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Inflation News Coverage, Expectations and Risk Premium

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Abstract

This paper investigates the effects of inflation news coverage on market-based inflation expectations and outcomes in the inflation-protected securities market. We employ a large corpus of news headlines from top U.S. newspapers and market data on the U.S. yield curve and inflation-protected securities. Our results indicate that news coverage, particularly regarding specific topics, exerts a significant influence on inflation compensation, expectations, and risk premiums. We observe that the impact of news diminishes as the maturity increases and varies across different news topics. This study contributes to the understanding of media influence on financial markets, specifically in shaping inflation expectations.

Keywords: Inflation, expectations, risk premium, newspapers, term structure

JEL classification: C22, D83, D84, E13, E31, E65

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1 Introduction

. *"The Inflation Debate Thats Muting the Feds Response". February 26, 2011, The New York Times*

"Inflation Rate Target Is Questioned as Fed Policy Panel". April 28, 2015, The New York Times

"Longer Term Inflation Expectations Rose in April Says New York Fed". May 9, 2022, The Wall Street Journal .

News headlines, such as the ones above, are not just fleeting pieces of information; they often serve as economic barometers, subtly influencing perceptions and expectations. This is especially true in the context of inflation expectations. While Conrad et al. (2022); Coibion et al. (2022) found that survey-based studies tend to see a limited role of the press in household inflation expectations, Larsen et al. (2021) highlighted the substantial effects of media narratives on inflation perceptions. Bridging the gap between these observations and a comprehensive understanding of media's role in market-based IE forms the cornerstone of this paper.

In this study, we employ a comprehensive dataset that includes U.S. yield curve information, inflation-protected securities data, and a broad corpus of inflation-related news headlines from leading U.S. newspapers to disentangle the effect of media coverage on the drivers of inflation compensation. Our study is centered around the following research questions: How does news coverage on current and expected inflation influence the outcomes in the market for inflation-protected securities? How does such coverage impact Break-Even Inflation (BEI), a well-known market-based measure for inflation compensation?, and how to disentangle this effect into the main drivers of BEI, namely expectations and risk premium? We also explore how the term structure of inflation-protected securities allows us to distinguish the effect of news coverage on different maturities.

To understand the impact of news on the market for inflation protection, we adopt a straightforward, three-step approach. First, we generate an index that tracks inflation news coverage across frequency (share of news) and content dimensions (polarity, subjectivity, and topic). Then, using the Essentially Affine Term Structure (EATS) model, detailed by Joyce et al. (2010), we break down the Break-Even Inflation (BEI) into Inflation Expectations (IE) and the Inflation Risk Premium (IRP).[1] Lastly, inspired by Larsen et al. (2021), we define a model to estimate the term structure effect of news metrics on inflation compensation variables and motivated by Gürkaynak et al. (2005), an SVAR model to recover the Impulse Response Functions (IRFs) of inflation compensation variables to observed and news-implied inflation shocks. Our research utilizes data from over

[1]We will use the acronym IE to refer specifically to market-based inflation expectations, obtained by decomposition of the BEI, throughout this chapter.

10,020 inflation-related news articles from top U.S. newspapers, collected from January 2000 to January 2023. Additionally, we draw from daily yield rates from the U.S. Department of the Treasury and information on inflation-protected securities, specifically Treasury Inflation-Protected Securities (TIPS) yields and inflation-linked swaps. We aggregate data at both the weekly and monthly levels for our analysis, to better fit the dynamics between media reporting and the market's reaction to inflation.

Our study shows that increased news coverage leads to higher short-term inflation compensation. More frequent inflation news pushes up the price of 2-year TIPS, resulting in a lower yield, increases the mid-rate of 1-year swaps, and raises the 1-year BEI rate. Positive sentiment in the news reduces swap and BEI rates and increases TIPS yields when present in a larger portion of all news. Opinion-heavy news, which often signals uncertainty about inflation's future path, also increases inflation compensation, as suggested by Born et al. (2023). The effects are more pronounced in high-inflation scenarios and diminish for long-term maturities. The estimated IRFs suggest that news can create short-term volatility, but more permanent shifts often require validation from real-world data or trusted sources. Inflation shocks produce a significant increase in the reporting of inflation news within the first month and again after a quarter.

News more significantly impacts IRP than IE. Positive news affects IE mainly when inflation surpasses targets. Changes in inflation compensation largely arise from IRP fluctuations, emphasizing the media's influence on risk perceptions. As maturities extend, the effect of most news measures weakens, except for subjectivity in the content.

Considering news narratives, we discovered that articles focusing on profits, stock markets, and politics significantly raise IRP and observed inflation compensation measures. Conversely, stories related to energy prices, global events like the COVID-19 pandemic and the Ukrainian invasion, and inflation reduction policies tend to mitigate inflation compensation pressures. The dampening effect from energy prices and global events might stem from markets perceiving these factors as temporary in their influence on inflation (Kilian and Zhou, 2022). The only relevant topic for IE is "expectations" itself, which covers articles analyzing trends in consumer expectations based on surveys.

The shaping of inflation expectations in households and firms traces its roots to the Full-Information Rational Expectations (FIRE) framework introduced by Muth (1961). This theory propounds that agents utilize all accessible information efficiently while forming expectations. However, Sims (2003) indicates that in our information-abundant world, agents might not always process every piece of available data due to costs or cognitive constraints, leading to models of inattention, as evidenced by works from (**?**Maćkowiak and Wiederholt, 2009; Coibion et al., 2020). Further, models indicating inflation rigidities suggest that firms might not adjust their prices instantly even when aptly informed, as

argued by Coibion and Gorodnichenko (2012, 2015); Dovern et al. (2015). Our findings provide new evidence to the FIRE framework, emphasizing the incremental value of news coverage in determining inflation expectations, particularly considering the contemporary weekly response of IE to news coverage.

The media's influence on inflation expectations has received comprehensive attention in the literature. Carroll (2003) proposed that due to the costs and effort of continual information updates, households might intermittently depend on macroeconomic news to adjust their expectations. This line of thought was expanded upon by Doms and Morin (2004), who accentuated the media's role in disseminating economic data, expert opinions, and the overall tone of economic reporting. in the same direction, Nimark and Pitschner (2019) introduced state-dependent reporting, suggesting that the choice of news broadcast could be as significant as the content itself. This intricate relationship between media narratives and economic events is further examined by Pfajfar and Santoro (2013); Lamla and Lein (2014); Larsen and Thorsrud (2019). An interesting observation from Dräger and Lamla (2017); Ehrmann et al. (2017) highlights that a spike in information dissemination does not guarantee enhanced economic comprehension among the masses. In a recent study, Larsen et al. (2021) used a news-topic-based approach to explore the media's role in reporting news on inflation. The study emphasizes that the quality and relevance of news topics are just as important as the quantity. Our study, which is similar in methodology and research question to Larsen et al. (2021), incorporates 9 additional sources beyond *The Wall Street Journal* and focuses exclusively on inflation-related news, providing a more comprehensive overview of inflation news coverage. Furthermore, the term-structure property of (IE) allows for estimating the impact of news on expectations at higher frequencies and across multiple horizons.

In discussions centered on inflation expectations, monetary policy communication stands out as a pivotal aspect. Cutting-edge research by Gorodnichenko et al. (2023) harnesses deep learning to analyze emotions in Federal Open Market Committee sessions. Concurrently, Coibion et al. (2020) explored if central banks could leverage expectations for stabilization, revealing that these expectations do influence household and firm actions. Lastly, Picault et al. (2022) formulated an indicator capturing media sentiments, showcasing that daily sentiment fluctuations can predict financial market inflation expectations. Blinder et al. (2008); Glas and Müller (2021) highlights central banks' transparent and clear communication as essential for aligning public expectations with overarching policy objectives. Reinforcing this perspective, Gürkaynak et al. (2005) emphasizes the profound impact of central bank communication on financial market dynamics. Studies by Coibion et al. (2018); Binder (2017) explore further examined the intricate synergy between media narratives, central bank communications, and their role in shaping firm and household

expectations. We contribute to this literature by demonstrating that the effect of news related exclusively to monetary policy announcements does not have a direct influence on expectations. On the other hand, opinion articles that focus on monetary policy (i.e. topic *expectations* in Section 4.2) are the primary drivers for expectations.

In the field of inflation compensation, market-based expectations reflect the collective beliefs of financial market participants about future inflation. Gürkaynak et al. (2007) pioneered a framework for deriving inflation expectations and risk premiums from TIPS, laying a foundation for subsequent research. Similarly, Haubrich et al. (2012) discusses the insights inflation risk premiums can provide into future inflation doubts. Elaborating on this aspect Beechey and Wright (2009); d'Amico et al. (2018); Bauer (2015) provide further evidence of the effect of the news on inflation compensation. Likewise, Ang et al. (2008); Evans (2003); Berardi and Plazzi (2019) focus on inflation risk and its relationship with the term structure. Our paper confirms the prevalence of news media as a driver of risk premium at different maturities.

The remainder of this paper is organized as follows. Section 2 discusses the methodology. Section 3 describes the data and provides summary statistics. Section 4 presents the main results. We assess the robustness of our findings in Section 5. Section 6 concludes.

2 Methodology

We introduce a three-step methodology to analyze how inflation news coverage influences inflation-protected securities, inflation compensation, inflation expectations, and the risk premium. Firstly, we construct a multidimensional index to monitor inflation news coverage. Secondly, using an Essentially Affine Term Structure (EATS) model as described by Joyce et al. (2010), we decompose BEI into IE and IRP, at both weekly and monthly frequencies. Finally, employing the results from the previous two stages, we estimate the impact of inflation news metrics on various inflation-related variables.

2.1 News coverage indices

We develop a multidimensional index in this study to capture the complex nature of inflation news coverage and its potential impacts. The index comprises frequency metrics, such as news share, and content/text metrics, including polarity, subjectivity, and topics. Each dimension of the index is considered an independent index, enabling independent analysis. The combination of these indices allows for the flexible definition of

news coverage.[2] In terms of Natural Language Processing (NLP), each news text, which incorporates the news title and snippet text, is considered a document. These documents are aggregated daily across all sources ($s = 1, \ldots, 10$) to create a single document-day, d. Metrics are initially calculated daily and then consolidated weekly or monthly.

News share

News share represents the proportion of news about inflation within all articles published by the top ten newspapers at a specific time. The *news share* variable is defined in Equation 1 below:

$$news\_share_t = \frac{\sum_{t=1}^{T}\sum_{s=1}^{S} count(query(t, s, q_1))}{\sum_{t=1}^{T}\sum_{s=1}^{S} count(query(t, s, q_0))} \times 100 \tag{1}$$

The share of inflation news in a week, starting at day t and ending at day T, is given by the sum of retrieved inflation news over all newspapers $s = 1, \ldots, 10$ using the main query q_1 divided by the sum of all news produced by each newspaper, given by empty query q_0, in the same week.[3]

Polarity

Polarity measures the sentiment in news articles using the Loughran-McDonald Financial Sentiment Word Lists, a finance-specific lexicon that classifies words based on their financial sentiment (Loughran and McDonald, 2011). The *polarity* variable is:

$$polarity_d = \frac{pos(d) - neg(d)}{pos(d) + neg(d)} \tag{2}$$

Equation 2 states that the polarity for a day-document d is the net sentiment words as a fraction of total sentiment words.

Subjectivity

Subjectivity captures the extent of personal opinions in the news. It's the proportion of sentiment words to the overall word count in a document:

$$subjectivity_d = \frac{pos(d) + neg(d)}{total\_words(d)} \tag{3}$$

[2]Different from similar news based indices, such as the *EPU* index (Baker et al., 2016). This study does not consider an *overall* index of inflation news coverage combining individual measures in a certain way. If needed, one can consider the frequency index, *news share* as the default news coverage index.

[3]Setting q_0 equal to "a" yields also more consistent number of results than a pure empty search.

Both $pos(d)$ and $neg(d)$ represent counts of sentiment words in the day-document d from the Loughran-McDonald Financial Sentiment Word Lists.

Topics and metatopics

We utilize the Latent Dirichlet Allocation (LDA) model, proposed by Blei et al. (2003), to identify topics. The LDA model assigns topics to documents and words to those topics. We set the prior topic number, $\underline{K}$, to 24.[4] Based on frequent word pairings, topic labels are assigned, and closely related topics are aggregated into *metatopics*. Further details on text preprocessing and topic modeling can be found in Perico Ortiz (2021); Perico Ortiz et al. (2023).

2.2 A term structure model for IE

The Essentially Affine Term Structure (EATS) model and the methodology to estimate it, are presented in detail in Joyce et al. (2010). This section summarizes their main components.

Theoretical framework

In a no-arbitrage setting, asset prices reflect the discounted present value of future payouts. For a zero-coupon real bond $p_t^{R,\tau}$ maturing in period $t+\tau$, the log price is:

$$p_t^{R,\tau} = ln\, E_t \left[\prod_{j=1}^{\tau} M_{t+j}\right] = E_t \left[\sum_{j=1}^{\tau} m_{t+j}\right] + \frac{1}{2} V_t \left[\sum_{j=1}^{\tau} m_{t+j}\right] \tag{4}$$

With M_{t+j} being the real Stochastic Discount Factor (SDF), m_{t+j} as its logarithm for the intermediate period j, and V_t is the conditional variance. The relationship between the current real yield and real price is given by:

$$y_t^{R,\tau} = -\frac{1}{\tau} ln(P_t^{R,\tau}) = -\frac{1}{\tau} p_t^{R,\tau} \tag{5}$$

The nominal yield, $y_t^{N,\tau}$, is defined as:

$$y_t^{N,\tau} = \frac{1}{\tau}\left(-E_t \left[\sum_{j=1}^{\tau} (m_{t+j} - \pi_{t+j})\right] - \frac{1}{2} V_t \left[\sum_{j=1}^{\tau} (m_{t+j} - \pi_{t+j})\right]\right) \tag{6}$$

[4] We assume symmetric priors for both document-topic and topic-term distributions. We select the prior number of topics $\underline{K}$ using the approach framed in Perico Ortiz (2021); Perico Ortiz et al. (2023)

In this equation, $\pi_{t+j} = ln(Q_{t+j}/Q_{t+j-1})$ is the log inflation. The Break-Even Inflation (BEI), defined as the difference between $y_t^{N,\tau}$ and $y_t^{R,\tau}$, is calculated using the following expression:

$$\begin{aligned} BEI &= y_t^{N,\tau} - y_t^{R,\tau} \\ &= \frac{1}{\tau}\left(\underbrace{-E_t\left[\sum_{j=1}^{\tau}\pi_{t+j}\right]}_{\text{Expected inflation}} \underbrace{-\frac{1}{2}V_t\left[\sum_{j=1}^{\tau}\pi_{t+j}\right]}_{\text{Inflation convexity}} \underbrace{+Cov_t\left[\sum_{j=1}^{\tau}m_{t+j},\sum_{j=1}^{\tau}\pi_{t+j}\right]}_{\text{Inflation risk premium}}\right) \end{aligned} \tag{7}$$

Therefore, nominal yields reflect the fluctuations in real yields, the average expected log inflation over the bond's lifespan, the average inflation convexity effect, and the average IRP.

model estimation

One of the primary implications of an EATS model is that expected risk-free interest rates, real-term premiums, and IRPs all show a linear or affine relationship with the N observable and/or latent variables. The real, continuously compounded, yields are expressed as:

$$y_t^{R,\tau} = \overline{A_\tau} + \overline{B'_\tau}(z_t - \mu) \tag{8}$$

Similarly, nominal, continuously compounded, bond yields can be represented as:

$$y_t^{N,\tau} = \overline{A^*_\tau} + \overline{B^{*\prime}_\tau}(z_t - \mu) \tag{9}$$

In these equations $\overline{A_\tau} = A_\tau/\tau$, $\overline{A^*_\tau} = A^*_\tau/\tau$ are scalars, while $\overline{B'_\tau} = B'_\tau/\tau$ and $\overline{B^{*\prime}_\tau} = B^{*\prime}_\tau/\tau$ are $N \times 1$ parameter matrices that are obtained recursively, imposing no arbitrage across yields with different maturities.The vector of observable and/or unobservable (latent) variables $(z_t - \mu)$ is an $N \times 1$ vector with a zero mean. The asterisk * denotes quantities estimated with the nominal SDF.

We use the maximum likelihood approach, relying on the Kalman filter, for model estimation. The Kalman filter requires the model in a state-space form, encompassing a state and a measurement equation. The state equation, specified in Equation 10, models the dynamics of the factors as a first-order four-dimensional VAR with normally distributed errors:

$$(z_{t+1} - \mu)' = \Phi(z_t - \mu) + \Omega^{1/2}\varepsilon_{t+1} \qquad \varepsilon_{t+1} \sim \mathcal{N}(0, I_4) \tag{10}$$

The vector of state variables influencing real and nominal yields is defined as:

$$(z_t - \mu)' = [z_{1,t} - \mu_1 \quad z_{2,t} - \mu_2 \quad z_{3,t} - \mu_3 \quad z_{4,t} - \mu_4] \tag{11}$$

In this equation, $z_{1,t}$, $z_{2,t}$, and $z_{3,t}$ are latent factors with distinct time-series dynamics, and the fourth factor, $z_{4,t}$, is inflation. The conditional covariance matrix Ω can vary over time.

A diagonal Ω and a lower triangular Φ are assumed to ensure the factors' identifiability considering the usage of latent variables. Allowing the off-diagonal elements of the Φ matrix to be non-zero enables correlation among the factors. Notably, all three latent factors contribute to the determination of inflation, which is the fourth factor. The measurement equation is given by:

$$\begin{pmatrix} \pi_t \\ y_t^{R,\tau} \\ y_t^{N,\tau} \end{pmatrix} = \begin{pmatrix} \mu_4 \\ \overline{A_j} \\ \overline{A_j^*} \end{pmatrix} + \begin{pmatrix} 0 & 0 & 0 & 1 \\ \overline{B_{j,1}} & \overline{B_{j,2}} & \overline{B_{j,3}} & \overline{B_{j,4}} \\ \overline{B_{j,1}^*} & \overline{B_{j,1}^*} & \overline{B_{j,1}^*} & \overline{B_{j,1}^*} \end{pmatrix} \begin{pmatrix} z_{1,t} - \mu_1 \\ z_{2,t} - \mu_2 \\ z_{3,t} - \mu_3 \\ z_{4,t} - \mu_4 \end{pmatrix} + \begin{pmatrix} 0 \\ u_{t,j} \\ u_{t,j}^* \end{pmatrix} \tag{12}$$

We use model estimates to compute recursively the SDF, forward nominal, $f_t^{\tau,N}$, and forward real rates, $f_t^{\tau,R}$. Then, we employ forward rates to compute IRP and inflation expectation series. The model is estimated with $N = 3$ variables integrated into the vector of observables in the measurement equation, explicitly expressed as follows:

$$Y_t = \left(cpi_t, y_t^{1,N}, y_t^{2,N}, y_t^{3,N}, y_t^{5,N}, y_t^{7,N}, y_t^{10,N}, y_t^{20,N}, y_t^{5,R}, y_t^{7,R}, y_t^{10,R}, y_t^{20,R}\right)'$$

Unlike Joyce et al. (2010), we exclude the current consensus forecasters' expectations.[5] Two model variants are considered: one with monthly data and another with weekly data. In the weekly data model, we use the latest known inflation value to address CPI series gaps.[6]

Decomposition of forward rates

Often, it is more beneficial to concentrate on forward interest rates for analysis. These rates provide information about future periods instead of average rates across a period like spot rates do. An advantage of this approach is the ability to calculate the BEI using forward rates. This is possible because the difference between nominal and real spot rates for a period of τ is equivalent

[5] In section 5, we show that using a more complex model including survey and swaps data, as calculated by the Clevelands, FED, does not drastically the conclusions of this study.

