# Beyond the Numbers: Professional Forecasters' Narratives about Inflation and Stock Market Performance*

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September 22, 2026

**Abstract**

Professional forecasters' heterogeneous narratives about how inflation affects stock markets in 2023 rationalize their high disagreement regarding quantitative expectations for 12-month-ahead inflation and stock returns in December 2022. Professional forecasters causally update their return expectations in heterogeneous directions in response to information about the inflation outlook, depending on the narrative they entertain. Moreover, the narratives also affect their asset allocation in a hypothetical portfolio-choice experiment. Providing common signals does not necessarily lead to convergence of beliefs if agents subscribe to different narratives.

**Keywords**: Narratives, Expectation Formation, Inflation, Beliefs, Monetary Policy, Subjective Models, Mental Models, RCT, Inflation Expectations, Return Expectations
**JEL Classification**: D83, D84, E31, E44, E52, E71, G11, G12

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*We would like to thank Hassan Afrouzi, Martin Brown, Tabea Bucher-Koenen, Peter Buchmann, Volker Clausen, Zeno Enders, Nicola Gennaioli, Alexander Glas, Lukas Hack, Michael Lamla, Bartosz Maćkowiak, Lora Pavlova, Davud Rostam-Afschar, Stefan Trautmann, and Johannes Wohlfart as well as seminar and conference participants at the ZEW in Mannheim (June 2024), Heidelberg University (July 2024), the 6th Behavioral Macroeconomics Workshop on Heterogeneity and Expectations in Macroeconomics and Finance (July 2024), the 11th HKMetrics Workshop (July 2024), the ZEW-FMT Workshop (September 2024), the 7th Joint Statistical Meeting of the Deutsche Arbeitsgemeinschaft Statistik (DAGStat) in Berlin (March 2025), the 8th Workshop on Subjective Expectations at Nova School of Business & Economics in Lisbon (June 2025), the Workshop Heterogenous Macro Expectations at the Friedrich-Alexander-University Erlangen-Nuremberg (September 2025), the 15th ifo Conference on Macroeconomics and Survey Data (October 2025), the 6th HeiTüHo Workshop in Hohenheim (December 2025), the 5th Investor Emotions & Asset Pricing in Lille (February 2026), the Economics Seminar at University of Duisburg-Essen (June 2026), the IAAE Annual Conference at Nova School of Business and Economics, Lisbon (June 2026) for helpful comments and suggestions. We are grateful to the Leibniz Centre for European Economic Research in Mannheim (ZEW) for including our questions in the ZEW Financial Market Survey. The survey data was obtained under a non-disclosure agreement. Any results, analysis, and observations published within this work do not necessarily correspond to results or analysis of the data providers. Funding by the German Federal Ministry of Education and Research (BMBF) and the Baden-Wuerttemberg Ministry of Science as part of Germany's Excellence Strategy (ExU 10.2.31) is gratefully acknowledged. The views expressed herein are those of the authors.

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# 1 Introduction

The releases of the outlook of professional forecasters for the overall economy and the stock market are widely watched and reported in the media and provide valuable signals about the outlook of the economy, moving stock markets. Yet, while the public typically focuses on the median or consensus beliefs, large disagreement is present in the cross-section of professional forecasters. The disagreement can arise because forecasters pay different attention to aggregate versus idiosyncratic signals, because they receive different signals or signals with different amounts of noise, or because they entertain different economic or mental models on how the economy works and operates.

We study whether, and to what extent, different narratives or mental models about how inflation affects stock returns drive disagreement among professional forecasters about expected inflation and expected equity returns, in a setting that holds the information environment and the noise in signals constant.[1] In our setting, narratives are not stories in the everyday sense of Shiller (2017), who emphasizes widely circulating stories that feed back into macroeconomic outcomes by shaping expectations and decisions. Our respondents are financial market professionals who forecast inflation and equity markets and have to justify a point forecast through an underlying mechanism. We therefore follow Eliaz and Spiegler (2020) and define a narrative as a causal structure, that is, the set of variables it incorporates and the way these variables are arranged in a causal mapping from inflation expectations through expected cash flows and discount rates to expected returns. Despite the rich set of theories linking inflation to stock returns, relatively little direct evidence exists on how inflation affects investor beliefs and portfolio decisions (Schnorpfeil et al., 2025).

