Quantifying Monetary Policy Communication and Transmission through Market Commentary*

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Abstract

This paper introduces a novel approach to measuring monetary policy surprises by analyzing the structured previews and commentaries that primary dealers produce around central bank events. Using a fine-tuned large language model (LLM), we construct a monetary policy tone index for both official communications and dealer reports. We find that the shift in tone from dealer previews to their commentaries provides significant explanatory power for market reactions. Furthermore, this pre-announcement dealer tone is predictable by recent macroeconomic data releases. Our framework provides a new lens on how markets form expectations about central bank actions, allows us to identify and quantify communication surprises, and deepens our understanding of monetary policy transmission.

Keywords: Monetary policy communication, interest rates, large language models
JEL codes: E52, E58, G15, C55

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1 Introduction

Monetary policy operates not only through policy rate decisions, but also through communication. Beyond announcing policy rate decisions, central banks influence markets through the tone and language of their announcements. The choice of words and the framing of assessments can convey subtle signals about the outlook and policy stance, sometimes shifting sentiment even without policy action. Market participants scrutinize every phrase for clues about the economic outlook and future policy. What central bankers say — and how they say it — can be as consequential as what they do.

The effect of this communication hinges on interpretation. Central bank language is deliberately nuanced, and its meaning is shaped by context and filtered through the expectations of market participants. The key signal is therefore not the text itself, but the market's collective understanding of it. Capturing this interpretive layer in real time remains a central challenge for researchers and policymakers alike.

Standard approaches attempt to measure this impact through high-frequency asset prices around policy announcements. By comparing financial market prices just before and after events, researchers identify the unexpected component of monetary policy – so-called "surprises." Depending on the instruments used, these estimates capture not only unanticipated rate changes, but also revisions to the expected policy path, balance sheet policies such as quantitative easing or tightening, and shifts in risk premia. This methodology has become the benchmark for quantifying the immediate market impact of monetary policy.

Yet price movements reveal only the net market response. They mask the interpretive process by which participants translate central bank language into policy expectations, leaving unanswered which elements were judged hawkish or dovish and how those judgments shaped views about the economy and policy path.

One promising avenue comes from the observation that financial market participants — especially primary dealers and analysts – publish real-time commentary interpreting macro news and central bank announcements. Such dealer commentary offers a real-time window into how the central bank's message is perceived by informed intermediaries. Indeed, central banks themselves monitor these reactions: Federal Reserve staff, for example, report on primary dealer commentary to understand market nuance beyond the official statements.[1]

In this paper, we introduce a novel dataset and a cutting-edge methodology to quantify monetary policy communication tone by harnessing real-time textual data from market participants.

[1] For example, see page 18 of the transcript of Federal Open Market Committee meeting on 2013 Jan 29-30 " Mr Potter ...'It shows the number of dealers that think that the purchases would end because of the efficacy. In the written comments and dealer commentary, you see more nuance in that ' ". https://www.federalreserve.gov/monetarypolicy/files/FOMC20130130meeting.pdf.

We collect a novel dataset which comprises real-time dealer commentary from major Canadian financial institutions, capturing immediate market interpretations on key macro news announcement and central bank policy rate announcement. The Canadian financial landscape is uniquely suited for this analysis, given its highly concentrated structure dominated by a few primary dealers, which allows us to collect nearly the complete universe of dealer commentaries. For commentaries related to central bank decision, we have both the pre-announcement forward looking comments that is between two to five days, and the post-announcement commentary that come out in a few hours after the announcement. To our knowledge, this is the first systematic collection of real-time policy commentary, providing a novel source of data on the market's perspective of central bank communications. We complement the commentary dataset with official Bank of Canada (BoC) communications, including Fixed Announcement Date (FAD) press releases, press conference opening statements, and deliberation summaries, leveraging Canada's structured and transparent central bank communication practices.

Building on this dataset, we introduce a quantitative measure of monetary policy communication: the **Policy Pulse Index (PPI)**. The PPI captures subtle linguistic nuances in central bank messages, converting qualitative insights into measurable data.

To construct the PPI accurately, we leverage an annotated training dataset developed by expert analysts from the Bank of Canada's Financial Markets Department. These analysts categorized sentences from dealer commentaries and official central bank communications into distinct classifications—hawkish, neutral, or dovish. This high-quality, domain-specific dataset enhances model reliability, consistent with recent literature highlighting the importance of specialized language models for economic text analysis (Gambacorta et al., 2024).

Our methodological innovation involves fine-tuning a state-of-the-art foundational language model—LLaMA 3.1—using Low-Rank Adaptation (LoRA). Constructing the PPI depends on integrating the high-quality annotated training dataset with the advanced language modeling capabilities provided by LLaMA 3.1. Applying this model to our annotated corpus enables systematic identification of nuanced policy stances within the textual data. This index measures the perceived hawkishness or dovishness of the Bank of Canada's communication as well as data releases on an event-by-event dealer-by-dealer basis.

Our approach builds upon and extends existing literature that has employed market commentary qualitatively or selectively to interpret the impact of central bank communications (e.g., Gürkaynak et al., 2005, 2020; Swanson and Jayawickrema, 2023). Previous studies have highlighted market commentary as valuable evidence, often referencing anecdotal or specific instances

where commentary clarified market responses to policy announcements.[2] This paper advances this work by systematically integrating real-time market commentary as a central data source, enabling us to quantify the otherwise qualitative market interpretation of policy in a reproducible way. In doing so, we move beyond selective case studies and provide a general analysis across all policy events in our sample. In addition, our LLM-based index provides an objective, reproducible measure that captures subtle changes in language that humans might overlook or interpret inconsistently. This systematic approach allows us to uncover effects that a purely anecdotal reading might miss – for instance, detecting that a slightly more pessimistic phrasing in an outlook paragraph is consistently picked up by dealers as dovish and immediately feeds into bond yields.

We empirically validate our PPI by demonstrating strong correlations between the PPI derived from official Bank of Canada communications and actual monetary policy rate changes, indicating the index's reliability in capturing central bank policy stances.

Our empirical analysis yields three main findings. First, we provide direct evidence on the mechanics of expectation formation. The hawkish or dovish tone of dealer commentary immediately following macroeconomic data releases is a powerful predictor of dealers' formal policy expectations in their pre-announcement reports. A commentary-based forecasting model for pre-FAD sentiment achieves a significantly lower root mean squared error than standard benchmarks, demonstrating how new data is systematically processed into a coherent policy outlook.

Furthermore, we identify the causal impact of communication surprises on a broad suite of asset prices, including short-term interest rate futures, Government of Canada benchmark yields, and the CADUSD exchange rate. We define a communication surprise as the change in the average dealer PPI from before to after a policy announcement. We find that a one-standard-deviation hawkish communication surprise causes an immediate and economically significant tightening of financial conditions. Specifically, it corresponds to an increase of 5 to 18 basis points in short-term interest rate futures and 8 to 11 basis points in 2-year government bond yields, along with a 1.1 percent appreciation of the Canadian dollar. Crucially, we find this effect is driven by the dealers' interpretation of the announcement. The tone of the official press release itself has a much weaker relationship with asset price movements, suggesting that dealers "read between the lines" and it is this higher-order belief formation that ultimately moves markets.

Finally, we use BERT-based topic modelling to study the drivers of dealers' tone. We show that the topics shaping dealers' policy perception index vary over time. In particular, topics re-

[2]For example, Swanson and Jayawickrema (2023) decides if Fed speeches contain information about monetary policy by reading the market commentary in The Wall Street Journal or The New York Times following each speech. Gürkaynak et al. (2005) states, "In table 4, we report details of the ten largest path factor observations over our sample. Nine of these ten observations (and twentyone of the top twenty-five) correspond to dates on which an FOMC statement accompanied the federal funds rate target decision; moreover, financial market commentary on these dates (as reported in the Credit Markets column of The Wall Street Journal the following day) typically directly attributed the move in the bond market to the specifics of the FOMC statement".

lated to the policy rate, inflation, and interest-rate forecasts account for the differences between dealers' pre- and post-announcement tone indices and help explain the associated financial-market reactions.

Our findings advance existing research in several interconnected areas within monetary economics. First, it significantly enhances central bank communication measurement methods. Traditional sentiment analysis approaches often rely on simplistic indicators or aggregated sentiment scores, potentially overlooking shifts crucial to understanding policy communications. Our work addresses this limitation by providing an objective and real-time textual index. By leveraging advanced language modeling techniques and systematically annotating textual data with domain expert inputs, we offer a highly granular and precise measurement of central bank communication tone, allowing researchers and policymakers to better understand how subtle variations in language can influence market perceptions and behaviors.

Second, this study enriches the market sentiment literature by integrating professional dealer commentary, a previously underutilized yet crucial source of real-time market insights. Unlike typical sentiment analyses that often use aggregated news media reports or broadly available textual sources, our approach incorporates detailed, immediate, and explicit interpretations from professional dealer economists. Dealer commentary is particularly valuable because it directly reflects professional market participants' real-time expectations and reactions to policy announcements and macroeconomic data releases. By capturing heterogeneity among dealers and explicitly linking commentary to policy implications, our analysis provides deeper insights into how market expectations evolve and diverge, thus significantly improving the understanding of expectation formation processes.

Lastly, our research advances the monetary policy transmission literature by explicitly modeling the relationship between textual communication and quantifiable asset price responses. Previous research has demonstrated the importance of policy communication in influencing market expectations, yet often relies on indirect or anecdotal evidence. Our approach systematically quantifies these communication-driven expectation shifts and directly connects them to specific asset price movements. The robust empirical evidence we provide highlights that textual communications possess an independent and substantial influence on market dynamics, highlighting that monetary policy effectiveness depends not only on direct policy actions but also on clear and carefully managed communications.

The rest of this paper is structured as follows. In Section 2, we provide background on both official central bank releases as well as dealer commentary and describe the construction of the document corpus. Section 3 outlines the methodology used to build the monetary policy pulse index, including sentence annotation, model fine-tuning, and index aggregation. Section 5 applies the index to analyze how market participants form expectations prior to FADs and respond to

policy announcements. Section 6 concludes. Additional details, examples, and robustness checks are provided in the Appendix.

2 Background and data

The Canadian context offers unique institutional features and rich data availability that are ideal for our study. Canada provides an ideal testing ground due to its institutional structure and data availability. The Canadian fixed-income market is served by a small number of primary dealers – effectively, all major domestic banks – who are highly attentive to Bank of Canada communications. This concentrated dealer structure means that a few key voices interpret and disseminate the Bank's policy messages, and their commentary is widely followed. As of 2025 the Bank of Canada recognizes only about eight primary dealers in government securities, versus dozens in the United States, exemplifying this concentration. The relative handful of commentary sources simplifies the task of compiling a comprehensive dataset and ensures that our index captures the bulk of market sentiment with minimal noise.

Primary dealers also generate detailed commentary on each key data releases and monetary policy event – often in a more unified and timely manner than in larger markets – which provides us with detailed textual data to analyze. For the data releases, unlike US, there are only three types (CPI, GDP and employment) data releases that matter the most to the primary dealers. From a policy perspective, Canada is interesting as a small open economy with an inflation-targeting central bank known for transparency and forward guidance. The Bank of Canada has experimented with explicit forward-looking statements and conditional commitments in the past, and understanding the reception of such guidance is important.

In the rest of this section, we describe our datasets and provide essential institutional context regarding central bank communication (subsection 2.1) and dealer commentaries (subsection 2.2) in Canada. We briefly introduce the financial market data in subsection 2.3.

2.1 Central bank communication

Central bank communication takes several forms, including formal statements outlining the institution's monetary policy strategy and inflation target. These foundational documents set the stage for how the public and markets interpret subsequent policy decisions. Central banks often communicate their current evaluation of economic conditions, along with potential insights into upcoming policy actions. Press releases from central banks that announce and clarify monetary policy decisions are closely monitored by financial markets, given their demonstrated influence on market movements.

The Bank of Canada communicates its monetary policy through several structured channels designed to clearly articulate its policy stance, economic assessment, and expectations about future policy actions. Since December 2000, the BoC has adhered to a system of eight fixed announcement dates (FADs) per year for policy rate decisions, aligning with practices of other major central banks. Each FAD involves publishing a detailed press release immediately following the Governing Council's meeting. These press releases typically announce the policy rate decision and provide updates on economic conditions, forward-looking assessments, and revisions to key economic projections.

The BoC's decision-making process is consensus-driven and involves rigorous analysis and consultations. The Governing Council, comprising the Governor, Senior Deputy Governor, and Deputy Governors, bases its decisions on extensive data, including macroeconomic models, economic forecasts, and analyses of financial market conditions. They also consider qualitative inputs such as consumer and business outlook surveys and feedback from various stakeholder consultations.

Four times per year, the BoC publishes a comprehensive Monetary Policy Report (MPR) alongside the FAD announcement. The MPR provides an extensive analysis of global and Canadian economic conditions, inflation forecasts, and risks to these projections over a two-year horizon. Each MPR release is accompanied by a press conference held by the Governor and Senior Deputy Governor, which offers deeper insights into the rationale behind policy decisions and the Bank's economic outlook. To enhance transparency, the BoC has published summaries of Governing Council deliberations since February 2023, detailing internal discussions, key topics debated, and the rationale behind final decisions.

As shown in Table 1, our sample includes 194 BoC FAD press releases from August 2001 to January 2025, 74 BoC FAD press conference opening remarks from January 2008 to January 2025, and 18 summaries of deliberations from February 2023 to February 2025.

Table 1: Official document collection

BoC official docs	**Total**	**Date range**
FAD press release	199	2001–2025
FAD press conference opening remark	80	2008–2025
FAD Summary of deliberations	21	2023–2025

2.2 Dealer Commentary as a Non-traditional Data Source

Dealer commentary provides an innovative data source, directly reflecting how market participants interpret monetary policy and macroeconomic announcements. Bank of Canada watchers, most of whom are economists at the largest Canadian banks, regularly publish their interpretation promptly after economic events, explicitly linking new information to monetary policy implications. These "BoC Watchers" are commonly referred to as dealer economists in markets, as their employers are Primary Dealers in the Government of Canada securities market.

Who Writes Commentaries? Banks employ economists and strategists to support their trading strategies and risk management activities. These reports are prepared by full-time professionals who closely monitor all relevant economic developments. More importantly, their expertise is leveraged for the benefit of clients, who gain access to their reports, and at times, one-on-one discussions on specific topics, such as upcoming interest rate decisions. In return – though not guaranteed – clients tend to reward the bank by executing trades with them, effectively compensating the bank for the research and advisory services. Economists and strategists also have personal incentives to produce insightful reports, notably to gain professional recognition for their forecasting superiority and analytical skills.

Use of Dealer Commentary by Central Banks Central banks pay close attention to market expectations, as these form one of several inputs influencing monetary policy decisions. By monitoring dealer commentary, central banks can verify whether markets accurately interpret their policy rationale, thereby helping to align market expectations with central bank forecasts. This alignment reduces the risk of significant policy surprises, which could generate unnecessary volatility and impair the effectiveness of monetary policy transmission.

Furthermore, central banks leverage extensive information to enhance their research, policy formulation, and operations. Economic analyses produced by dealer economists frequently serve as benchmarks and complements to central banks' internal research. Reports that cover macroeconomic indicators and financial market developments are particularly valuable. Given the increasing complexity and speed of global developments, including events like COVID-19, central banks continuously broaden their informational inputs.

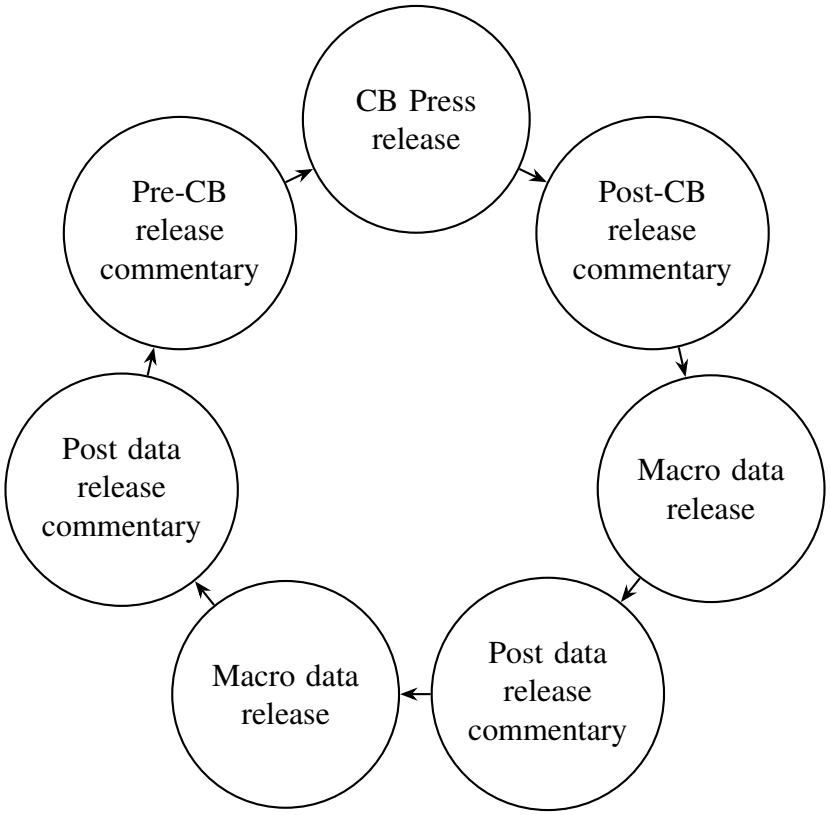
Timing of Dealer Commentary Publication Dealer commentaries are systematically timed around key policy and economic data announcements:

- **Pre-FAD commentaries:** Published approximately 2–5 business days before policy announcements, reflecting anticipatory market sentiment and expectations.

- **Post-FAD commentaries:** Released within a few hours following policy announcements, offering updated assessments and immediate reactions.
- **Macro data commentaries:** Published within a few hours as key macroeconomic news releases (GDP, CPI, employment), explicitly linking data outcomes to monetary policy implications.

In Figure 1, we illustrate the central bank policy communication cycle. Primary dealers update their views based on recent economic data and use that information to update their forecasts for upcoming central bank decisions, which ultimately feed into their pre-announcement (pre-FAD) commentary. After the announcement, they publish post-FAD commentary that evaluates both the immediate policy decision and its implications for future monetary policy.

Figure 1: Central Bank Policy Communication Cycle



Structure of Dealer Commentary by Event Type Dealer commentary varies depending on the event type — primarily divided into three categories: CPI, GDP, and employment data releases, pre-FAD commentaries, and post-FAD commentaries.