[6] An alternative approach using linear interpolation is also considered, both methods yield very similar results.

to the average difference between forward rates over the same τ period.

$$y_t^{N,\tau} - y_t^{R,\tau} = \frac{1}{\tau}\left(\sum_{j=1}^{\tau}(f_t^{N,j} - f_t^{R,j})\right) \tag{13}$$

where $f_t^{N,j}$ is the nominal forward rate and $f_t^{R,j}$ is the real forward rate, given by

$$f_t^{R,\tau} = (\tau+1)y_t^{R,\tau+1} - \tau y_t^{R,\tau} = (A_\tau - A_{\tau+1}) + (B_\tau - B_{\tau+1}+)'(z_t - \mu) \tag{14}$$

$$f_t^{N,\tau} = (\tau+1)y_t^{N,\tau+1} - \tau y_t^{N,\tau} = (A_\tau^* - A_{\tau+1}^*) + (B_\tau^* - B_{\tau+1}^*+)'(z_t - \mu) \tag{15}$$

Based on this term structure model we can decompose forward curves into $j-$period interest rate expectations $E_t\left[y_{t+j}^{\tau}\right]$, term premia ϕ_t^{τ} and a convexity effect ω_t^{τ} at maturity τ as follows:

$$f_t^{R,\tau} = E_t\left[y_{t+j}^{R,\tau}\right] + \phi_t^{R,\tau} + \omega_t^{R,\tau} \tag{16}$$

Similarly it is possible to decompose the nominal forward rate as follows:

$$f_t^{N,\tau} = E_t\left[y_{t+j}^{N,\tau}\right] + \phi_t^{N,\tau} + \omega_t^{N,\tau} = E_t\left[y_{t+j}^{R,\tau}\right] + E_t\left[\pi_{t+j}\right] + \phi_t^{N,\tau} + \omega_t^{N,\tau} \tag{17}$$

The gap between these two equations leads to the forward break-even rate:

$$f_t^{N,j} - f_t^{R,j} = E_t\left[\pi_{t+j}\right] + \phi_t^{\pi,\tau} + \omega_t^{\pi,\tau} \tag{18}$$

Where $E_t\left[\pi_{t+j}\right]$ is the τ periods ahead IE, and $\omega_t^{\pi,\tau}$ and $\phi_t^{\pi,\tau}$ are the forward IRP and convexity effect, respectively.

2.3 Estimating the effect of news coverage

To better understand the dynamics between news coverage, inflation expectation and inflation compensation, we implement two different estimation approaches. First, we implement an Ordinary Least Squares (OLS) regression, inspired by Larsen et al. (2021), to analyze the effects of various inflation news metrics on BEI determinants and inflation-protected instruments across the term structure. Subsequently, we implement a Vector Autoregression (VAR) approach to assess the weekly dynamics of inflation and news-related shocks on short-term IE, IRP, yields, and inflation-protected securities.

The regression model is giben by:

$$y_t^{\tau} = \alpha + \sum_{i=1}^{I}\beta_i news_t + \gamma\pi_t + \lambda x_t + \varepsilon_t \tag{19}$$

Here, y_t^{τ} could be τ-years $TIPS_t^{\tau}$, $swaps_t^{\tau}$, BEI_t^{τ}, IE_t^{τ}, or IRP_t^{τ}. We primarily use spot weekly rates from the EATS model. In this specification $news_t$, allows for several news mea-

sures, or a combination of them, affecting the dependent variable contemporaneously. Further, controls include the month-on-month inflation (π_t), and a set of control variables (x), such as oil prices and FOMC events. The model is estimated using OLS with Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors.

Our VAR approach, aligned with Gürkaynak et al. (2005), extracts Impulse Response Functions for two shock types: a one-standard-deviation inflation shock and an implied inflation shock from an unexpected surge in inflation-related news coverage, labeled as *inflation shock* and *news shock* respectively.[7] The model representation is:

$$\mathbf{y}_t = \mathbf{a}_0 + \sum_{j=1}^{p} \mathbf{A}_j \mathbf{y}_{t-j} + \varepsilon_t, \ with\ \epsilon_t \sim \mathcal{N}(0, \Sigma) \tag{20}$$

Here, $\mathbf{y}_t$ can represent various vectors of endogenous variables, such as:

$$\mathbf{y}_t = \left(\pi_t, news_t, y_t^{R,\tau}, y_t^{N,\tau}, security_t^{\tau}\right)',$$
$$\mathbf{y}_t = (\pi_t, news_t, ie_t^{\tau}, irp_t^{\tau}, bei_t^{\tau})'$$

The parameters $\mathbf{a}_0$ and $\mathbf{A}_j$ (for $j = 1, \ldots, p$) are intercept vector and coefficient matrices, respectively, and ϵ_t is the exogenous Gaussian shock vector. The variable $security_t^{\tau}$ denotes the τ-yield of TIPS or the mid-rate of a τ-inflation-linked swaps. Since the model is estimated at a weekly frequency, we set $\tau = 52$.

The model is estimated using bayesian methods, as described in Giannone et al. (2015), using a Minnesota (Litterman) prior, with parameters hierarchically estimated using the Metropolis-Hastings algorithm. Identification relies on short-term restrictions (Cholesky decomposition). To capture the uncertainty, we construct confidence bands for the impulse response functions. We report confidence bands spanning the 5th-95th, 15th-75th, and interquartile range percentiles, offering an encompassing perspective on outcomes following price level or inflation news coverage innovations.

3 Data and summary statistics

In this study, we utilize three distinct forms of data, namely inflation news data, yield curve and inflation data, and controls and validation data. In this section, we outline the datasets employed and provide a brief summary of statistics for the multidimensional index of inflation news and the fitted series from the EATS model.

[7] Other kinds of news shock variables can be constructed from our data, such as those based on the interaction of news share and subjectivity/polarity, or the interaction of news share and a specific topic. To keep the analysis brief, we concentrate solely on the most straightforward type of news coverage shock.

3.1 Inflation news coverage

We employ a substantial corpus of over 10,020 inflation-related news headlines from the top U.S. newspapers by circulation, collected from January 2000 to January 2023. To retrieve the news data we scrape daily inflation headlines titles and their snippets from a Google search using the following query:

$$query(\mathbf{q}, \mathbf{t}, \mathbf{s}) = \mathbf{q} \quad after : \mathbf{t} \quad before : \mathbf{T} \quad site : \mathbf{s}$$

where $\mathbf{q}$ is a vector of Google search queries, limited to the period between $\mathbf{t}$ and $\mathbf{T}$ and by domain $\mathbf{s}$. The vector $\mathbf{t}$ gives the date of each Monday in the sample period, and $\mathbf{T}$ the date for each Sunday, such that the frequency of the search is weekly. Finally, $site : \mathbf{s}$ is a vector of domains for the top ten U.S. newspapers by circulation. The vector $\mathbf{q}$ includes two types of queries: The main query, q_1: *allintitle: inflation OR prices OR CPI*, is a boolean search of different keywords, restricted to occurrences where any of these keywords appear in the headline title; and a control empty query, q_0, which retrieves all available news of a newspaper, s, in a given period, t. The search results for each query may return news objects, composed of date, title, snippet, type, and link, or may be empty. Table 1 provides a summary of the number of news by domain and type of news.

Table 1: News by source and type

domain	article	blog	data	opinion	podcast	story	video	total
bostonglobe.com	184	0	0	21	0	75	0	280
chicagotribune.com	16	2	0	31	0	303	0	352
latimes.com	55	0	0	31	0	651	0	737
newsday.com	135	0	0	10	0	0	0	145
nypost.com	609	0	0	0	0	0	1	610
nytimes.com	1,448	36	0	143	7	1	20	1,655
startribune.com	260	0	0	0	0	1	0	261
usatoday.com	163	0	0	67	0	1,773	51	2,054
washingtonpost.com	577	29	0	124	7	338	41	1,116
wsj.com	2,609	4	19	27	44	29	78	2,810
total	6,056	71	19	454	58	3,171	191	10,020

Notes: This provides the aggregated number of news obtained for query $query(q_1, s)$, for each source $s = (bostonglobe.com, \ldots, wsj.com)$, over all weeks in the period between 01-01-2000 and 01-01-2023. The type of news is given by the provider, if it is not directly stated it is inferred by the information in the link or the snippet, otherwise, it is classified as *article*. The column *data* in this table refers to stock-market data published by the *Wall Street Journal*.

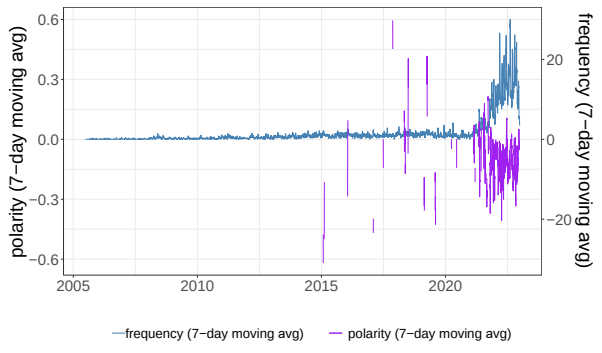
As shown in Table 1, most of the news articles (76.2%) come from just four media sources: the New York Times, USA Today, the Washington Post, and the Wall Street Journal. Notably, the Wall Street Journal is the top source for news about inflation. One advantage of using multiple sources is that it reduces political bias in our results (cf. Baker et al. (2019)). Around 60% of the articles in the sample are articles, which may imply a more concise, unbiased, and fast reporting of current events dealing with the change in prices of particular goods or services; the

disclosure of macroeconomic indicators; or policy/political announcements. The remaining share of news suggests an in-depth coverage of these issues (*story*), an expert opinion (*opinion, blog*), or a multimedia version/combination of these (*podcast, video*). Finally, we drop observations classified as *data*, which refers to stock-market data published by the Wall Street Journal, from the sample, since they did not convey relevant information for the overall price level.

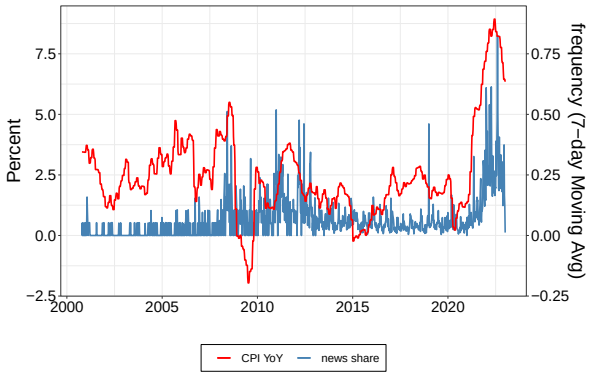
Figure 1 shows the count of inflation-related news articles published over the entire sample period, with the left panel showing a significant increase in the 7-day average, particularly in recent years. There are two contributing factors to this increase: an increase in media attention on inflation topics and Google's search algorithm prioritizing recent articles. The right panel of Figure 1 shows the normalized count of inflation news by the total news count, as represented by the *news share* series, which aligns with the dynamics of the Year-over-Year (YoY) CPI series. Spikes are evident in 2008, around 2012, and post-2021.

Figure 1: News counts, polarity and share

(a) News frequency and polarity



(b) News share and CPI YoY



Notes: This figure shows the 7-day moving average for *polarity* (in the left axis) and the 7-day moving average for inflation news count (right axis), in Panel (A). Panel (B), presents the weekly CPI YoY values (left axis) and the weekly *news share* in percent. Missing CPI YoY weekly values are filled with the last known value.

Table 2 presents the summary statistics of news measures. On average, about 8.616 inflation news articles were reported weekly. The highest weekly count was 198, with a standard deviation of 21.372. On average, 0.066% of all weekly news is concerned to inflation. The data highlights that the proportion of news in recent years varies depending on the domain, and that multimedia formats such as podcasts and videos have become increasingly popular.[8]

Looking at content-based measures, Figure 2 shows how the keywords in news titles and snippets differ. The range of vocabulary in snippets is wider than in titles. Notably, terms associated with energy and increasing magnitude are more prominent, while political references (predominantly tied to President Biden) and the FED appear less dominant.[9] It's also worth highlighting that certain words, like *opinion* or *expected*, hint at a degree of subjectivity in the content.

[8]See to Figure 16 in the Appendix for a breakdown of inflation news by type and domain over time

[9]For distribution of the most frequent words in news titles and news snippets see Figure 17 in the Appendix.

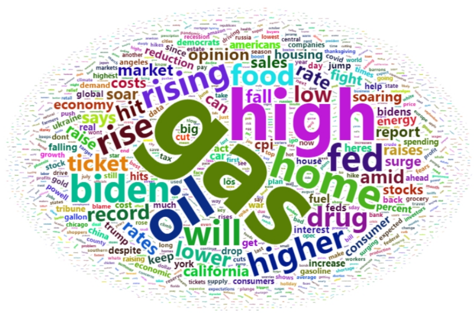
Table 2: Summary statistics news measures

	mean	median	sd	max
count	8.616	3.000	21.372	198.000
news share	0.066	0.048	0.087	0.826
polarity	-0.033	0.000	0.105	0.595
subjectivity	0.007	0.003	0.009	0.050

Notes: This table presents summary statistics for news measures, aggregated weekly, derived from 1,157 observations. The minimum value for *polarity* is -0.49.

Figure 2: Word clouds based on inflation news titles and snippets

(a) News titles



(b) News snippets

Notes: This figure shows word clouds for headline titles in Panel (A) and news snippets in Panel (B). Both clouds are created based on news from the top-ten newspapers by circulation, aggregated weekly, for the sample described in Table 1.

Next, we will explore the polarity and subjectivity dimensions of inflation news. As shown in Figure 1, the polarity of weekly inflation news has trended negatively, especially after 2021. Table 2 reveals a near-zero median polarity score for the dataset, indicating neutral reporting on inflation. Yet, a slightly negative mean polarity of -0.033 exists, potentially due to pronounced negative shifts during high-inflation periods. The summary statistics for *subjectivity* underscore the objective nature of reporting on price dynamics, evidenced by an average value of 0.007.

The last part of this section offers insight into the topics and meta-topics derived from the LDA topic modeling on inflation news. To simplify notation we will use the term *topic* to refer to the nine meta-topics, and *original topics* for each of the 23 original LDA topics. Key narratives, expressed as topics, that emerge include the interplay between *politics* and inflation. Monetary policy decisions and strategies underscore the *monetary policy* theme. Volatility in the energy markets delineates the *oil & gas* narrative. The *housing* sector's influence on inflation trends also emerges. The market sentiment in the wake of inflationary pressures is captured in $profit$ & *stocks*. External events, such as the COVID-19 pandemic and the Ukraine war, shape the *global events* narrative. The anticipatory sentiments about future inflation,

including experts' opinions and surveys constitute the *expectations* topic. Direct impacts on consumers articulate the *food & goods* narrative. Lastly, the theme of *inflation eases* emerges, signifies phases of relaxed inflationary pressures or measures to induce them. Table 3 summarizes the relative importance of topics for each document in our corpus, given by the topic weight, aggregated at the weekly frequency. Table 15 in Appendix presents the top three words for *original topics* and their clustering into meta-topics.

Table 3: Summary statistics meta-topics

	mean	median	sd	max
politics	0.040	0.011	0.053	0.289
monetary policy	0.038	0.015	0.047	0.263
oil & gas	0.053	0.027	0.066	0.374
housing	0.025	0.002	0.038	0.235
profits & stocks	0.037	0.012	0.047	0.277
global events	0.029	0.005	0.042	0.255
expectations	0.016	0.002	0.029	0.264
food & goods	0.052	0.026	0.065	0.420
inflation eases	0.029	0.008	0.038	0.230

Notes: This table presents summary statistics for meta-topics derived from the LDA model with $\underline{K} = 24$ topics. For a description of the topics composing each meta-topics see Table 15.

In Table 3, the *oil & gas* and *food & goods* topics emerge dominantly, possibly due to their direct consumer impact. The *politics* topic, with a mean weight of 0.040, indicates its consistent presence in inflation discussions, especially during pivotal policy or political events. The monetary policy topic, closely aligned with central bank actions, weighs 0.038. The interrelationship between stock market dynamics and inflation, captured by the *profits & stocks* carries a similar mean value of 0.037. Lastly, *global events* are not overwhelmingly prevalent in inflation discussions.

