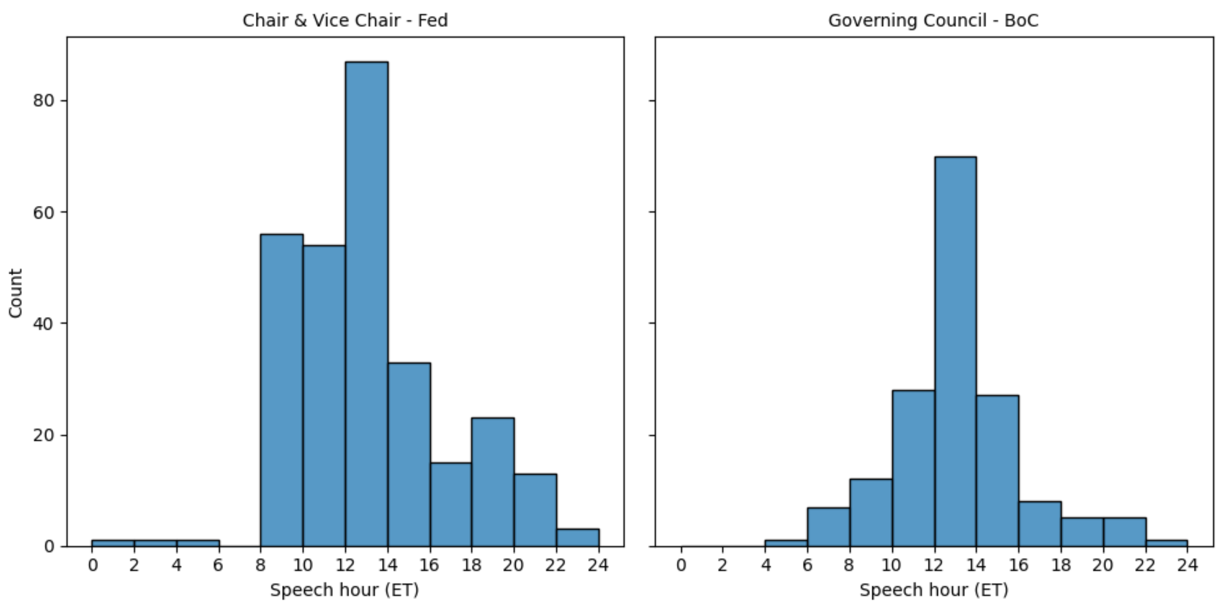
2. Otherwise, the quote surprise if the time between the pre- and post-event quotes is less than 12 hours.

3. Finally, the trade surprise if both surprises' pre- and post-event observations are more than 12 hours apart.

Appendix C Time distribution of speeches

Fed speeches are more likely to be given outside of the market hours for our assets. Figure C.1 is a histogram showing what time, in eastern time, each speech was delivered for the monetary policy relevant speeches from each central bank. Both BoC and Fed speeches are most often delivered between noon and 2 p.m. ET, but Fed speeches have a greater concentration in the evening and early morning. This is partly due to the Fed delivering more speeches in other time zones, especially in Europe and Asia, but international events do not fully explain the difference. Even for speeches given in Eastern North America, the Fed is more likely to deliver a speech in the evening than the BoC.

Appendix Figure C.1: DISTRIBUTION OF SPEECH TIMES



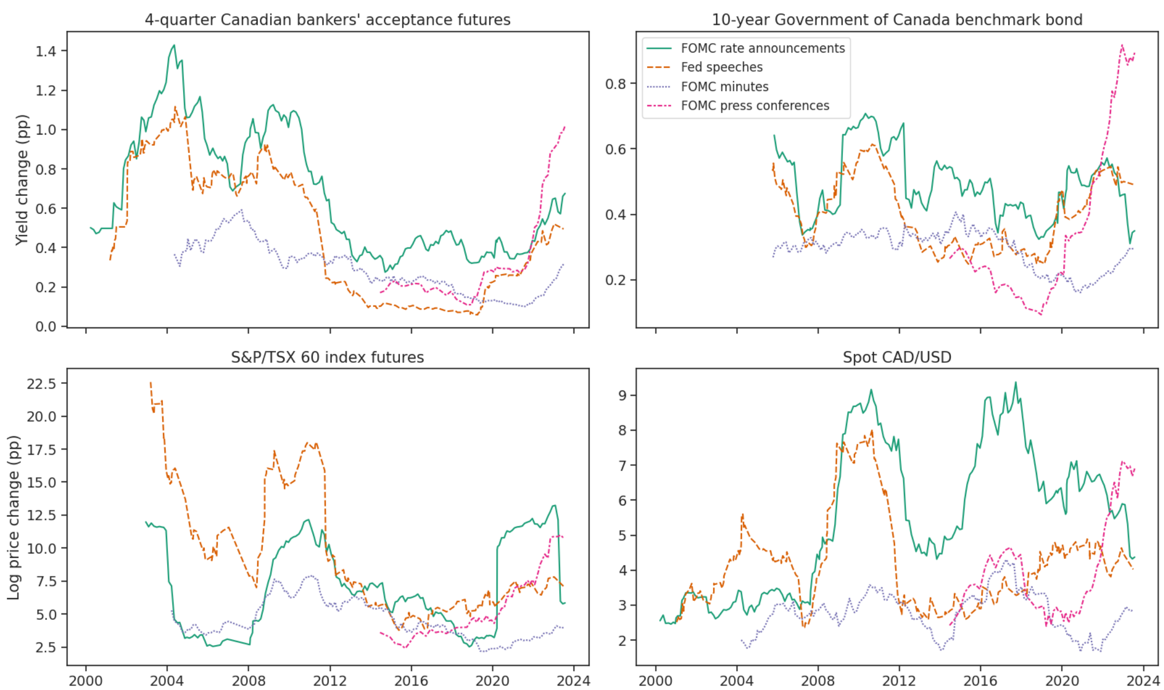
Note: Sample starts in January 1997 and ends in July 2023.

Appendix D The time-varying importance of Fed and BoC communication events for Canadian financial markets

In this section, we examine how the importance for Canadian asset prices of the different types of monetary policy announcements from the Fed and the BoC has changed over time. Swanson and Jayawickrema (2023) reports marked changes in importance of FOMC announcements and the different kinds of Fed communication on interest rates and the stock market in the U.S. Likewise, Narain and Sangani (2025) shows that there were large differences in how Fed Chair press conferences have impacted markets in the U.S., particularly since the Covid-19 recession.

Figure D.1 reports a three-year rolling-window absolute sum of the impact in percentage points of the FOMC policy announcement and the three monetary policy communication types on BAX4, the 10-year Government of Canada bond yield, the stock market futures, and the spot exchange rate.

Appendix Figure D.1: THE TIME-VARYING IMPORTANCE OF FED COMMUNICATION EVENTS ON CANADIAN FINANCIAL MARKETS



Note: Cumulative sum over 1095-day (3-year) rolling window of the absolute value of the changes in interest rate, stock price, and exchange rate. Sample periods are 1997–2023 for bankers' acceptance futures, 1999–2023 for stock futures, and 2002–2023 for GoC benchmark bonds.