For CPI, GDP, and employment data releases, dealers typically produce dedicated reports focusing exclusively on the newly published data. In Appendix A, we first present an original dealer report from CIBC's "Economic Flash!" series dated October 19, 2022. This report provides a clear example of the typical structure of dealer commentary for data release. The first section begins by summarizing headline and core CPI data, immediately linking these statistics to Bank of Canada policy considerations for the upcoming Fixed Announcement Date. Subsequent paragraphs detail inflation components such as gasoline, transportation, and shelter costs. The fifth paragraph explicitly compares various CPI measures, including annual and three-month annualized rates, CPI-trim, and CPI-median. The second section, "Implications and Actions," explicitly translates these discussion into economic forecasts and policy expectations, stating:

> *"We now believe the Bank will need to go with a 75 bps hike next week rather than the 50 bps we previously anticipated. The Bank might then be left with a last 25 bps in December if growth numbers support it."*

For pre-FAD commentaries, banks typically produce either stand-alone reports (e.g., National Bank of Canada) or include policy predictions within broader weekly previews (e.g., CIBC, BMO, Scotia). For example, RBC provides detailed weekly forecasts in its series titled "Forward Guidance: Our Weekly Preview," which covers anticipated economic data releases and monetary policy expectations in depth, as shown in their October 26, 2020 preview ahead of the October 28 FAD. This includes specific GDP forecasts, assessments of consumer and housing sectors, and the potential implications of recent economic developments for monetary policy.

Post-FAD commentaries, published shortly after monetary policy announcements, explicitly evaluate and interpret the central bank's policy decisions. The structure typically begins by summarizing the policy decision, noting whether it matched market expectations, followed by interpretations and selective quotes from official statements. They are notably forward-looking compared to pre-FAD commentaries, emphasizing implications for future policy meetings. The third example in Appendix A is from BMO "EconoFACTS" series post-FAD commentary. It summarizes the Bank of Canada's decision on December 7, 2022 to raise rates by 50 basis points, discusses the economic rationale behind the decision, and explicitly outlines expectations for subsequent policy actions, such as anticipating a further 25 basis point increase based on upcoming economic data.

Unique features of Dealer Commentary for Policy Monitoring and Monetary Policy Research
DThe Canadian context offers unique institutional features and rich data availability that are ideal for our study. First, it provides direct, contemporaneous evidence of market participants' interpretations and expectations, facilitating clearer causal identification than indirect inferences from asset prices alone. In addition to the example above, we also have For example, the BMO CPI commentary (August 20, 2024) explicitly anticipated monetary policy easing:

"The July CPI report should further cement a 25 bp rate cut from the Bank of Canada in September. It will be difficult for policymakers to act more aggressively at this point, but rate cuts will keep coming as inflation continues to move toward a sizeable output gap."

Similarly, CIBC's commentary on the labour market data release (October 7, 2022) highlights labor market strength supporting hawkish policy actions:

"The low unemployment rate and still strong wage growth support the continued hawkish tone from the Bank of Canada Governor yesterday and a 50bp rate hike at the next meeting."

Second, dealer commentary captures heterogeneous market views, particularly valuable when financial derivatives markets are illiquid or insufficiently informative. Divergent opinions among dealers preceding monetary policy decisions provide insight into market uncertainty and disagreement. For instance, in Table B.1, commentary prior to the April 2024 FAD shows consensus around maintaining current policy rates. However, underlying reasons varied, from concerns about persistent wage growth and upgraded economic forecasts (TD, CIBC) to signals for imminent rate cuts (Desjardins). In contrast, commentary prior to the October 2024 FAD (Table B.2) illustrates strong consensus toward a 50 basis point cut, driven by weakening inflation trends, sluggish economic growth, and heightened urgency to normalize policy rates. TD stood apart, advocating for a smaller 25 basis point cut, citing still-robust wage growth and resilience in the job market as mitigating factors. The September 2024 post-FAD commentary (Table B.3) broadly characterized the Bank of Canada's 25 basis point rate cut as widely anticipated across market analysts. The prevailing view is that the Bank remains cautious but dovish, highlighting concerns over economic slack and downside risks to inflation, with several analysts (e.g., BMO, TD, National Bank) signaling openness to potential larger rate cuts if economic conditions deteriorate further. The commentary also underscored the increasing weight placed on labor market developments, notably persistent wage pressures despite rising unemployment, which could influence the Bank's future policy path.

While dealer commentaries provide timely reactions, formal forecasts are updated less frequently. Thus, commentary data are particularly suited for analyzing short-term shifts in policy expectations and sentiment dynamics.

Advantages Compared with Alternative Measures In Canada, the Bank of Canada's Market Participants Survey (MPS) serves as a key survey-based source of market expectations. Conducted quarterly, the MPS captures insights from diverse financial market participants regarding macroeconomic and financial variables, including monetary policy expectations. The MPS is primarily

intended for ex ante monitoring of market expectations and sentiment rather than for detailed analysis of real-time shifts following specific economic data releases.

Bloomberg's economic surveys provide more frequent updates, often ahead of major economic releases and policy announcements. These surveys collect forecasts from a broad range of economists and market participants, including primary dealers. However, Bloomberg surveys typically focus on immediate upcoming events, such as the next policy rate decision, and may not consistently capture expectations for subsequent meetings or the longer-term policy path. Bloomberg's economic surveys typically do not include policy rate forecasts for subsequent meetings immediately following major macroeconomic releases like CPI release. Compared to broader sources such as news articles, dealer reports offer more targeted and timely insights.

Compared with alternative measures, dealer commentaries provide timely, qualitative insights into market expectations and interpretations of economic developments. These commentaries, published both before (pre-FAD) and shortly after (post-FAD) key economic data releases or policy announcements, deliver analyses often not captured by quantitative forecasts alone.

Commentary Collection and Filtering We collected dealer commentary reports from seven Canadian domestic systemically important banks: Bank of Montreal (BMO), Canadian Imperial Bank of Commerce (CIBC), Royal Bank of Canada (RBC), Bank of Nova Scotia (Scotia), National Bank of Canada (NBC), Toronto-Dominion Bank (TD), and Desjardins Bank.

We analyze only domestic banks, given their deep expertise and detailed coverage of the Canadian market. International banks typically concentrate their analytical resources on U.S. and European markets, often providing less frequent and detailed Canadian coverage. Although international/foreign banks such as Citi, Wells Fargo, JP Morgan, Morgan Stanley and BNP Paribas occasionally provide accurate forecasts of Canadian policy rates, preliminary analysis suggests their overall accuracy and comprehensiveness are generally lower compared to domestic banks. Thus, while we plan to incorporate international banks into future research extensions, our primary analysis remains centered on Canadian banks.

Dealer commentary covering Bank of Canada announcements and macroeconomic data releases (GDP, CPI, employment) was our targeted documents. These events were selected due to their persistent influence on Canadian fixed-income markets, as documented in prior studies such as Martos et al. (2025).[3]

After reviewing all relevant commentary series from each dealer, we selected the series most

[3]While Figure 1 emphasizes the core communication cycle involving macroeconomic data releases and monetary policy announcements, it omits other significant central bank communication events such as speeches, testimonies and meeting deliberations (e.g., FOMC minutes in the U.S. and the Bank of Canada's Summary of Deliberations). These additional events also influence market expectations, though Canadian dealers' coverage is typically limited and selective.

appropriate for our analysis based on their scope, frequency, and availability. Within banks, distinct teams may produce separate reports on the same event—for example, the economics team typically provides detailed interpretations of policy decisions, while the rates strategy team often emphasizes implications for investment strategies. Since our focus is on economic interpretation rather than trading recommendations, we primarily chose commentary from economics teams. However, in rare cases when our preferred series was unavailable, we used comparable series from the same bank, confident that such substitutions would yield similar insights. Table B.4 lists the primary commentary series selected from each dealer.

Our data collection proceeded through two stages. First, we identified the most relevant commentary series for each bank. Next, we systematically extracted individual reports corresponding to known event dates, resulting in a comprehensive dataset. Table 2 summarizes our commentary collection across six domestic banks, totaling 1,419 documents from September 2020 through December 2025. The dataset includes 315 pre-FAD commentaries, 256 post-FAD commentaries, and 865 commentaries covering key macroeconomic data releases (CPI, GDP, employment).

Table 2: Dealer Commentary Collection

Bank	**CPI**	**GDP**	**JOBS**	**PreFAD**	**PostFAD**	**Total**	**Date range**
CIBC	125	125	124	78	99	**551**	2016(2019)–2025
BMO	77	77	78	43	53	**328**	2019–2025
RBC	57	60	61	42	41	**261**	2020–2025
Scotia	60	61	73	68	50	**312**	2020–2025
Desjardins	48	47	46	37	53	**231**	2020(2023)–2025
National	12	14	14	16	11	**67**	2024–2025
TD	138	121	110	104	107	**580**	2011(2012) – 2025

2.3 Financial market data

Macroeconomic forecast and surprise data are obtained from Bloomberg, and for each announcement we construct the surprise component as the difference between the actual release and Bloomberg's median forecast. The announced policy rate target (the target for the overnight rate) for each fixed announcement date is taken from Bank of Canada sources (the official interest rate announcements).

We analyze asset price reactions at both daily and intraday frequencies. Daily frequency data include changes in Government of Canada (GoC) benchmark bond yields at various maturities, obtained from the Bank of Canada, to reflect aggregate market responses to policy announcements.

To capture immediate market reactions with greater precision, our intraday analysis employs high-frequency data from Sekkel et al. (2025) across key Canadian financial instruments. The primary short-term instrument considered is Banker's Acceptance Futures (BAX) contracts.[4] BAX contracts closely resemble Chicago Mercantile Exchange-traded Eurodollar futures, used to gauge market expectations for future U.S. interest rates. The second through fourth BAX contracts reflect market expectations about the policy rate path approximately 5 to 14 months into the future.

The Canadian transition from BAX to Canadian Overnight Repo Rate Average (CORRA) futures mirrored the U.S. shift from Eurodollar to SOFR futures. Care must be taken to properly align CORRA and BAX futures contracts. While BAX futures are based on expected interest rates over three months after the settlement date, CORRA futures are based on interest rates over the three months before. Both futures contracts are named based on the quarter of their interest rate exposure, allowing them to be matched according to their contract names. Alternatively, one can match the nth-outstanding CORRA contract with the (n-1)st-outstanding BAX contract. The three-month CORRA futures contract was introduced in June 2020 and became more actively traded than BAX in the second half of 2023; our analysis incorporates CORRA futures starting July 2023. In Section 5, we will refer to this series as `BAX(n-1)_CRA(n)`, e.g., `BAX2_CRA3`.

We also have GoC benchmark bond yields at the 2-year (short-term), 5-year (medium-term), and 10-year (long-term) maturities, equity index futures (S&P/TSX 60 index futures), and the spot CAD/USD exchange rate.

All intraday asset price changes are calculated within a concise window surrounding each policy announcement, specifically from 10 minutes before to 20 minutes after the announcement (a total of 30 minutes). This approach is consistent with established methodologies in the literature (e.g., Gürkaynak et al. (2005), Nakamura and Steinsson (2018), Swanson (2021)), aimed at minimizing contamination from unrelated news and accurately isolating the immediate impact of the monetary policy announcements. The detailed methodology for constructing these high-frequency price changes is outlined by Sekkel et al. (2025), aligning with standard event-study frameworks. The figures in Appendix C plot the series of these surprises.

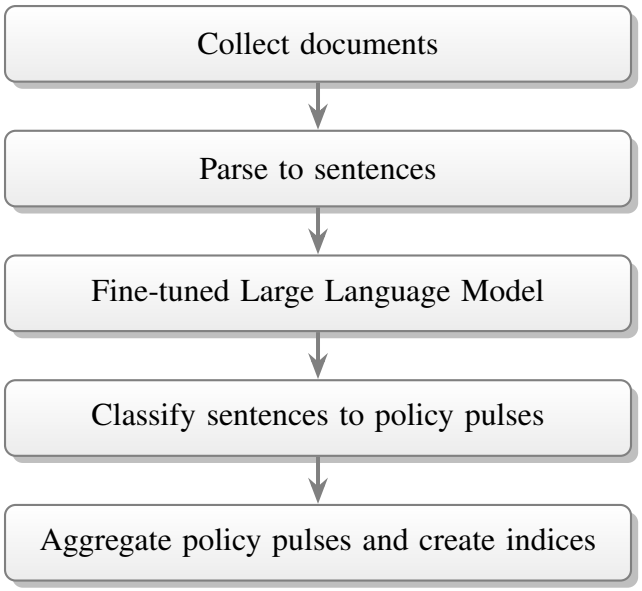
3 Construction of the monetary policy pulse indices

This section details the creation of our Policy Pulse Index. We developed the PPI using a rich corpus of texts relevant to the Bank of Canada. The process, illustrated in Figure 2, involves several key steps. After defining our indices (subsection 3.1), we describe the assembly and preparation of

[4] BAX futures are quoted on an index basis as 100 minus the annualized yield of three-month CDOR and mature two business days prior to the third Wednesday of March, June, September, and December over a two-year cycle (TMX Montreal Exchange, 2013).

our text corpus (Subsection 3.2). We then detail the creation of our expert-annotated training data (Subsection 3.3) and the fine-tuning of a large language model (LLM) for classification (Subsection 3.4). Finally, we explain how the document-level index is constructed (Subsection 3.5) and present a series of comprehensive validation and robustness checks (Subsections 3.6 and 3.7).

Figure 2: Workflow



3.1 Definition of the Indices

Our primary index is the **Policy Pulse Index** (PPI), which specifically captures direct communication on monetary policy. It is designed to quantify the stance expressed regarding:

- Policy decisions, including interest rate hikes/cuts, forward guidance, and quantitative easing/tightening.
- Evaluations of macroeconomic conditions influencing policy rate decisions (such as inflation, labor market conditions, and output growth).

Each sentence is categorized as *hawkish*, *dovish*, or *neutral*. The PPI provides central banks, researchers, and market participants with a clear, quantifiable measure of policy direction, useful for assessing communication effectiveness, guiding expectations, and anticipating market reactions. Previous studies (e.g., Ehrmann and Fratzscher, 2007; Hansen et al., 2018) have demonstrated the predictive power and usefulness of sentiment indices derived from textual analysis in monetary policy contexts.

3.2 Paragraphs filtering and parsing into sentence level

We collected official Bank of Canada (BoC) documents—including FAD press releases, press conference opening remarks, and summaries of deliberations—as well as commentary reports from seven major Canadian domestic banks. Our final data collection includes full articles of BoC official documents on FAD and relevant paragraphs from Canadian 7 banks report on FAD announcements and major data releases. Let's call this dataset as "BoC relevant core corpus". All official BoC documents were retained in their entirety, as they consistently focus directly on monetary policy issues and macroeconomic assessments critical to our analysis. These documents were systematically parsed into sentences, resulting 7,450 sentences in our final dataset.

Dealer commentaries required an additional filtering step to maintain relevance and consistency. We retained overarching commentary sections on the event and excluded detailed discussions of specific economic sectors or metrics. We use the first document from Appendix A, the CIBC commentary on Canadian CPI published on October 19, 2022, as an example. We began with this document. Then we extracted the first paragraph, which summarizes both overall inflation trends and their direct implications for Bank of Canada policy, as well as the "Implications and Actions" paragraph explicitly discussing policy expectations. We excluded other paragraphs which are about detailed sector-specific commentary (e.g., gasoline prices, transportation costs, shelter costs) and comprehensive statistical breakdowns of various CPI measures.

In total, dealer reports were parsed into 12,032 sentences. The final compiled dataset—our BoC-relevant core corpus—thus includes 7,450 sentences from official documents and 12,032 sentences from dealer commentaries, offering a comprehensive and focused textual resource for training our indices. The parsing process ensures data consistency and prevents redundancy.

3.3 Creation of Training Data

Document Selection and Dataset Balance We selected 953 sentences dated from October 2013 to May 2024, drawn from 59 documents spanning both BoC releases and dealer reports. The selection ensured coverage across different primary dealers, event types (CPI, GDP, employment, pre-FAD), and monetary policy cycles. Specifically, our dataset captures periods of holding, hiking, and easing policy rates, as well as Canada's first quantitative easing (QE) implementation during the COVID-19 pandemic.[5] Figures D.1–D.4 illustrate coverage across event types, sources, and time, as well as the policy rate backdrop.

Annotator Expertise We recruited five expert market analysts from the Financial Markets Department in Bank of Canada, each with at least ten years of experience in financial markets. Ana-

[5] QE was not employed during the Global Financial Crisis in Canada.

lyzing dealer reports and official monetary policy documents has been a part of their job responsibilities for a minimum of five years. Their expertise ensured high-quality, informed and consistent labeling.

Training and Guidelines We conducted comprehensive training sessions to ensure all annotators applied the classification criteria consistently. During the session, we introduced the Policy Pulse Index (PPI) and provided clear definitions for hawkish (leaning toward monetary tightening), dovish (leaning toward easing), and neutral statements. The training included hands-on exercises with an extensive set of examples (adapted from Gorodnichenko et al. (2023); see Table D.1) to align the team's interpretation of nuanced language. While guidelines provided structure, we instructed the analysts to leverage their professional judgment and domain knowledge for ambiguous cases.

Annotation Implementation and Process To minimize potential biases, sentence attributes such as source and date were removed, and sentences were randomized before annotation. This design choice also ensured consistency with the eventual application of our algorithm, which does not incorporate metadata. This approach is consistent with standard practices in text-as-data applications, where preprocessing often involves stripping punctuation, numbers, and other metadata that can complicate automated interpretation (see Gentzkow et al. (2019)).

Annotators were explicitly instructed to label each sentence individually. They were strictly advised not to combine sentences or consult with other annotators, though they could seek clarification from one of the co-authors of this paper when necessary. Sentences were annotated using two five-point scales:

- **Monetary Policy Pulse:** Very hawkish (+2), Somewhat hawkish (+1), Neutral (0), Somewhat dovish (-1), Very dovish (-2).

Annotated Dataset and Agreement For analysis, we collapsed the five-point scale into three categories by combining "very hawkish" with "somewhat hawkish" and "very dovish" with "somewhat dovish." We adopted this approach after consultation with annotators during the training sessions, who indicated that a three-point scheme alone might lead them to hesitate in assigning clear directional labels and instead default disproportionately to "neutral." By offering finer distinctions in the labeling stage, we encouraged annotators to provide sharper judgments, while retaining comparability through aggregation to three categories for the final dataset.