3.2 The yield curve and inflation data

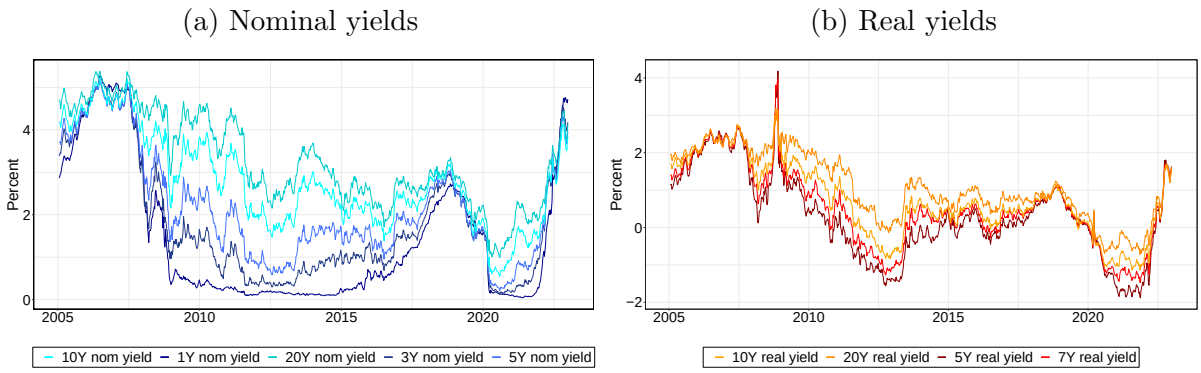
This study employs the daily yield curve rates published by the U.S. Department of the Treasury for the estimation of the term structure model used to decompose the break-even inflation into inflation expectations and inflation-risk premium. An advantage of expressing the yield curve in terms of par yields is that financial market participants typically quote yields on coupon-bearing bonds and use the par yields (Gürkaynak et al., 2007). The nominal par yield curve, which relates the par yield on a security to its time to maturity, is based on the closing market bid prices on the most recently auctioned Treasury securities in the over-the-counter market.[10] The par real curve, which relates the par real yield on a Treasury Inflation Protected Security

[10]The Treasury's yield curve is derived using a quasi-cubic hermite spline function. The par yields are derived from input market prices, which are indicative quotations obtained by the Federal Reserve Bank of New York at approximately 3:30 PM each business day (U.S. Department of the Treasury, 2023).

(TIPS) to its time to maturity, is based on the closing market bid prices on the most recently auctioned TIPS in the over-the-counter market .

Although the U.S. Department of the Treasury publishes data for nominal yields from 1990, the real yield data is only available from January 2003 onwards. Due the lack of short-maturity in the real yields series, we use real yields with maturities of five, seven, ten and twenty years and nominal yields with maturities of one, two, three, five, seven, ten and twenty years in the estimation of the model. Yields are plotted in Figure 3.

Figure 3: Nominal (left) yields and real (right) yields



Notes: The left panel of this figure plots the weekly average nominal yields with maturities of 1, 2, 3, 5, 7, 10 and 20 years maturities. The right panel plots the weekly average real yields with maturities of 5, 7, 10 and 20 years maturities. Figures in both panels are ploted for the period between 01-01-2005 and 01-01-2023.

As can be seen from Figure 3, both nominal and real yields have varied significantly over time. The plots reveal several patterns in nominal and real yields across different maturities. For instance, during the years 2008, late 2018, and 2023, yields for both short-term and long-term maturities increase considerably. During these periods, the yield curve seems to flatten, as the gap between short-term and long-term maturities reduces. This could be interpreted as market anticipation of slowing economic growth.

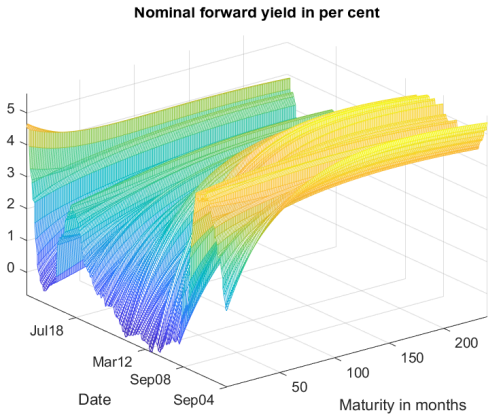
Inflation data for this study is derived from the Consumer Price Index (CPI) provided by the U.S. Bureau of Labor Statistics. The data includes the CPI level series, which is seasonally adjusted to eliminate the impact of changes that follow a regular pattern due to seasonal factors. In addition to the CPI level series, the study also utilizes seasonally adjusted year-over-year (YoY) and month-over-month (MoM) CPI change rates.

Further, we briefly review the results of the Affine Term Structure Model's estimation. Figure 4 implied term structure for forward yields for the U.S. in the period between 2004 and 2023:

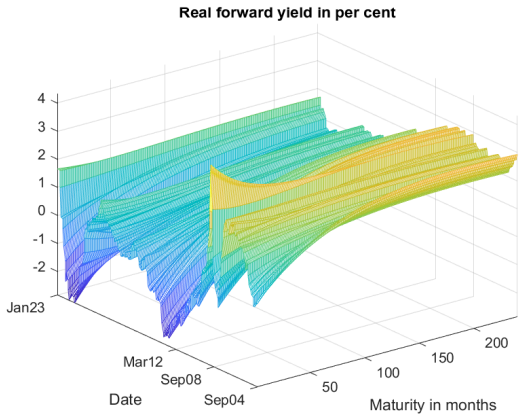
The nominal forward yield (Panel A) in Figure 4 showcases the evolution of nominal yields in the sample period. As supported by Gürkaynak et al. (2007), the U.S. nominal yield curve is upward-sloping most of the time, suggesting that long-term rates are typically higher than short-term rates. In the plot, as maturity increases from the left to the right, the yield generally rises. This increase reflects investors' expectations of future inflation and their required compensation for bearing inflation risk. The real forward yield (Panel B) reflects expected real interest rate compensation without the inflation component. Similar to nominal yields, as maturity increases,

Figure 4: Term structure of nominal yields

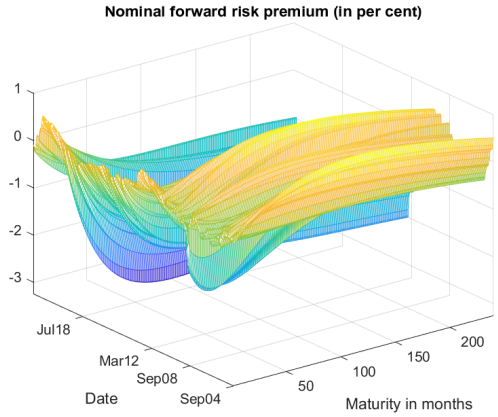
(a) Nominal forward yield



(b) Real forward yield



(c) Nominal forward risk premium



Notes: This figure shows the fitted nominal forward yield (A), the real forward yield (B), and the nominal forward risk premium (C) series for the EATS model presented in Chapter 2.2. The model is estimated using monthly data from January 2004 to January 2023, with all sub-figures in percent. The maturity levels range up to 240 months.

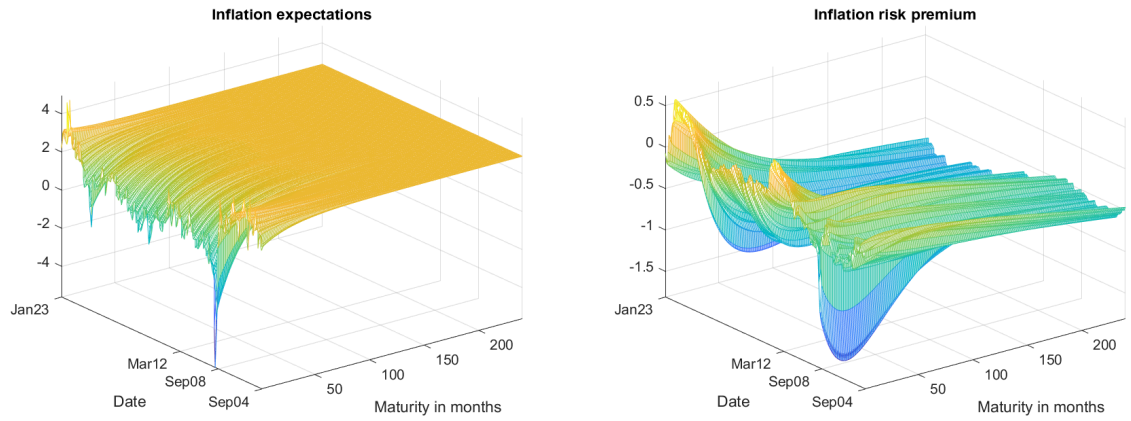
the real yield tends to rise but not as steeply as its nominal counterpart. The dynamics of the real forward yield, stripped of inflation expectations, often provide insights into real economic factors, such as productivity or real interest rate levels. According to Kim and Orphanides (2005), real yields have been relatively stable over longer horizons, hinting at steady expectations about long-term economic growth.

Finally, the nominal forward risk premium (Panel C) captures the compensation investors require for bearing inflation risk. A rising risk premium, as documented by Piazzesi and Schneider (2010), can be indicative of increasing uncertainty about future inflation or growing aversion to inflation risk by bondholders. Typically, as the maturity lengthens, the risk premium might increase, reflecting the greater uncertainty about inflation in the distant future. However, after a certain point, it might plateau or even decrease slightly, as very long horizons might be seen as reverting to some long-run inflation mean.

In Figure 5 we can trace two key components of inflation compensation over time and across different investment horizons (maturities). The left panel of this figure shows the dynamics of expectations. Short-term IE are quite responsive to recent inflation data and current events. As we look towards longer maturities, IE tend to be more stable. This is because they are anchored by long-term beliefs about where the economy is headed and how policymakers, like the Federal Reserve, will act. Thus, the curve might flatten as maturity increases, suggesting that long-term expectations do not vary as much as short-term ones. On the other hand, the IRP, in the right panel, varies widely, especially during times of economic uncertainty or volatility. Investors might demand higher premiums during such periods. As we move to longer maturities, the IRP typically rises at first, reflecting the increasing uncertainty about the distant future. However, after a certain point, this premium might level off or even dip. The long run brings both risks and opportunities for corrective actions, so extremely long-term rates might reflect a belief that over a very long horizon, ups and downs in inflation risks might average out.

Figure 5: Term structure effect of IE and IRP

(a) Inflation expectations (b) Inflation risk premium



Notes: This figure shows the fitted forward IE rate (A), and IRP rate (B) series for the EATS model presented in Chapter 2.2. The model is estimated using monthly data from January 2004 to January 2023, with all sub-figures in percent. The maturity levels range up to 240 months.

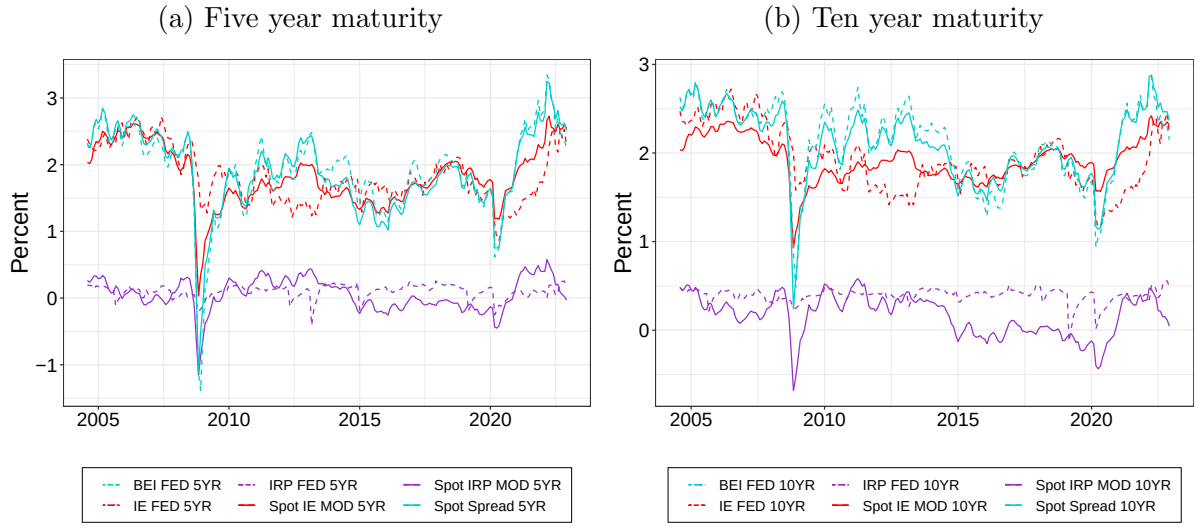
From Figures 4 and 5 one can see several periods, particularly around financial crises or economic downturns, where the curve flattens or even inverts. There are four relevant events in our sample, namely The Global Financial Crisis (2007 - 2009), the European Debt Crisis (2010-2012), the COVID-19 Pandemic (2020-2021), and the current rise in inflation (2021-2023), having a significant impact on nominal, real, and risk premium rates.

During the Global Financial Crisis (2007-2009), there was a sharp increase in risk aversion, which led to a decline in nominal and real interest rates as investors sought safety in government bonds. The crisis also led to a decline in inflation expectations, which further reduced nominal interest rates. The risk premium, on the other hand, increased as investors demanded higher compensation for bearing risk in an uncertain economic environment (Thakor, 2015). The European Debt Crisis (2010-2012) had a similar impact on nominal, real, and risk premium

rates. According to Lane (2012) The crisis led to an increase in risk aversion and a decline in nominal and real interest rates as investors sought safety in government bonds of countries perceived as safe havens. Inflation expectations also declined, further reducing nominal interest rates. The risk premium increased as investors demanded higher compensation for bearing the risk of sovereign default.

The COVID-19 Pandemic (2020-2021) has had a significant impact on the yield curve. In response to the pandemic, central banks around the world lowered interest rates and implemented monetary stimulus measures to support their economies. This caused nominal and real interest rates to fall. Inflation expectations also declined initially but have since rebounded as the global economy has recovered. The risk premium has fluctuated during the pandemic but has generally remained elevated due to the high level of uncertainty (Lane, 2021). The current rise in inflation has led to an increase in nominal interest rates as investors demand higher compensation for the loss of purchasing power. Real interest rates have also increased as central banks have begun to tighten monetary policy in response to rising inflation. The risk premium has also increased as investors demand higher compensation for bearing the risk of higher inflation (Cavallo, 2021).

Figure 6: Validation of inflation expectation and IRP



Notes: This figure shows the estimated monthly spot BEI (spread), IE, and IRP series for the EATS model (MOD) for five (panel A) and ten (panel B) years of maturity. Additionally, this figure shows the same series computed by Cleveland's Federal Reserve (FED) for comparison.

To validate our model, Figure 6 compares our fitted spot break-even inflation, IE, and IRP values with similar data released by the Federal Reserve. We observed a strong correlation between our model's implied spot spread and the FED BEI series for both the 5-year and 10-year maturity horizons. The correlation was not as strong for the IE series, but the overarching trends and magnitudes remained consistent. However, the IRP series for longer maturities showed significant divergence. This can be attributed to the use of a simpler three-factor model in this research, compared to the Cleveland FED's incorporation of survey data and inflation swaps for better targeting of inflation dynamics. Nonetheless, our subsequent robustness analysis

shows that our main results are largely model-agnostic and persist regardless of the complexity of the model employed.

3.3 Inflation-protected instruments, validation, and controls

Furthermore, three additional types of data are incorporated. The first one is Inflation-protected instruments, consisting of daily TIPS yields spanning 2-20 years maturity, available from 2000 onwards from Gürkaynak et al. (2010). we also include in this category inflation-linked swaps (daily mid-rate) with maturities from 1 to 20 years, available from June 18, 2007, and retrived from Refinitiv. These series enter as dependent variables in the analysis of the effects of news measures on inflation-related instruments.

The validation data serves two purposes: validating the quality of the term structure model and acting as a robustness check for the effects of news metrics on inflation-related measures. The dataset includes daily break-even inflation rates with 2-20 years maturity from Gürkaynak et al. (2010). This type of data also includes Cleveland Fed's monthly inflation expectations for 1-20 years maturity and IRP for 5 and 10 years maturity.

Finally, control data helps to isolate the effect of news variables. The control data includes the daily closing price of the West Texas Intermediate (WTI) oil reference and a daily indicator variable $FOMC$, which is equal to 1 if there is any statement made by the Federal Reserve on a specific day. The oil price allows for the control of changes in IE and IRP due to unexpected changes in input costs or disposable income from an observed energy price shock. The $FOMC$ variable accounts for the change in expectations due to the direct impact of central policy communication (Glas and Müller, 2021).

4 Effect of news coverage on inflation compensation

The main findings of this study are divided into three parts. The first part examines the effect of inflation news metrics on inflation-protected securities, namely TIPS, and swaps, and on inflation compensation as measured by break-even inflation. The second part disentangles the effect of news measures on inflation compensation by examining their impact on IE and the IRP. The final part explores the dynamics of observed and implied price level shocks on inflation-protected securities and inflation compensation drivers.

4.1 Inflation-protected securities and Break-even inflation

Table 4 presents the impact of inflation news metrics on 2-year TIPS, 1-year swaps, and 1-year BEI. The effect of *news share*, *polarity*, and *subjectivity* on the 2-year TIPS, in model (1), is negative but only *subjectivity* is statistically significant. The negative coefficients associated with an increase in the share of news about inflation follow the expected dynamics of TIPS after an increase in the price level. TIPS prices tend to rise as well because investors demand higher

yields on nominal Treasury bonds to compensate for the expected erosion of purchasing power due to inflation, In contrast, yields on inflation-protected Treasury bonds remain relatively stable because their principal value adjusts upward with rising inflation rates d'Amico et al. (2018). In model (2) we focus on the interaction between *news share* and *polarity*. As the share of news with positive sentiment increases we can observe a significant reduction in the yield of short-term TIPS. On the other hand, the interaction between *news share* and *subjectiviy* in (3) results in a large positive and significant increase in the yield, although the main effects for *subjectivity* and *news share* remain negative.

Table 4: Effect of news variables on short term inflation-protected securities and BEI

	2 year TIPS			1 year swap			1 year BEI		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
constant	1.473***	1.221***	1.667***	-0.182	-0.114	-0.130	1.289***	1.328***	1.392***
	(0.139)	(0.136)	(0.147)	(0.116)	(0.123)	(0.156)	(0.058)	(0.051)	(0.062)
news share	-0.814	-3.224***	-4.026***	1.634***	1.015***	0.983	0.437**	-0.191	-1.273**
	(0.563)	(0.706)	(1.026)	(0.406)	(0.388)	(0.951)	(0.218)	(0.266)	(0.520)
polarity	-0.049	2.147***		-0.167	0.264		0.168	0.842***	
	(0.364)	(0.528)		(0.197)	(0.326)		(0.124)	(0.225)	
subjectivity	-37.779***		-56.642***	1.504		-0.637	0.650		-9.996***
	(4.899)		(6.553)	(2.788)		(5.501)	(1.749)		(2.970)
news share × *polarity*		-15.057***			-6.699			-7.972***	
		(5.109)			(4.354)			(2.584)	
news share × *subjectivity*			244.120***			42.538			128.336***
			(69.195)			(77.760)			(39.640)
CPI MoM	-1.050***	-1.133***	-1.091***	1.744***	1.784***	1.750***	0.916***	0.905***	0.894***
	(0.193)	(0.198)	(0.191)	(0.123)	(0.122)	(0.124)	(0.073)	(0.073)	(0.076)
WTI	-0.013***	-0.011***	-0.013***	0.029***	0.028***	0.029***	0.004***	0.004***	0.004***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
FOMC	-0.127	-0.124	-0.115	-0.068	-0.062	-0.067	-0.139***	-0.129***	-0.133***
	(0.115)	(0.117)	(0.113)	(0.057)	(0.056)	(0.057)	(0.043)	(0.042)	(0.042)
Obs	932	932	932	410	410	410	935	935	935
Adj R^2	0.210	0.174	0.230	0.830	0.832	0.830	0.350	0.365	0.382

Notes: This table presents the estimated coefficients from Equation 19, using as dependent variables the 2-year TIPS (1-3), 1-year swap (4-6), and the 1-year BEI fitted series from the EATS model (7-9). The model is estimated using weekly frequency data. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis. Swap data available from 2017.