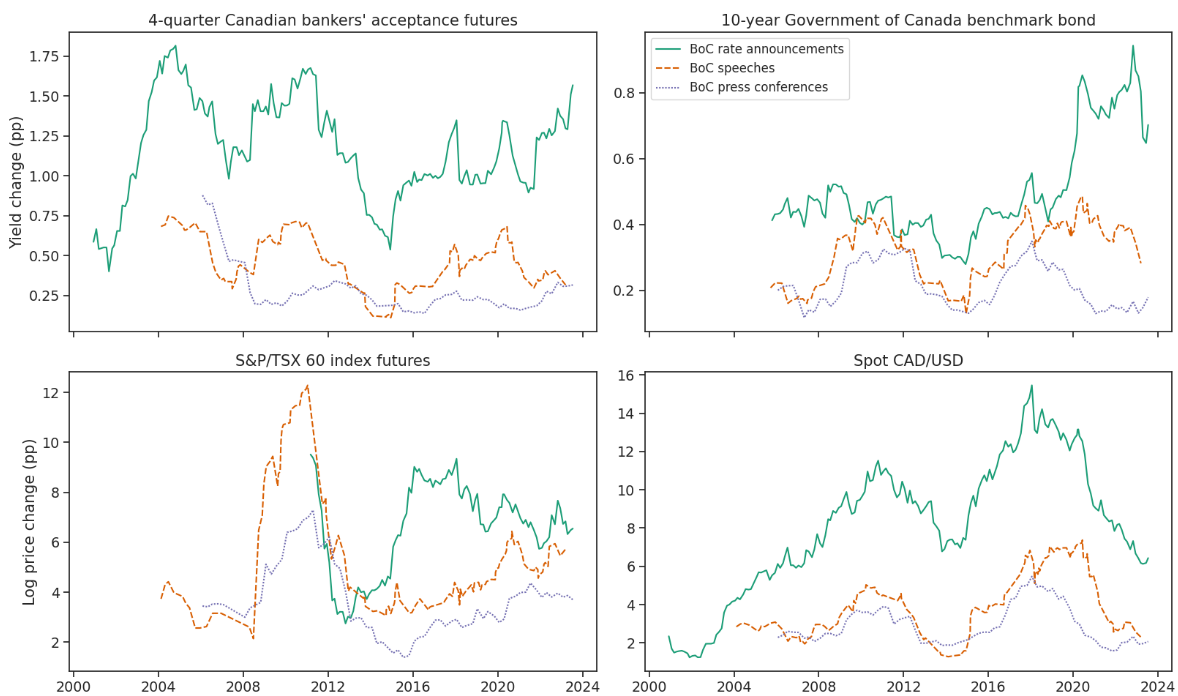
Figure D.1 shows that FOMC announcements had a pronounced effect on short-term interest rates in the early part of our sample. However, as both the U.S. and Canadian economies recovered from the Global Financial crisis, the influence of FOMC announcements diminished, only to regain prominence towards the end of 2019.

The importance of speeches and Fed press conferences also increased notably after the

Covid-19 pandemic began. Speeches by the Fed Chair and Vice Chair increasingly affected BAX4 and 10-year bond yields, with their impact growing fivefold. Likewise, post-FOMC press conferences became far more impactful on Canadian asset prices, particularly after the Fed doubled the frequency of these conferences in 2019. By the end of our sample, these press conferences had become the most important Fed event for BAX4, 10-year GoC benchmark bonds and the CAD/USD spot exchange rate. Their influence on stock market futures was second to rate announcements. These findings align with Narain and Sangani (2025), who documented a significant rise in the importance of press conferences for U.S. asset prices during Chair Powell's tenure and the onset of the pandemic.

Similarly, Figure D.2 shows the three-year rolling-window estimates for BoC policy rate, press conference and speech's impacts on the same set of financial asset prices. From 1997-2001 there were only 16 Bank of Canada policy rate changes, which is why the effects are small. The implementation of the eight fixed announcement dates started in 2001. There are some clear differences with respect to the spillovers of Fed policy rate and communication announcements. Contrary to the evidence for the Fed spillovers, BoC policy rate announcements are generally the most important monetary policy rate announcement throughout all of our sample.

Appendix Figure D.2: THE TIME-VARYING IMPORTANCE OF BOC COMMUNICATION EVENTS ON CANADIAN FINANCIAL MARKETS



Note: Cumulative sum over 1095-day (3-year) rolling window of the absolute value of the changes in interest rate, stock price, and exchange rate. Sample periods are 1997–2023 for bankers' acceptance futures, 1999–2023 for stock futures, and 2002–2023 for GoC benchmark bonds.

Interestingly, BoC press conferences following policy decisions have far less influence on Canadian asset prices compared to Fed press conferences. No clear trend emerges for the importance of BoC press conferences, even after the onset of the Covid-19 pandemic. By the end of our sample, BoC press conferences were roughly half as important as Fed press conferences for BAX4 futures and only one-eighth as impactful for Canadian 10-year bond yields. However, BoC speeches have gained prominence over time. Since 2019, and especially post-Covid-19, BoC speeches have reached roughly one-third of the impact of BoC policy rate announcements for BAX4 futures, about half for 10-year rates and the CAD/USD spot rate, and a similar magnitude of influence for Canadian stock futures.

Appendix E Sampling of placebo events

To put the effects of speeches into perspective, we follow Ehrmann et al. (2023) and generate a placebo distribution of speeches to match (i) the distribution of actual speeches across time on the year-month level and (ii) the timing of speeches on each day. In particular, we use the following procedure to generate each placebo timestamp:

1. Extract the "year-month" component from the timestamps of all actual speeches. Using this, create an empirical distribution of "year-month" combinations and randomly draw a candidate placebo "year-month" combination.

2. Randomly select a calendar day and append it to the "year-month" combination to form a complete date in the "year-month-day" format.

3. Extract the "hour-minute" component from all actual speech timestamps and use the empirical distribution to randomly draw a "hour-minute" combination. Append this to the previously generated date to create a full placebo timestamp in the "year-month-day hour-minute" format.

4. Discard any placebo events whose windows would overlap with real monetary policy communications, macroeconomic news releases or treasury auctions from the U.S. or Canada.

In total, we draw 4,000 unique placebo speech events from the Fed's distribution and another 4,000 from the BoC's distribution. We are only able to compute the surprises around these events subject to each asset's data availability, thus the number of placebo surprises will vary.

Unlike the Fed Chair and Vice-Chair speeches and BoC Governing Council speeches, other monetary policy communication events follow a fixed schedule. For example, FOMC press conferences always take place after FOMC policy rate announcements, which occur on Wednesdays at 14:15 before January 2013 and at 14:30 afterward. For these events, we apply our windows to financial market movements exactly seven days prior, using the same time of day as the actual events.

We exclude placebo dates that overlap with actual monetary policy communication events, treasury auctions or macroeconomic news releases.

Appendix F Gaussian affine term structure models

Appendix F.1 Basic framework

The aim of this section is to provide a brief overview of the ATSM and introduce concepts and notation used in Section 3.1.2. Specifically, consider a $K \times 1$ vector of variables F_t whose dynamics are characterized by a Gaussian vector autoregression:

$$F_{t+1} = c + \rho F_t + \Sigma u_{t+1} \tag{F.1}$$

with $u_t \sim$ i.i.d. $N(0, I_K)$. This specification implies that

$$F_{t+1} | F_t, F_{t-1}, \ldots, F_1 \sim N(\mu_t, \Sigma\Sigma')$$

for

$$\mu_t = c + \rho F_t.$$

Let r_t denote the risk-free one-period interest rate. If the vector F_t includes all the variables that could matter to investors, then the price of a pure discount asset at date t should be a function $P_t(F_t)$ of the current state vector. Moreover, if investors were risk neutral, the price they would be willing to pay would satisfy

$$P_t(F_t) = \exp(-r_t) E_t \left[P_{t+1}(F_{t+1})\right] = \exp(-r_t) \int_{\mathbb{R}^M} P_{t+1}(F_{t+1}) \phi(F_{t+1}; \mu_t, \Sigma\Sigma') \, dF_{t+1}$$

for $\phi(y; \mu, \Omega)$ the M-dimensional $N(\mu, \Omega)$ density evaluated at the point y:

$$\phi(y; \mu, \Omega) = \frac{1}{(2\pi)^{M/2} |\Omega|^{1/2}} \exp\left[-\frac{(y-\mu)'\Omega^{-1}(y-\mu)}{2}\right].$$

More generally, with risk-averse investors we would replace the above equation with

$$P_t(F_t) = E_t\left[P_{t+1}(F_{t+1}) M_{t+1,t}\right] = \int_{\mathbb{R}^M} P_{t+1}(F_{t+1}) \left[M_{t+1,t} \phi(F_{t+1}; \mu_t, \Sigma\Sigma')\right] dF_{t+1} \tag{F.2}$$

for $M_{t+1,t}$ the pricing kernel. In many macro models, the pricing kernel would be

$$M_{t+1,t} = \beta \frac{U'(C_{t+1})}{U'(C_t)(1+\pi_{t+1})}$$

for β the personal discount rate, $U'(C)$ the marginal utility of consumption, and π_{t+1} the inflation rate between t and $t+1$.