From the initial 953 sentences, annotations from at least four annotators determined our final dataset of 788 sentences: 215 hawkish, 444 neutral, and 129 dovish. We present some examples of

annotated sentences and agreement levels in Table F.1. In Figures F.1–F.3 summarize the distribution by provider, event type, and time. The BoC accounts for the largest share (492 high-agreement sentences), while each dealer contributes 30–60 sentences with high inter-annotator consistency (typically above 80%). Press conference remarks and FAD press releases are the largest categories, followed by pre-FAD commentary and major macroeconomic releases (CPI, GDP, employment). The dataset is evenly distributed across the sample period, with heightened coverage in recent policy events. Overall, these patterns confirm that the dataset is balanced across sources, event types, and time.

3.4 Fine-tuning the LLaMA Model

We use Large Language Model Meta AI, formally stylized as LLaMA, to construct our Policy Pulse Index. LLaMA is an open-source foundational large language model pretrained based on the autoregressive decoder-only transformer system architecture. In simple words, this architecture creates text sequence one piece (e.g. word) at a time. It is built on the transformer framework (Vaswani et al., 2023), which uses self-attention mechanism to allow the model to focus on different parts of the input sequence to capture the semantic meaning of the text sentence. It weights the importance of previous words when predicting the next.

The objective of fine-tuning is to adapt the general-purpose LLaMA model to better understand and classify text in the specific domain of Canadian monetary policy communications. To achieve this, we use a supervised approach to introduce domain-specific vocabulary and contextual structure based on our curated corpus of Bank of Canada and dealer commentary sentences.

We finetune LLaMA 3.1(8b) base model by employing Unsloth framework (Daniel Han and team, 2023), an optimized library that integrates Low-Rank Adaptation (LoRA) (Hu et al., 2022) to efficiently adapt the pre-trained LLaMA model.[6] This framework preserves LLaMA model's general linguistic knowledge which effectively tailoring its outputs to the target domain. We fine-tune the base LLaMA 3.1 (8B) model using 4-bit LoRA applied to all linear layers, with a rank of 16, a learning rate of 2e–4, a batch size of 2, and 2 training epochs.

The model is evaluated on two classification tasks: monetary policy pulse (hawkish, neutral, dovish) and general sentiment (positive, neutral, negative). Table 3 summarizes the classification performance using precision, recall, and F1-score. For the monetary policy pulse classification task, the model achieves an F1-score of 0.91 for hawkish, 0.89 for neutral, and 0.81 for dovish statements. In the general sentiment classification task, the model attains F1-scores of 0.89 for positive, 0.91 for neutral, and 0.91 for negative sentiment. The fine-tuned LLaMA model effec-

[6] https://unsloth.ai/ Unsloth leverages custom Triton kernels and 4-bit quantization to achieve up to 2-5x faster training speeds and reduced memory footprints.

tively identifies both directional policy tones and broader sentiment embedded in central bank and dealer communications.

Table 3: Classification performance by category (MP Pulse and Sentiment).

	Classification	Precision	Recall	F1-score
MP Pulse	hawkish	0.91	0.91	**0.91**
	neutral	0.89	0.89	**0.89**
	dovish	0.81	0.81	**0.81**
Sentiment	positive	0.87	0.90	**0.89**
	neutral	0.89	0.92	**0.91**
	negative	0.95	0.87	**0.91**

We compare several approaches with different LLMs, including prompt engineering and fine-tune foundational models. We consider BERT, LLaMA, Mistral, and GPT models. The best performance model for our dataset is fined-tuned LLaMA 3.1 (8b).

3.5 Construct BoC Monetary Pulse Index at Document Level

Each sentence from the BoC core corpus is classified as hawkish (1), neutral (0), and dovish (-1). Using these sentence-level classifications, we construct the monetary policy pulse indices for each document. Specifically, for a given dealer i, event j, and date t, the policy pulse index is computed as follows:

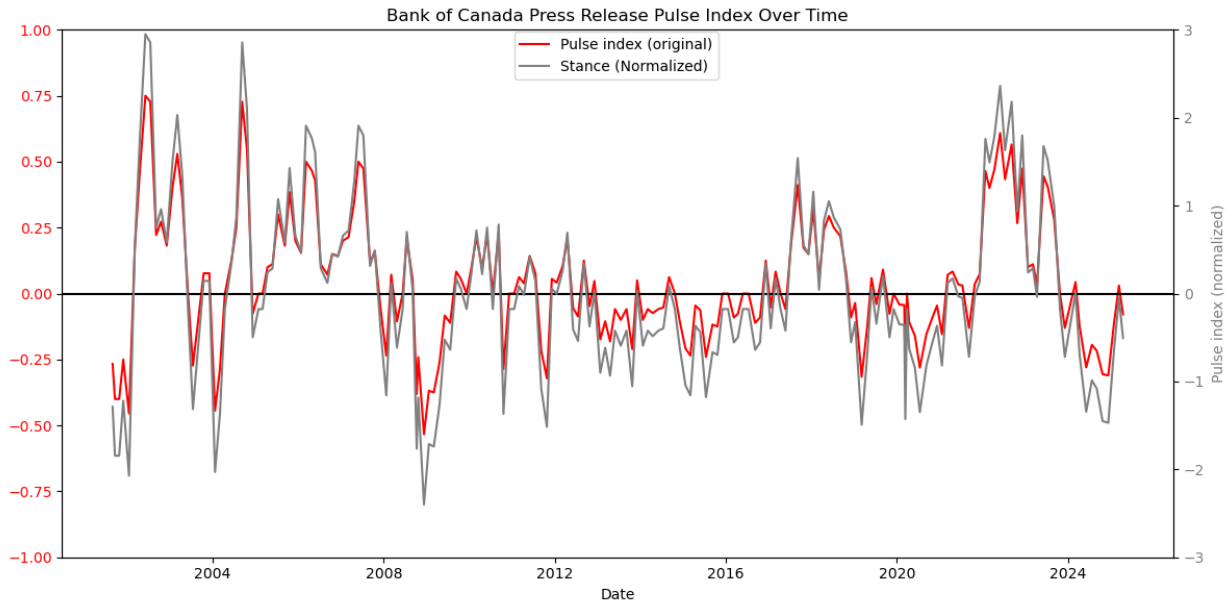
$$\text{Pulse}_{i,j,t} = \frac{\text{Hawkish}_{i,j,t} - \text{Dovish}_{i,j,t}}{\text{Total Sentences}_{i,j,t}},$$

where, $\#\text{Hawkish}_{i,j,t}$ denotes the number of hawkish sentences in document (i,j,t), $\#\text{Dovish}_{i,j,t}$ the number of dovish sentences, and $\#\text{Neutral}_{i,j,t}$ the number of neutral sentences. The denominator, $\#\text{Total Sentences}_{i,j,t}$, is the sum of hawkish, dovish, and neutral sentences in the document.

For each dealer-event combination (e.g., BoC press releases), we generate a time series of pulse indices. To facilitate comparisons, we normalize each index by subtracting the mean and dividing by the standard deviation of the respective time series. For example, the original pulse index for BoC press releases has a mean of -0.1 and a standard deviation of 0.29. Hence, we produce two indices: original and normalized. Both indices over time for BoC press releases are illustrated in Figure 3.

Additionally, we aggregate indices across dealers to generate combined indices for specific

Figure 3: Original and Normalized Press Release Pulse Indices Over Time



events. For instance, the aggregated CPI dealer index is calculated as the mean of indices from individual dealers (e.g., CIBC, BMO, NBC, RBC).

3.6 Validation and Evaluation of the Policy Pulse Index

We validate the Policy Pulse Index using a combination of statistical tests and economic benchmarks. First, we evaluate the classification model itself through standard cross-validation procedures. The fine-tuned LLaMA model was trained on a subset of annotated sentences and tested on held-out data, achieving high precision and recall across hawkish, neutral, and dovish categories (see Table 3). This provides confidence that the model can reliably reproduce expert annotations when applied to the full corpus.

Second, we assess the economic relevance of the constructed index. The PPI derived from BoC press releases correlates strongly with actual policy rate changes (0.73 for the full sample, 0.71 since 2016; see Figure G.1). The correlation with the policy rate level is weaker (0.06 overall, 0.24 in the recent period), but a positive relationship with two-year benchmark bond yields (0.28) suggests that the index captures forward-looking expectations as well.

Finally, we review dealer commentaries to confirm the substantive validity of the index. For example, in June 2023 the PPI registered a notably dovish tone, coinciding with weak employment data. RBC's commentary at the time stated:

> "We expect those headwinds to ultimately be enough to push the economy into a modest contraction in the year ahead, and look for unemployment to continue to edge

broadly higher from this point on." (RBC, June 2023)

This explicit dovish assessment aligns closely with the model-generated index, illustrating how the PPI captures shifts in tone that market participants themselves emphasize.

3.7 Robustness

We perform robustness checks. Some dealers occasionally publish multiple commentary series for the same event (e.g., CIBC's "Quicktake" and "Economic Flash"). We verified that the PPIs generated from these parallel series are highly consistent, exhibiting strong correlations as illustrated in Figure G.2. To maintain continuity in our time series, we occasionally imputed missing reports from one series using data from its counterpart. Our main results are robust regardless of this imputation.

We validated our modeling approach by comparing the results from our fine-tuned LLaMA model with those from a prompted GPT-4o model.[7] As shown in Figures G.3 and G.4, the indices produced by these two distinct models are highly correlated. This result demonstrates that our classification methodology is robust and not dependent on a specific model architecture.

4 Text-Based Monetary Policy Surprises and Their Financial Market Impact

Dealers track central bank announcements in real time. They publish concise pre-announcement previews that summarize their expectations and post-announcement commentaries that explain how the decision and guidance changed their views. By applying our Policy Pulse Index to both sets of reports, we can measure the change in tone around the announcement. This comparison yields a novel, text-based measure of monetary policy surprise–the new information relative to prior beliefs–and allows us to link these communication-driven belief revisions to financial market movements.

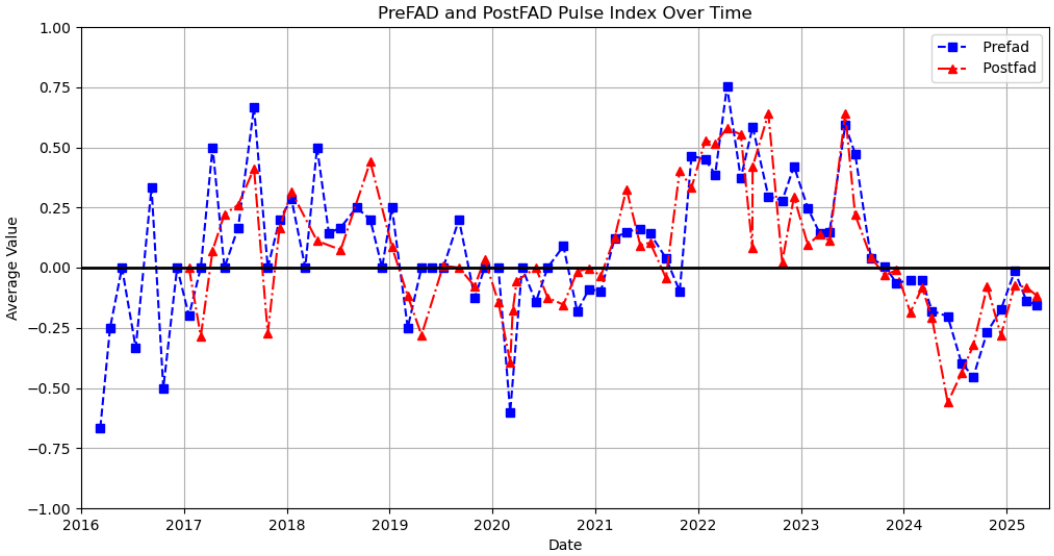
4.1 Pre-announcement preview vs. post-announcement commentary

For each primary dealer, we compute the Pulse index separately for dealer previews issued just before each announcement and for dealer commentary published immediately after. Figure 4 plots the average index value across dealers for both report types from 2016 to 2025.

[7] We use the following prompt for GPT-4o: *"Classify the sentence into monetary policy stances 'hawkish', 'neutral', or 'dovish' in the context of Bank of Canada, you are a very experienced financial market analyst."*

Several patterns emerge. First, the pre- and post-announcement tone series generally co-move, suggesting the Bank of Canada has often been effective in guiding market expectations. Nonetheless, the figure reveals notable episodes where the two series diverge. A positive gap (post-announcement tone is more hawkish than pre-announcement) signals a hawkish surprise, while a negative gap signals a dovish surprise. These surprise gaps appear to have narrowed in the most recent period.

Figure 4: Pre- vs. post-FAD dealer Pulse index, 2016–2025



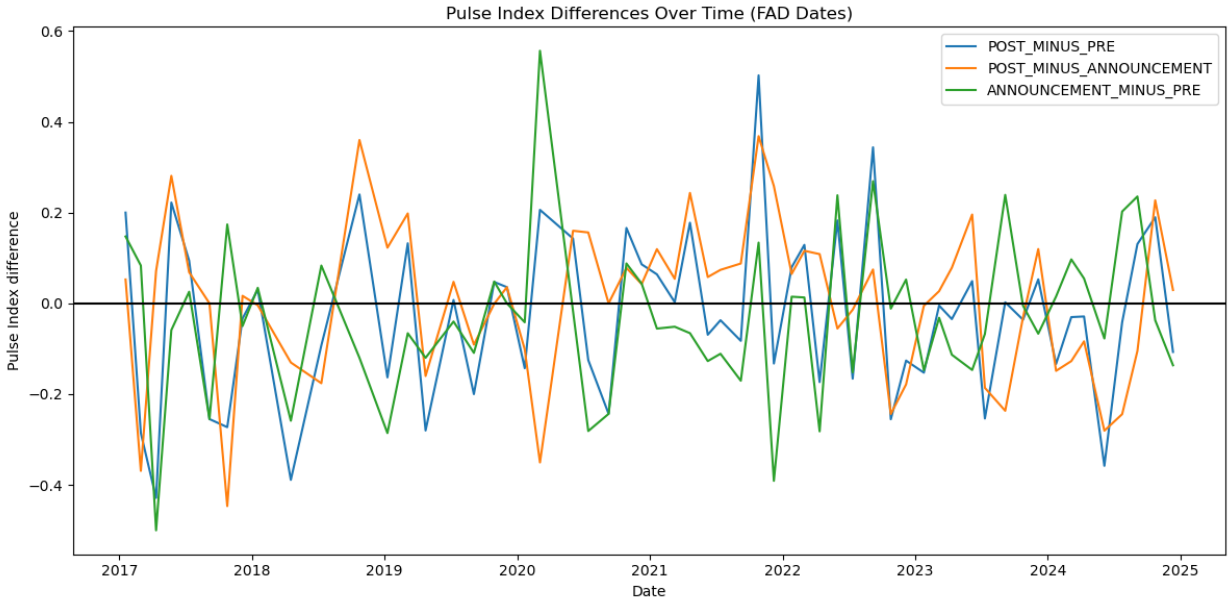
Furthermore, we compare the Pulse index across three specific time near central bank announcement days: a pre-FAD period (before the policy release), the announcement window (immediately around the fixed announcement time), and the post-FAD period (during the press conference and aftermath). Differences in tone between these intervals – namely announcement-minus-pre, post-minus-announcement, and post-minus-pre – quantify how the central bank's messaging shifts relative to prior expectations and through the course of the event. These tone differences serve as proxies for the surprise content of communications: a more positive (hawkish) Pulse index at announcement than pre-FAD, for example, would signal an unexpectedly tighter policy outlook, whereas a drop in tone during the press conference could indicate a dovish clarification.

We summarize belief revisions with three text-based tone differences on FAD days:

$$\Delta\text{tone}_t^{\text{ann–pre}} \equiv \text{tone}_t^{\text{ann}} - \text{tone}_t^{\text{pre}},$$
$$\Delta\text{tone}_t^{\text{post–ann}} \equiv \text{tone}_t^{\text{post}} - \text{tone}_t^{\text{ann}},$$
$$\Delta\text{tone}_t^{\text{post–pre}} \equiv \text{tone}_t^{\text{post}} - \text{tone}_t^{\text{pre}}.$$

Figure 5 plots these measures over time. Post−Pre is positively correlated with each of the other two (0.54), while Ann−Pre and Post−Ann are negatively correlated (-0.42), indicating that the press conference often refines or partially reverses the initial statement signal. Figure 5 plot the three measures over time. The correlation is positive (0.54) between Post-FAD minus Pre-FAD and each of the other two measures. However, Post-FAD minus Press Release and Press Release minus Pre-FAD show a negative correlation (-0.42).

Figure 5: Three measures of tone difference over time



4.2 Market Reactions to Text-Based Monetary Policy Surprises

To formally test if our text-based measure of surprise explains market movements, we follow a standard event-study approach.

First, we measure the high-frequency market reaction, or market-based surprise, using changes in asset prices or yields within a tight window around the policy announcement:

$$\Delta y_t \equiv y_{t+} - y_{t-},$$

where t_- and t_+ bound a tight window around the FAD (baseline: 30 minutes; see Sections 2.3 and Appendix C). The variable y_t can be any asset price or yield that reacts to policy news—short-end rates (e.g., BAX, and GoC with maturity $\leq$ two years), longer-term yields (ten to thirty years), the exchange rate, or equity indices. We refer to Δy_t as the *market-based surprise*. When y_t is a short-maturity, policy-sensitive rate ($\leq$ two years), Δy_t coincides with the standard high-frequency

monetary-policy surprise in the identification literature (e.g., (**?**Gürkaynak et al., 2005; Swanson and Jayawickrema, 2023)).[8]

Central bank communication shifts beliefs about the future policy path. A stylized expectations relation is

$$y_t = \beta^\top \mathbb{E}_t[\vec{i}_{t+h}], \tag{1}$$

$$\Delta y_t = \beta^\top \left(\mathbb{E}_{t+}[\vec{i}_{t+h}] - \mathbb{E}_{t-}[\vec{i}_{t+h}] \right) + u_t, \tag{2}$$

where $\vec{i}_{t+h}$ is a vector of future policy rates along horizons, β is the corresponding $K \times 1$ sensitivity (loading) vector, and u_t is an error term. The change in dealer tone (our text-based signal) proxies the revision in $\mathbb{E}[\vec{i}_{t+h}]$.

We regress high-frequency price/yield changes on the corresponding change in dealer tone:

$$\Delta y_t \;=\; \alpha \;+\; \beta\, \Delta\text{tone}_t \;+\; \varepsilon_t, \tag{3}$$

where $\Delta\text{tone}_t \in \{\Delta\text{tone}_t^{\text{ann–pre}},\ \Delta\text{tone}_t^{\text{post–ann}},\ \Delta\text{tone}_t^{\text{post–pre}}\}$. For yields we expect $\beta > 0$; for equities $\beta < 0$; for FX, a hawkish surprise appreciates CAD (thus $\beta < 0$ if y_t is USD/CAD and $\beta > 0$ if y_t is CAD/USD). The tone measure is holistic—we do not parse whether the surprise arises from the target, path, guidance, fundamentals, or the reaction function.