Specifically, we first elicited prevalent narratives concerning the link between inflation and stock returns in November 2022 using the ZEW Financial Market Survey (ZEW Survey), which is the leading German indicator for the financial market outlook, using open-ended text questions.[2] Based on the answers, we derived six narratives that were most prevalent in the open-text responses. In the subsequent survey wave in December 2022, we then asked participants in the ZEW panel to select the narrative that, in their view, best describes the link between inflation and stock returns. To study the causal role of narratives in expectation formation, we run a randomized information treatment in the December 2022 wave of the ZEW Survey. Prior to the treatment, we elicited the professional forecasters' expectations regarding inflation, output, and stock returns. In the randomized information treatment, a subset of forecasters received a statement from the Bundesbank President about the Bundesbank's 2023 inflation forecast. To measure the response of expectations, we compare pre- and post-treatment inflation and return forecasts across narratives and treatment status, first verifying that the information treatment reduces the gap between forecasters' subjective

[1] We use the concepts of mental model and narrative interchangeably given that we focus on a single episode. In general, mental models refer to the underlying subjective representation of how the economy works, whereas a narrative is an event-specific causal explanation generated from that representation.

[2] The advantage of using open-ended answers to elicit narratives is that we obtain unprompted responses that simply come to mind of respondents rather than providing possible mechanisms of how inflation and returns are related, which might appear plausible once respondents read them but might have not come to mind unprompted (Haaland et al., 2025; Link et al., 2026).

inflation expectations and the Bundesbank forecasts provided in the survey. We then document that this exogenous shift in inflation expectations leads to revisions in return expectations only for forecasters whose narratives imply that lower inflation is good news for equities. To understand whether the differences in opinions in the return outlook also likely trigger heterogeneous trading behavior, we ask forecasters to make a hypothetical portfolio allocation between an asset whose return is tied to the German stock market index DAX40 and a safe asset to examine how narratives are transmitted into trading decisions. The panel structure of the ZEW Survey further allows us to revisit the same forecasters in later waves and re-elicit their narratives, so we can study how persistent these narratives are and how their explanatory power for return expectations evolves over time.

We have five main sets of results. First, professional forecasters are characterized by heterogeneous beliefs about the relevant mechanisms through which inflation affects the performance of the stock market in 2023. Almost all forecasters look at the relationship between inflation and returns through a present-value model, in which prices reflect discounted future cash flows. Two-thirds of forecasters view monetary policy as the main channel through which inflation affects stock returns, focusing on the discount-rate component of the present-value relation, implying a negative relationship between inflation and returns. Among them, some expect inflation to ease and monetary policy to become less restrictive, which they interpret as improving the return outlook for 2023. Others anticipate rising inflation and further monetary tightening and therefore view inflation as detrimental to the stock market. By comparison, about one quarter of forecasters emphasize firms' profit margins as the primary mechanism, focusing on how inflation affects the numerator of the present-value relation, specifically, whether higher costs can be passed on to customers. If they can, inflation is viewed as positive for equity valuations and if they cannot, higher costs compress margins and are seen as negative for stock returns in the next year.

Second, we show these narratives align with respondents' expectations for inflation, growth, and stock returns. Conditional on similar inflation forecasts, respondents with different narratives map a given level of expected inflation into different expected returns. Moreover, the narratives help to explain not only the level of expectations but also the cross-sectional relationship between expected inflation and returns. Specifically, the direction and strength of the correlation between long-term inflation expectations and return expectations vary across forecasters who believe in a negative relationship and those who believe in a positive one.

Third, using a randomized controlled trial (RCT), we provide causal evidence that the link between long-term inflation and return expectations is narrative-dependent. By providing a random sample of forecasters with a quote from the Bundesbank President about the Bundesbank's inflation forecasts, we find that this treatment shifts the professional forecasters' expectations about near-term inflation closer to the Bundesbank's forecast. Specifically, among the treated forecasters those for whom the gap between the pre-treatment inflation expectation and the Bundesbank forecast is the largest, are the most likely to update towards the target. However, this exogenous change in inflation expectations does not translate uniformly into stock return expectations. It depends on the

narratives forecasters hold about the inflation–return relationship. Only forecasters who believe in a negative relationship between inflation and returns revise their return expectations in response to the treatment.

Fourth, in a hypothetical portfolio choice experiment, we study how narratives affect trading behavior by asking forecasters what share of a one million euro portfolio they would allocate to the DAX rather than to a risk-free investment. Forecasters who expect inflation to ease and monetary policy to become less restrictive allocate 65% to the DAX. Those who expect lower profit margins or persistently high inflation and further tightening allocate on average 20 percentage points less. For forecasters whose narrative implies a negative inflation-return relationship, a one percentage point higher long-term inflation expectations are associated with a 4.4 percentage point lower equity share.