Affine term structure models are derived from the particular kernel

$$M_{t+1,t} = \exp\left[-r_t - (1/2)\lambda_t'\lambda_t - \lambda_t' u_{t+1}\right]$$

for λ_t an $M \times 1$ vector that characterizes investor attitudes toward risk, with $\lambda_t = 0$ in the case of risk neutrality. Then we will obtain

$$M_{t+1,t}\phi(F_{t+1};\mu_t,\Sigma\Sigma') = \exp(-r_t)\phi(F_{t+1};\mu_t^Q,\Sigma\Sigma')$$

where $\mu_t^Q = \mu_t - \Sigma\lambda_t$. Risk-averse investors value any asset the same as risk-neutral investors would if the latter thought that the conditional mean of F_{t+1} was μ_t^Q rather than μ_t.

The risk prices λ_t measure the additional expected return required per unit of risk in each of the shock. Following Duffee (2002), we assume λ_t being an affine function of the factors,

$$\lambda_t = \Sigma^{-1}(\lambda_0 + \lambda_1 F_t), \tag{F.3}$$

Under the above assumptions, the risk-neutral dynamics are given by

$$F_{t+1} = c^{\mathbb{Q}} + \rho^{\mathbb{Q}} F_t + \Sigma u_{t+1}^{\mathbb{Q}}, \tag{F.4}$$

where $u_{t+1}^{\mathbb{Q}} = u_{t+1} + \lambda_t$, $u_t^{\mathbb{Q}} \sim N(0, I_K)$, $E^{\mathbb{Q}}(u_r^{\mathbb{Q}} u_s^{\mathbb{Q}'}) = 0$ for $r \neq s$, and the parameters describing the physical and risk-neutral dynamics are related in the following way:

$$\begin{aligned} c^{\mathbb{Q}} &= c - \lambda_0, \\ \rho^{\mathbb{Q}} &= \rho - \lambda_1. \end{aligned} \tag{F.5}$$

The VAR process in equation (F.1) generates a '$\mathbb{P}$-measure' and the implied dynamics are referred to as the '$\mathbb{P}$-dynamics'.

The short rate is assumed to be related to the K factors through affine mapping:

$$r_t = \delta_0 + \delta_1' F_t, \tag{F.6}$$

Then, as demonstrated in Ang and Piazzesi (2003) , under the above assumptions the yield on a risk-free n-period pure-discount bond can be calculated as follows. Let $p_{t,n}$ represents the price of an n-period zero coupon bond. Starting with $p_{t,0} = 1$, equation (F.2) allows bond prices to be computed recursively by

$$p_{t,n} = \mathbb{E}_t(M_{t+1} p_{t+1,n-1}).$$

The state dynamics of F_t (equation (F.1)) together with the dynamics of the short rate r_t (equation (F.6)) and the Radon–Nikodym derivative form the affine class of term structure models because bond prices are exponentially affine functions of the state variables. More precisely, bond prices are given by

$$p_{t,n} = \exp(\mathscr{A}_n + \mathscr{B}_n' F_t),$$

where the coefficients $\mathscr{A}_n$ and $\mathscr{B}_n$ follow the difference equations:

$$\begin{aligned} \mathscr{A}_{n+1} &= \mathscr{A}_n + \mathscr{B}_n'(c - \Sigma\lambda_0) + \frac{1}{2}\mathscr{B}_n'\Sigma\Sigma'\mathscr{B}_n - \delta_0 \\ &= \mathscr{A}_n + \mathscr{B}_n' c^{\mathbb{Q}} + \frac{1}{2}\mathscr{B}_n'\Sigma\Sigma'\mathscr{B}_n - \delta_0, \end{aligned}$$

$$\mathscr{B}_{n+1}' = \mathscr{B}_n'(\rho - \Sigma\lambda_1) - \delta_1' = \mathscr{B}_n'\rho^{\mathbb{Q}} - \delta_1',$$

with $A_1 = -\delta_0$ and $B_1 = -\delta_1$. We define $\mathscr{A}_n = \mathscr{A}_n(\delta_0, \delta_1, c^{\mathbb{Q}}, \rho^{\mathbb{Q}}, \Sigma)$, $\mathscr{B}_n = \mathscr{B}_n(\delta_1, \rho^{\mathbb{Q}})$.

The continuously compounded yield $y_{t,n}$ on an n-period zero coupon bond is given by

$$\begin{aligned} y_{t,n} &= -\frac{1}{n}\log p_{t,n} \\ &= A_n + B_n' F_t, \end{aligned} \tag{F.7}$$

where $A_n = -n^{-1}\mathscr{A}_n$ and $B_n = -n^{-1}\mathscr{B}_n$. Note that yields are affine functions of the state F_t, so that Equation (F.7) can be interpreted as being the observation equation of a state space system. The arbitrage-free loadings A_n and B_n are non-linear, recursive functions of the model parameters δ_0, δ_1, $c^{\mathbb{Q}}$, $\rho^{\mathbb{Q}}$, and Σ, i.e., $A_n = -n^{-1}\mathscr{A}_n(\delta_0, \delta_1, c^{\mathbb{Q}}, \rho^{\mathbb{Q}}, \Sigma)$, $B_n = -n^{-1}\mathscr{B}_n(\delta_1, \rho^{\mathbb{Q}})$.

Risk-neutral yields, the yields that would prevail if investors were risk-neutral, can be calculated using

$$\text{yrn}_{t,n} = A_n^{\text{rn}} + B_n^{\text{rn}\prime} F_t$$

where $A_n^{\text{rn}} = -n^{-1}\mathscr{A}_n(\delta_0, \delta_1, c, \rho, \Sigma)$, $B_n^{\text{rn}} = -n^{-1}\mathscr{B}_n(\delta_1, \rho)$.

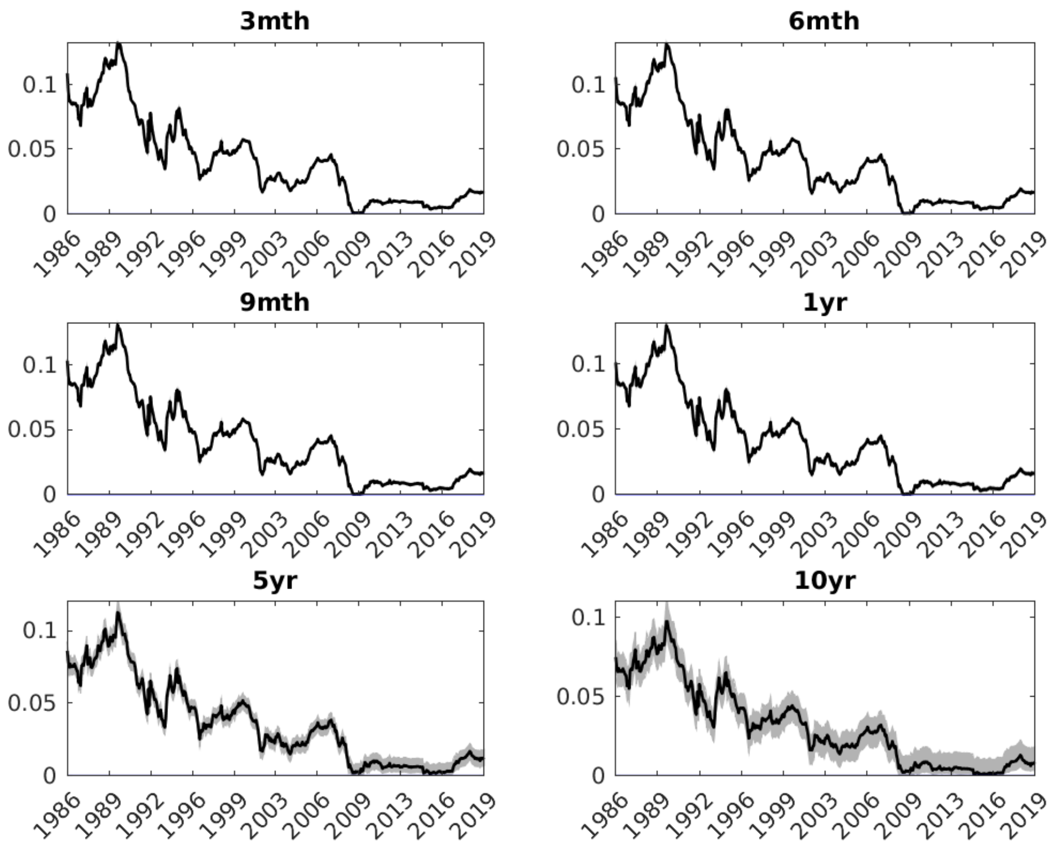
Risk-neutral yields reflect policy expectations over the life of the bond. The yield term premium is defined as the difference between actual and risk-neutral yields, $\text{ytp}_{t,n} = y_{t,n} - \text{yrn}_{t,n}$.