Table 4 reports estimates of (3). Differences involving Post−Pre or Post−Ann significantly predict short-horizon moves in policy-sensitive rates and the exchange rate. A more hawkish tone shift is associated with higher 2-year yields and an appreciating CAD; dovish shifts have the opposite effect. In contrast, Ann−Pre alone often has limited explanatory power, indicating that dealer interpretation during and after the press conference refines the statement's signal.

[8] For longer maturities and risk assets, Δy_t still captures the immediate response to policy communication but can also load on term or risk premia. We therefore use short-maturity instruments when we want a clean market-based policy surprise.

Table 4: Effect of tone differences on asset price and yield changes

Outcome	Independent Variable	Constant	Beta	R-squared	Observations
bax1_cra2	post_minus_pre	0.5	5.5	0.032	58
bax1_cra2	post_minus_announcement	0.3	9.7**	0.089	58
bax1_cra2	announcement_minus_pre	0.3	-3.4	0.011	58
bax2_cra3	post_minus_pre	0.4	9.1**	0.068	58
bax2_cra3	post_minus_announcement	0.1	13.3***	0.126	58
bax2_cra3	announcement_minus_pre	0.1	-2.8	0.006	58
bax3_cra4	post_minus_pre	0.6	14.2***	0.125	58
bax3_cra4	post_minus_announcement	0.1	16.7***	0.150	58
bax3_cra4	announcement_minus_pre	0.2	-0.3	0.000	58
bax4_cra5	post_minus_pre	0.7	15.9***	0.135	58
bax4_cra5	post_minus_announcement	0.2	18.2***	0.153	58
bax4_cra5	announcement_minus_pre	0.3	0.2	0.000	58
goc_yield_2y	post_minus_pre	0.3	10.5***	0.115	58
goc_yield_2y	post_minus_announcement	-0.0	11.4***	0.117	58
goc_yield_2y	announcement_minus_pre	0.1	0.8	0.001	58
goc_yield_5y	post_minus_pre	0.5	10.5***	0.156	58
goc_yield_5y	post_minus_announcement	0.2	10.0***	0.122	58
goc_yield_5y	announcement_minus_pre	0.3	2.1	0.006	58
goc_yield_10y	post_minus_pre	-0.1	7.9***	0.190	58
goc_yield_10y	post_minus_announcement	-0.4	7.5***	0.150	58
goc_yield_10y	announcement_minus_pre	-0.3	1.6	0.006	58
CADUSD	post_minus_pre	0.0	0.5	0.040	58
CADUSD	post_minus_announcement	0.0	1.1***	0.175	58
CADUSD	announcement_minus_pre	-0.0	-0.5	0.041	58

Notes: Estimates of (3) using intraday data for short-rate futures (BAX initially; CRA/CORRA futures more recently), GoC benchmark yields at 2-, 5-, and 10-year maturities, and the spot CAD/USD exchange rate. The second–fourth BAX (third–fifth CRA) contracts proxy policy path expectations roughly 5–14 months ahead. Windows and instruments are detailed in Sections 2.3 and Appendix C.

Overall, market reactions are tightly linked to shifts in expectations. The Pulse-based Δtone bridges qualitative belief revisions and quantitative price changes: when new information arrives, dealers update their view of the policy path, and markets reprice accordingly in real time.

Central bank communications can shape the expected path of policy interest rates, which in turn drives immediate asset price reactions. In this context, the Pulse index reflects how markets update their expectations about the Bank of Canada's policy stance in real time. We examine how shifts in tone around policy announcements relate to intraday market movements.

We interpret shifts in the Pulse index between the pre-FAD and post-FAD commentary as reflections of changes in dealers' expectations about the future policy rate path. In particular, if we denote a given dealer's expectation (formed just before the announcement) of the policy rate at some future horizon h as $E_{t-}[\vec{i}_{t+h}] - E_{t_0}[\vec{i}_{t+h}]$ and the updated expectation after the announcement as $E_{t+}\vec{i}_{t+h} - E_{t_0}\vec{i}_{t+h}$, the difference is captured qualitatively by the change in that dealer's commentary tone.

Table 4 presents our regression results, which confirm that differences in tone—particularly between Post-FAD and Pre-FAD or the Press Release—significantly predict short-term market responses. Specifically, our results indicate robust relationships between shifts in commentary tone and immediate market reactions. When dealer commentary turns more hawkish (Pulse index rise), the two-year yield tends to increase significantly in the immediate aftermath. On average, a positive tone shift is associated with a rise of about +5 to +8 basis points in the 2-year yield over the next hour, whereas when the tone turns dovish (Pulse index fall), the 2-year yield declines by a similar magnitude. This difference is statistically significant, consistent with the idea that market participants adjust their interest rate expectations in response to the tone of expert commentary. The Canadian dollar exhibits a parallel pattern: a hawkish shift in tone leads to an immediate appreciation of the CAD (against USD), typically on the order of 0.3–0.5% stronger, while a dovish shift sees the currency weaken. These exchange rate movements reflect investors pricing in tighter or looser future monetary policy.

We also find that asset prices respond significantly to commentary tone shifts when the dealers' post-announcement interpretation differs from the pre-announcement tone, or diff from the announcement, whereas they respond little to the official announcement's tone difference from pre-FAD. The key insight is that dealer interpretation plays a crucial role in how information is absorbed by markets. The Post-FAD Pulse index is derived from commentary written immediately after the policy announcement, reflecting how dealers digest and contextualize the central bank's actions and language. Therefore, a large change between the Pre-FAD and Post-FAD Pulse index means that dealers' expectations for future policy have been materially revised once the announcement is known.

On the other hand, the Announcement vs. Pre-FAD tone difference isolates the change in tone

from the central bank's statement itself relative to earlier market chatter. The fact that this metric often shows an insignificant relationship with $y_{t+} - y_{t-}$ indicates that the direct content of the announcement (measured by textual tone alone) is usually not the sole driver of market surprises. One interpretation is that by the time of the rate release, dealers had already priced in much of the expected policy decision and even the general language, so the statement's tone doesn't drastically shift their expectations. This highlights that dealers may read between the lines: if the Pulse index based on dealer commentary is more dovish or hawkish than the tone of the official statement itself, it likely reflects dealers inferring additional meaning (for example, reading the economic context or anticipating future moves beyond what was explicitly stated). Such inferences can drive asset prices if they represent information not already digested by the market at the moment of the announcement.

Overall, we find that market reactions are tightly linked to shifts in expectations. The Pulse index serves as a bridge between the qualitative information flow and quantitative market outcomes. When the BoC releases new information, the immediate question is how dealers' expectations of future policy change – our analysis shows that measuring this via commentary tone differences is highly informative. Markets reprice accordingly to reflect the new expected policy trajectory. This finding contributes to the literature by providing direct evidence that textual analyses of market commentary can capture the monetary policy surprise in real time.

4.3 Deal Commentary Difference by Topics

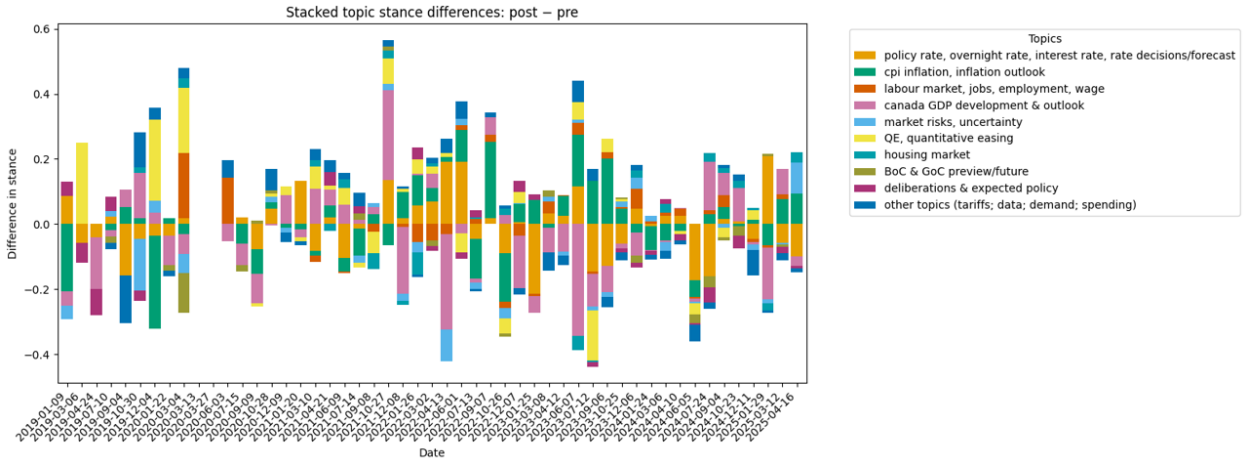
We use BERT-based topic modelling to study the drivers of dealers' tone around Bank of Canada policy announcements. The analysis decomposes dealers' aggregate policy perception index into contributions from distinct economic and policy-related topics, allowing us to track how the sources of tone evolve over time and differ across communication stages.

Figure G.5 shows the distribution of topics in press releases over time. The composition varies substantially across policy cycles, with shifts between inflation, policy-rate discussions, and broader macroeconomic outlooks. This variation highlights that official communications emphasize different dimensions of the policy narrative at different points in time.

Figure G.6 decompose dealers' post-announcement tone indices into stacked topic contributions. While both indices reflect a common set of underlying topics, their relative importance differs markedly. Figure 6 focuses on the difference between post- and pre-announcement tone. It shows that updates to dealers' views are primarily driven by revisions in topics related to the policy rate, inflation, and interest-rate forecasts. These topic-level adjustments capture how dealers reinterpret policy signals once the announcement and accompanying communications are released.

To assess the financial-market relevance of these topic-specific updates, we re-estimate equa-

Figure 6: Dealer updates their views: Policy, GDP and CPI



tion (3) by replacing the overall change in dealers' tone with its topic-level components. Table 5 reports the results. Topics associated with policy-rate decisions, inflation outlooks, and forward guidance exhibit the strongest and most consistent effects across short-rate futures, government bond yields, and the exchange rate. These findings indicate that market reactions are not driven by generic changes in sentiment, but by specific dimensions of the policy narrative emphasized in dealers' communications.

Overall, the results show that the topics shaping dealers' policy perception index vary systematically over time. In particular, policy-rate, inflation, and interest-rate forecast topics account for the differences between dealers' pre- and post-announcement tone indices and help explain the associated financial-market reactions.

Table 5: Market reaction by post minus pre topics

Topic	Topic label	bax1	bax2	bax4	bax5	bax6	GoC 2y	GoC 5y	GoC 10y	GoC 30y	CAD/USD
0	Policy rate, overnight rate, interest rate, rate decisions/forecast	7.827	12.828	25.197**	25.679**	24.036**	17.996**	13.019*	11.236**	4.878	0.626
1	CPI inflation, inflation outlook	18.635**	20.335**	22.331**	21.806**	20.976**	17.925**	17.830***	10.014**	5.604**	1.192**
2	Labour market, jobs, employment, wage	15.780	16.242	12.898	12.889	16.645	20.274	24.930*	13.440	10.042	0.739
3	Canada GDP development & outlook	-4.588	4.044	14.170	15.089*	15.767*	11.875*	6.062	8.410**	3.232	0.543
4	Market risks, uncertainty	12.762	20.402	29.725	33.366	35.592	20.667	29.773*	15.090	8.678	1.052
5	QE, quantitative easing	15.726	17.374	32.077*	34.983**	35.460**	16.022	12.259	15.092**	9.152*	0.609
6	Housing market	48.710	26.032	43.664	37.475	22.343	53.087	16.691	29.946	-3.339	3.918
7	BoC & GoC preview/future	102.617*	144.429***	146.050**	133.847**	126.447**	130.507***	73.945*	79.583***	18.571	5.175
8	Deliberations & expected policy	56.714*	51.598*	60.037*	65.094**	68.407**	59.549**	51.532**	32.485**	16.661*	6.719***
-1	Other topics (tariffs; data; demand; spending)	10.754	10.340	4.881	2.321	2.809	1.099	10.859	-2.096	1.339	-0.081

Notes: Estimates of (3) using intraday data for short-rate futures (BAX initially; CRA/CORRA futures more recently), GoC benchmark yields at 2-, 5-, and 10-year maturities, and the spot CAD/USD exchange rate. The second–fourth BAX (third–fifth CRA) contracts proxy policy path expectations roughly 5–14 months ahead. Windows and instruments are detailed in Sections 2.3 and Appendix C.

5 Macroeconomic Data Releases and Policy Expectations in Dealer Commentary

Understanding how primary dealers interpret macroeconomic news is essential for analyzing expectations around Bank of Canada (BoC) policy decisions. This section begins by outlining our conceptual approach in subsection 5.1. We then present empirical evidence showing how dealer commentary responds to key economic indicators such as inflation (CPI), GDP growth, and employment data (subsection 5.2). Next, we illustrate how variations in the Policy Pulse Index (PPI) following macroeconomic news help predict dealers' expectations just prior to BoC announcements (subsection 5.3). Additionally, we examine how dealer views shift immediately after announcements to capture the impact of policy surprises (subsection 4.1). Lastly, we confirm that changes in dealer sentiment around these announcements correspond to measurable shifts in financial market outcomes (subsection 4.2).

5.1 Conceptual Framework

Our main assumption is that when new economic information arrives, it prompts dealers to update their beliefs about the future path of monetary policy in a manner consistent with central banks' reaction function.

Our analysis begins from a standard monetary policy rule (Taylor, 1993, 1999), that characterizes the central bank's setting of the policy interest rate as follows:

$$i_t = r_t^* + \pi_t^* + \gamma_t x_t + \beta_t(\pi_t - \pi_t^*) + u_t, \tag{4}$$

where i_t is the nominal policy interest rate at time t, r_t^* is the natural rate of interest, π_t^* represents the central bank's inflation target, x_t denotes the output gap or other measures of real economic activity, and $(\pi_t - \pi_t^*)$ captures deviations of actual inflation from its target. The coefficients γ_t and β_t determine how the central bank responds to economic activity and inflation gaps, respectively. We also allow these parameters to vary over time, consistent with recent advances in the monetary policy literature that emphasize time-varying reaction functions Bauer and Swanson (2023).

Primary dealers form expectations about the central bank's future policy actions by forecasting the components of equation (4). At time t, dealer j's forecast for horizon h is given by:

$$E_t^{(j)} i_{t+h} = E_t^{(j)} r_{t+h}^* + E_t^{(j)} \pi_{t+h}^* + E_t^{(j)} \gamma_{t+h} x_{t+h} + E_t^{(j)} \beta_{t+h}(\pi_{t+h} - \pi_{t+h}^*)$$

where we assume $E_t^{(j)} u_{t+h} = 0$ for all t.

In practical terms, dealers form these expectations around key macroeconomic data releases

(such as CPI inflation, GDP growth, and employment reports) and monetary policy announcements (FAD). Here, t denotes the timing of the news release or announcement, and h represents the forecast horizon, typically focusing on immediate upcoming policy meetings or subsequent meetings, possibly extending the end of the calendar year or next year. This modeling approach aligns closely with how expectations are updated in real-world market settings.

In practice, when we think of t, dealers form these expectations primarily around key macroeconomic data releases—such as CPI inflation, GDP growth, and employment—and monetary policy announcements (FAD). when we think of h, typically for the immediate upcoming policy meetings or the subsequent meetings (usually up to 2 meetings ahead), some times will also say what will happen within the calendar year.

Consider a simple case of Figure 1. Market participants sequentially update forecasts around macroeconomic data releases and policy announcements, illustrated by four distinct sequential events:

t_0^+: Immediately after the first Central Bank policy announcement (FAD)

t_1: Inflation data release

t_2: GDP data release

t_3: Employment data release

t_4^-: Immediately before the second Central Bank policy announcement (FAD)

$$
\begin{aligned}
E^{(j)}_{t_4^-} i_{t+h} - E^{(j)}_{t_0^+} i_{t+h} &\approx E^{(j)}_{t_3} i_{t+h} - E^{(j)}_{t_0^+} i_{t+h} \\
&= \underbrace{E^{(j)}_{t_3} i_{t+h} - E^{(j)}_{t_2} i_{t+h}}_{\text{Employment data}} + \underbrace{E^{(j)}_{t_2} i_{t+h} - E^{(j)}_{t_1} i_{t+h}}_{\text{GDP data}} + \underbrace{E^{(j)}_{t_1} i_{t+h} - E^{(j)}_{t_0^+} i_{t+h}}_{\text{CPI data}}
\end{aligned}
$$

The Pulse index, derived from dealer commentary via LLM text analysis, aggregates these iterative information updates into a holistic measure of policy sentiment. Intuitively, dealer reports published after each event reflect their rational updates based on new economic information and evolving expectations of the Bank's reaction. Hence, the Pulse index at time t_2 summarizes the market's updated stance just prior to the policy announcement and can be empirically employed to predict the dealers' pre-FAD sentiment.

Importantly, our empirical approach does not explicitly separate changes in expectations due to shifts in the perceived reaction function (changes in γ_t and β_t) from those driven purely by economic conditions (x_t and π_t). Rather, we employ textual analysis through our constructed Pulse index to summarize dealers' commentary and quantify shifts in their overall policy sentiment. The forecaster predicts a series of policy actions $i_t, i_{t+1}, i_{t+2}, \ldots, i_{t+h}$, and our Pulse index serves as an integrated summary measure capturing the evolution of these expected policy paths.

This conceptual justification aligns closely with central bank communication literature (Blinder et al., 2008; Hansen and McMahon, 2016), emphasizing how market participants interpret data and guidance in forming policy expectations. The Pulse index thus provides a theoretically coherent and empirically robust measure of how macroeconomic releases shape expectations for monetary policy decisions.