The signs of the interaction effects in (2) and (3) are unexpected, since they imply an increase in short-term TIPS price if the share of positive news increases, in (1) and a reduction of the TIPS price if the share of subjective news raises (2). They contrast with their main effects which show the expected sign, i.e. TIPS price decreases (yield increases) with positive news and increases if news reflects more uncertainty regarding future inflation, signaling an increase in the variety of opinions. The sign on the interaction between *news share* and *polarity* suggests a distrust of waves of optimistic news. On the contrary, the interaction between *news share* and *polarity* suggest a positive perspective (inflation reduction) on short-term TIPS prices when the debate on current and expected inflation substantially increases. However, these interaction effects decline in magnitude towards zero as maturity increases but remain significant for the rest of the term structure.[11]

[11]These results are not part of the main paper, but can be provided upon request.

The second block on Table 4 shows the impact of news measures on inflation swaps. A one-percent increase in the *news share* leads to a 1.634 pp increase in the mid-rate of 1-year inflation swaps. To get an idea of the dymension of the effect, recall that the maximum observed increase in the *news share* was only 0.82 percent in Table 2. The interaction term in equation (5) indicates a reduction in the mid-rate due to a wave of optimistic news regarding inflation, but the effect is not significant.

The last block shows the effect of news measures on short-term inflation compensation, measured by the one-year break-even rate. Regression (7) reveals that only news share and control variables affect inflation compensation. Regression (8) shows that a positive increase in news regarding inflation leads to an expected reduction of about 8 pp in the break-even inflation. The interaction term in model (9) indicates that an increase in the share of opinion articles results in a positive and significant increase in inflation compensation. Finally, the control variables indicate an inverse relationship between TIPS yields and swap rates. The latest observed monthly changes in CPI, $CPI\ MoM$, and oil prices, WTI, have a significant and increasing effect on inflation compensation. However, weeks that include Federal Reserve announcements, $FOMC$, have a significant decreasing effect on short-term break-even inflation rates.

Table 5: Effect of news variables on short term inflation-protected securities and BEI, overshooting

	2 year TIPS			1 year swap			1 year BEI		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
constant	1.267***	1.318***	1.500***	0.162	0.092	0.094	1.412***	1.381***	1.386***
	(0.130)	(0.130)	(0.139)	(0.144)	(0.126)	(0.126)	(0.051)	(0.050)	(0.057)
news share	-2.505***			-0.350			-0.744**		
	(0.693)			(1.125)			(0.328)		
polarity		0.844***			0.020			0.319***	
		(0.313)			(0.182)			(0.121)	
subjectivity			-28.616***			-1.218			-1.133
			(4.508)			(2.705)			(1.816)
overshoot	0.927***	0.886***	1.068***	0.519***	0.621***	0.424***	0.310***	0.398***	0.358***
	(0.147)	(0.125)	(0.128)	(0.127)	(0.089)	(0.154)	(0.049)	(0.040)	(0.047)
news share × *overshoot*	-0.516			1.291			1.389***		
	(1.019)			(1.261)			(0.368)		
polarity × *overshoot*		1.966*			-1.039*			-0.827***	
		(1.136)			(0.619)			(0.307)	
subjectivity × *overshoot*			-37.438***			17.100**			9.405***
			(11.037)			(8.521)			(3.308)
Controls	all	all	all	all	all	all	all	all	all
Obs	932	932	932	410	410	410	935	935	935
Adj R^2	0.220	0.205	0.266	0.846	0.845	0.845	0.439	0.433	0.434

Notes: This table presents the estimated coefficients from Equation 19, using as dependent variables the 2-year TIPS (1-3), 1-year swap (4-6), and the 1-year BEI fitted series from the EATS model (7-9). The model is estimated using weekly frequency data. All available control variables, $CPI\ MoM$, WTI, $FOMC$, were added. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis. Swap data available from 2017.

In the next table, Table 5, we include the variable 'overshooting,' which is intended to capture those instances when the year-on-year inflation exceeds the Federal Reserve's target of 2%. The

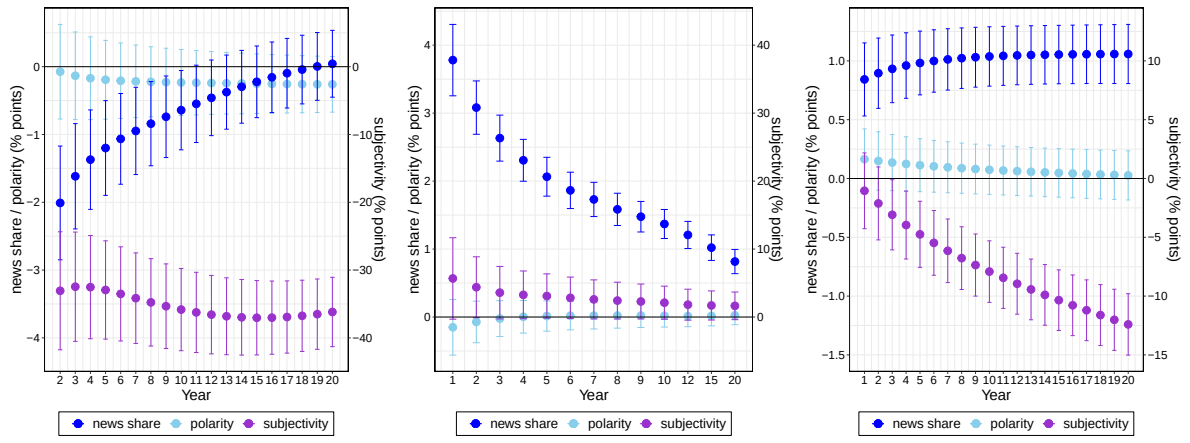
positive and significant coefficients across all models suggest that when inflation YoY overshoots the Fed target, there is a notable upward shift in short-term TIPS yields, swaps rates, and BEI rates. This reflects the concerns about rising future inflation or a more hawkish Fed stance.

The interaction of *news share* with *overshooting* has a positive significant effect on 1-year BEI, suggesting that in times of above-expected inflation, BEI corrects upwards, when inflation coverage rises. The interaction between *polarity* and *overshoot* reveals that short-term inflation compensation is sensitive to positive inflation news, demonstrated in the reduction of swap rates, BEI rates and the equivalently increase in TIPS yields, especially for high inflation periods. Finally, when inflation exceeds its target and there is a surge in opinion articles speculating on how monetary authorities may respond and how it will impact the economy, the resulting uncertainty leads to a significant increase in inflation compensation, evident in the coefficients for the *subjectivity* $\times$ *overshoot*.

Figure 7 summarizes the term structure effect of inflation measures on inflation-protected securities and the break-even inflation. Note that the estimates depicted in this figure for the shortest maturity available correspond to models (1), (4) and (7) in Table 4, and the error bars show the 90% confidence interval.

Figure 7: Term structure effect of news measures on inflation-protected securities

(a) TIPS (b) Swaps (c) Break-even Inflation



Notes: This figure plots the estimated coefficients from Equation 19 for selected news measures, using as dependent variables the τ-year TIPS with $\tau = 2, \ldots, 20$ in Panel (A); τ-year swap with $\tau = 1, \ldots, 10, 12, 15, 20$ in Panel (B), and the τ-year BEI fitted series from the EATS model, with $\tau = 1, \ldots, 20$ in Panel (C). The model is estimated using weekly frequency data. All available control variables, $CPI\ MoM$, WTI, $FOMC$, were added. Confidence bands at 90% level.

Panel (A) shows that the impact of *news share* on TIPS starts insignificantly at -0.814 for short-term maturities. As maturity progresses, the effect slowly converges towards zero. In contrast, for maturities exceeding 6 years, this effect grows slightly in magnitude and becomes statistically significant. The *subjectivity* of news showcases a notable and consistent effect on TIPS across the term structure. Beginning at a -37 pp, it slightly decreases in magnitude to about -34 pp by 20-year maturity. This effect is statistically significant throughout the maturity spectrum. *Polarity*, on the other hand, remains statistically insignificant across the entire term

structure for TIPS. Panel (B) shows how the initial effect of *news share* decreases as maturity increases, becoming statistically insignificant at 20 years. Both *polarity* and *subjectivity* do not exhibit statistically significant effects on the term structure of inflation swaps. In Panel (C) we can observe that all three news measures have an initial positive effect on Break-Even-Inflation, diminishing as maturity extends. For example, *news share* starts with an effect of 0.43, becoming statistically insignificant after a 14-year maturity horizon. *Subjectivity*, turns significant and negative at 6-year maturity, around -3 pp. The decline is fairly consistent, reaching approximately -8 pp by the 20-year mark. *Polarity* begins near zero and slowly approaches it as maturity increases. It remains statistically insignificant across all maturities.

The findings in Figure 7 suggest that different financial instruments have varying sensitivities to the effect of inflation news. While TIPS appear to be more sensitive to news subjectivity, inflation swaps are predominantly influenced by news share, especially in the short term. For BEI, the decline in the effect of news measures as maturity increases suggests that the market believes in the transitory nature of news-driven influences or the central bank?s ability to anchor long-term expectations Gürkaynak et al. (2010). The response of TIPS to subjectivity in news might underscore the market?s perception of uncertainty or noise in news, leading to cautious investment behaviors. Furthermore, the pronounced effect of news share on short-term swaps might point to the immediacy of expectations formed from prevalent news (Coibion et al., 2022).

We now turn our attention to the content of the news, represented by topics, and its impact on inflation compensation. The results, summarized in Table 6, show that all topics except *politics* and *inflation eases* have a negative and significant effect on 2-year TIPS in model (1). The inclusion of *news share*, in (2), or *polarity*, in (3), does not importantly alter the effect of already significant topics. Notably, the topic *monetary policy* leads to a decrease in TIPS yields by approximately 3.158 pp in model (2). This aligns with the narrative that concerns on the effectivity of monetary policies often increases the attractiveness of TIPS (Campbell and Shiller, 1996).

In Table 6, the second set of results deals with a 1-year swap rate. The impact of news on this type of security is mainly driven by topics such as *politics*, $profits \,\&\, stocks$, and *oil & gas*. However, the topic *politics* is not robust to the inclusion of *news share* in model (5). Models (5) and (8) show negative significant coefficients for *oil & gas* (-0.896), and *global events* (-0.909), respectively. However, this finding does not reflect the common belief that rising energy prices and distortions in supply chains should translate into higher swaps' mid-rates due to an increase in inflationary pressure. One explanation for this finding is the close relation of these topics with other topics such as $profits \,\&\, stocks$ and $food \,\&\, goods$. While news about $profits \,\&\, stocks$ tends to focus on firms' profitability and how they pass higher input costs (such as energy) to final consumers, motivating cost-push inflation of $food \,\&\, goods$, news about *oil & gas* and *global events* could be interpreted as having mostly temporary effects on inflation dynamics, explaining the negative coefficients for short-term inflation compensation. Similarly, *politics* and $inflation\ eases$ also show significant but opposing coefficient signs. While news about *politics* focuses more on the partisan debate on the best policy to tackle inflation, the

Table 6: Effect of news topics on short term inflation-protected securities and BEI

	2 year TIPS			1 year swap			1 year BEI		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
constant	2.156***	2.303***	2.157***	-0.368***	-0.174	-0.368***	1.277***	1.281***	1.275***
	(0.151)	(0.153)	(0.151)	(0.121)	(0.124)	(0.122)	(0.071)	(0.076)	(0.071)
news share		1.921***			1.500***			0.046	
		(0.579)			(0.448)			(0.249)	
polarity			-0.099			-0.220			0.223*
			(0.350)			(0.208)			(0.123)
politics	-1.310	-1.935**	-1.330	0.962*	0.507	0.884*	1.449***	1.434***	1.492***
	(0.949)	(0.948)	(0.950)	(0.518)	(0.502)	(0.528)	(0.296)	(0.299)	(0.298)
monetary policy	-2.854***	-3.158***	-2.870***	0.594	0.178	0.573	0.181	0.174	0.218
	(0.865)	(0.880)	(0.874)	(0.474)	(0.484)	(0.472)	(0.329)	(0.333)	(0.325)
oil & gas	-2.010***	-2.397***	-2.017***	-0.678*	-0.896**	-0.681*	-0.140	-0.149	-0.125
	(0.634)	(0.646)	(0.637)	(0.355)	(0.358)	(0.359)	(0.214)	(0.224)	(0.214)
housing	-3.094***	-3.227***	-3.106***	0.605	0.433	0.604	-0.015	-0.018	0.009
	(1.086)	(1.076)	(1.090)	(0.581)	(0.542)	(0.579)	(0.416)	(0.416)	(0.417)
profits & stocks	-1.884*	-2.451**	-1.896*	1.565***	1.019*	1.513***	0.957***	0.944***	0.985***
	(0.976)	(0.991)	(0.971)	(0.556)	(0.533)	(0.565)	(0.314)	(0.318)	(0.316)
global events	-2.616***	-2.750***	-2.645***	-0.125	-0.363	-0.174	-0.906***	-0.909***	-0.842***
	(0.824)	(0.829)	(0.844)	(0.517)	(0.511)	(0.520)	(0.306)	(0.309)	(0.308)
expectations	-2.438*	-3.056**	-2.441*	0.699	0.008	0.651	0.244	0.229	0.253
	(1.250)	(1.224)	(1.250)	(0.915)	(0.917)	(0.905)	(0.483)	(0.487)	(0.483)
food &, goods	-2.422***	-2.481***	-2.425***	0.197	0.184	0.198	-0.081	-0.082	-0.073
	(0.636)	(0.640)	(0.638)	(0.315)	(0.311)	(0.318)	(0.233)	(0.234)	(0.231)
inflation eases	-1.255	-1.205	-1.226	0.283	0.261	0.358	-1.116***	-1.115***	-1.180***
	(1.057)	(1.053)	(1.071)	(0.656)	(0.644)	(0.660)	(0.425)	(0.427)	(0.430)
Controls	all	all	all	all	all	all	all	all	all
Obs.	932	932	932	410	410	410	935	935	935
Adj.R^2	0.309	0.317	0.308	0.823	0.832	0.823	0.369	0.368	0.370

Notes: This table presents the estimated coefficients from Equation 19 for news topics, using as dependent variables the 2-year TIPS (1-3), 1-year swap (4-6), and the 1-year BEI fitted series from the EATS model (7-9). The model is estimated using weekly frequency data. All available control variables, $CPI\ MoM$, WTI, $FOMC$, were added. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis. Swap data available from 2017.

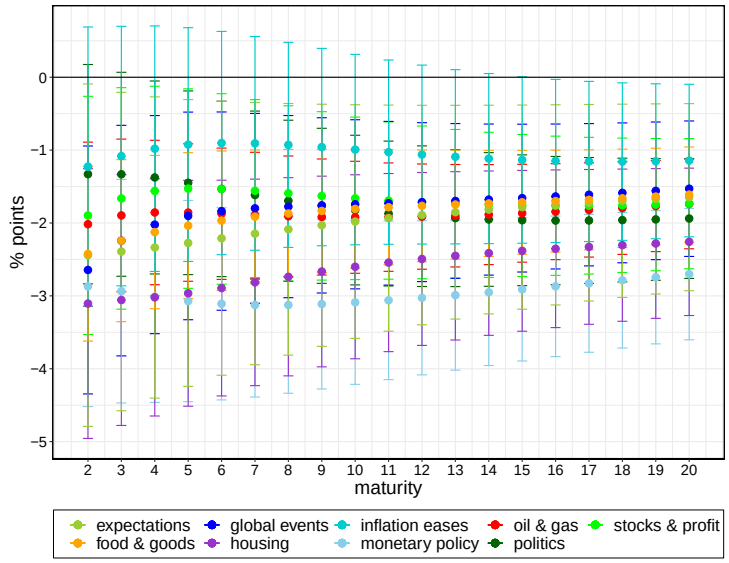
topic *inflation eases* directly looks at the particular plans and measures of the government and the Fed to reduce inflation.[12]

Moving on to the term structure effect of inflation news topics on inflation compensation, Figure 8 displays the changes in influence across different maturity horizons for both TIPS and inflation swaps. Panel (A) reveals a persistent and significant pattern for most topics in TIPS, except for *inflation eases*, which exhibit negative coefficients throughout the entire term structure. The magnitude of their effect seems to slightly decrease as maturity increases, but their consistent significance indicates that they have long-term implications for inflation protection. Interestingly, *politics* displays a slight increase in the magnitude of its effect as maturity rises. This suggests that political decisions or events may have prolonged inflationary consequences.

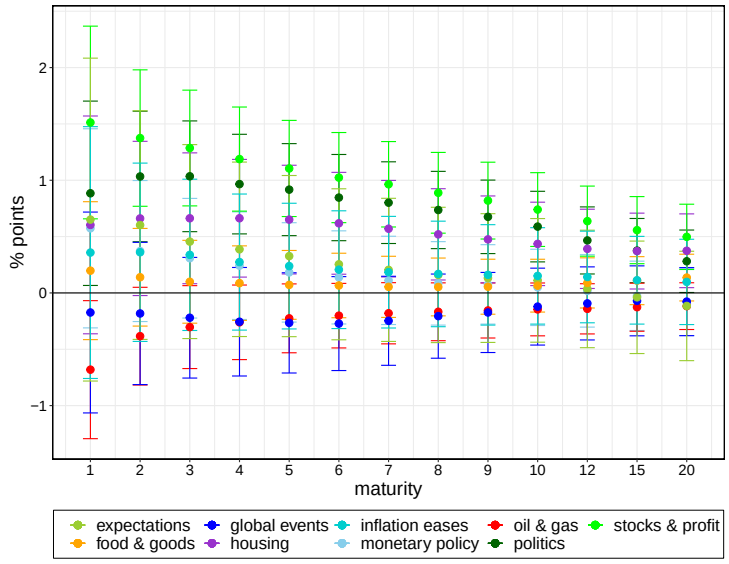
[12]Table 15 in the appendix demonstrates that the keywords *inflation reduction act* and *crisis* are representative of this topic.