Appendix F.2 Data and estimation results

We estimate the dynamic term structure model using monthly data for Canadian zero-coupon yields across 13 maturities, ranging from 3, 6, and 9 months to 1 through 10 years. Yields for maturities are sourced from the Bank of Canada website.[23] The sample runs from January 1986 to December 2019. To ensure identification, we employ the normalizing restrictions of Joslin et al. (2011), leading to their canonical representation. We follow Bauer (2018) to impose restrictions on risk prices. The monthly expectation and term premium over various maturities can be found in Figures F.1 and F.2.

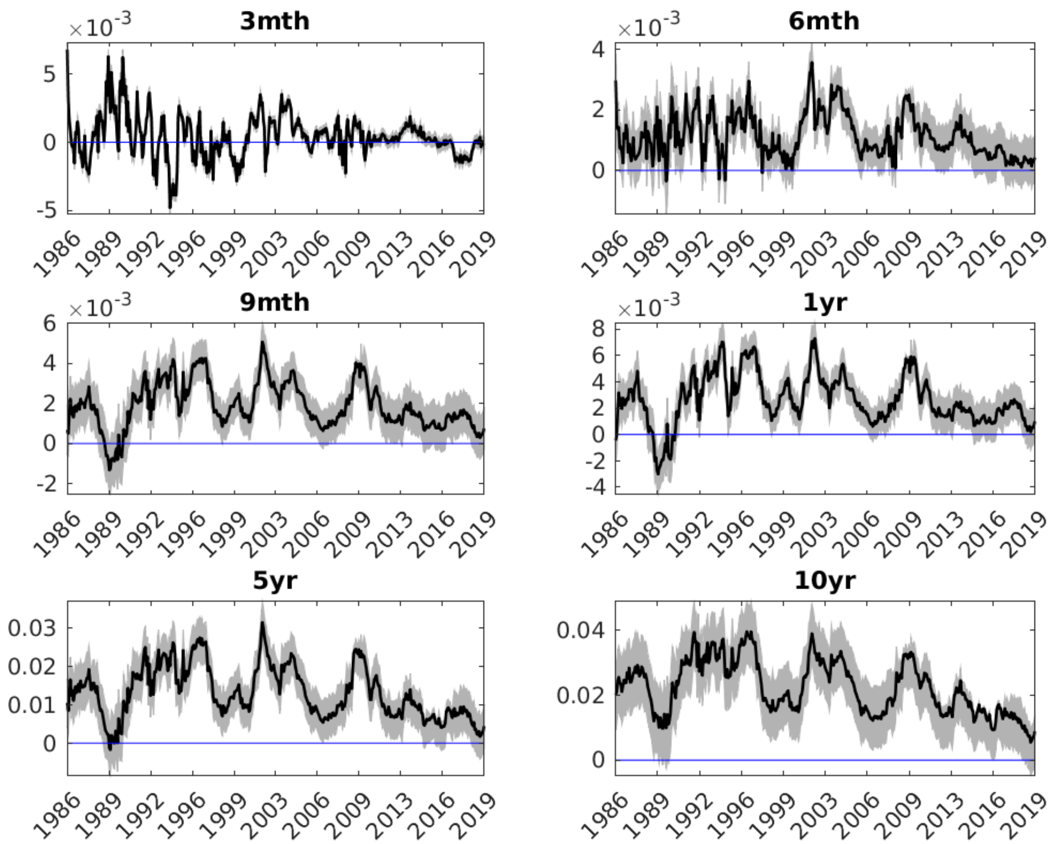
[23] https://www.bankofcanada.ca/rates/interest-rates/bond-yield-curves/

Appendix Figure F.1: YIELD CURVE ESTIMATION - EXPECTATION



Note: This figure plots the estimated expectation component of Canadian interest rates ranging from 3-month to 10-year using the model of Joslin et al. (2011) and bias-correction as in Bauer (2018). Sample starts in January of 1986 and ends in December 2019.

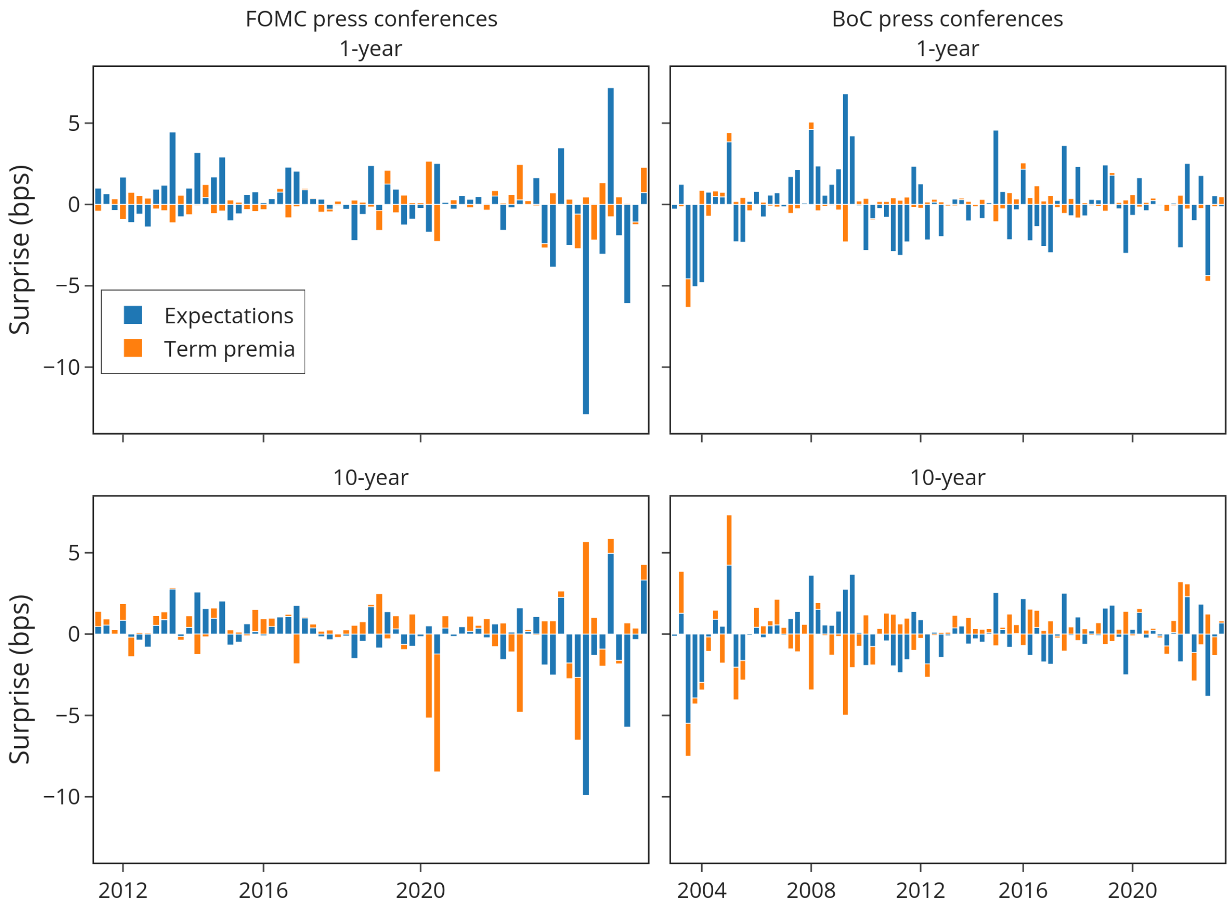
Appendix Figure F.2: YIELD CURVE ESTIMATION - TERM PREMIUM



Note: This figure plots the estimated term premium component of Canadian interest rates ranging from 3-month to 10-year using the model of Joslin et al. (2011) and bias-correction as in Bauer (2018). Sample starts in January of 1986 and ends in December 2019.