5.2 Monetary Policy Pulse Indices from Macroeconomic News

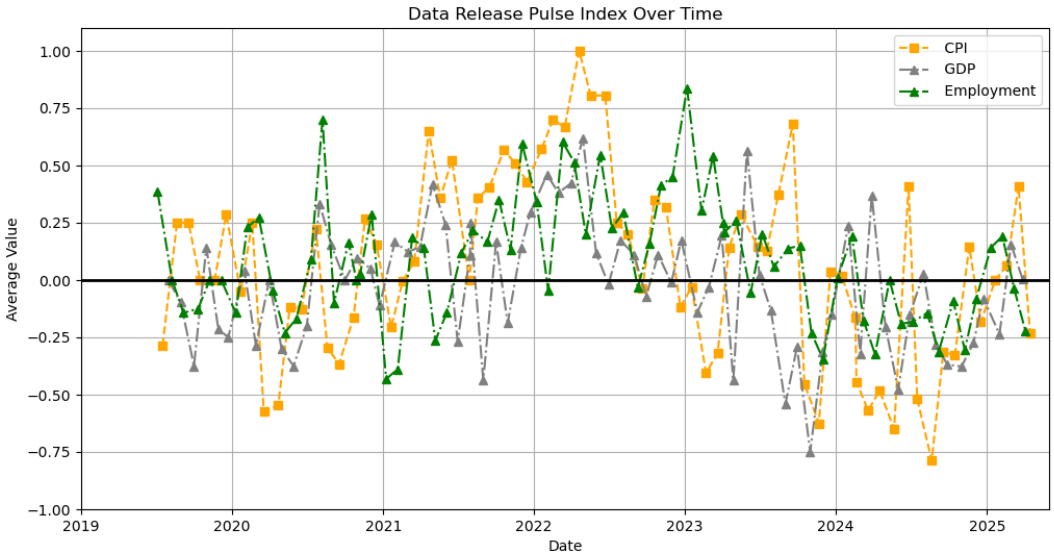
For each key release (such as CPI inflation, GDP growth, and employment figures), we use an LLM-based algorithm to measure the sentiment or "policy pulse" in the commentary produced by major financial dealers (e.g., CIBC, BMO, RBC). A higher pulse index value indicates more hawkish commentary (suggesting increased odds of a policy rate hike), whereas a lower or negative value corresponds to dovish commentary (indicating a tilt towards easing or rate cuts). Figure 7 plots the resulting pulse indices for CPI, GDP, and employment releases over time averaged across dealers.

First, CPI (inflation) surprises tend to provoke the strongest reactions in dealer commentary. For instance, during 2022—when inflation readings consistently exceeded forecasts—the CPI pulse index spikes prominently (reaching values around 0.8–1.0), reflecting widespread hawkish sentiment in response to upside inflation surprises. By contrast, GDP releases generally elicit more moderate commentary swings: the GDP pulse index remains closer to zero on average and rarely exceeds 0.5 in absolute value. Employment data fall in between, with labor market surprises occasionally prompting significant commentary shifts (e.g., a sharp drop in the employment pulse index in early 2024 corresponds to an unexpectedly weak jobs report that led dealers to adopt a markedly dovish tone). Overall, Figure 7 confirms that inflation news has the most pronounced and consistent influence on policy-related commentary, while growth and employment data produce more variable and sometimes milder effects. This illustrates that market participants place differing weights on incoming data, with inflation metrics being the primary driver of immediate policy sentiment adjustments.

5.3 Using Data Release Commentary to Predict Pre-FAD Policy Stance

After quantifying sentiment from recent commentaries, we examine how these commentary-based measures help form expectations for upcoming policy decisions. In particular, we investigate whether the "pulse" from recent data releases can predict the tone of dealers' views just before a policy announcement. We focus on the policy stance expressed by each dealer in their research notes immediately prior to a FAD rate decision. We estimate an OLS regression for each dealer's pre-FAD sentiment on the latest pulse indices from CPI, GDP, and employment releases. Formally,

Figure 7: Average dealer pulse index for data release over time



for dealer i at each announcement t, we specify:

$$i_{d,t}^{\text{pre-FAD}} = \beta_{d,t}^{\text{CPI}} i_{d,t}^{\text{CPI}} + \beta_{d,t}^{\text{GDP}} i_{d,t}^{\text{GDP}} + \beta_{d,t}^{\text{EMP}} i_{d,t}^{\text{EMP}} + \text{constant} + \varepsilon_{d,t} \tag{5}$$

where $i_{d,t}^{\text{pre-FAD}}$ is the pre-FAD pulse index for dealer d on day t, typically two to five calendar days before the announcement. The indices $i_{d,t}^{\text{CPI}}$, $i_{d,t}^{\text{GDP}}$, and $i_{d,t}^{\text{EMP}}$ represent the most recently available pulse indices for CPI, GDP, and Employment, respectively, before each pre-FAD date. Finally, $\varepsilon_{d,t}$ denotes the error term.

Table 6 summarizes the out-of-sample forecasting performance of the OLS model for three major dealers (CIBC, BMO, and RBC), compared against two simple benchmarks. The first benchmark is a *zero-change forecast*, which assumes the dealer's sentiment remains unchanged (a naive prediction of no shift in stance). The second is a *historical mean forecast*, which always predicts the dealer's average sentiment value. For each dealer, Table 6 reports the root mean squared forecast error (RMSE) for the OLS model and for both benchmarks, as well as Diebold-Mariano (DM) test statistics comparing the OLS forecast errors to each benchmark's errors. Across all three dealers, the OLS model achieves a lower RMSE than either benchmark, indicating superior predictive accuracy. The improvement is especially pronounced for RBC and BMO. For RBC, the OLS model's RMSE is substantially smaller than both the zero and mean forecasts, and the DM test statistics show that these gains in accuracy are statistically significant (at the 5% level or better).

To illustrate the model's fit, Figure 8 plots the OLS model's fitted values for RBC's pre-FAD

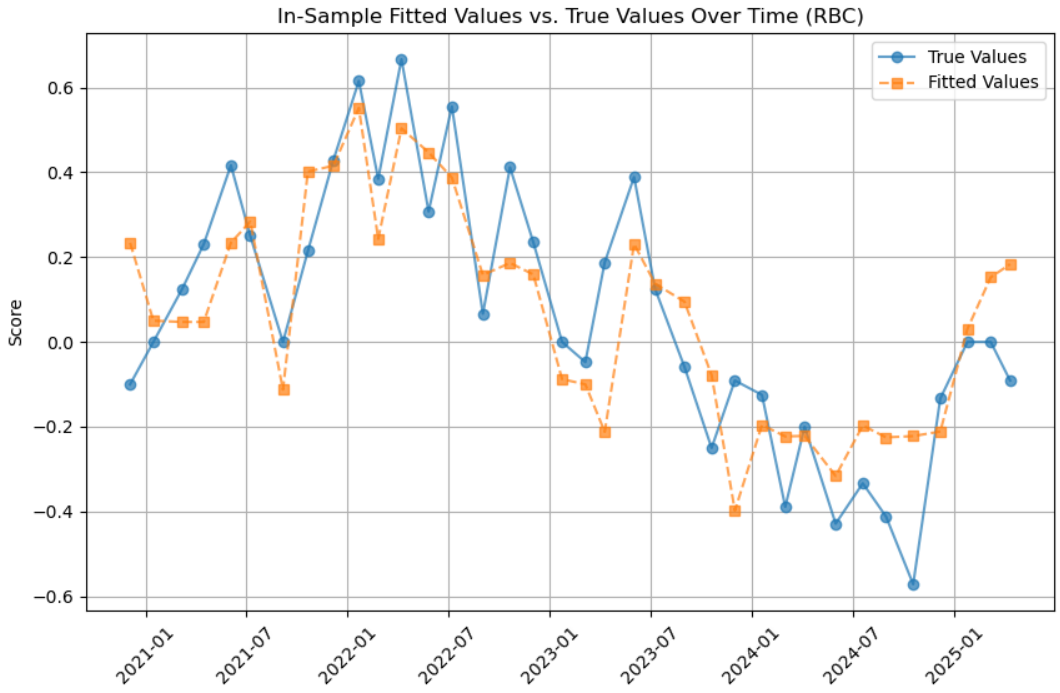
Table 6: Prediction of Pre-FAD using data release commentaries

	CIBC	BMO	RBC
CPI	0.006	0.328***	0.368***
	(0.156)	(0.102)	(0.06)
GDP	0.304	0.05	0.175*
	(0.219)	(0.115)	(0.088)
EMP	0.949***	0.1	0.061
	(0.228)	(0.135)	(0.08)
constant	-0.004	0.049	0.047
	(0.062)	(0.044)	(0.033)
Obs	36	38	36
Rsquared	0.496	0.345	0.676
RMSE (OLS)	0.324	0.218	0.172
RMSE (Zero)	0.466	0.293	0.310
RMSE (Mean)	0.457	0.269	0.302
DM stat (Zero)	-2.410	-2.300	-3.310
DM p-value (Zero)	0.020	0.030	0.000
DM stat (Mean)	-2.680	-2.270	-3.360
DM p-value (Mean)	0.010	0.030	0.000

Notes: We estimate the results using equation (5). The table reports root mean squared forecast errors (RMSE) for the OLS model and two benchmarks: the *zero-change forecast*, which assumes no sentiment shift, and the *historical mean forecast*, predicting constant sentiment at its historical average. The Diebold-Mariano (DM) test statistics assess whether the OLS forecasts significantly outperform each benchmark.

PPI against RBC's actual PPI over time. The model tracks RBC's PPI dynamics reasonably well. In periods where macroeconomic news drove notable shifts in expectations, the fitted PPI (orange dashed line) closely follows the actual PPI (solid blue line). For example, the model captures the strong hawkish turn in RBC's commentary during mid-2022, as well as the sharp dovish shift in early 2024. The overall correspondence between the fitted and actual series suggests that a large portion of RBC's policy outlook is explained by the latest macroeconomic developments encapsulated in our pulse indices. Some discrepancies remain — particularly during certain volatile episodes where idiosyncratic factors or qualitative judgment may have influenced RBC's stance — but the broad co-movement indicates the regression model is capturing the key drivers.

Figure 8: Prediction of Pre-FAD using data release commentaries(RBC)



6 Conclusion

Our paper develops a novel method to quantify the tone of central bank communications by systematically analyzing real-time dealer commentary through advanced natural language processing. The introduction of the Policy Pulse Index provides a precise and immediate gauge of market expectations and sentiment surrounding monetary policy decisions. Our analysis demonstrates the PPI's predictive capability in forecasting market reactions to policy announcements, capturing shifts that traditional methods may overlook. By bridging qualitative textual data and

quantitative market outcomes, we contribute significantly to the understanding of monetary policy communication and its transmission to financial markets.

Future research could extend this framework to include broader sets of financial institutions and international contexts, allowing for comparative analyses of central bank communications across different monetary policy frameworks. Additionally, further methodological enhancements could incorporate real-time integration of multimedia content, such as central bank press conferences and speeches, to enrich sentiment analysis and capture more subtle aspects of market interpretations. Finally, exploring the role of individual analyst characteristics and institutional biases in shaping market expectations may offer deeper insights into the dynamics of monetary policy communication.

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Appendix A Raw dealer report examples

CIBC CAPITAL MARKETS

Economics

ECONOMIC FLASH!

economics.cibccm.com

October 19, 2022

Canadian CPI (Sep): Cooler, but not cold, core inflation

by **Karyne Charbonneau** karyne.charbonneau@cibc.com (613 552-1341)

Consumer price index (% chg)	22:Q2	22:Q3	Jul	Aug	**Sep**
Year/year rate (unadjusted)	7.5	7.2	7.6	7.0	6.5
Monthly rate (unadjusted)	-	-	0.1	-0.3	-0.2
Monthly rate (SA)	-	-	0.1	0.1	0.4
Three-month rate (SAAR)	-	-	7.1	2.9	2.4
CPI-trim (year/year rate)	5.3	5.3	5.4	5.2	5.2
CPI-median (year/year rate)	4.7	4.8	4.9	4.7	4.7
CPI-common (year/year rate)	5.8	6.1	6.3	6.0	6.0

Source: Statistics Canada

- There will be some long faces at the Bank of Canada this morning as inflation cooled less than expected. Unadjusted headline CPI increased 0.1% in September, with the annual rate easing only one tick to 6.9% (consensus -0.1%, 6.7% y/y). This is the third consecutive deceleration in headline CPI driven mainly by the fall in gasoline prices. Given that those prices have since reversed, the next month could see headline inflation temporarily heading in the wrong direction again. But that is not the main focus for the Bank of Canada, who is paying closer attention to core inflation. CPI excluding food and energy rose by 0.4% seasonally adjusted on the month, faster than last month, and at a pace that's too high to be consistent with the 2% target. The Bank of Canada therefore still has work to do, and should be set for another 75 bps increase in the overnight rate next week.
- The 7.4% drop in gasoline prices once again drove the decline in CPI in September. But those prices started to reverse at the end of the month and continued to rise in October. That will likely imply at least a temporary acceleration in annual headline inflation next month. Meanwhile, food prices continued to grow at a historic pace. Part of the acceleration reflected another increase in dairy prices in the month, though price pressures at grocery stores remain broad-based.
- CPI excluding food and energy increased 0.4% seasonally adjusted on the month, above the prior month and the trend needed to sustain a 2% inflation target, but an improvement over earlier in the year. After declining last month, the price of passenger vehicles grew strongly and was the largest upward contributor to the 12-month change in CPI. This is another sign that supply chain issues in the sector are not improving as fast as expected. Prices for clothing, particularly woman's clothing, also rose strongly.
- Shelter prices rebounded somewhat in September, despite the cooling in the housing market. While other owned accommodation and homeowner's replacement continued to decelerate, this was more than offset by increases in mortgage interest cost (reflecting the increase in interest rates), homeowner's insurance, and the index for maintenance and repairs.
- The annual (5.4%) and the three-month seasonally adjusted annualized rates (4.9%) of inflation excluding food/energy are still well above 2%. Meanwhile, CPI-trim and CPI-median remained unchanged at 5.2% and 4.7% respectively (remember that the Bank of Canada has stopped looking at CPI-common). With core inflation this high, the Bank of Canada will need to continue with its outsized rate hikes.

Implications & actions

Re: Economic forecast — The Bank of Canada has clearly not slayed the inflation dragon yet and is therefore set for another large rate hike next week. The pace of growth in seasonally adjusted inflation excluding food and energy picked up by more than expected this month and is too high for comfort. As such, we now believe the Bank will need to go with a 75 bps hike next week rather than the 50 bps we previously anticipated. The Bank might then be left with a last 25 bps in December if growth numbers support it.

Re: Markets — Bond yields jumped immediately after the release, but have since retraced part of those gains. The Canadian dollar, which had depreciated overnight, appreciated right after the release as investors understand that this CPI report adds some pressure on the Bank of Canada.

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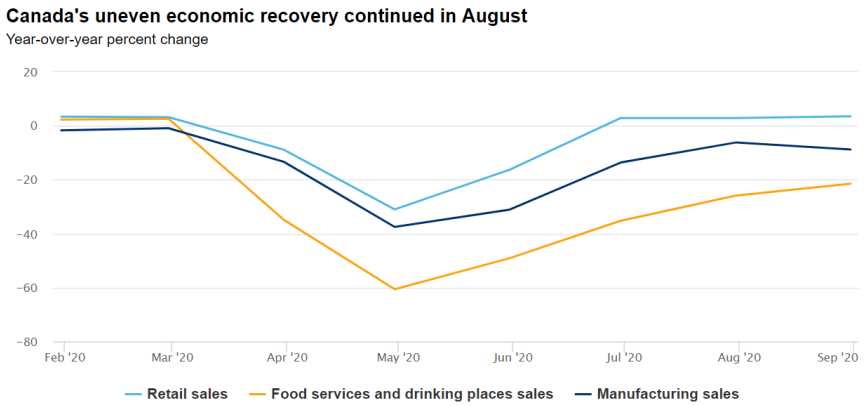
For the week of October 26, 2020

Canada's economic recovery slowing ahead of COVID resurgence

Expect next week's GDP data to confirm that the uneven Canadian recovery continued in August. Our forecast suggests the economy grew by 0.7% (roughly in line with Statistics Canada's 1% preliminary estimate), a slowdown from July's 3.0% increase and June's 6.5% rise. That would leave the level of activity still running 5% below pre-pandemic levels. The retail sector recovery continued to outperform other industries in August and housing market activity surged. But manufacturing sales took a step back. Some of the sectors hardest-hit by the pandemic – accommodation & food services, and entertainment industries – will likely show gains though activity remained well behind year-ago levels and lagged the rebound in other sectors. While the economy likely continued to grow in September, the resurgence in COVID-19 cases and the re-imposition of some targeted containment measures could weaken growth beyond that.

Overall GDP is still on track to rise at an annualized 45% in the third quarter. That's higher than the Bank of Canada's forecast in the July Monetary Policy Report (+32%) and we expect the central bank to bump up its Q3 GDP growth assumptions in the Monetary Policy Report update Wednesday. More attention will be paid to the bank's expectations for the economy beyond that given the resurgence in COVID-19 – and certainly, there are limits to how much it can recover while the threat of the virus remains. The central bank assumed a 2% increase in Q4 GDP in their last 'central tendency' forecast, slightly above our own current tracking for a 1% increase. The early recovery in consumer spending was supported by

unprecedented amounts of fiscal and monetary stimulus. And low interest rates have clearly played a role in the rebound in housing markets. But the recovery in spending on services has been much slower, and that has also been weighing on inflation. We expect the BoC to remain focused on economic growth rather than near-term inflation concerns, and look for exceptionally low interest rates to be maintained for the foreseeable future.



Source: Statistics Canada, RBC Economics

Week ahead data watch:

- We expect the **US advance Q3 GDP** report to show a 35% annualized increase backed by a solid recovery in household spending and residential investment. Net trade is expected to be the only drag on GDP as recovery in imports continued to outpace exports during the third quarter.
- **Personal income** is expected to tick up another 0.5% in September after falling almost 3% in August as some fiscal stimulus measures expired. **Household spending** is also expected to hold up well, rising another 1% in the same month.

EconoFACTS

December 07, 2022 | 10:49

BoC 50 bp Rate Hike — Semi-Finals

Economist

Related Research

The Bank of Canada raised its key overnight lending rate 50 bps to 4.25% today, the seventh consecutive hike and bringing this year's cumulative rate hike to 400 basis points. This latest move was a bit more than many expected, but was not a major surprise—we looked for a 50 bp move, while consensus and market pricing was almost evenly split between a 25 and 50 bp hike (with a slight bias to 25), after the 50 bp effort in October. Beyond the rate hike itself, equally important was the **messaging** on possible future moves, and the tone here was **definitely on the mild side**. Dropping any suggestion that rates still need to go higher, the Bank indicated that this **could possibly be the last move** (depending on the data, of course).

The key statement was: *"Looking ahead, Governing Council will be considering **whether** the policy interest rate needs to rise further to bring supply and demand back into balance and return inflation to target.*" (Emphasis ours.)

The three factors that the Bank suggested would inform their decision *whether* to keep hiking or not were:

*"...assess how tighter monetary policy is working to slow **demand**, how **supply challenges** are resolving, and how **inflation and inflation expectations** are responding."* So, not surprisingly, the keys to watch will be the strength of the economy (notably GDP and jobs), supply chains pressures, and core inflation.

Thus, from having been split on this decision, the consensus and markets will now debate the chances of a move at the January 25 decision, and it's already seen as a close call. At this point, **we would stick with our call of a terminal rate of 4.50% with one final 25 bp hike next month**.