Figure 8: Term structure effect of inflation news topics on TIPS and SWAPS

(a) TIPS



(b) Swaps



Notes: This figure plots the estimated coefficients from Equation 19 for news topics, using as dependent variables the τ-year TIPS with $\tau = 2, \ldots, 20$ in Panel (A) and τ-year swap with $\tau = 1, \ldots, 10, 12, 15, 20$ in Panel (B). The model is estimated using weekly frequency data. All available control variables, $CPI\ MoM$, WTI, $FOMC$, were added. Confidence bands at 90% level.

In the context of inflation swaps, Panel (B) in Figure 8 shows two topics that stand out with their positive and significant coefficients across all maturities: $profits\,\&\,stocks$ and $politics$. Positive coefficients for these topics suggest that news around them increases the mid-rates of inflation swaps. The declining magnitude as maturity extends might indicate that the market perceives the effects of these news topics to wane in the long run. At the 3-year maturity level, the effect of "politics" is larger. This could indicate that political events or decisions made are perceived to have the most tangible impact on inflationary pressures around this mid-term

horizon. At this maturity level, the topic *housing* becomes significant and remains so for longer maturities. This suggests that housing market news or changes influence expectations more from a mid to long-term perspective, impacting the swap rates accordingly.

4.2 Inflation expectations and risk premium

Table 7 presents a summary of the weekly impact of the primary news variables on one-year spot IE and IRP, as derived from the BEI series decomposition produced by the EATS model detailed in section 2.2. To allow for a direct comparison with the Federal Reserve's BEI, EI, and IRP, we utilize the spot series instead of the forward version. Our analysis indicates that the share of news does not exert a significant effect on IE. We evaluate the potential sensitivity of IE to *news share* by introducing interaction terms with $CPI\ MoM$, *polarity*, and *subjectivity* in models (2), (3), and (4), respectively. However, the findings confirm the lack of sensitivity of IE to *news share* in different contexts. On the other hand, control variables seem to account for most of the variation in the model.

Table 7: Effect of news variables on short term IE and IRP

	1 year ie				1 year irp			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
constant	2.039***	2.041***	2.048***	2.042***	-0.385***	-0.347***	-0.348***	-0.283***
	(0.025)	(0.026)	(0.023)	(0.025)	(0.058)	(0.057)	(0.051)	(0.062)
news share	0.030	0.058	-0.064	-0.029	0.434**	-0.033	-0.185	-1.270**
	(0.095)	(0.184)	(0.114)	(0.126)	(0.219)	(0.367)	(0.268)	(0.519)
polarity	0.033		0.137		0.164		0.828***	
	(0.068)		(0.103)		(0.124)		(0.230)	
subjectivity	0.484			0.032	0.602			-10.000***
	(0.838)			(0.954)	(1.746)			(2.974)
news share × $CPI\ MoM$		-0.052				1.320*		
		(0.526)				(0.793)		
news share × *polarity*			-1.340				-7.838***	
			(1.136)				(2.660)	
news share × *subjectivity*				4.208				127.915***
				(7.455)				(39.600)
$CPI\ MoM$	0.302***	0.307***	0.301***	0.301***	0.886***	0.763***	0.875***	0.864***
	(0.054)	(0.073)	(0.054)	(0.054)	(0.074)	(0.107)	(0.073)	(0.076)
WTI	-0.002***	-0.002***	-0.002***	-0.002***	0.005***	0.004***	0.005***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
$FOMC$	0.028	0.028	0.030	0.028	-0.142***	-0.145***	-0.132***	-0.136***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.043)	(0.043)	(0.042)	(0.042)
Obs.	935	935	935	935	935	935	935	935
Adj. R^2	0.175	0.175	0.177	0.175	0.341	0.346	0.355	0.373

Notes: This table presents the estimated coefficients from Equation 19, using as dependent variables the the 1-year IE (1-4) and the 1-year IRP fitted spot series from the EATS model. The model is estimated using weekly frequency data. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis. Swap data available from 2017.

Compared to IE, a one-year IRP is more sensitive to new measures, with the "news share" showing a risk increase in all its variations. In model (5), IRP increases by 0.434 pps, but this effect is amplified if "CPI MoM" also increases. Conversely, if the share of positive news about

inflation increases, the IRP significantly decreases. Non-positive news increases the IRP by 0.828 pp. The interaction term in column (8) has a very high positive coefficient, indicating that the more subjective and prevalent the news is, the more it can drastically inflate the risk premium. This is likely because abundant, subjective news creates more uncertainty, driving investors to demand a higher premium for bearing inflation risks.

Similarly to IE, the control variables have a significant effect on the IRP, but there are two important differences. First, the effect for "WTI" flips the sign and increases in magnitude, indicating the more relevant role of oil prices for unexpected changes in the price level. Second, the variable "FOMC" remains negative and significant for models (5) to (8), suggesting that FOMC announcements tend to reduce the IRP, due to their role in providing clarity and direction of monetary policy interventions.

Table 8: Effect of news variables on short term IE and IRP, overshooting

	1 year ie			1 year irp		
	(1)	(2)	(3)	(4)	(5)	(6)
constant	2.047***	2.047***	2.047***	-0.263***	-0.295***	-0.289***
	(0.025)	(0.024)	(0.026)	(0.052)	(0.050)	(0.058)
news share	-0.068			-0.738**		
	(0.115)			(0.329)		
polarity		0.089			0.310**	
		(0.067)			(0.121)	
subjectivity			-0.271			-1.106
			(0.846)			(1.824)
overshoot	-0.020	-0.018	-0.022	0.312***	0.400***	0.360***
	(0.025)	(0.021)	(0.023)	(0.049)	(0.040)	(0.047)
news share × *overshoot*	0.178			1.371***		
	(0.169)			(0.370)		
polarity × *overshoot*		-0.347*			-0.792**	
		(0.179)			(0.309)	
subjectivity × *overshoot*			2.402			9.165***
			(1.924)			(3.314)
Controls	all	all	all	all	all	all
Obs.	935	935	935	935	935	935
Adj. R^2	0.175	0.179	0.176	0.431	0.425	0.425

Notes: This table presents the estimated coefficients from Equation 19, using as dependent variables the the 1-year IE (1-4) and the 1-year IRP fitted spot series from the EATS model. The model is estimated using weekly frequency data. All available control variables, *CPI MoM*, *WTI*, *FOMC*, were added. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis. Swap data available from 2017.

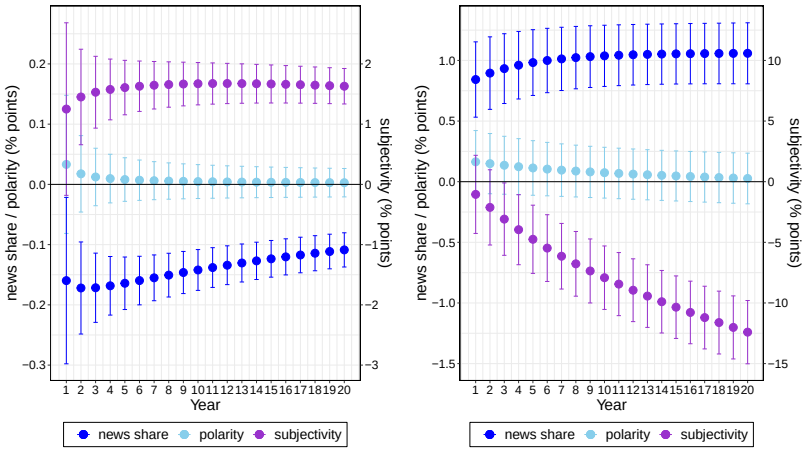
In the context of inflation overshooting the FED target, the impact of news variables on short-term expectations and risk premium is presented in Table 8. The estimated coefficients for *news share* and *subjectivity* are not statistically significant for IE, which is consistent with the findings of the previous table. However, the interaction between *polarity* and *overshooting* is positively and significantly related to IE, indicating that positive news can alleviate the pressure on IE in the case of high inflation.

For the short-term IRP, in a scenario of high inflation, the effect of news measures gets amplified. The coefficient of "overshooting" indicates a significant rise in inflation risk, which can be attributed to market anticipation of tightened monetary policies and fear of an overheating economy. The estimated coefficients for all interactions with "overshooting" are statistically significant. The "news share" coefficient suggests that the abundance of news, regardless of its nature, increases the perceived risk associated with future inflation, resulting in an increased demand for risk premiums. The same applies to the interaction between "subjectivity" and "overshooting." In situations where there are competing opinions about future monetary interventions, market participants might perceive such scenarios as particularly risky, leading to an even higher IRP.

Figure 9 presents the estimated coefficients from Table 7 across the term structure. In Panel (A), the coefficients for news share, polarity, and subjectivity are not statistically significant for short-term expectations. However, for maturities ranging from 3 years onwards, subjectivity starts to play a significant role. Not only does it become statistically significant, but it also exhibits a slightly increasing trend with the term structure, rising above 0.1 pps. These findings highlight the relatively insignificant role of "objective" news coverage in shaping medium to long-term expectations, but the importance of expert opinions and in-depth analysis in the formation of long-term expectations.

Figure 9: Term structure effect of inflation news topics on IE and IRP

(a) Inflation expectations (b) Inflation risk premium



Notes: This figure plots the estimated coefficients from Equation 19 for news measure, using as dependent variables the τ-year IE with $\tau = 2, \ldots, 20$ in Panel (A) and τ-year IRP with $\tau = 1, \ldots, 20$ in Panel (B). The model is estimated using weekly frequency data. All available control variables, $CPI\ MoM$, WTI, $FOMC$, were added. Confidence bands at 90% level.

The results presented in Panel (B) of Figure 9 reveal that the IRP is positively and significantly affected by news share for short-term horizons. This finding implies that a greater proportion of news corresponds to a higher IRP. However, as the maturity period lengthens, the significance of news share diminishes until it becomes statistically insignificant at a 13-year

maturity. This implies that the impact of news volume or prevalence on the risk premium tends to weaken as we look further into the future.

For the one-year horizon, the effect of subjectivity on the IRP is positive but not statistically significant. However, as the maturity period lengthens, the effect becomes negative, significant, and as large as 0.25 pps at a 5-year maturity. The effect continues to decline at a slower pace thereafter. This suggests that, in the medium term, more subjective news tends to reduce the IRP. The polarity of news remains statistically insignificant across all maturities for the IRP.[13]

Table 9 presents a content perspective of the effect of news on IE. News related to "expectations" has a positive and significant effect on IE, with an increase of 0.512 pp for every unit increase in such news. This effect remains consistent even when we consider "news share" or "polarity" measures. News classified into this topic deals with opinions or analysis about how consumer expectations evolve, usually based on surveys conducted by the FED.[14]We found that no other topic has a significant impact on expectations, indicating that anchored expectations are insensitive to news in the short term.

However, the results for short-term IRP in Table 9 reveal a different pattern. The analysis shows that news content has a more significant impact on the variation in the risk premium than on expectations. This is evident when we compare the adjusted R^2 of models (1) and (4) in the table. Political news, news related to profitability and firms, and the stock market have a pronounced and increasing impact on the IRP of 1.449 pp and 0.980 pp, respectively. Conversely, news related to global events, such as the war in Ukraine or the pandemic, and news related to policies intended to reduce inflation, such as the Inflation Reduction Act, significantly reduce the risk perception in 0.905 pp and -1.124 pp. The positive coefficients can be aligned with the risk of high inflation due to partisan disputes on the best policy to tackle inflation, or due to the behavior of investors and firms to bid up the prices of assets, such as stocks, or final goods in anticipation of future gains or raising costs.

Figure 10 offers insights into how the effect of various news topics on IE, in Panel (A), and IRP, in Panel (B), evolves across different maturities. At the one-year maturity, the topic that stands out with a significant impact on IE is *expectations* itself, registering an increase of 0.5 pp. This suggests that news related to opinions on inflation projections has an immediate effect on the market's short-term expectations, but this effect diminishes relatively quickly until the 4-year maturity and then remains stable for the rest of the term structure. Other topics, such as *global events* and *monetary policy* rise swiftly in their significance, making them two of the leading influencers for long-term expectations. Such a trend suggests that over extended

[13]The paths depicted for subjectivity and polarity do not reflect the path of the interaction effects, as the term structure effect of *news share*×*polarity* is positive, significant and slightly increasing with maturity, and the term structure effect of *news share*×*subjectivity* is positive, significant and slightly decreasing with maturity. These further results are available upon request.

[14]An example for this topic is the following news item: `<< date: 07.11.2022, type: article, domain: wsj.com, title: "New York Fed Survey Finds LongTerm Inflation Expectations", snippet: "Americans are expecting lower inflation increases over the longer run amid sharp drop in the projected rate of homeprice increases the Federal Reserve." >>`

Table 9: Effect of news variables on short term IE and IRP, meta-topics

	1 year ie			1 year irp		
	(1)	(2)	(3)	(4)	(5)	(6)
constant	2.022***	2.019***	2.021***	-0.396***	-0.392***	-0.398***
	(0.028)	(0.029)	(0.028)	(0.071)	(0.077)	(0.071)
news share		-0.030			0.049	
		(0.112)			(0.250)	
polarity			0.031			0.220*
			(0.065)			(0.123)
politics	-0.001	0.009	0.005	1.449***	1.433***	1.492***
	(0.154)	(0.158)	(0.155)	(0.295)	(0.298)	(0.297)
monetary policy	-0.178	-0.173	-0.173	0.199	0.191	0.236
	(0.154)	(0.157)	(0.156)	(0.329)	(0.333)	(0.325)
oil & gas	0.139	0.145	0.141	-0.154	-0.164	-0.139
	(0.139)	(0.139)	(0.138)	(0.214)	(0.224)	(0.215)
housing	0.092	0.094	0.095	-0.024	-0.028	-0.000
	(0.192)	(0.191)	(0.192)	(0.419)	(0.419)	(0.420)
profits & stocks	-0.224	-0.215	-0.220	0.980***	0.965***	1.007***
	(0.156)	(0.158)	(0.157)	(0.312)	(0.316)	(0.314)
global events	-0.006	-0.004	0.003	-0.905***	-0.908***	-0.842***
	(0.192)	(0.192)	(0.187)	(0.306)	(0.310)	(0.308)
expectations	0.512**	0.522**	0.514**	0.193	0.177	0.202
	(0.223)	(0.230)	(0.223)	(0.483)	(0.486)	(0.483)
food & goods	0.162	0.163	0.163	-0.097	-0.099	-0.090
	(0.115)	(0.115)	(0.116)	(0.234)	(0.236)	(0.232)
inflation eases	0.079	0.078	0.070	-1.124***	-1.123***	-1.187***
	(0.191)	(0.191)	(0.190)	(0.424)	(0.426)	(0.430)
Obs.	all	all	all	all	all	all
Adj. R^2	0.178	0.177	0.177	0.360	0.359	0.361

Notes: This table presents the estimated coefficients from Equation 19 for news topics, using as dependent variables the 1-year IE (1-3), and the 1-year IE fitted spot series from the EATS model (7-9). The model is estimated using weekly frequency data. All available control variables, $CPI\ MoM$, WTI, $FOMC$, were added. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis. Swap data available from 2017.

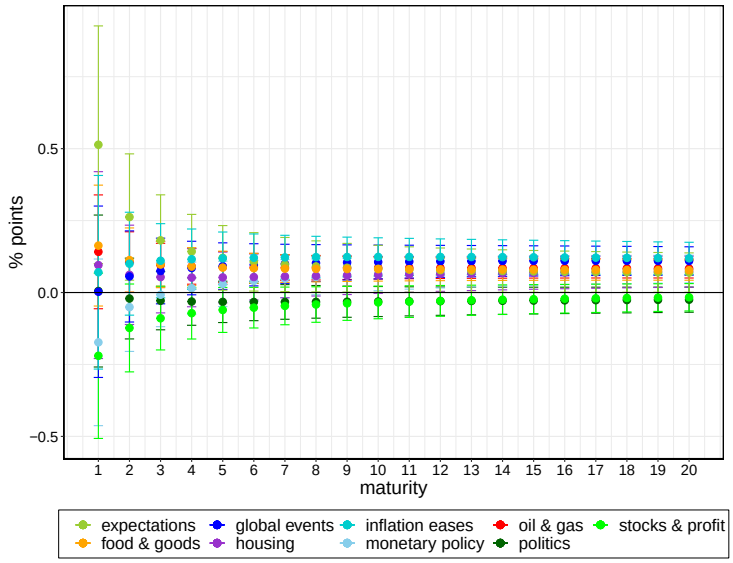
periods, broad global developments and central bank policies play a minor but pivotal role in shaping inflationary expectations.

The second panel in Figure 10 demonstrates that *politics* and *profits & stocks* have a consistently positive and significant impact on IRP, starting from the one-year maturity. However, their influence wanes as the term structure extends, suggesting that political events and market-related dynamics have a pronounced but short to medium-term effect on the perceived risks related to future inflation. Conversely, global events and inflation eases exhibit a negative and significant relationship with IRPs across maturities. This implies that global developments and news suggesting easing inflationary pressures tend to reduce the premium that investors demand for holding inflation-protected securities.

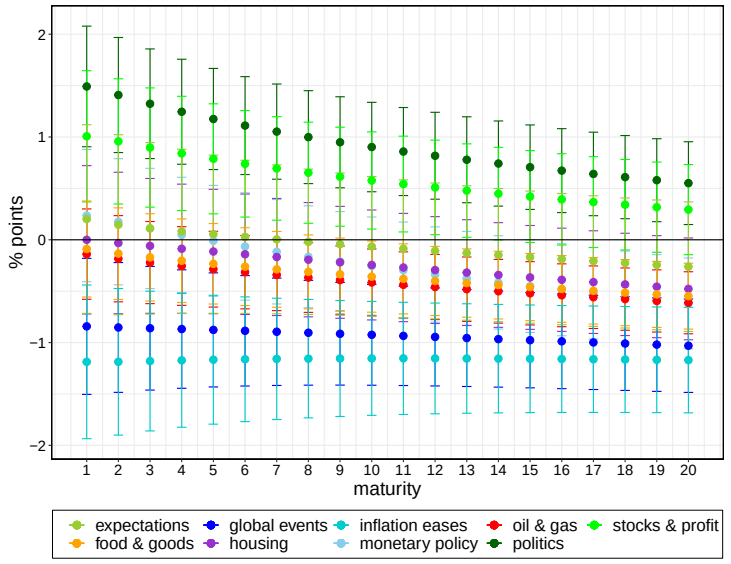
These results for inflation-protected securities and components of the break-even inflation demonstrate how the explanatory power of inflation news changes with the type of independent

Figure 10: Term structure effect of inflation news topics on IE and IRP

(a) Inflation expectations



(b) Inflation risk premium



Notes: This figure plots the estimated coefficients from Equation 19 for news topics, using as dependent variables the τ-year IE with $\tau = 2, \ldots, 20$ in Panel (A) and τ-year IRP with $\tau = 1, \ldots, 20$ in Panel (B). The model is estimated using weekly frequency data. All available control variables, $CPI\ MoM$, WTI, $FOMC$, were added. Confidence bands at 90% level.