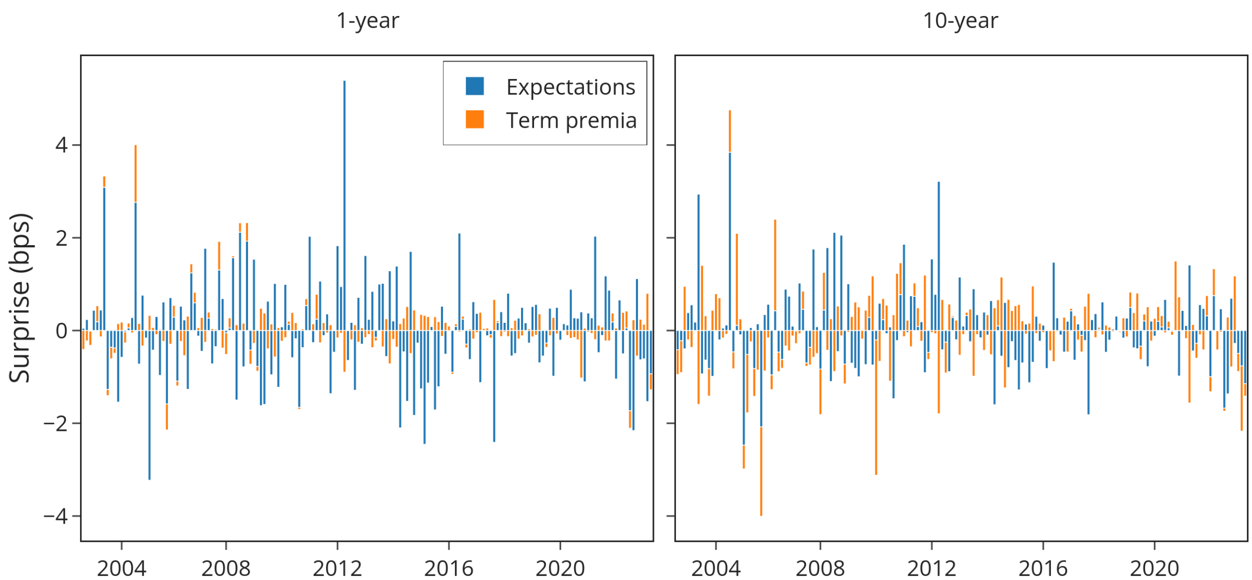
Appendix F.3 Additional results for expectation and term premium decomposition

Appendix Figure F.3: Decomposition of high-frequency changes in yields around FOMC and BoC press conferences



Note: This figure plots high-frequency changes in the expectations (blue) and term premium (orange) components of 1- and 10-year yields in Canada around FOMC and BoC press conferences.

Appendix Figure F.4: DECOMPOSITION OF HIGH-FREQUENCY CHANGES IN YIELDS AROUND FOMC MINUTES RELEASES



Note: This figure plots high-frequency changes in the expectations (blue) and term premium (orange) components of 1- and 10-year yields in Canada around FOMC minute releases.

Appendix G Testing CIP around Fed and BoC monetary policy announcements

We evaluate CIP around monetary policy announcements using event studies with narrow windows to capture immediate market reactions. Leveraging simultaneous operation of U.S. and Canadian markets due to shared time zones reduces external noise from time-zone differences common in other markets. Furthermore, we exploit the institutional structure of the financial markets, which provides an ideal setting. As noted by TMX Montreal Exchange (2013), BAX contracts, which are financial instruments created to facilitate arbitrage opportunities, closely track the pricing of Eurodollar futures with matching expiration dates.

For the Canadian dollar and the U.S. dollar, a deviation from covered interest rate parity refers to the wedge between two differentials: (i) the difference between the n-period forward exchange rate and spot exchange rate, which we denote by $s_t - f_{t,t+n}$, where both rates are quoted in terms of the U.S. dollar per Canadian dollar; and (ii) the difference in the nominal interest rates from holding each currency, which we denote by $n(y_{t,t+n} - y^*_{t,t+n})$, the n-period interest rate difference between Canadian dollar and U.S. dollar (with an asterisk) interest rates.

A basic CIP test for horizon n in this setup can be expressed by:

$$\left(s_t - f_{t,t+n}\right)/n = a_n + b_n\left(y_t^{(n)} - y_t^{*(n)}\right) + \varepsilon_t.$$

We derive the forward rate $f_{t,t+n}$ from both the CAD/USD futures and nine-month forwards. The CAD/USD futures are actively traded on the CME, with trading that is mainly concentrated in the first quarterly contract. This indicates that n ranges from 1 to 2 quarters. This data starts from 2006 October. For the nine-month horizon, we use five-minute bar bid and ask data on forward spot rate deviations from Olsen.com. The data starts from 1997. We calculate the midquote by averaging the best bid and ask prices.

We rely on Eurodollar and BAX contracts for interest rate expectations due to the lack of high-frequency, long-history interest rate swap data. The first quarterly Eurodollar and first BAX contracts reflect market expectations for the 3-month bank lending rate in the U.S. and Canada, respectively, at expiration, which is two business days before the third Wednesday of the contract's delivery month (March, June, September, or December). Similarly, the third quarterly Eurodollar and third BAX contracts capture expectations for the 3-month bank lending rate in the U.S. and Canada at expiration, also two business days prior to the third Wednesday of the delivery month.

We rewrite the equation above in terms of differences around the event window, $t_1 < t < t_2$,:

$$(\Delta s_t - \Delta f_{t,t+n})/n = b_n \Delta(y_{t,t+n} - y^*_{t,t+n}) + \nu_t,$$

where $\Delta\tilde{F}_t = x_{t_2} - x_{t_1}$ for variable x, and $\nu_t = \Delta\varepsilon_t$. Although this specification should be valid at any horizon n, its estimation over short horizons in response to specific events would require high-frequency measures of exchange rate expectations at said horizons around these events. For the 10-year horizon, following Ceballos et al. (2023), we assume a negligible change in the 10-year forward exchange rate over a 30-minute event window due to the limited liquidity in contracts extending beyond one year.

We estimate the following form:

$$(\Delta s_t - \Delta f_{t,t+n})/n = \alpha_n + \beta_n \Delta(y_{t,t+n} - y^*_{t,t+n}) + \nu_{n,t} \tag{G.1}$$

Our null hypothesis posits that the CIP holds, implying that α is 0 and β is 1. The results for specification (G.1), as presented in Table G.1, are organized into three panels. Panel (A) presents the three-month CIP test results, Panel (B) are the findings for the nine-month horizon, and Panel (C) is the ten-year horizon analysis. Each column within these panels corresponds to a different central bank event. For each event and horizon, we provide the point estimate for α_n and β_n, accompanied by the respective t-statistics and p-values derived from testing α_n equal to 0 and β_n equal to 1.

The empirical evidence largely suggests a departure from the CIP across various events and time horizons. Specifically, we frequently fail to reject the hypothesis that α equals zero, and conversely, we often find sufficient grounds to reject the notion that β equals one. There are a few exceptions; for example, for Bank of Canada speeches and Fed speeches, at the nine-month horizon, we cannot reject the hypothesis that β_n is equal to 1. We also restrict our sample to start from 2008, and the results are quite robust.