The Bank explained today's mildly aggressive move by noting the resiliency in the global economy and the U.S. consumer, the stronger-than-expected Q3 GDP in Canada, as well as the still-tight domestic labour market. It did approvingly note the calming in the three-month trend in core inflation (3.7% a.r. on ex food & energy—watch this space in the CPI release two weeks hence). As well, the Bank allowed that the rate hikes to-date are *"restraining domestic demand"*, the key factor behind its mild message on future moves.

Bottom Line: Today's relatively aggressive hike suggests that the Bank remains acutely concerned about still-high inflation expectations, even amid a clear cooling in domestic demand and some early indications that underlying inflation is losing momentum. In recognition of those latter factors, the Bank has opened the door to the possibility that this could be the last rate hike of the cycle. However, we are more concerned than the consensus on the stickiness of underlying inflation, and suspect that the data will direct the way to **one more 25 bp hike at the next meeting**.

Appendix B Data details

Appendix Table B.1: Example of pre-FAD commentary on 2024-April 10

Bank	Comments
BMO	BMO expects no change. – "Last month saw the U.S. churn out yet another chart-topping payroll gain of 303,000... That 2.3 ppt divide between the jobless rates is at the very upper end of the range over the past twenty years." – "There has been some wavering on our call for a June cut... ex-shelter inflation dropping to a mere 1.3% y/y. But the snapback in oil and sticky wage growth of around 5% could frustrate further progress."
CIBC	CIBC expects no change. – "The central bank can't sound too dovish if, as we expect, they leave rates on hold... So look for dovish language on inflation to be countered by an upgraded growth forecast for Q1." – "We still expect a quarter point cut in June, but... we now see 100 bps in policy easing for this year in total."
NBF	NBF expects no change. – "CPI data over the last two months has been extremely encouraging... These developments have sparked debate on whether the BoC will soften the tone." – "We expect the BoC to continue to flag upside inflation risks... leaning against an immediate need for lower rates." – "The MPR will also reveal the BoC's updated neutral rate projection... likely to a range of 2.25% to 3.25%."
RBC	RBC expects no change. – "Economic data since the last interest rate decision have been mixed... tracking substantially above the central bank's forecast." – "Labour markets have continued to soften... and wage growth has shown further signs of slowing." – "Resilience in early-2024 GDP data gives the BoC time to hold the line... our base case assumption is that the BoC will be in a position to shift to cuts around mid-year."
Scotia	Scotia expects no change. – "You could argue that the BoC will turn more dovish because of two back-to-back soft readings... I wouldn't and I don't think the BoC will be of such persuasion." – "If they do take any step toward teeing up a cut... it would be a signal to markets that its reaction function is independent of the balanced suite of data and developments."
TD	TD expects no change. – "BoC will release a fresh set of forecasts in their MPR... growth should see a significant upgrade from the current flat-GDP projection." – "Wage growth remains a thorn in the BoC's side... but there is clear evidence that current policy is doing its part in lowering the temperature on Canada's job market."
Desjardins	Desjardins expects no change. – "The BoC won't be changing interest rates in April, but will be looking to signal that rate cuts aren't too far off." – "The latest BoC consumer and business surveys suggest that... easing policy gradually and consistently likely won't stoke any inflationary pressures." – "Since the original publication of our work, we've been joined by other economics groups in pointing out the limitations of using CPI median and CPI trim as operational guides."

Appendix Table B.2: Example of pre-FAD commentary on 2024-Oct 23

Bank	Comments
BMO	BMO expects 50bps cut. – "Canadian consumer prices fell 0.4% in September, helping chop the annual inflation rate to 1.6% from 2.0% the prior month." – "The latest dip was mostly driven by a 7.1% slide in gasoline prices (since partly reversed), as ex-gasoline inflation actually held steady at 2.2%. In a similar light, all the major measures of core held steady." – "Sliding energy prices were the big driver here, as core price inflation was largely as expected and essentially stable. Still, the long-awaited drop in headline CPI to below 2% is a watershed moment, which will help calm down inflation expectations. While gasoline will likely pop back up in next month's report, some of the hottest components of shelter costs are relenting and will act as an undertow on overall inflation in coming months."
CIBC	CIBC expects 50bps cut. – "Markets have thrown down their 50 basis point chip on the poker table, betting that the Bank of Canada will deliver an interest rate cut of that magnitude next week. But will the central bankers call that bet, or raise to 75? While a mega-move isn't our base-case forecast, there are reasons to think that Governor Macklem's team will give such a move more consideration than the 25 basis point cut that some economists are still projecting." – "A 50 basis point rate cut from the Bank of Canada is a reasonable bet, and rightly so in the face of softer inflation and sluggish Q3 growth. The Bank will downgrade its call for that quarter, but don't expect it to get too pessimistic about growth next year, since it should view the inflation trend as giving it carte blanche to do what it takes to get the economy moving at a faster clip."
NBF	NBF expects 50bps cut. – "We expect the central bank to cut its policy rate by 50 basis points after Wednesday's meeting, accelerating the move away from its still highly restrictive policy stance. We also expect the rate statement and press conference to leave the door open for a similar move in December, as officials stress the need for a more neutral policy stance." – "The outlook for the Canadian labour market remains challenging, as evidenced by subdued hiring intentions and job openings. In our view, the pickup in hiring in September will ultimately be seen as noise rather than the start of a new trend." – "While the release of the Q3 GDP report is still some way off (November 29), all signs point to a growth rate that's less than half of what was projected in the optimistic July Monetary Policy Report."
RBC	RBC expects 50bps cut. – "Interest rate changes impact the economy with a substantial lag, increasing the urgency to get rates back down to a more neutral policy quickly, which is somewhere in the 2.25% to 3.25% range, according to BoC's estimates." – "We expect the BoC will ultimately need to go further than that to prevent the softening in the Canadian economy from stretching into the second half of 2025. Our base case assumes another 50 basis point cut in December and reductions down to 2% by mid next year." – "The economic backdrop has continued to soften, and risks to inflation look increasingly tilted to the downside of the BoC's 2% target."
Scotia	Scotia expects 50bps cut.

Bank	Comments
	– "50bps would take cumulative cuts to date to 125bps and leave the policy rate at 3.75%. Our forecast is marked by considerable uncertainty in both directions, but at this point we think the rate will decline to 3% by Spring and stay there throughout the rest of 2025 as the nearer-term terminal rate." – "Governor Macklem is likely to repeat the line that it is reasonable to expect further rate reductions and otherwise let his team's forecasts do the talking on the bias. That bias is less data dependent now than it is driven by a quest to normalize rates. We do not expect changes to balance sheet management." – "Forecast revisions for Canadian growth and inflation are expected to be relatively modest compared to the BoC's July MPR and our current BNS Economics forecasts."
TD	TD expects 25bps cut. – "The biggest beneficiary from the BoC's easing cycle is typically the housing market. While the market response to rate cuts hasn't come to a boil like many would have expected, it is starting to stir. Housing sales jumped nearly 2% in September and are up 6% since rate cuts started in June. But at the same time, listings are up over 9%, as sellers test out the market following nearly two years of housing market uncertainty." – "The argument for a 25 bp cut is that there is still clear strength coming from the jobs market, with wage growth running well above inflation." – "Now, the case for a 50 bp move is coming from the fact that Q3 GDP growth is tracking well below the BoC's forecast (even if it should rebound in Q4) and headline inflation is below target. The central bank will have to downgrade its forecast for both on Wednesday and can use this as cover to justify a 50." – "Despite market pricing shifting towards 50 bps, we still think 25 bps is the right move given the arguments above."
Desjardins	Desjardins expects 50bps cut. – "Economic growth has been disappointing, particularly given the blistering pace of population growth, while forward-looking indicators of business activity and consumer spending remain soft. Inflationary risks are limited, with many measures of underlying inflation having normalized. In fact, risks to inflation now appear to be skewed to the downside." – "We expect central bankers to return to 25 basis-point reductions beginning in December on the way to taking the policy rate down to a trough of 2.25% in 2025."

Appendix Table B.3: Example of post-FAD commentary on 2024-September 4, 25bps rate cut

Bank	Comments
BMO	cut its overnight target rate again by 25 bps to 4.25%, as widely expected." BMO expects continued rate cuts, sees risk of a 50 bp step. – With inflation getting closer to the target, we need to increasingly guard against the risk that the economy is too weak and inflation falls too much." – Persistent solid wage growth may be the single biggest factor keeping the Bank from being even more aggressive." – Jobless figures have quickly become equally as important as inflation data in the Bank's decision-making."
CIBC	CIBC expects cautious pace of cuts, but sees potential for acceleration. – Victory goes to the bold, but the Bank of Canada went with the more cautious approach of yet another quarter-point rate cut." – Two-sided risks to inflation" despite a base case of economic slack pushing inflation lower. – "We're calling for two more 25 bp moves this year... but a disappointment in upcoming jobs data could still compel a bolder pace of easing."
Desjardins	As was widely expected." Desjardins sees rate cuts continuing amid sluggish economy, potential for larger steps. – Even after three rate cuts, we don't believe the central bank has done enough to see a rebound." – With growth faltering... the risk is that central bankers will need to slash rates in October by 50 bps instead of 25 bps." – Bond yields were relatively unchanged... communications not as dovish as they could have been."
NBC	in line with the consensus and market expectations." National Bank expects steady 25 bp cuts with increasing focus on downside risks. – Forward rate guidance... reiterated that 'it is reasonable to expect further cuts' if inflation eases in line with their forecast." – Governor stressed they're not on a pre-determined path... 'if we need to take a bigger step, we're prepared to take a bigger step."' – Growing focus on downside inflation and economic risks... should keep markets pricing some probability of larger-than-25 bp cuts."
RBC	The move was in line with market and our own expectations." RBC expects continued cuts, emphasizing downside economic risks. – Gradually weakening economy... puts further downward pressure on inflation." – Below-target inflation is also a growing concern, speaking to rising downside risks." – Canadian economy remains in a state of excess supply... hiring demand has struggled to keep up with rising labour supply."
Scotia	The Bank of Canada met expectations." Scotia sees measured pace of cuts, highlights muted market reaction. – Signalling nothing more than a drip pace of data-dependent future cuts... markets couldn't have cared less." – Forward guidance was unchanged in signalling a measured pace with no hints at altering size or pace." – Macklem still downplayed any serious consideration being given to upsizing and made it clear that slow and steady is the base case."

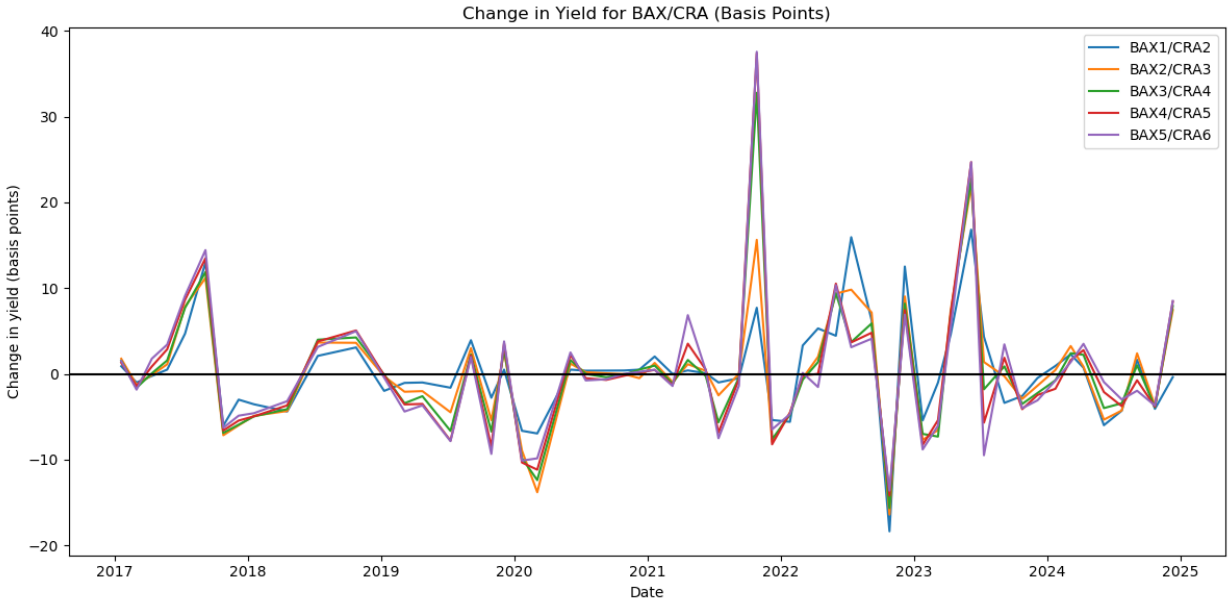
Bank	Comments
TD	delivered another 25bp rate cut in September as widely expected." TD expects rate at 3.75% by year-end, sees dovish shift in BoC tone. – The policy statement was dovish... now putting equal weight on upside/downside risks to inflation." – Very little to balance the dovish message... stronger wage growth was largely dismissed as backward looking." – We now look for the BoC to finish the year at 3.75%, cutting by 25 bp in both October and December."

Appendix Table B.4: Dealer Commentary Series

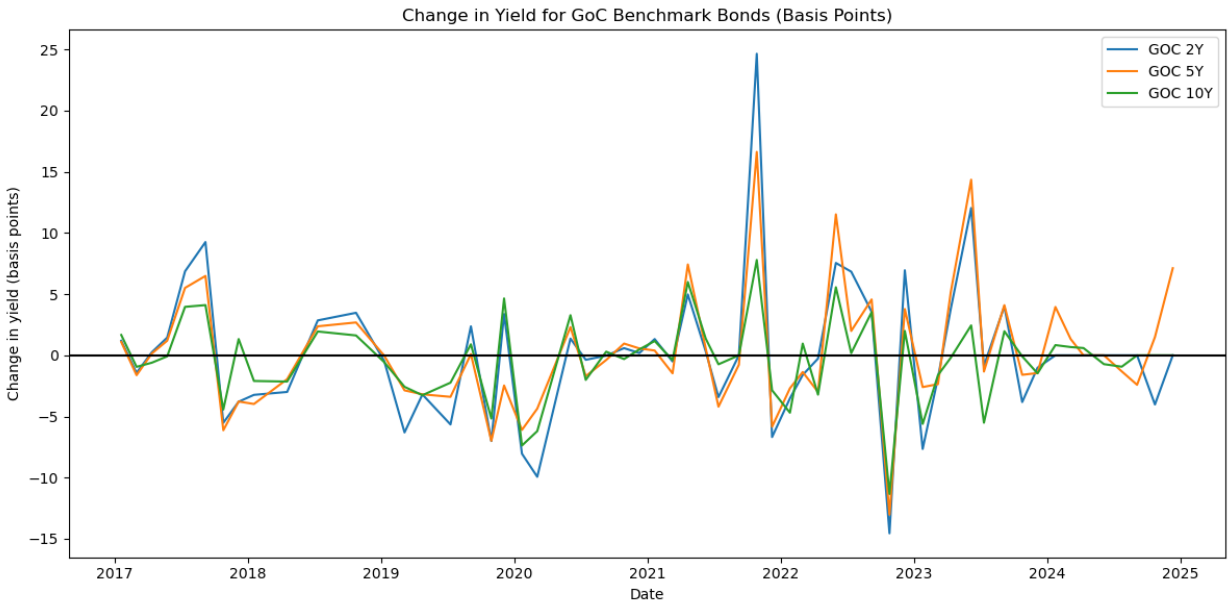
Bank	**Series for data release**	**Series for post-FAD**	**Series for pre-FAD**
CIBC	Economic Flash!	Economic Flash!	The global week ahead
BMO	Econofacts	Econofacts	BMO preview
RBC	(Daily) Economic update	(Daily) Economic update	Forward guidance
Scotia	Scotia Flash	Scotia Flash	The week ahead
Desjardins	Economic news	Essentials of the monetary policy	Weekly Newsletter
National	Economic news	BoC monitor	BoC preview
TD	TD commentary	TD commentary	TD preview

Appendix C Financial market surprises

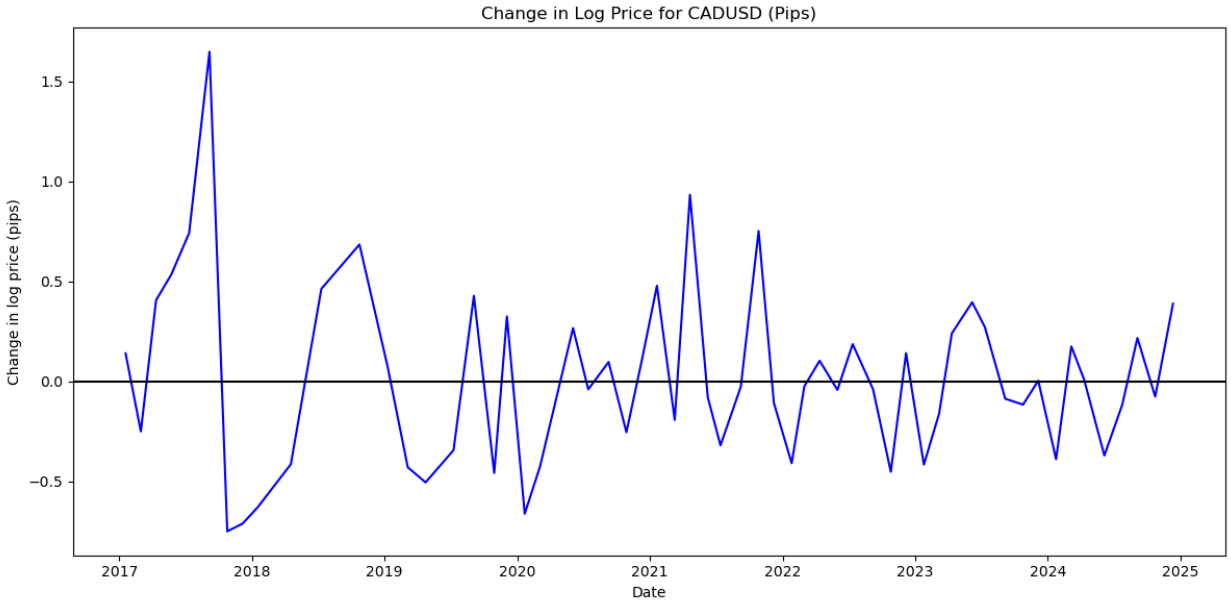
Appendix Figure C.1: Surprises in BAX and CRA contracts yields over time