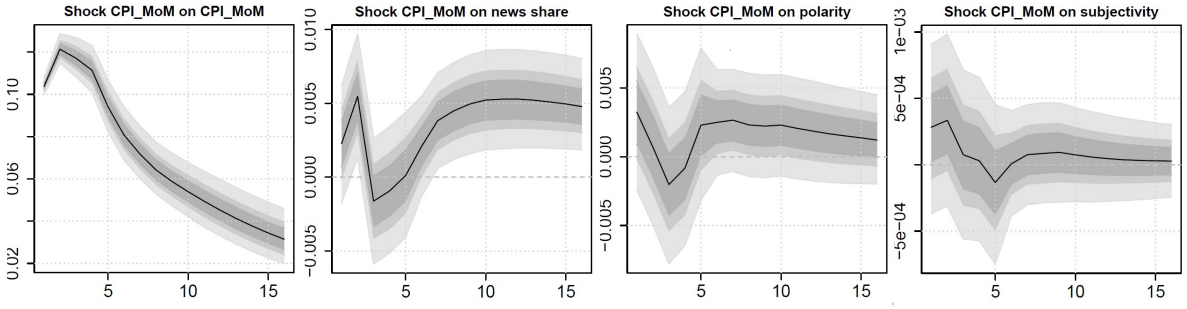
variables, the dimension of news coverage, and the inflation regime. From Tables 4 and 5, we found that for frequency and polarity-based measures of news coverage, the adjusted R^2 is higher for swap mid-rates than for TIPS yields and break-even rates. The explanatory value of these measures becomes more relevant in a high inflation regime, defined as periods when the inflation rate YoY exceeds its FED target. When comparing Tables 4 and 6 in terms of R^2 values, we found that the explanatory power of the content of news, given by the topics, surpasses the power of other types of news coverage metrics, especially for TIPS yields, and marginally for

swaps and break-even inflation. We can observe similar patterns for the R^2 of IRP in Tables 7, 8, and 9. Inflation expectations appear to be less sensitive to news, with a marginal increase in R^2 when content features are considered.

4.3 Impulse Response Functions (IRFs)

In this section, we conduct an assessment of the Impulse Response Functions (IRFs) for inflation-protected instruments and the components of break-even inflation in response to observed and implied shocks in the price level utilizing the Bayesian VAR methodology presented in Section 2.3. Figure 11 below serves as an introduction to this section by displaying the response of news coverage measures to a positive shock in MoM change in the price level.

Figure 11: Response of news measures to an inovation in the price level



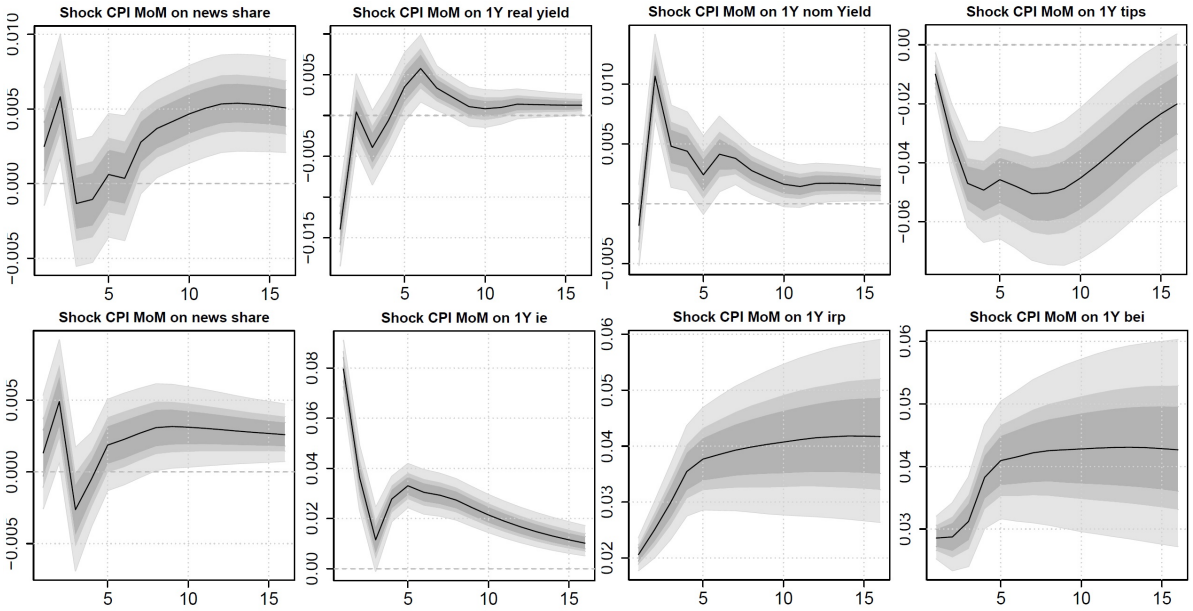
Notes: This figure shows the response of *news share*, *polarity*, and *subjectivity* to a one-standard-deviation shock in $CPI\ MoM$. The model is estimated using 6 lags and weekly data from 08-01-2007 to 26-12-2023 (1,018 observations). The estimated horizon in this figure corresponds to 16 weeks.

The response of the news share to a one-standard-deviation inflation shock is initially positive but not statistically significant. However, by the second week, it amplifies to 0.005 which is significant at the 90% confidence level, and it remains significant through the 16th week. Polarity's initial response to the shock is positive but not statistically significant. It becomes negative by the third week, suggesting a brief period of negative news sentiment after the shock. Subjectivity exhibits a slight uptick in the initial weeks after the shock, indicating a transient rise in opinionated news. However, it dips below zero by the fifth week and remains insignificant throughout, indicating a general return to less opinion-driven news coverage as the effects of the inflationary shock fade. These patterns highlight the prolonged impact of inflation shocks on media attention and sentiment, revealing the multifaceted media reactions to economic shifts.

Figure 12 displays the weekly response of yields, inflation-protected securities, and the components of inflation compensation to a price-level shock after accounting for news effects. This model assumes that the volume of news is contemporaneously only affected by the inflation shock.

The upper row of Figure 12 starts with the evolution of *news share* in a model including additionally 1-year real and nominal yields, and 1-year TIPS yields. The response of *news share* resembles the response observed in Figure 11 but with delayed response in building up after the

Figure 12: Response of yields, tips and break-even inflation to an inovation in the price level, one year maturity



Notes: This figure shows the response of *news share*, the 1-year real yield, the 1-year nominal yield, and 1-year TIPS to a one-standard-deviation shock in *CPI MoM* in the first row. The second row shows the response of *news share*, 1-year IE, 1-year IRP, and 1-year BEI to the same shock. The model is estimated using 6 lags and weekly data from 08-01-2007 to 26-12-2023 (1,018 observations). The estimated horizon in this figure corresponds to 16 weeks.

initial peak. The inclusion of news variables in the system does not radically change the expected responses of yields (cf. Gürkaynak et al. (2005)) and TIPS (cf. Fleckenstein et al. (2014)). Real yields initially decline, indicating that nominal yields do not adjust instantly to the inflation shock, which happens to be the case as the contemporaneous response of nominal yields is not statistically different from zero. When financial markets react to the inflation shock, nominal yields might start to rise. Since nominal yields increase more than inflation expectations, real yields will go up but with delay, reaching their peak in the sixth week. Assuming that the inflation shock is temporary and central bank policy is credible, expectations and real yields stabilize and decline as the shock dies, driving the nominal yield down.

The dynamics between real and nominal yield responses can be observed in the response of 1-year TIPS in Figure 11. After a positive inflation shock, the principal of TIPS will adjust upwards to compensate for the higher inflation, leading to a contemporaneous significant drop in the yield of TIPS. This drop in yields intensifies for the subsequent three weeks and then stabilizes, achieving its minimum in the seventh week. As the inflationary shock fades out the yield adjusts upwards becoming statistically not different from zero in the 14th week.

A positive inflation shock leads to an immediate upward revision in short-term IE close to 0.008 *pp.* and rapidly decrease below 0.002 *pp* at the third week, it then rises again but to a lower level (above 0.003*pp.*) at week five, and from there it steadily returns to the initial expectation level. This reaction shows that if the inflation shock is perceived as transitory and if there's confidence in the central bank's ability to manage inflation, long-term expectations might

remain anchored. IRP also immediately increases after the shock as investors demand additional compensation for the uncertainty introduced by the unexpected change. This premium rises fast up to week four, when its growth rate starts declining week after week, but remains positive and high until the end of the forecast horizon. Persistent higher volatility in inflation or doubts about the central bank's ability or commitment to stabilize inflation could keep the IRP elevated over the long term. The BEI rose immediately as well, reflecting both increased IE and a higher IRP. The trajectory of BEI resembles the one for IRP but with a slower initial increase and a faster decrease in the growth rate after week 5, such that the growth rate becomes slightly negative at the end of the forecast horizon. BEI might stabilize at a new level that reflects the revised long-term expectations and risk premium.

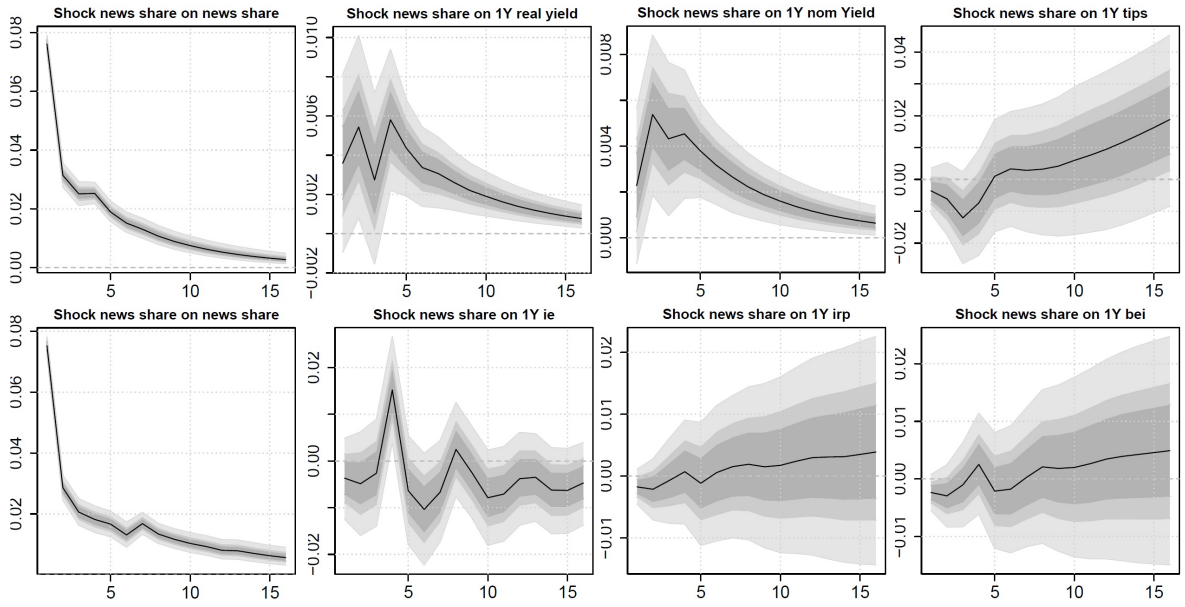
In Figure 13, we analyze the weekly response of yields, inflation-protected securities, and the components of inflation compensation to a *news share* shock. Contrary to the responses on yields in Figure 12, the contemporaneous responses of nominal and real yields are positive, and they reach a peak, significant at the 10% level, after two weeks. The real yield achieves its maximum at week four. From these peaks, the responses steadily decrease but remain significant over the rest of the forecast horizon. The magnitude of these responses for yields is smaller than the ones in Figure 12, but they seem to be more persistent. The response of TIPS to the news shock, although negative as in the case of the inflation shock, is only a fifth of the magnitude and not significant at the 90% level at its minimum at week 3. These results show that both types of shocks share similar dynamics but the inherent uncertainty of news shocks makes their responses less acute but more persistent.

In Figure 13, the second row displays the 1-year BEI and its components. When a news shock occurs, the initial response of IE is small, negative, and insignificant for the first three weeks. However, at week four, it jumps to above 0.01 *pp* and becomes significant at the 90% level. Subsequently, the response is mostly negative, except for a small positive peak at week eight, and remains insignificant. The responses of IRP and BEI are contemporaneously negative and increase afterward, but do not achieve any degree of significance over the forecast horizon. Comparing these results with those in Figure 12 shows that the dynamic effect of news is diffuse in terms of magnitude and significance. Nonetheless, it provides insight into the intra-month dynamics of expectations. It is noteworthy that positive and negative peaks repeat themselves in a four-week frequency, which may be linked to periods of high uncertainty about the price level before the official value is released, and periods of lower uncertainty as expectations are updated with new information.

5 Robustness

We performed several robustness checks to ensure the validity of our findings. These checks provide further support for the results and their implications.

Figure 13: Response of yields, IE, IRP and break-even inflation to an inovation in the share of news, one year maturity



Notes: This figure shows the response of *news share*, the 1-year real yield, the 1-year nominal yield, and 1-year TIPS to a one-standard-deviation shock in *news share* in the first row. The second row shows the response of *news share*, 1-year IE, 1-year IRP, and 1-year BEI to the same shock. The model is estimated using 6 lags and weekly data from 08-01-2007 to 26-12-2023 (1,018 observations). The estimated horizon in this figure corresponds to 16 weeks.

5.1 Monthly Frequency Results

We conduct a test to ensure that our results are reliable even when the frequency of data changed. We use monthly data to re-evaluate our models, which allowed us to compare the quality of the series produced by the EATS model against those from the Clevelands FED by examining the estimated impact of news measures on monthly IE and IRP from both models. Table 10 displays the effect of news measures on IE at the monthly level, as calculated by our model (1-4) and the FED's model (5-8).

The results presented in Table 10 confirm the effects of news measures on IE observed at the weekly level. It is worth noting the non-significant effect of independent news measures in (1) and (5) and the non-significant interaction with $CPI\ MoM$. However, there is a difference in the interactions *news share* $\times$ *polarity* and *news share* $\times$ *subjectivity*. These results may be driven by the weekly dynamics of IE after a news shock. The peak of the response appears four weeks after the innovation, and further positive peaks move in four-week intervals. It is important to note that the sign and significance level of these effects hold independent of the source for IE, though estimates are larger in magnitude for IE derived from our model. Finally, R^2 increases concerning Table 7 for all specifications.

Regarding IRP, it is worth noting that we can only compare 5-year maturities since the IRP FED series are not available at shorter maturities. Table 11 provides a comparison of the effect of news measures on the monthly 5-year IRP from different sources. The effect of news measures on IRP extracted from our model resembles the weekly results presented in Table 7 in terms

Table 10: Effect of news variables on short term IE and IRP

	1 year ie				1 year ie FED			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
constant	1.326***	1.330***	1.446***	1.748***	1.464***	1.497***	1.540***	1.762***
	(0.219)	(0.213)	(0.178)	(0.190)	(0.180)	(0.182)	(0.161)	(0.165)
news share	1.168	-0.961	-4.559***	-12.202***	1.370	-0.395	-1.988*	-8.063***
	(1.011)	(1.877)	(1.462)	(1.684)	(0.889)	(1.573)	(1.203)	(1.492)
polarity	0.590		6.481***		0.604		4.047***	
	(0.882)		(1.345)		(0.814)		(1.093)	
subjectivity	-9.653			-72.231***	-4.960			-49.911***
	(10.078)			(10.457)	(7.274)			(8.269)
news share × *CPI MoM*		4.085				3.686		
		(3.160)				(2.723)		
news share × *polarity*			-63.649***				-37.581***	
			(12.378)				(11.628)	
news share subjectivity				920.029***				647.673***
				(103.514)				(96.612)
CPI MoM	1.237***	0.847**	1.156***	0.989***	0.648***	0.300	0.600***	0.473***
	(0.241)	(0.387)	(0.223)	(0.228)	(0.137)	(0.275)	(0.141)	(0.130)
WTI	0.004	0.005**	0.007***	0.009***	0.006**	0.007***	0.007***	0.009***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
FOMC	-0.475***	-0.498***	-0.430***	-0.356***	-0.236***	-0.252***	-0.209***	-0.152**
	(0.112)	(0.114)	(0.101)	(0.095)	(0.086)	(0.086)	(0.080)	(0.077)
Observations	221	221	221	221	221	221	221	221
Adjusted R^2	0.303	0.309	0.397	0.488	0.209	0.220	0.265	0.364

Notes: This table presents the estimated coefficients from Equation 19, using as dependent variables the 1-year IE (1-4) spot rates from the EATS model, and the 1-year IE rates from Cleveland's FED. The model is estimated using monthly frequency data. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis.

of direction and significance. However, this only holds for the interaction between *news share* and *subjectivity* in model (7), and the main effect for *news share* in model (8), when FED IRP series are considered. It is important to note that the adjusted R^2 values of the models using monthly IRP series from our EATS model increase, in comparison to models using weekly data, but decrease when FED series.

We have conducted a comparison of the impact of news topics on monthly IE and IRP series with 1 and 5-year horizons. The findings in Table 9 differ from what we observed previously, as the effect of topics for IE shows a significant change. While *expectations* was the only notable topic at the weekly level, it does not retain significance at the monthly level. Instead, the positive effect is driven by *politics* and $profits \,\&\, stocks$. This observation holds irrespective of the IE source. However, the monthly FED series shows a negative and significant impact on the *housing* topic.

Regarding IRP, the coefficients for *politics*, $profits \,\&\, stocks$, and $inflation\ eases$ have the same sign, similar magnitudes, and significance level for the series from our model. For the FED series, only $profits \,\&\, stocks$ show statistical significance. As we have seen in previous tables, the adjusted R^2 is higher for monthly regressions, except for FED's IRP regressions.