Appendix Table G.1: CIP REGRESSION RESULTS

Event	Rate Announcements		Speeches		Press conferences		Minutes
Source	BoC	FOMC	BoC	Fed	BoC	FOMC	FOMC
Panel (A) three-month							
α							
point estimate	0.002	-0.002	-0.000	-0.003	0.002	0.010	0.001
t-stat	0.624	-0.366	-0.067	-0.472	0.301	0.922	0.350
p-value	0.534	0.715	0.947	0.637	0.764	0.360	0.727
β							
point estimate	0.309	-0.173	0.510	-0.800	0.929	0.316	-0.970
t-stat	-11	-7.623	-1.871	-3.851	-0.103	-1.033	-3.444
p-value	0.000	0.000	0.064	0.000	0.918	0.305	0.001
R-squared	0.185	0.005	0.055	0.011	0.033	0.004	0.040
N	135	143	126	158	66	67	133
Panel (B) nine-month							
α							
point estimate	-0.003	-0.036	0.014	-0.001	-0.086	-0.010	-0.024
t-stat	-0.107	-1.644	0.817	-0.033	-1.471	-0.693	-1.429
p-value	0.915	0.102	0.415	0.974	0.145	0.491	0.155
β							
point estimate	3.500	4.941	1.797	0.849	0.120	0.840	1.121
t-stat	3.022	2.404	1.109	-0.163	-0.432	-0.323	0.086
p-value	0.003	0.017	0.269	0.871	0.667	0.748	0.931
R-squared	0.324	0.205	0.058	0.006	0.000	0.040	0.006
N	196	222	159	261	81	67	174
Panel (C) ten-year							
α							
point estimate	0.002	0.004	0.002	0.001	0.003	0.002	0.001
t-stat	0.912	1.915	0.921	0.765	0.900	0.499	0.797
p-value	0.363	0.057	0.358	0.445	0.371	0.620	0.427
β							
point estimate	1.207	0.761	0.529	0.025	0.751	0.117	0.403
t-stat	1.252	-1.111	-2.737	-10	-1.272	-5.523	-3.669
p-value	0.212	0.268	0.007	0.000	0.207	0.000	0.000
R-squared	0.453	0.135	0.116	0.000	0.214	0.008	0.053
N	167	175	148	204	81	67	165

Note: This table presents the CIP regression results. We provide the point estimate for α_n and β_n, accompanied by the respective t-statistics and p-values derived from testing α_n equal to 0 and β_n equal to 1, respectively. Nine-month and ten-year samples are from Jan 1997–Jul 2023. Three-month sample is Oct 2006–Jul 2023 (earliest available date).

Appendix H Additional results on the effects of the target and forward guidance factors

In this section we present additional results showing how the target component of BoC rate announcements and the forward guidance components of Fed and BoC communications affect Canadian financial markets both instantaneously and in the days following a surprise.

Table H.1 below presents the instantaneous effects of the target factor and forward guidance factors for each event and asset. The results for bankers' acceptance futures and GoC benchmark bonds were presented graphically in Figure 3. This table adds the results for the FOMC minutes releases as well as the S&P TSX 60 index futures and the spot CAD/USD exchange rate.

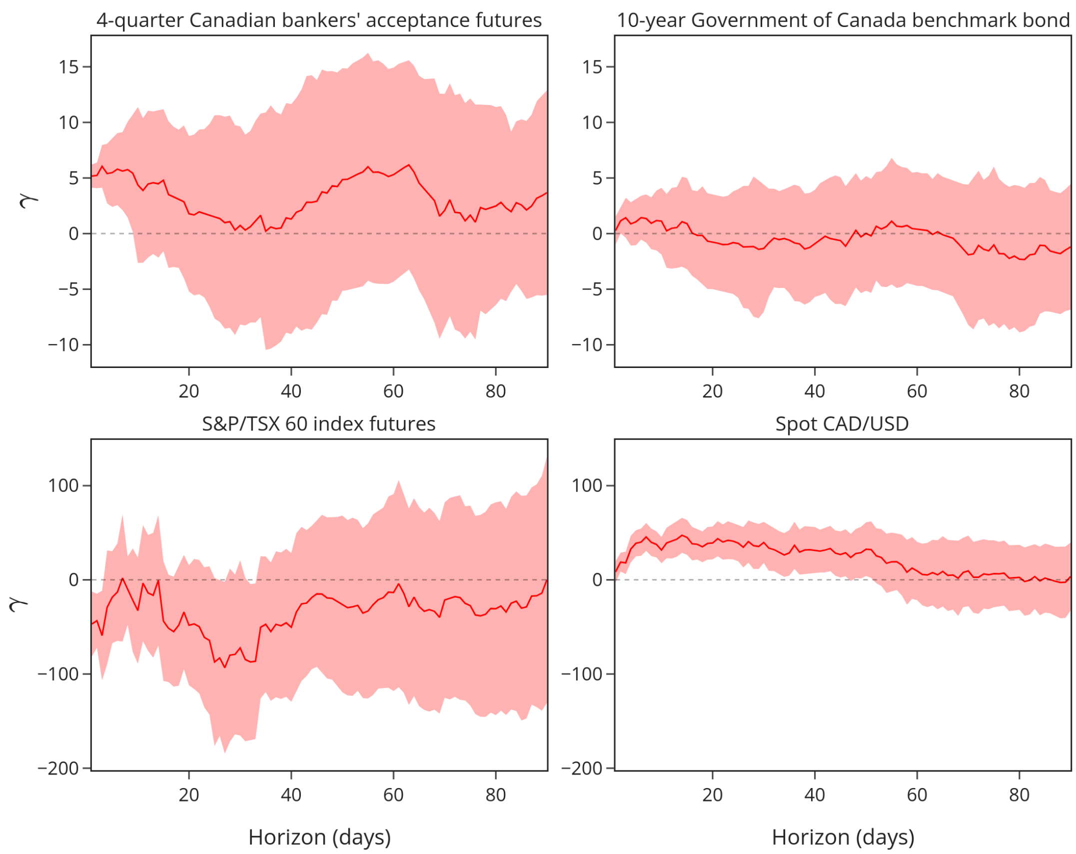
Appendix Table H.1: EFFECTS OF BOC POLICY RATE AND FORWARD GUIDANCE FOR DIFFERENT TYPES OF FED AND BOC MONETARY POLICY ANNOUNCEMENTS

	Bankers' Acceptance Futures				GoC Benchmark Bonds				Stock	CAD/USD
	1Q	2Q	3Q	4Q	2yr	5yr	10yr	30yr	Futures	
(A) Effects of BoC policy rate target changes										
BoC Rate Anncmts	5.90	4.72	4.22	3.63	2.86	1.99	1.01	0.10	-15.00	13.41
	(0.31)	(0.09)	(0.14)	(0.21)	(0.28)	(0.32)	(0.26)	(0.13)	(3.82)	(3.95)
(B) Effects of forward guidance										
FOMC Rate Anncmts	2.88	3.94	4.11	3.28	2.55	2.23	1.65	0.74	-19.51	-11.74
	(0.28)	(0.17)	(0.21)	(0.60)	(0.19)	(0.25)	(0.27)	(0.21)	(5.73)	(2.03)
BoC Rate Anncmts	6.56	7.17	7.60	7.49	5.83	4.32	2.30	1.04	-21.77	30.28
	(0.54)	(0.17)	(0.18)	(0.42)	(0.19)	(0.14)	(0.20)	(0.15)	(3.92)	(4.23)
Fed Speeches	1.27	1.43	1.88	1.96	1.14	0.95	0.82	0.51	4.18	-1.65
	(0.68)	(0.25)	(0.33)	(0.34)	(0.29)	(0.28)	(0.27)	(0.18)	(5.19)	(1.27)
BoC Speeches	1.58	2.75	3.01	3.27	2.36	1.84	1.18	0.64	6.28	8.22
	(0.25)	(0.13)	(0.09)	(0.26)	(0.15)	(0.16)	(0.16)	(0.13)	(12.32)	(3.39)
FOMC Press Confs	1.76	2.73	3.53	3.79	3.15	2.98	2.48	1.16	-23.11	-19.28
	(0.28)	(0.21)	(0.09)	(0.10)	(0.26)	(0.77)	(0.28)	(0.28)	(6.84)	(2.55)
BoC Press Confs	1.88	2.99	3.57	4.05	2.67	2.24	1.20	0.62	5.45	5.79
	(0.34)	(0.13)	(0.08)	(0.11)	(0.13)	(0.20)	(0.35)	(0.29)	(4.09)	(3.59)
FOMC Minutes	0.65	1.48	1.90	1.92	1.15	1.22	1.06	0.96	0.32	-2.92
	(0.08)	(0.06)	(0.06)	(0.10)	(0.07)	(0.13)	(0.15)	(0.25)	(2.28)	(1.19)