Appendix Figure C.2: Surprises in GoC benchmark yields over time

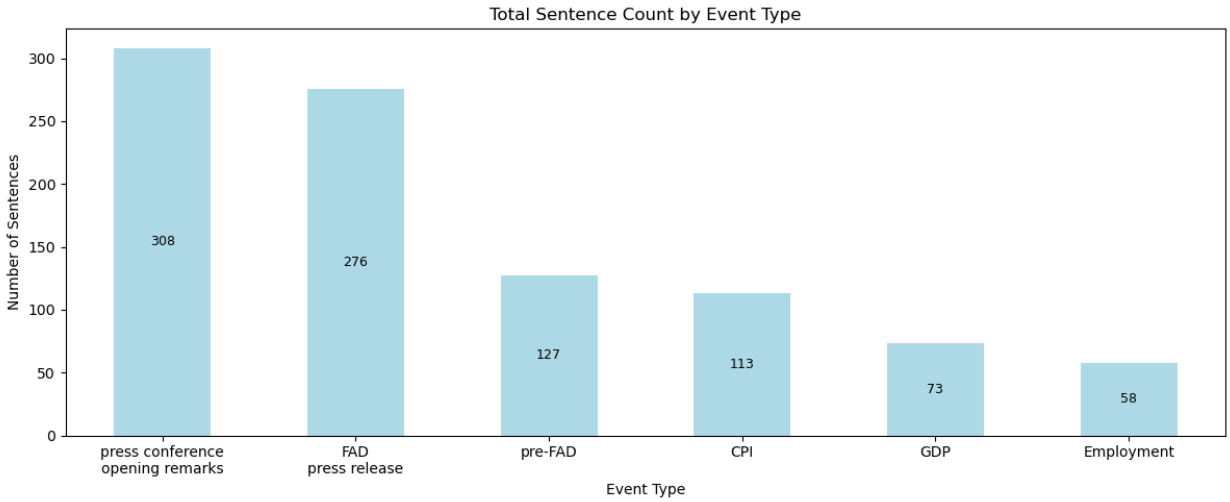


Appendix Figure C.3: Surprises in log of CADUSD price over time



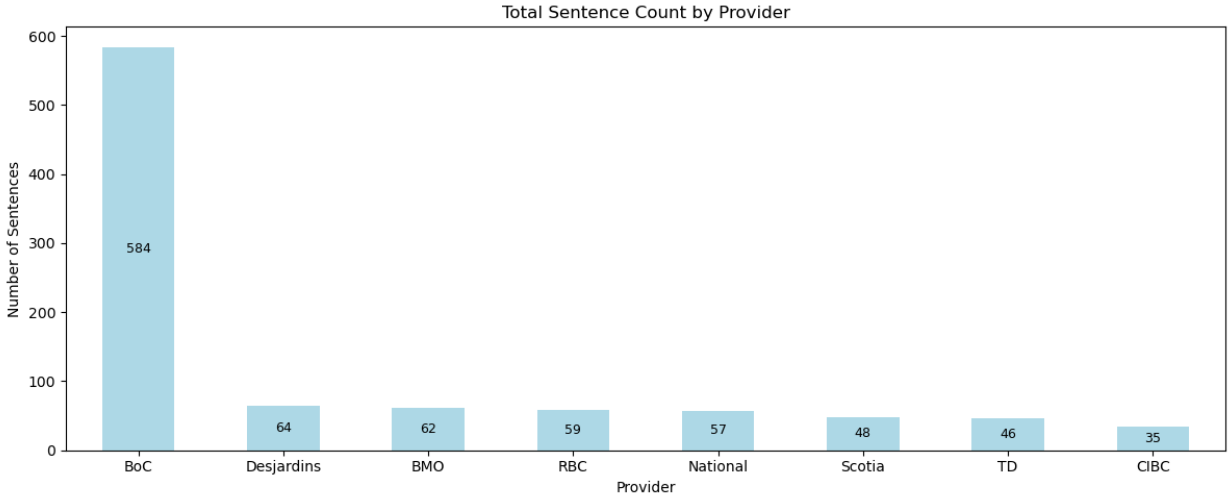
Appendix D Training data selection

Appendix Figure D.1: Total Sentence Count by Event Type



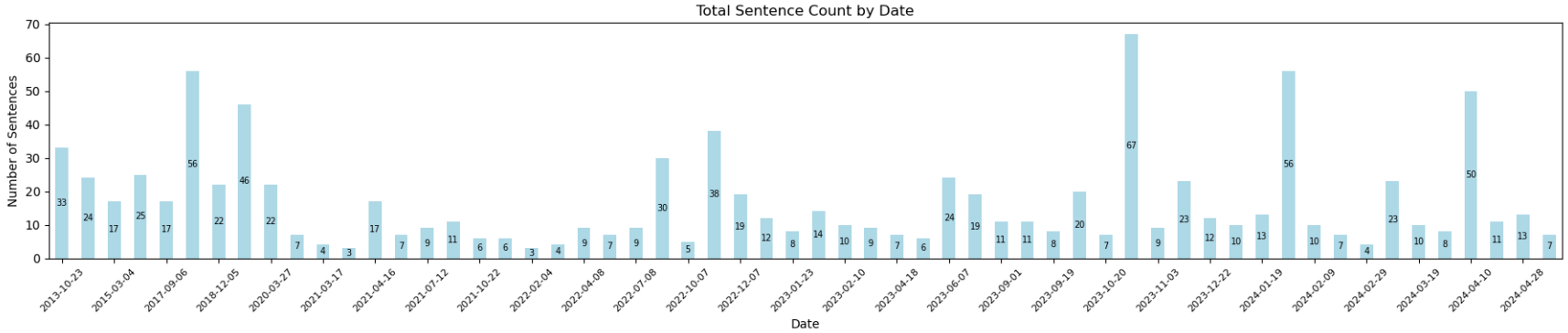
Notes: Distribution of the selected 953 sentences from the BoC-relevant core corpus across various event types, including Bank of Canada press releases and macroeconomic data announcements.

Appendix Figure D.2: Total Sentence Count by Provider

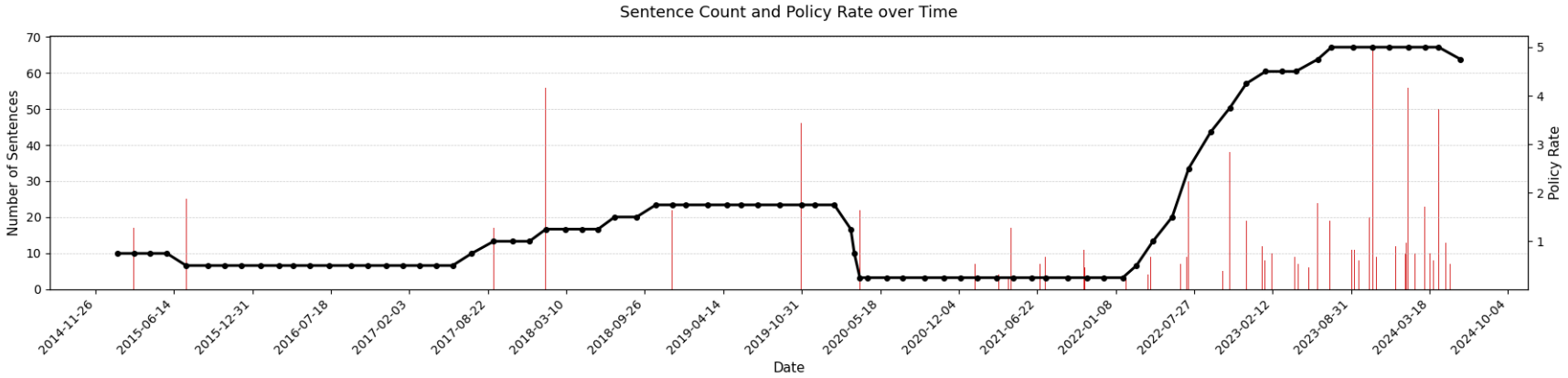


Notes: Total number of sentences by data provider, highlighting the distribution between Bank of Canada official releases and dealers' commentary reports from major Canadian banks.

Appendix Figure D.3: Sentence Count and Policy Rate over Time



Appendix Figure D.4: Sentence Count and Policy Rate over Time



Appendix Table D.1: Examples of dovish and Hawkish phrases

Dovish phrases	**Hawkish phrases**
inflation expectations anchor	inflation expectations increase
anchor inflation expectations	rise inflation expectations
inflation expectations decline	inflation expectations increase
inflation expectations remain stable	inflation expectations higher
inflation expectations stable	inflation expectations higher
stable inflation expectations	rise inflation expectations
lower inflation expectations	higher inflation expectations
reduction inflation expectations	increase inflation expectations
cut federal funds rate	raise federal funds rate
lower federal funds rate	higher federal funds rate
reduce federal funds rate	raise federal funds rate
decrease federal funds rate	increase federal funds rate
reduction federal funds rate	rise federal funds rate
cut interest rate	raise interest rate
lower interest rate	higher interest rate
reduce interest rate	raise interest rate
decrease interest rate	increase interest rate
reduction interest rate	rise interest rate
decline economic activity	increase economic activity
stable inflation	rise inflation
downward pressure inflation	upward pressure inflation
decrease inflation	increase inflation
declined employment	higher employment
employment fallen	employment increased
employment fell	employment increased
unemployment rate rising	unemployment rate lower
increases unemployment rate	declines unemployment rate
rise unemployment rate	drop unemployment rate
higher unemployment rate	lower unemployment rate
dovish monetary policy	hawkish monetary policy
easing monetary policy	tightening monetary policy
quantitative easing	quantitative tightening

Appendix E Examples and reasoning provided in the training session

In the session, annotators were provided example scenarios illustrating how to apply the labeling rules. For example,

> *"Look for the BoC to note increased confidence in the recovery, both at home and abroad, supported by residential investment and fiscal stimulus in the US."*

We used this example to clarify that references to factors like residential investment and U.S. fiscal stimulus are indirect economic factors rather than explicit policy signals. Annotators were thus told that even if such factors support a positive economic outlook, the statement should be labeled Neutral in terms of the Policy Pulse Index unless it contains a more direct indication of tightening or loosening of policy.

We also gave explicit instructions on how to handle conditional statements. For instance,

> *"The issue is that we've likely taken a step back from that precipice due to Omicron, and with some uncertainty on where that story is going, the Bank could still opt to set the stage for a hike in March or April when there's greater clarity (See our cover story)."*

Here, annotators were advised to interpret such statements by focusing on the implied policy stance in the scenario. In the example above, the condition suggests a possible tightening action; therefore, even though the sentence is conditional, it implies a hawkish stance (since it signals rate hike in a certain scenario).

Another important part of the training was differentiating the policy stance from the broader economic sentiment expressed in a statement.

> *"CPI inflation slowed to 2.8% in February, with easing price pressures becoming more broad-based."*

We instructed annotators that the general sentiment of this statement is positive – it reports a favorable development in inflation dynamics. However, we also explained that its policy pulse should be categorized as Dovish. The rationale is that slowing inflation and broad-based easing of price pressures would typically reduce the urgency for further monetary tightening, thereby signaling a more dovish policy outlook.

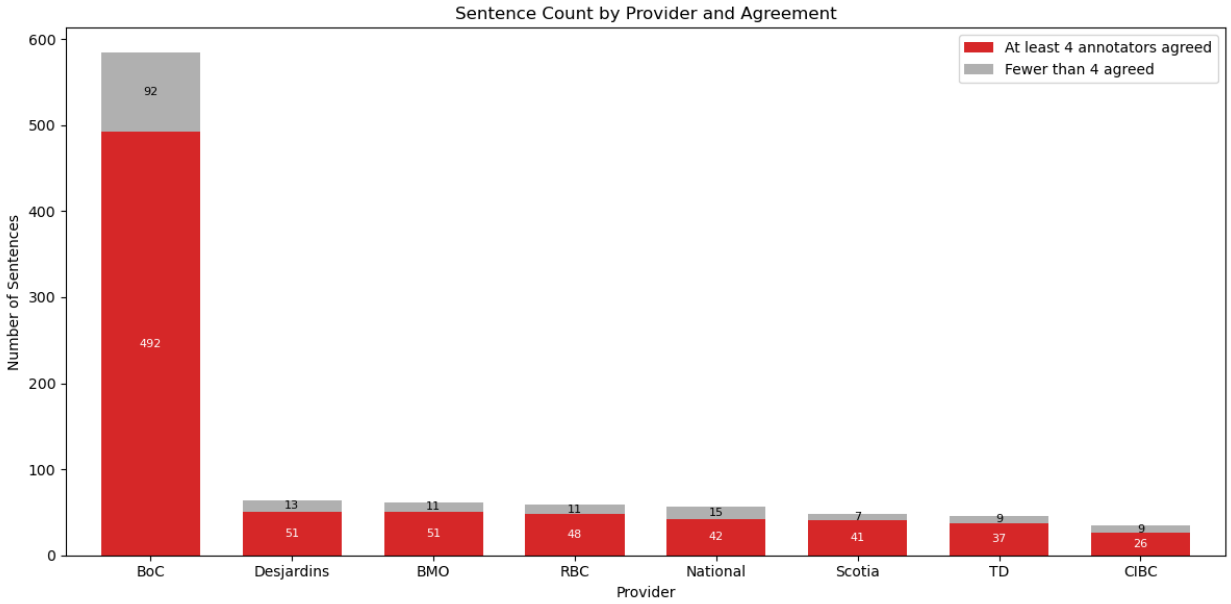
Additionally, the instructions covered how to classify statements discussing global economic conditions. Many Bank of Canada statements reference developments in other economies (such as the United States or Euro-area) as part of the context. We clarified that unless a direct spillover or link to Canada's economy or policy is stated, such foreign context should be labeled Neutral for the Policy Pulse Index.

Appendix F Training data feature (agreement vs disagreement)

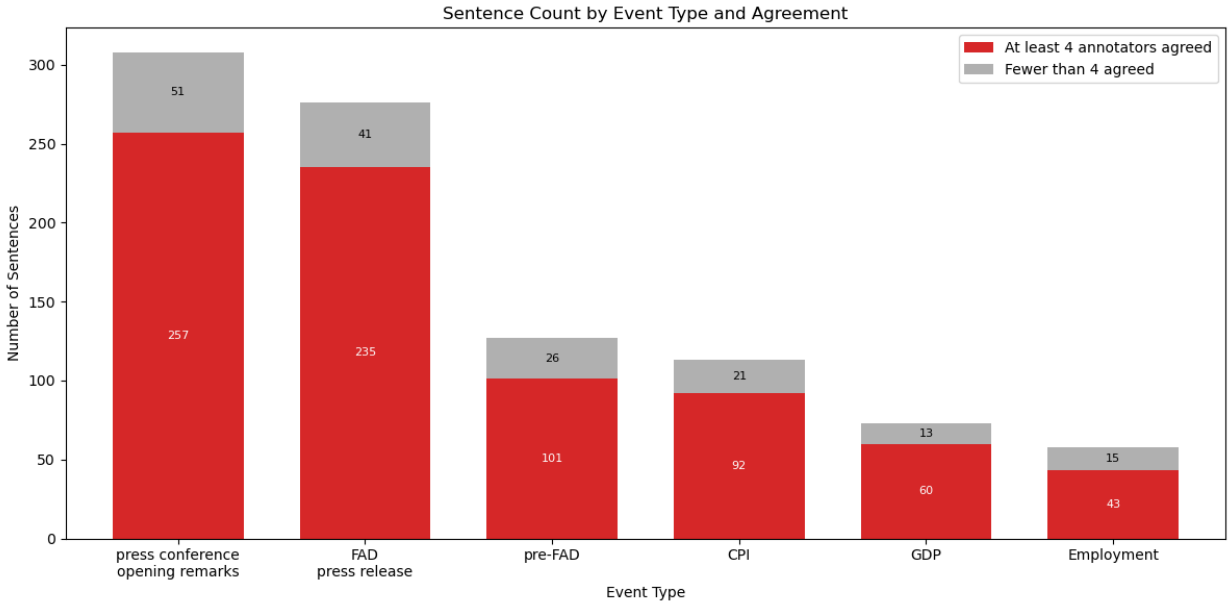
Appendix Table F.1: Examples of Annotated Sentences and Agreement Levels

Agreement Type	**Sentence**	**Date & Source**
Five agreed: Dovish	*"The January CPI report also showed further deceleration across other core inflation measures such as CPIX or CPI ex. food/energy, so today's report should bring the goalposts a little closer."*	2024 Feb 20, TD CPI
Five agreed: Dovish	*"CPI inflation eased to 2.9% in January, as goods price inflation moderated further."*	2024 Mar 6, BoC FAD press release
Five agreed: Hawkish	*"Canadian employment recorded its strongest increase in 15 months in April, widely surpassing consensus expectations."*	2024 May 10, National Employment
Five agreed: Hawkish	*"Despite this, we've revised up our outlook for inflation."*	2023 Oct 25, BoC FAD open remarks
2 Dovish, 3 Neutral	*"The Canadian economy as a whole grew in line with the Bank's projection in the third quarter, although data suggest less momentum going into the fourth quarter."*	2018 Dec 5, BoC FAD press release
2 Hawkish, 2 Neutral, 1 Dovish	*"These conditions will mitigate the negative effects of the oil price shock, further boosting growth through stronger non-energy exports and investment."*	2015 Mar 4, BoC FAD press release
2 Hawkish, 3 Neutral	*"We are currently tracking 2021 GDP growth at 5.9%, with 2022 GDP at 3.7% which would imply an upward revision of roughly 2 p.p. in 2021 offset by a downward revision of roughly 1 p.p. in 2022 – in addition to an upward revision of 0.1 p.p. for 2020."*	2021 Apr 16, TD PreFAD
3 Hawkish, 1 Neutral, 1 Dovish	*"Even the sectors that have been hit by the tightening of interest rates, namely real estate, construction and finance, are contributing positively to growth so far in the first quarter after difficult months."*	2024 Apr 28, National GDP

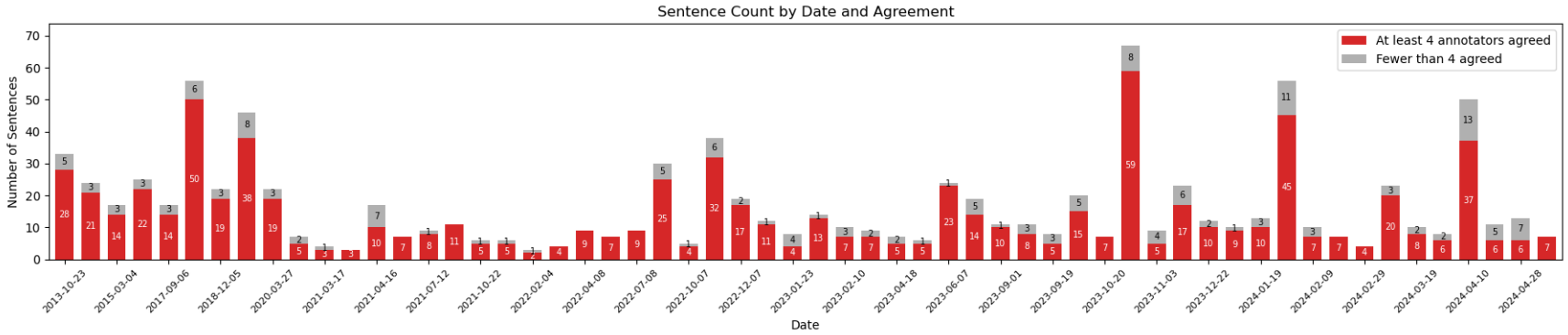
Appendix Figure F.1: Sentence Count by Provider and Agreement