Overall, we have observed a significant impact of news measures on both expectation and risk premium, regardless of the data frequency or model used for BEI decomposition. While there

Table 11: Effect of news variables on short term IE, monthly frequency

	5 year irp				5 year irp FED			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
constant	-0.762***	-0.775***	-0.770***	-0.735***	0.057*	0.060**	0.069***	0.066**
	(0.053)	(0.047)	(0.047)	(0.052)	(0.029)	(0.026)	(0.026)	(0.028)
news share	0.342*	0.015	-0.136	-0.523	-0.164	-0.162	-0.371**	-0.459*
	(0.205)	(0.290)	(0.311)	(0.460)	(0.122)	(0.167)	(0.159)	(0.251)
polarity	0.015		0.542**		0.072		0.270	
	(0.199)		(0.269)		(0.154)		(0.174)	
subjectivity	-2.987			-6.937***	0.623			-1.011
	(2.168)			(2.442)	(1.522)			(1.578)
news share × *CPI MoM*		0.496				0.009		
		(0.642)				(0.393)		
news share × *Polarity*			-4.496*				-2.666**	
			(2.308)				(1.255)	
news share × *subjectivity*				59.705**				19.841
				(26.251)				(14.980)
CPI MoM	0.297***	0.248***	0.289***	0.281***	0.057	0.056	0.054	0.051
	(0.078)	(0.087)	(0.077)	(0.078)	(0.037)	(0.057)	(0.036)	(0.037)
WTI	0.005***	0.005***	0.005***	0.005***	0.001	0.001	0.001*	0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
FOMC	-0.048**	-0.053**	-0.048**	-0.041*	-0.011	-0.011	-0.008	-0.008
	(0.024)	(0.024)	(0.024)	(0.024)	(0.014)	(0.014)	(0.014)	(0.014)
Observations	221	221	221	221	221	221	221	221
Adjusted R^2	0.534	0.533	0.537	0.545	0.036	0.039	0.049	0.042

Notes: This table presents the estimated coefficients from Equation 19, using as dependent variables the 5-year IRP (1-4) spot rates from the EATS model, and the 5-year IRP rates from Cleveland's FED. The model is estimated using monthly frequency data. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis.

were some differences in the results based on time-frequency, these can largely be attributed to the dynamics of news consumption and official information disclosure regarding price levels. We found minimal differences in results across sources for IE, but larger differences for IRP. This discrepancy can be explained by the number of factors included in the term structure model used to estimate the real SDF. Our model utilized a simple tree factor model, while the FED model incorporated swap rates and survey information to fit price dynamics. The addition of this extra factor may reduce the explanatory power of news measures, particularly for IRP.

5.2 Subsample Analysis

To ensure the reliability of our findings, we conducted a subsample analysis based on the temporal distribution of the recovered news, as illustrated in Figure 16 in the Appendix. Given Google Search's tendency to rank recent results higher than older ones and the lack of clarity regarding the memory length of Google Search or the completeness of newspapers' electronic archives, we defined a weekly subsample consisting of news from the last four years (January 2019 to Dec 2022). We aimed to determine if our results are influenced by specific periods in

Table 12: Effect of topic variables on short term IRP, monthly frequency

	1-yr IE	1-yr IE FED	5-yr IRP	5-yr IRP FED
	(1)	(2)	(3)	(4)
constant	1.481***	1.622***	-0.751***	0.038
	(0.264)	(0.201)	(0.063)	(0.032)
news share	-0.041	0.209	0.067	-0.290**
	(1.266)	(0.955)	(0.234)	(0.129)
politics	5.093***	2.905*	0.758*	-0.177
	(1.917)	(1.724)	(0.393)	(0.310)
monetary policy	-0.625	-0.386	-0.035	-0.198
	(1.990)	(1.675)	(0.492)	(0.321)
oil & gas	-1.172	-1.522	-0.336	-0.156
	(1.431)	(1.178)	(0.351)	(0.235)
housing	-2.333	-5.863***	0.131	-0.536
	(2.637)	(2.146)	(0.613)	(0.454)
profits & stocks	4.379**	3.508**	0.854*	0.662**
	(2.144)	(1.680)	(0.458)	(0.303)
global events	-4.215*	-1.535	-0.800	0.183
	(2.262)	(1.941)	(0.554)	(0.403)
expectations	-3.730	3.672	-0.075	0.339
	(3.645)	(3.136)	(0.747)	(0.547)
food & goods	-0.532	-0.611	-0.010	0.259
	(1.582)	(1.259)	(0.362)	(0.248)
inflation eases	-3.467	-1.093	-1.360**	0.213
	(2.921)	(2.356)	(0.539)	(0.442)
CPI MoM	1.075***	0.529***	0.261***	0.048
	(0.279)	(0.145)	(0.087)	(0.037)
WTI	0.004	0.005*	0.005***	0.001*
	(0.003)	(0.003)	(0.001)	(0.000)
FOMC	-0.449***	-0.211**	-0.040*	-0.016
	(0.111)	(0.090)	(0.024)	(0.014)
Observations	221	221	221	221
Adjusted R^2	0.328	0.246	0.548	0.052

Notes: This table presents the estimated coefficients from Equation 19 for meta-topics, using as dependent variables the 1-year IE (1) and 5-year IRP (3) spot rates from the EATS model, and the 1-year IE and 5-year IRP spot rates from Cleveland's FED. The model is estimated using monthly frequency data. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis.

our sample. Table 13 presents the outcomes of the short-term TIPS yields, swap rates, and BEI rates using the subsample data, which are consistent with the results reported in Table 4.

The findings presented in Table 13 indicate that the primary factor affecting the news effect in the reduced sample is the measure of news coverage, denoted as *news share*. This factor exhibits an increase in magnitude for TIPS and BEI, while the interaction terms become non-significant. The reduction in the number of observations results in a significant drop in R^2 values for TIPS and BEI but not for short-term swap rates. These results demonstrate that the fundamental measure of news coverage, *news share*, remains significant and does not change its direction even in short samples. The availability of data plays a crucial role in the analysis of

Table 13: Effect of news measures on short term IE and IRP, sample Jan 2019 - Dec 2022, weekly frequency

	2 year TIPS			1 year swap			1 year BEI		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
constant	-1.112***	-1.068***	-1.088***	-0.421**	-0.345*	-0.417*	1.012***	1.030***	0.988***
	(0.245)	(0.239)	(0.252)	(0.194)	(0.200)	(0.227)	(0.088)	(0.089)	(0.092)
news share	-1.482**	-1.247	-1.984	1.571***	1.023*	1.252	0.918***	0.879***	1.249***
	(0.694)	(1.079)	(2.021)	(0.606)	(0.555)	(1.395)	(0.222)	(0.233)	(0.459)
polarity	-0.083	-0.371		-0.325	0.052		-0.117	-0.111	
	(0.670)	(0.784)		(0.317)	(0.455)		(0.151)	(0.175)	
subjectivity	8.631		6.858	6.159		5.832	2.291		3.968
	(8.873)		(10.010)	(4.132)		(7.195)	(2.288)		(2.843)
news share × *polarity*		1.890			-5.552			-0.467	
		(7.294)			(5.186)			(1.419)	
news share × *subjectivity*			28.817			19.121			-18.562
			(107.477)			(98.926)			(27.565)
Controls	*CPI MoM*, *WTI*, *FOMC*			*CPI MoM*, *WTI*, *FOMC*			*CPI MoM*, *WTI*, *FOMC*		
Obs.	207	207	207	208	208	208	208	208	208
Adj. R^2	0.412	0.410	0.413	0.877	0.877	0.876	0.822	0.821	0.822

Notes: This table presents the estimated coefficients from Equation 19, using as dependent variables the 2-year TIPS (1-3), 1-year swap (4-6), and the 1-year BEI fitted series from the EATS model (7-9). The model is estimated using weekly frequency data. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis. Swap data available from 2017.

news coverage, as it reduces the variation in news sentiment, which is the base for polarity and subjectivity.

Regarding IE, Table 14 shows that the reduced sample leads to a decline in R^2 compared to the results from table 7, as none of the coefficients for news measures and their interactions are significant in both tables. In the case of IRP, we observe an increase in magnitude and significance level of *news share* accompanied by a reduction in magnitude and significance of most interactions, except *news share* $\times$ $CPI\ MoM$. Notably, there is a considerable increase in R^2 in the IRP for regressions based on the reduced sample, highlighting the importance of news coverage for the unexpected change in the price level, given by the risk premium, in periods of rising inflation and high uncertainty driven by global events.

Figures 11 and 13 illustrate the impulse response functions (IRFs) for inflation and news shocks, respectively, but for the limited sample. Specifically, Figure 14 shows that the contemporaneous response of *news share* to an innovation $CPIMoM$ is negative and non-significant in the limited sample, and then begins to rise after week five. Although this response appears to be delayed compared to the full-sample response, its peak value at week 12 is twice the magnitude of the full-sample peak. Moreover, polarity displays a larger positive response for the reduced sample, even significant in the second week, and then declines and stabilizes near zero. This contrasts with the same response in Figure 11, where the minimum peak at week three becomes negative, while in Figure 14 it does not.

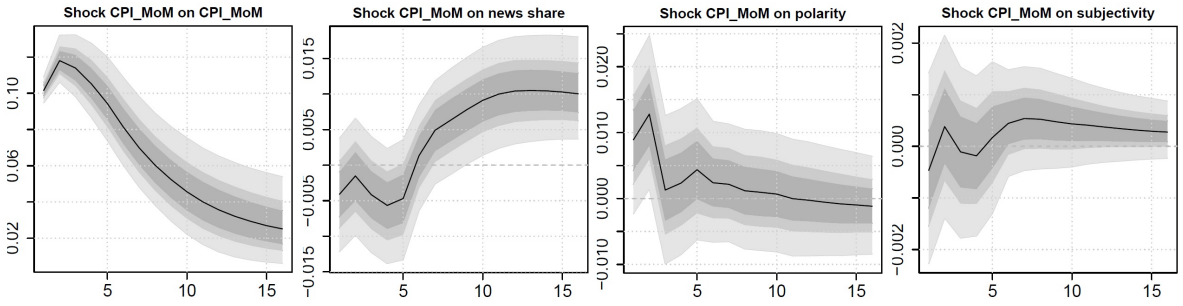
The responses to a news shock, as depicted in Figure 15 using a short sample, exhibit dynamics similar to those in Figure 13 for the entire sample. While the response magnitudes for real and nominal yields increase, this trend does not hold for short-term TIPS. Figure 15's

Table 14: Effect of news variables on short term IE and IRP, sample Jan 2019 - Dec 2022, weekly frequency

	1-year IE				1-year IRP			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
constant	2.024***	2.022***	2.035***	2.046***	-0.661***	-0.695***	-0.644***	-0.687***
	(0.068)	(0.069)	(0.066)	(0.066)	(0.089)	(0.085)	(0.090)	(0.092)
news share	-0.201	-0.008	-0.247	-0.467	0.938***	1.575***	0.904***	1.295***
	(0.223)	(0.266)	(0.278)	(0.518)	(0.227)	(0.432)	(0.233)	(0.467)
polarity	0.140		0.164		-0.131		-0.128	
	(0.151)		(0.144)		(0.148)		(0.178)	
subjectivity	1.214			-0.268	2.169			3.995
	(2.300)			(2.117)	(2.228)			(2.846)
CPI MoM	0.291***	0.360***	0.296***	0.295***	0.474***	0.676***	0.480***	0.471***
	(0.083)	(0.127)	(0.084)	(0.084)	(0.074)	(0.109)	(0.074)	(0.075)
news share × *CPI MoM*		-0.466				-1.467***		
		(0.541)				(0.516)		
news share × *polarity*			-0.497				-0.417	
			(1.236)				(1.431)	
news share × *subjectivity*				14.758				-20.037
				(21.384)				(27.738)
Controls		*WTI*, *FOMC*				*WTI*, *FOMC*		
Obs.	208	208	208	208	208	208	208	208
Adj. R^2	0.101	0.106	0.100	0.099	0.819	0.828	0.818	0.819

Notes: This table presents the estimated coefficients from Equation 19, using as dependent variables the the 1-year IE (1-4) and the 1-year IRP fitted spot series from the EATS model. The model is estimated using weekly frequency data. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis. Swap data available from 2017.

Figure 14: Response of news measures to an inovation in the price level, sample Jan 2019 - Dec 2022, weekly frequency

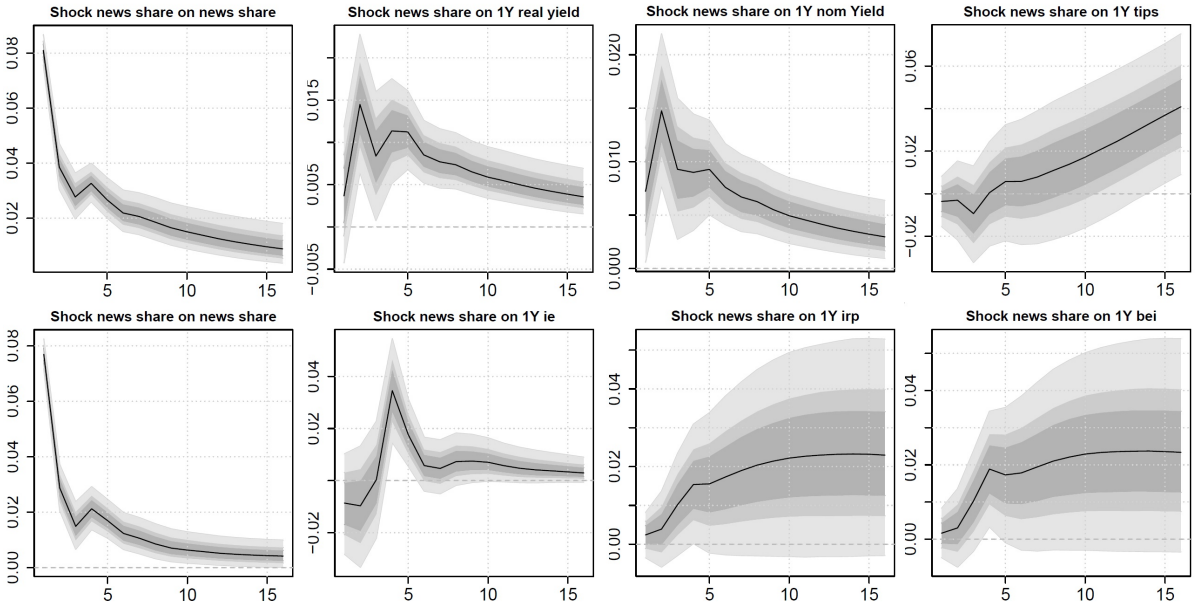


Notes: This figure shows the response of *news share*, *polarity*, and *subjectivity* to a one-standard-deviation shock in *CPI MoM*. The model is estimated using 6 lags and weekly data from 08-01-2007 to 26-12-2023 (1,018 observations). The estimated horizon in this figure corresponds to 16 weeks.

second row shows that the response for IE is more significant at week four. IRP and BEI also display large response magnitudes in the same plot, indicating a significant response after four weeks.

In Figure 15, the second row displays the weekly dynamics of IE after a news shock from January 2019 to December 2023. Comparing it with the same response in Figure 13, we observe that the peak in expectations at week four doubles in magnitude in the subsample. The subsequent decay is smoother and remains positive for the rest of the forecast horizon, although not

Figure 15: Response of break-even inflation to an inovation in the price level, several year maturity, sample Jan 2019 - Dec 2022, weekly frequency



Notes: This figure shows the response of *news share*, the 1-year real yield, the 1-year nominal yield, and 1-year TIPS to a one-standard-deviation shock in *news share* in the first row. The second row shows the response of *news share*, 1-year IE, 1-year IRP, and 1-year BEI to the same shock. The model is estimated using 6 lags and weekly data from 08-01-2007 to 26-12-2023 (1,018 observations). The estimated horizon in this figure corresponds to 16 weeks.

statistically different from zero. Additionally, the responses for IRP and BEI in Figure 15 are larger, positive, and smoother than their counterpart in Figure 13, becoming significant in week four. Overall, the effect of news is amplified during periods of high uncertainty and inflation overshooting the FED target, as shown in Figure 15.

Our robustness checks confirm the validity of our main findings, focusing on the significant effect of news coverage in the formation of expectations and the compensation of inflationary risk. The frequency of news coverage, indicated by the share of news, is the main driver of news effects during the pandemic and the Ukraine-war period. These findings demonstrate the importance of considering coverage frequency when analyzing news effects during uncertain times.

6 Conclusion

This study has examined the impact of news coverage - measured in terms of frequency, polarity, and topic - on inflation compensation, IE, and IRP. Our findings provide compelling evidence of the significant role news media plays in the dynamics of these variables.

Our study reveals that heightened news coverage correlates with an increase in short-term inflation compensation. Specifically, the prevalence of inflation news elevates the price of 2-year TIPS, which subsequently leads to a reduced yield, augmented mid-rates of 1-year swaps, and a rise in the 1-year BEI rate. This effect becomes particularly prominent when news conveys

a positive sentiment or is opinion-heavy, the latter signaling potential uncertainty about future inflation trajectories. Such effects are notably amplified in high-inflation contexts but taper off for long-term maturities. The assessed IRFs indicate that news might introduce short-term fluctuations, but sustained changes typically depend on confirmation from tangible data or reliable sources. Inflation disturbances lead to a marked rise in the coverage of inflation news in the initial month, followed by another spike after a quarter.

Interestingly, the impact of news on the IRP surpasses its effect on IE. Positive news, especially in times when inflation exceeds targets, mainly influences IE, whereas changes in inflation compensation predominantly stem from variances in IRP. This underscores the media's potent role in shaping perceptions of risk. Moreover, as the term structure extends, the influence of most news dimensions diminishes, with content subjectivity remaining a notable exception. In terms of news content, narratives centered on profits, stock markets, and politics bolster IRP and inflation compensation. In contrast, articles focused on energy prices, significant global events like the COVID-19 pandemic and the Ukrainian invasion, and policies aimed at reducing inflation, generally counteract inflation compensation pressures. This could be attributed to markets perceiving such topics as transient in terms of their inflationary impact.

The findings from this study hold substantial implications for policymakers and central banks. Recognizing the significant influence of news coverage on short-term inflation compensation can guide central banks in tailoring their communication strategies, ensuring transparency and clarity to mitigate undue market volatility. The pronounced effects of news in high-inflation scenarios underscore the need for timely and accurate information dissemination, especially during economic uncertainties. Moreover, the fact that opinion-heavy news intensifies inflation compensation emphasizes the importance of minimizing ambiguity in official communications about inflation. As for future research, there's a potential avenue in examining the long-term impacts of continuous news exposure on market participants' behaviors and expectations.