Note: Panel (A) and (B) present the estimated coefficients β from the regression $\Delta y_t = \alpha + \beta F_t^{type} + \epsilon_t$. The dependent variables Δy_t are changes in yields (basis points) for interest rates, changes in stock futures prices (10,000 times log price changes, approximately basis points), and changes in the CAD/USD exchange rate (10,000 times log price changes, approximately basis points). The variable F_t^{type} denotes the factors associated with target and forward guidance changes for each event type. Heteroskedasticity-consistent standard errors are reported in parentheses. Sample: Jan 1997–July 2023.

In Figure H.1, we present the persistence of the target factor effect on 4-quarter bankers' acceptances, 10-year benchmark bonds, stock futures and the spot exchange rate. A one standard deviation tightening shock to the BoC target factor is associated with a highly significant change of about 5 bps in BAX4—which persists for ten days—but no statistically significant impact on the 10-year bond yields. The target factor influences the stock return not only on the day of the announcement, but also sustains over a period of up to a month. The effect on the exchange rate is highly persistent: CAD appreciates against USD, and the effect lasts about two months.

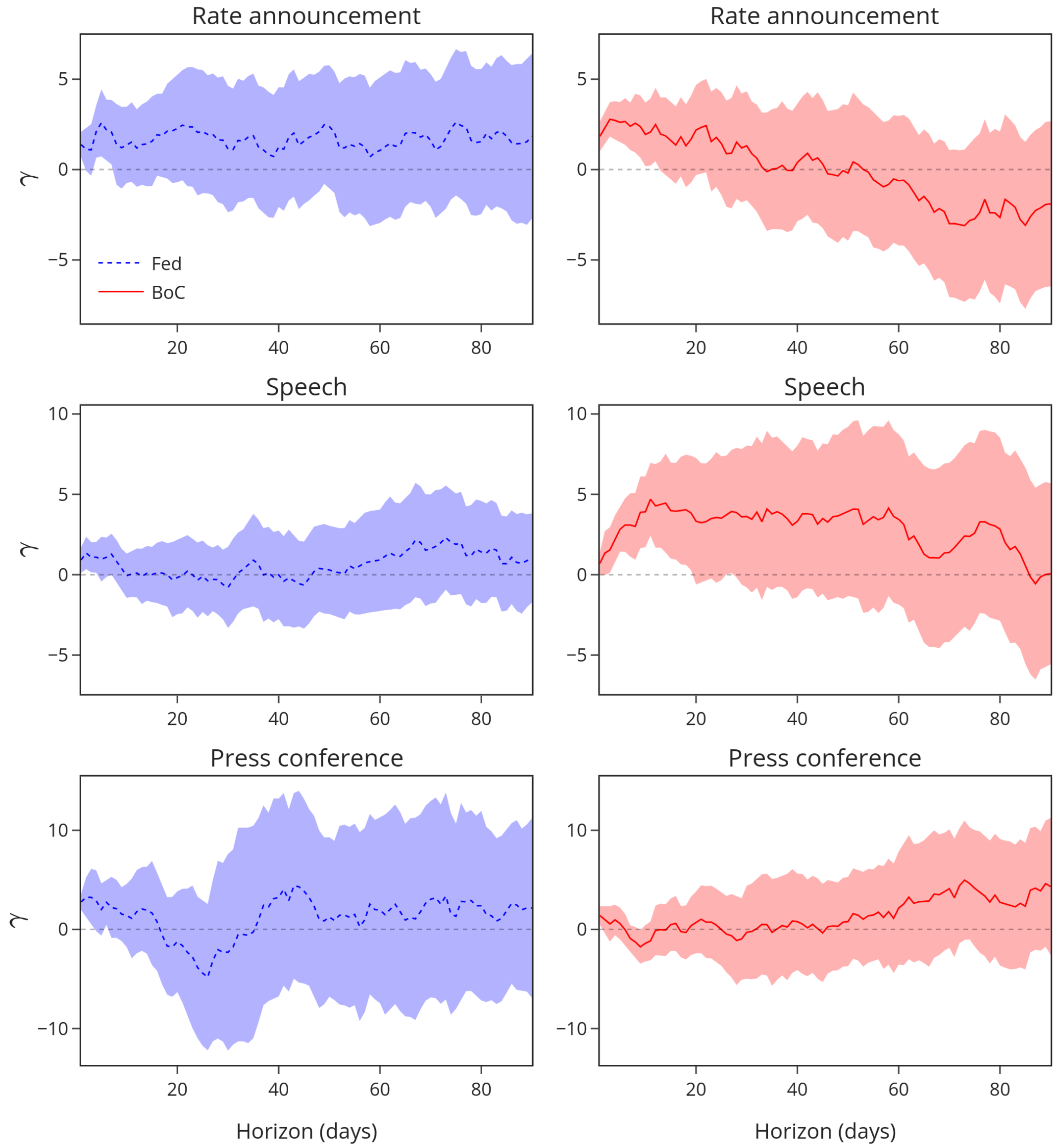
Appendix Figure H.1: THE PERSISTENCE OF DOMESTIC TARGET FACTOR EFFECTS ON CANADIAN ASSETS



Note: Estimated effects of the target factor of BoC rate announcements on interest rates, stock futures prices and exchange rates across horizons h from 1 to 90 business days. The dependent variables are changes in yields (basis points) for interest rates, changes in stock futures prices (10,000 times log price changes, approximately basis points), and changes in the CAD/USD exchange rate (10,000 times log price changes, approximately basis points). The estimated coefficients γ and $\pm$ 1.96-robust-standard errors are from regression equation (4).