Appendix Figure F.2: Sentence Count by Event Type and Agreement

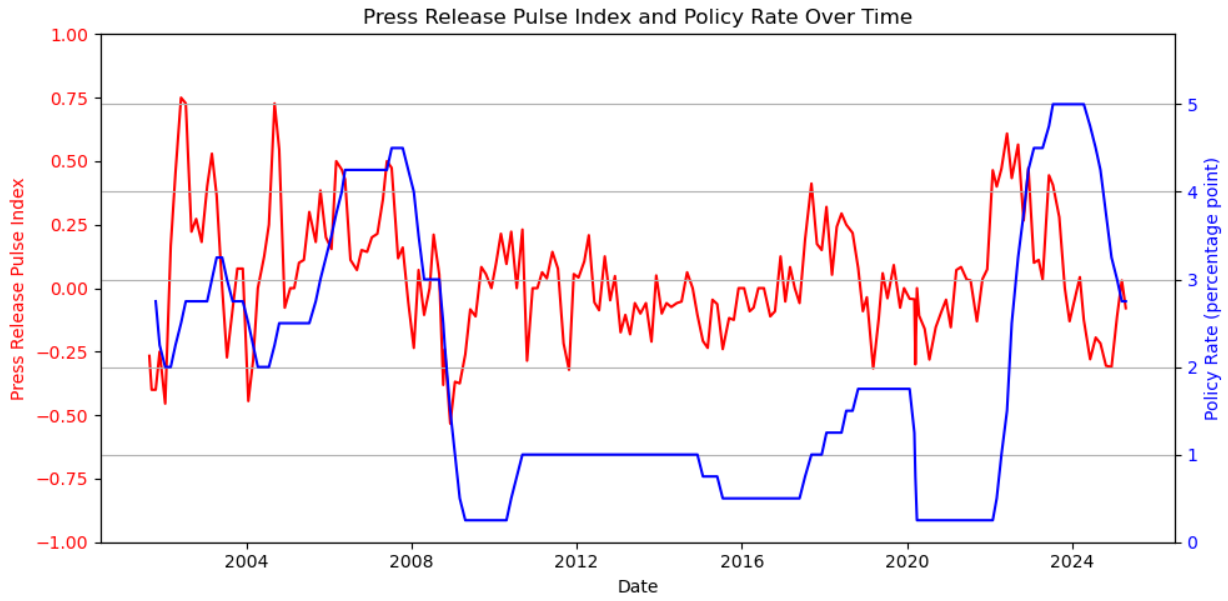


Appendix Figure F.3: Sentence Count by Event Date and Agreement

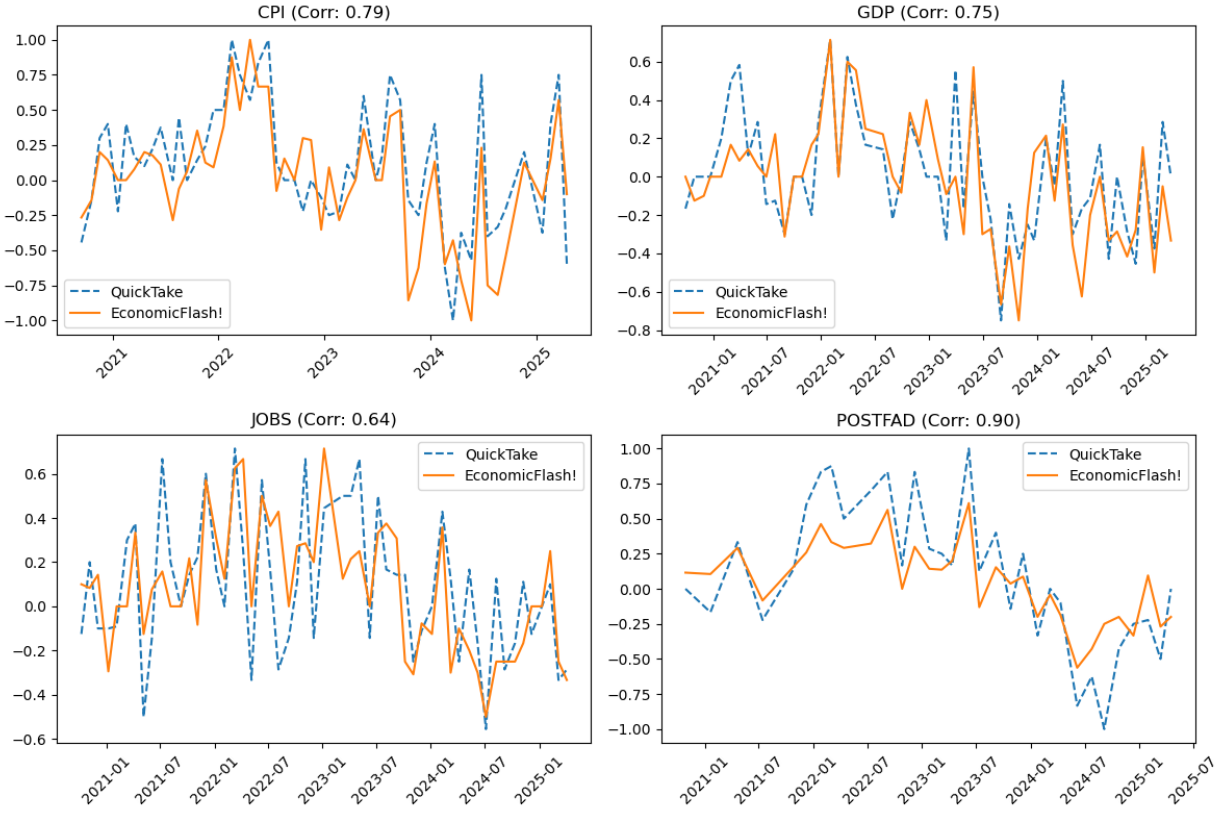


Appendix G Additional figures

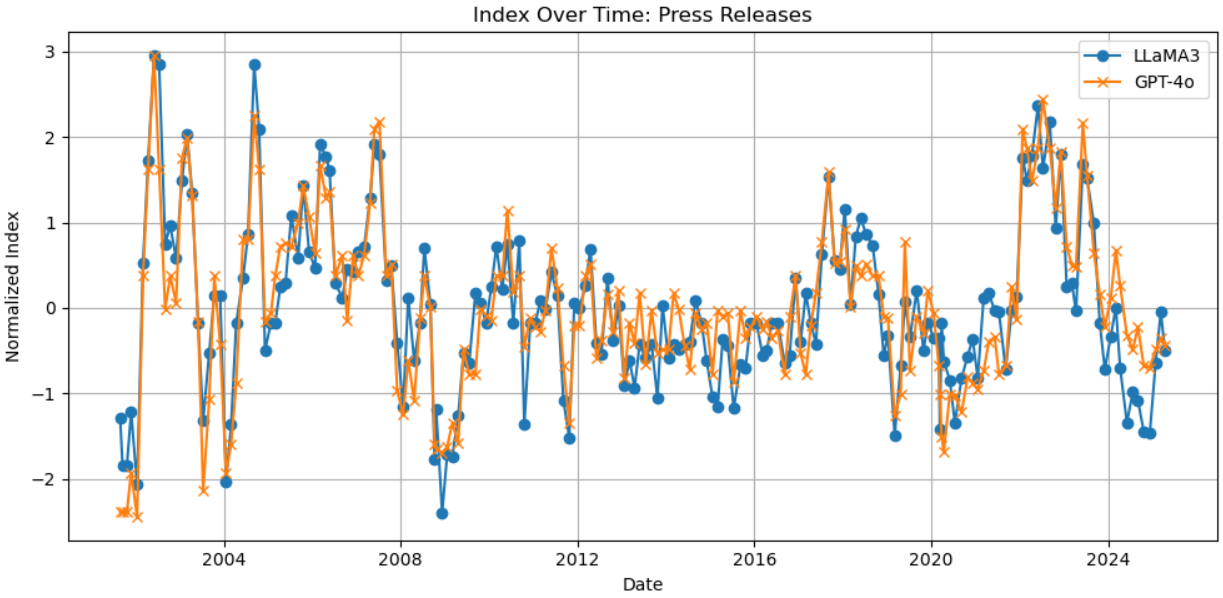
Appendix Figure G.1: Press release pulse index and policy rate change over time



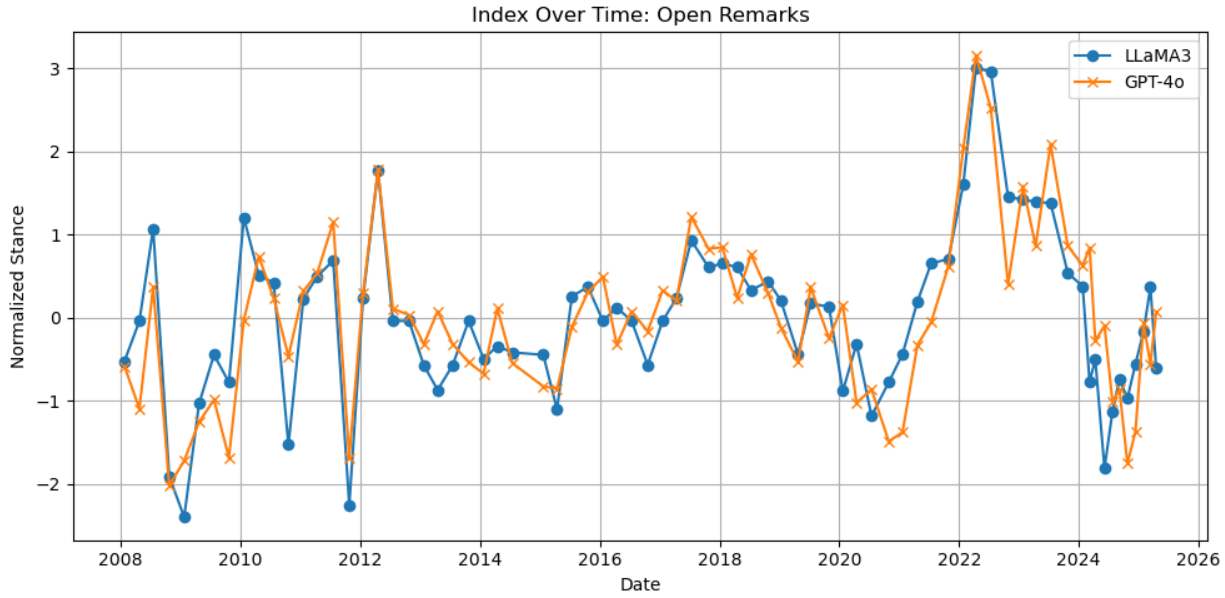
Appendix Figure G.2: Comparison of the indices of between CIBC's QuickTake and Economic Flash! series



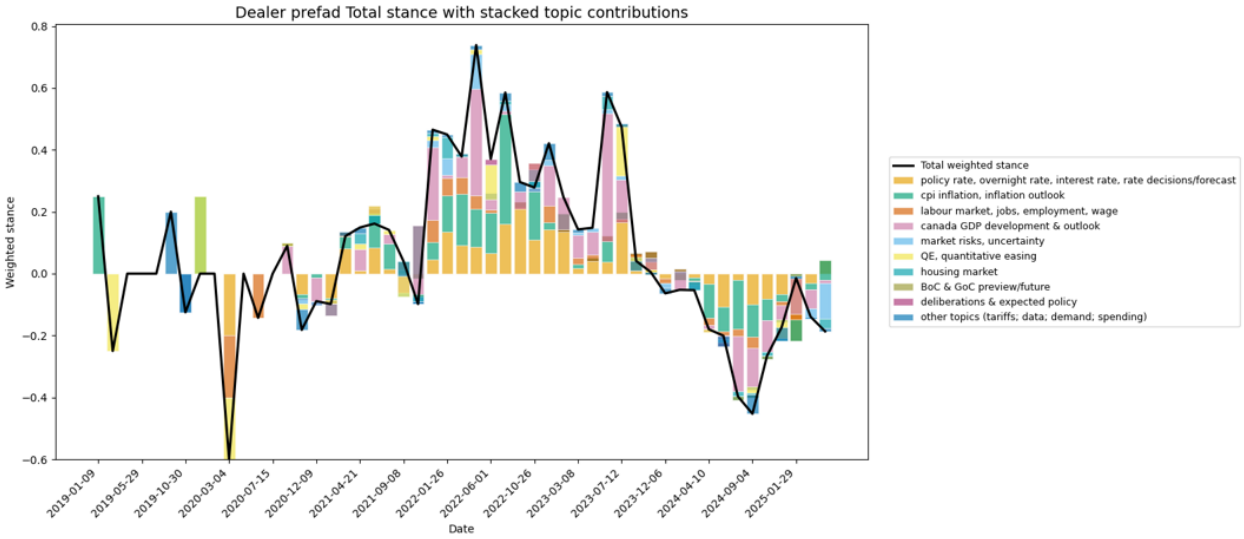
Appendix Figure G.3: Comparison of indices constructed by Llama3 and GPT4O: press release



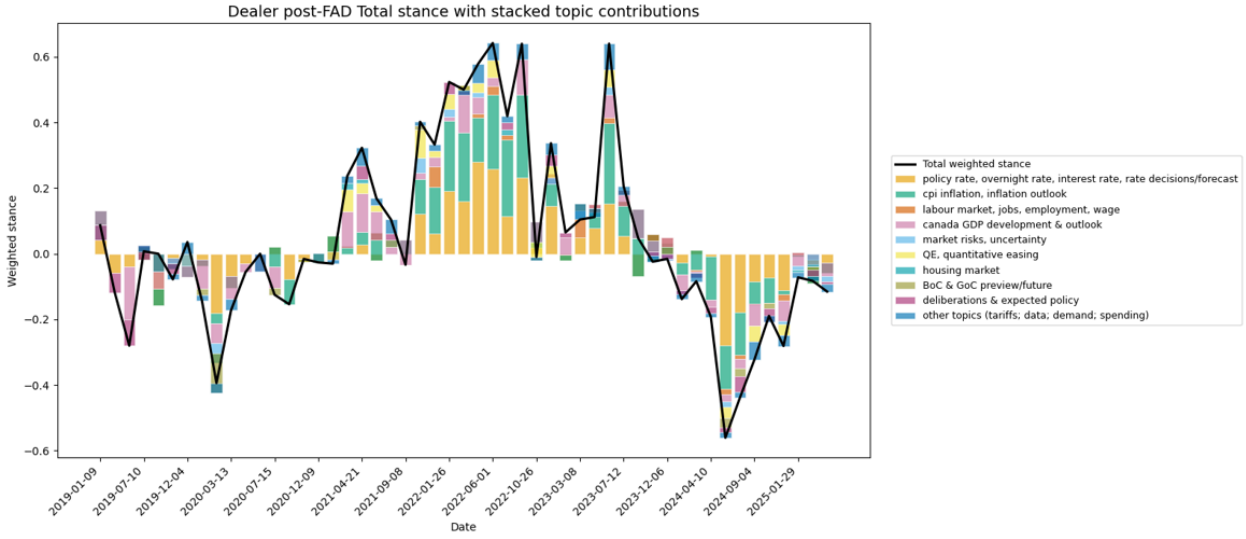
Appendix Figure G.4: Comparison of indices constructed by Llama3 and GPT4O: open remarks



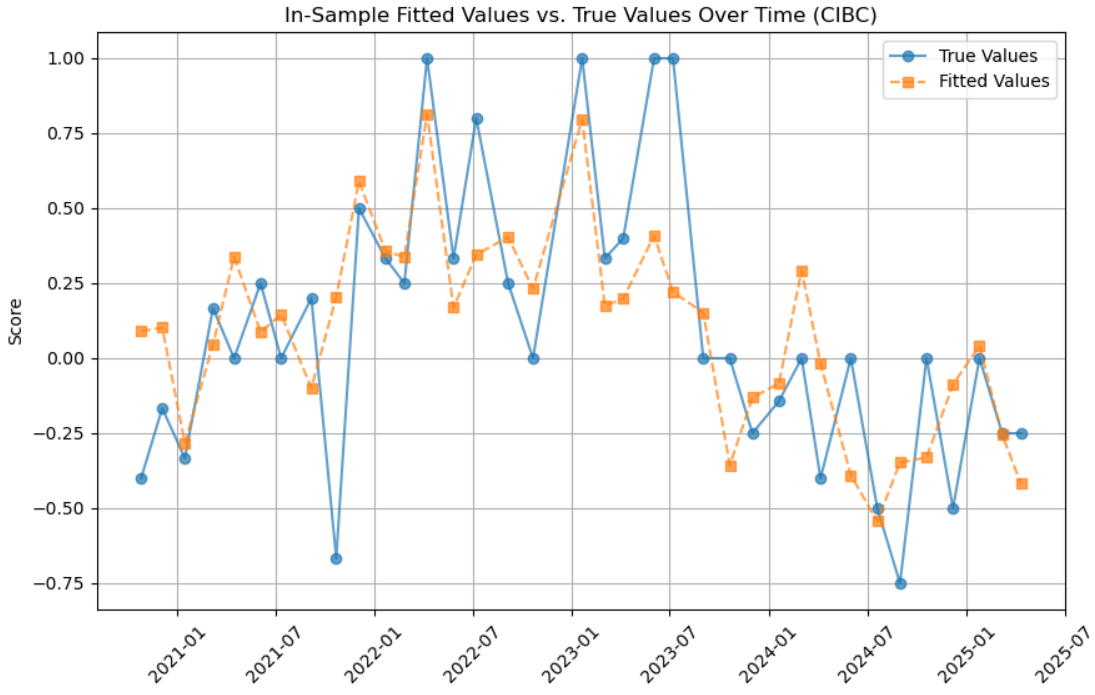
Appendix Figure G.5: Press release Topics



Appendix Figure G.6: Dealer PostFAD Topics



Appendix Figure G.7: Prediction of Pre-FAD using data release commentaries(CIBC)



Appendix Figure G.8: Prediction of Pre-FAD using data release commentaries(BMO)