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7 Appendix

Table 15: meta-topics by composition

meta-topics	topics
politics	topic 12: *biden*, *democrats*, *act*
	topic 15: *plan*, *republicans*, *house*
	topic 19: *food*, *Inflation*, *fight*
monetary policy	topic 0: *inflation*, *rises*, *target*
	topic 8: *Inflation*, *state*, *powell*
	topic 21: *fed*, *rates*, *slow*
oil & gas	topic 2: *oil*, *high*, *demand*
	topic 10: *gas*, *oil*, *gasoline*
	topic 14: *fuel*, *gas*, *high*
housing	topic 17: *home*, *sales*, *housing*
profits & stocks	topic 4: *higher*, *inflation*, *profit*
	topic 5: *market*, *wages*, *hot*
	topic 20: *stocks*, *russia*, *wall_street*
global events	topic 1: *inflation*, *soaring*, *ukraine*
	topic 18: *global*, *pandemic*, *Inflation*
expectations	topic 3: *opinion*, *fed*, *expectations*
food & goods	topic 6: *drug*, *shortage*, *reduce*
	topic 7: *ticket*, *cost*, *fans*
	topic 9: *food*, *Inflation*, *rising*
inflation eases	topic 16: *Inflation_reduction*, *crisis*
	topic 23: *Inflation_eases*, *high*, *consumer*

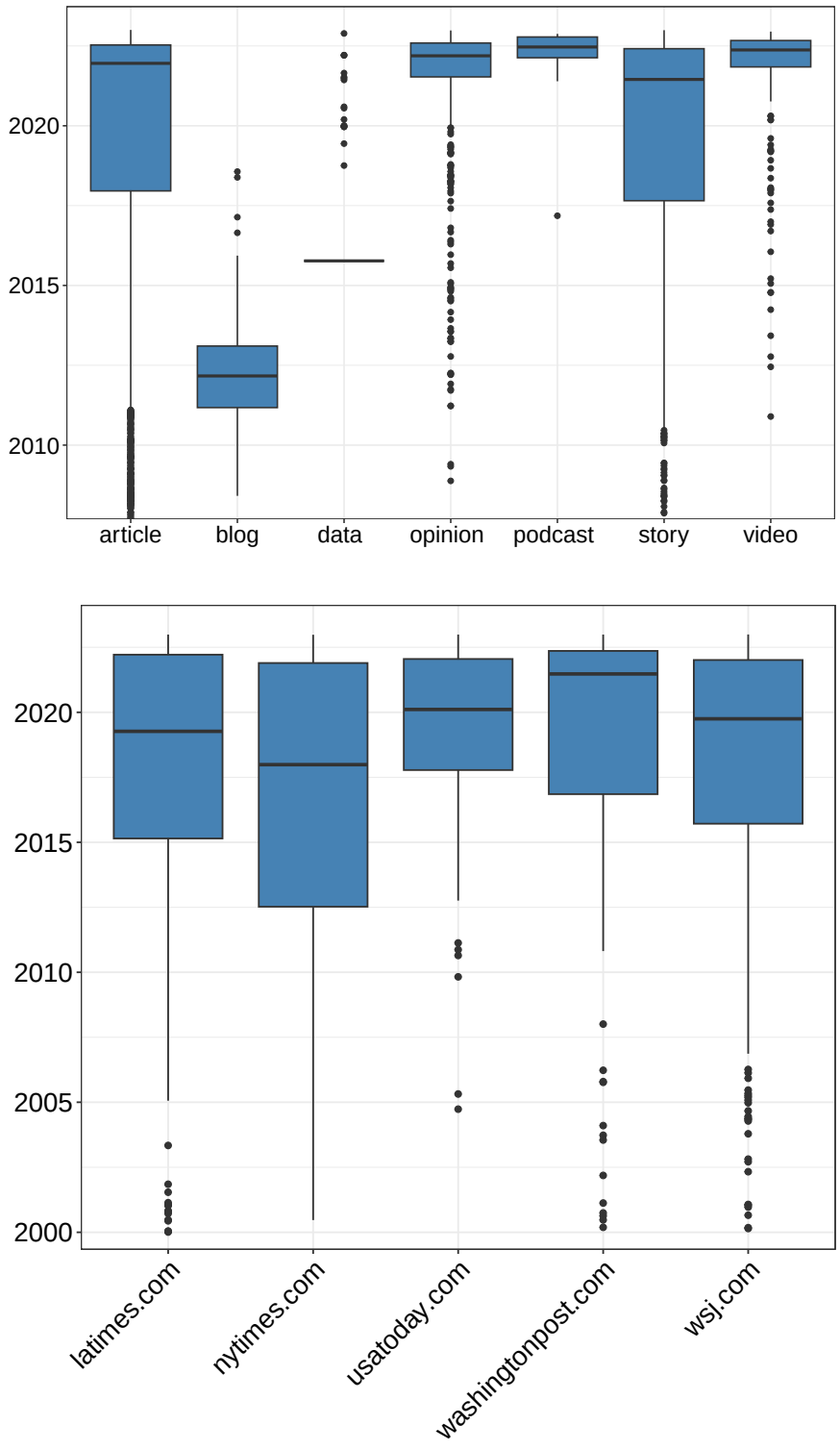
Notes: This table presents the resulting topics from the LDA topic modeling algorithm and the composition of meta-topics. I exclude topics 11, 13, and 22 based on two primary considerations. Firstly, I filter out topics that are challenging to associate with a clear inflation narrative, making them unsuitable for classification into a meta-topic. Secondly, I aim to mitigate multicollinearity when estimating the impact of meta-topics on inflation-related metrics.

Table 16: Data availability

Series type	Available from	Frequency	Obs	Series
Main datasets				
TIPS yields[a]	01/01/1999	daily	8395	$TIPSY02$-$TIPSY20$
Break-even inflation[a]	01/01/1999	daily	8395	$BKEVEN02$-$BKEVEN20$
Zero-coupon yields [b]	14/06/1961	daily	15848	$SVENY01$-$SVENY30$
Par nominal and real yields [f]	01/01/2003	daily	5200	$yp01$-$yp20$
Inflation-linked swap[d]	01/01/2007	monthly	180	$USDIS10$-$USDIS30$
Cleveland Fed's inflation expectations	01/01/1982	monthly	480	$IE01$-$IE30$
CPI[e] (seasonally adjusted)	01/01/1947	monthly	902	$Level$, MoM, YoY
Newspaper articles	01/01/2000	daily	11520	prices AND inflation AND CPI NoT stock
Other datasets				
SPF Survey - median inflation[d]	15/08/2003	quarterly	76	1,5 and 10 years

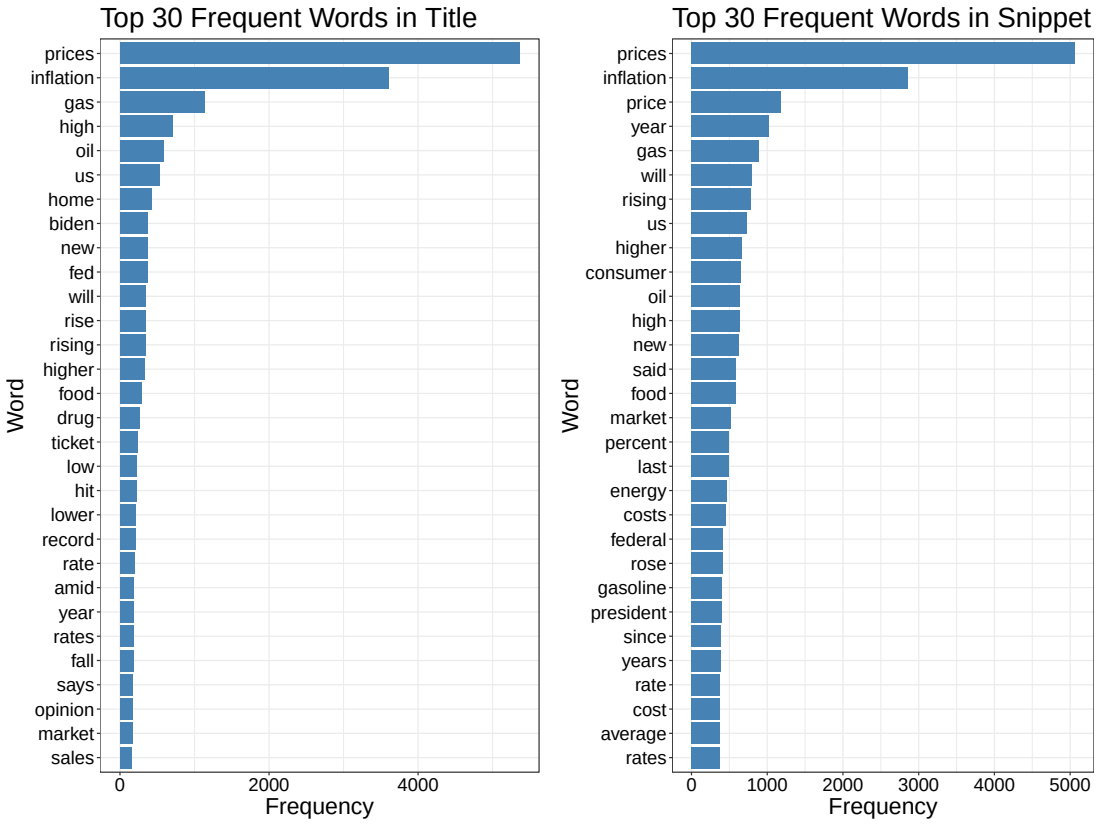
Notes: [a] Gürkaynak et al. (2010), TIPS yields and inflation compensation, zero-coupon, continuously compounded, maturities 2-20. [b] Gürkaynak et al. (2007) maturities 1-30. [d] Eikon Datastream. [e] U.S. Bureau of Labor Statistics. [f] U.S. Treasury.

Figure 16: Time distribution of inflation news by type (top) and domain (bottom)



Notes: This graph show the distribution of inflation news by type (top) and domain (bottom).

Figure 17: Most frequent words in news titles (left) and news snippets (right)



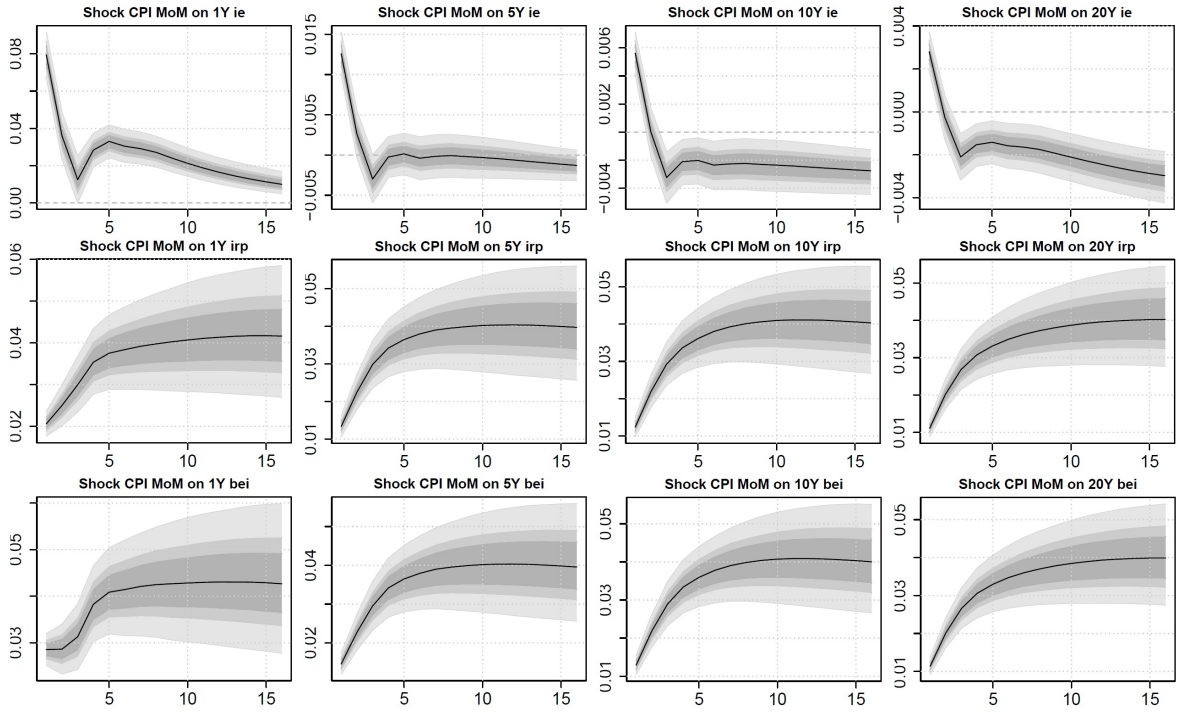
Notes: This graph shows the 30 most frequent words in news titles (left), and news snippets (right), after pre-processing (i.e. Deleting stop-words and lemmatizing).

Table 17: Individual topic weights

	1-year BEI		1-year IE		1-year IRP	
	(1)	(2)	(3)	(4)	(5)	(6)
constant	1.285***	1.281***	2.016***	2.017***	-0.387***	-0.392***
	(0.072)	(0.077)	(0.077)	(0.030)	(0.057)	(0.059)
news share		-0.069		0.023		-0.071
		(0.250)		(0.116)		(0.224)
topic 0	-0.001	0.008	-0.135	-0.138	0.012	0.022
inflation, *rises*, *target*	(0.676)	(0.677)	(0.677)	(0.264)	(0.695)	(0.696)
topic 1	-0.799*	-0.786*	0.016	0.012	-0.801	-0.787
inflation, *soaring*, *ukraine*	(0.460)	(0.460)	(0.460)	(0.343)	(0.661)	(0.663)
topic 2	-0.419	-0.410	0.157	0.154	-0.435	-0.426
oil, *high*, *demand*	(0.499)	(0.499)	(0.499)	(0.218)	(0.570)	(0.571)
topic 3	0.088	0.103	0.586	0.581**	0.030	0.045
opinion, *fed*, *expectations*	(0.489)	(0.493)	(0.493)	(0.229)	(0.564)	(0.567)
topic 4	1.134**	1.154**	-0.370	-0.377	1.171*	1.191*
higher, *inflation*, *profit*	(0.562)	(0.558)	(0.558)	(0.278)	(0.686)	(0.689)
topic 5	0.474	0.489	0.128	0.123	0.461	0.477
market, *wages*, *hot*	(0.615)	(0.621)	(0.621)	(0.302)	(0.708)	(0.710)
topic 6	0.073	0.065	0.154	0.157	0.058	0.050
drug, *shortage*, *reduce*	(0.412)	(0.410)	(0.410)	(0.214)	(0.534)	(0.535)
topic 7	-0.349	-0.356	0.205	0.207	-0.370	-0.377
ticket, *cost*, *fans*	(0.356)	(0.352)	(0.352)	(0.167)	(0.466)	(0.467)
topic 8	-0.752	-0.765	0.236	0.240	-0.776	-0.789
Inflation, *state*, *powell*	(0.505)	(0.503)	(0.503)	(0.277)	(0.731)	(0.732)
topic 9	0.331	0.359	-0.038	-0.048	0.335	0.363
food, *Inflation*, *rising*	(0.638)	(0.639)	(0.639)	(0.356)	(0.633)	(0.639)
topic 10	0.373	0.392	0.086	0.080	0.364	0.384
gas, *oil*, *gasoline*	(0.330)	(0.340)	(0.340)	(0.286)	(0.411)	(0.416)
topic 12	2.096***	2.122***	0.214	0.205	2.074***	2.102***
biden, *democrats*, *act*	(0.582)	(0.586)	(0.586)	(0.281)	(0.617)	(0.623)
topic 14	-0.919*	-0.910*	0.289	0.286	-0.948	-0.938
fuel, *gas*, *high*	(0.473)	(0.479)	(0.479)	(0.256)	(0.603)	(0.604)
topic 15	0.416	0.418	0.515	0.514	0.365	0.367
plan, *republicans*, *house*	(0.680)	(0.679)	(0.679)	(0.346)	(0.784)	(0.784)
topic 16	-1.862***	-1.848***	0.168	0.164	-1.879***	-1.865***
Inflation_reduction, *crisis*	(0.607)	(0.602)	(0.602)	(0.277)	(0.672)	(0.674)
topic 17	-0.037	-0.033	0.098	0.097	-0.047	-0.043
home, *sales*, *housing*	(0.425)	(0.424)	(0.424)	(0.192)	(0.440)	(0.441)
topic 18	-1.001**	-0.998**	-0.028	-0.030	-0.998*	-0.995*
global, *pandemic*, *Inflation*	(0.402)	(0.405)	(0.405)	(0.228)	(0.511)	(0.512)
topic 19	1.121**	1.141**	-0.434	-0.441	1.164*	1.185*
food, *Inflation*, *fight*	(0.553)	(0.559)	(0.559)	(0.275)	(0.633)	(0.637)
topic 20	0.664	0.676	-0.214	-0.219	0.685	0.698
stocks, *russia*, *wall_street*	(0.609)	(0.612)	(0.612)	(0.317)	(0.737)	(0.739)
topic 21	0.953	0.981	-0.493	-0.503*	1.003	1.031
fed, *rates*, *slow*	(0.670)	(0.674)	(0.674)	(0.290)	(0.703)	(0.709)
topic 22	0.625	0.640	-0.406	-0.411	0.665	0.681
Inflation, *covid*, *economy*	(0.587)	(0.586)	(0.586)	(0.308)	(0.660)	(0.662)
Controls	all	all	all	all	all	all
Obs.	935	935	935	935	935	935
Adj. R^2	0.370	0.370	0.178	0.177	0.362	0.361

Notes: This table presents the estimated coefficients from Equation 19, using as dependent variables the 2-year TIPS (1-3), 1-year swap (4-6), and the 1-year BEI fitted series from the EATS model (7-9). The model is estimated using weekly frequency data. All available control variables, $CPI\ MoM$, WTI, $FOMC$, were added. Significance at the 10%, 5% and 1% levels are denoted by *, ** and ***, respectively. Heteroscedasticity and Autocorrelation Consistent (HAC) robust standard errors in parenthesis. Swap data available from 2017.

Figure 18: Response of IE, IRP and break-even inflation to an inovation in the price level, several year maturity



Notes: This figure shows the response of 1-year (first row), 5-year (second row), 10-year (third row), and 20-year (fourth row) IE, IRP, BEI to a one-standard-deviation shock in $CPI\ MoM$. The model is estimated using 6 lags and weekly data from 08-01-2007 to 26-12-2023 (1,018 observations). The estimated horizon in this figure corresponds to 16 weeks.