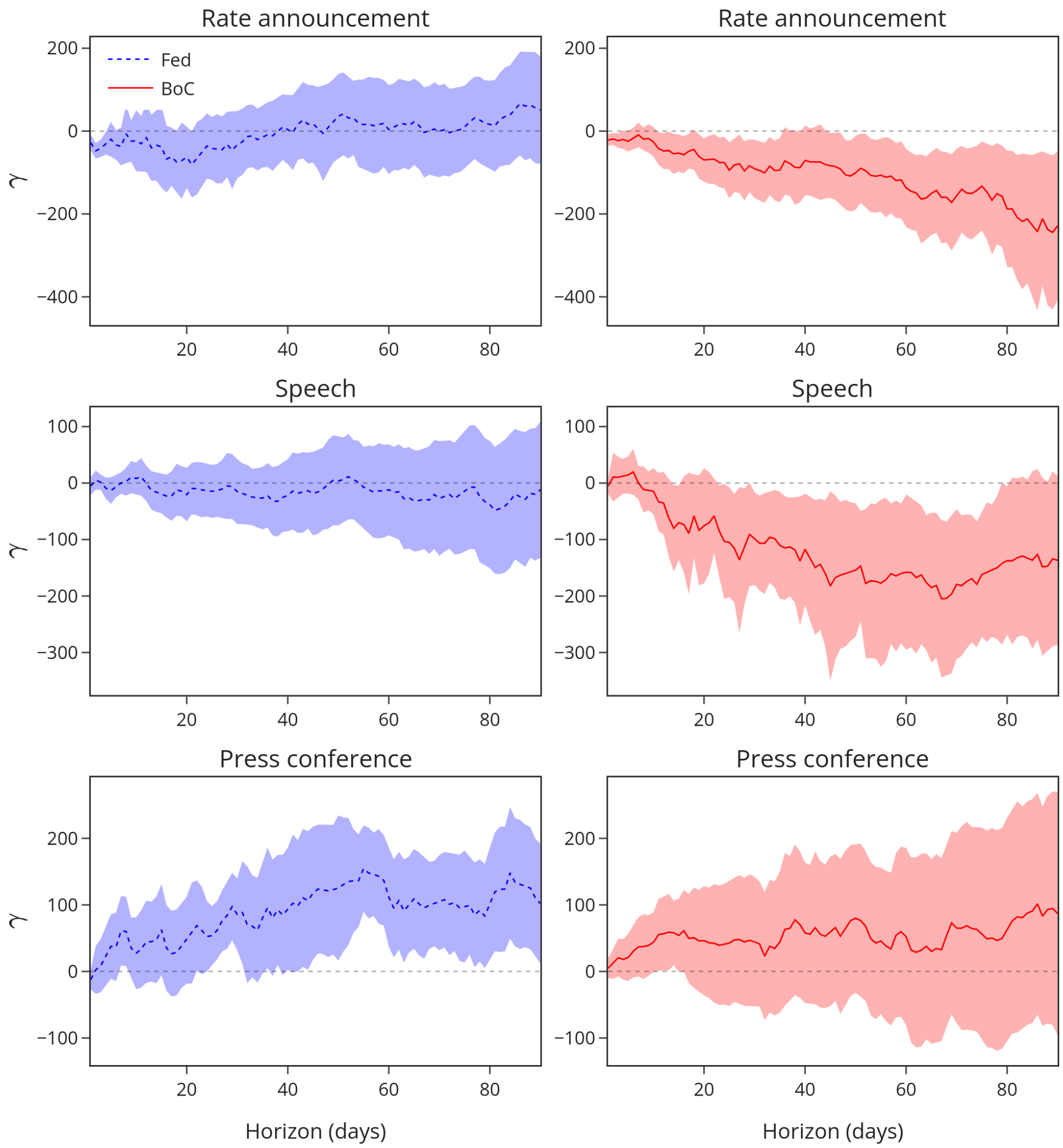
In Figures H.2 to H.4, we show the persistent impacts of a one-standard-deviation increase in forward guidance on the 10-year rate, stock returns, and the CAD/USD spot rate. For example, we find that a one-standard-deviation increase in the forward guidance factor during FOMC rate announcements produces lasting currency movements, peaking at around 50 basis points and lasting over a month. In contrast, a comparable increase in the BoC's forward guidance factor during rate announcements leads to more moderate, yet still significant, exchange rate movements, peaking around 25 basis points and lasting about two weeks.

Appendix Figure H.2: THE PERSISTENCE OF FOREIGN (FED) AND DOMESTIC (BOC) FORWARD GUIDANCE EFFECTS ON CANADIAN 10-YEAR BENCHMARK BONDS



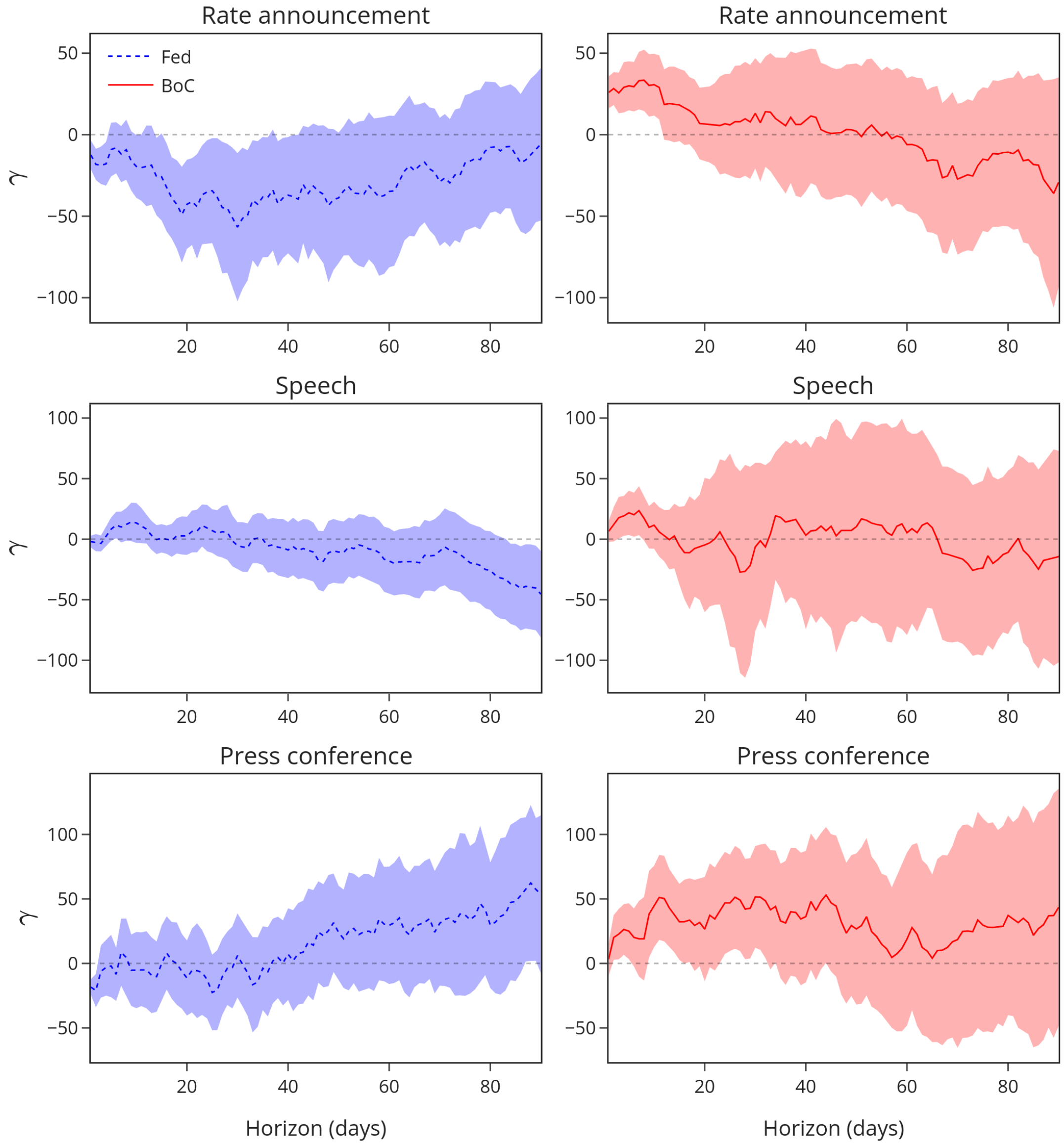
Note: Estimated effects of the forward guidance from Fed and BoC monetary policy announcements and communication events on 10-year Government of Canada benchmark bond yields. Effects are measured as yield changes in basis points over horizons h ranging from 1 to 90 business days. The estimated coefficients γ and $\pm$ 1.96-robust-standard errors are from regression equation (4).

Appendix Figure H.3: THE PERSISTENCE OF FOREIGN (FED) AND DOMESTIC (BOC) FORWARD GUIDANCE EFFECTS ON CANADIAN STOCK MARKET



Note: Estimated effects of the forward guidance from Fed and BoC monetary policy announcements and communication events on Canadian stock returns. Effects are measured as changes in stock returns (10,000 times log price changes, approximately basis points) over horizons h ranging from 1 to 90 business days. The estimated coefficients γ and $\pm$ 1.96-robust-standard errors are from regression equation (4).

Appendix Figure H.4: THE PERSISTENCE OF FOREIGN (FED) AND DOMESTIC (BOC) FORWARD GUIDANCE EFFECTS ON SPOT CAD/USD



Note: Estimated effects of the forward guidance from Fed and BoC monetary policy announcements and communication events on the spot CAD/USD exchange rate. Effects are measured as changes in the exchange rate (10,000 times log price changes, approximately basis points) over horizons h ranging from 1 to 90 business days. The estimated coefficients γ and $\pm$ 1.96-robust-standard errors are from regression equation (4).