Lastly, we utilize the panel structure of the ZEW Survey and find that narratives from December 2022 can explain variation in return expectations across each of the subsequent eight survey waves. As the economic situation evolved and inflation in Germany declined, we repeated the narrative question ten months later, in September 2023. We find that disagreement over narratives remains high, and that roughly 40% of forecasters retain the narrative they initially selected. Moreover, many forecasters continue to endorse the same underlying relationship between inflation and returns in both waves, while updating their beliefs about the future path of inflation. Thus, using the updated narratives from September 2023, we can confirm our findings from the December 2022 wave regarding how the narratives shape forecasters' views of inflation's effects on stock returns.

**Related literature.** Our paper contributes to four strands of the literature. First, we contribute to the growing literature on narratives and subjective models in economics. Following the idea that agents interpret data through subjective models (e.g., Spiegler, 2016; Shiller, 2017; Schwartzstein and Sunderam, 2021; Andre et al., 2022; Flynn and Sastry, 2024; Andre et al., 2026*b*; Gründler et al., 2026) and Andre et al. (2026*a*) who show that narratives about the macroeconomy shape inflation expectation, we extend this literature to professional forecasters and to *joint* macro–asset-price expectations. Professional forecasters are an ideal setting for this question, since a point forecast has to be justified through an underlying narrative and narratives are also the format in which economic information is most memorable and most readily retrieved (Graeber et al., 2024).

Second, our paper contributes to the literature on heterogeneous expectations and the sources of disagreement among professional forecasters (e.g., Lahiri and Sheng, 2008; Giacomini et al., 2020; Clements et al., 2023; Conrad and Lahiri, 2025). Disagreement about expected inflation is time-varying and strongly increasing in the level of inflation (Mankiw et al., 2003; Patton and Timmermann, 2010). Using professional-forecaster surveys, Lahiri and Sheng (2008) show that this disagreement arises from two main sources: heterogeneity in initial priors and heterogeneity in how forecasters interpret public information. Giacomini et al. (2020) argue that in normal times, heterogeneous priors and inattention suffice to match the data, whereas during crisis periods, professional forecasters' subjective models become a key source of disagreement. Our contribution is to make this subjective model channel directly observable by providing direct micro evidence that heterogeneity in subjective models is an independent and quantitatively important source of disagreement among

professional forecasters, over and above heterogeneous priors. By classifying forecasters into groups with a common economically interpretable narrative, we show that these narratives explain substantial cross-sectional heterogeneity in inflation and growth expectations and map the same inflation forecast into very different expected returns. To the best of our knowledge, our paper is the first paper in this literature using an RCT with financial professionals. Studying subjective expectation formation of financial professionals provides further guidance for advancing asset pricing theory with realistic belief formation and detect potential deviations from the conventional Merton model of portfolio choice, ultimately affecting household's wealth.

Third, we add to the growing asset-pricing literature that uses survey data on subjective expectations (see Adam and Nagel, 2023, for a survey). Following Anderson et al. (2005), Greenwood and Shleifer (2014), and Giglio et al. (2021), a large body of work studies how heterogeneity in beliefs matters for asset prices. Recent survey evidence emphasizes subjective models to explain beliefs and choices. For instance, Beutel and Weber (2026) study how beliefs about the importance of past returns causally affect portfolios, and Andre et al. (2026*b*) use outdated earnings news to reveal households' subjective understanding of the stock market.

Fourth, we contribute to the literature on how inflation affects stock returns and, specifically, on how investors respond to inflation. Greenwood and Shleifer (2014) and Amromin and Sharpe (2014) document that individual investors' expected stock returns are strongly pro-cyclical and closely tied to perceived economic conditions. In contrast, Møller et al. (2026) provide evidence for counter-cyclical return expectations of professional economists. The existing empirical evidence on the sign of the inflation–stock return relationship is mixed. Negative mechanisms include money illusion (Modigliani and Cohn, 1979; Cohen et al., 2005; Schmeling and Schrimpf, 2011), sticky cash flows (Gorodnichenko and Weber, 2016; Bhamra et al., 2023), the proxy hypothesis of Fama (1981), and persistent stagflationary shocks (Cieslak and Pflueger, 2023). Kim et al. (2025) emphasize the importance of monetary policy for the negative relationship. By contrast, the Fisher (1930) hypothesis suggests that inflation should not reduce real stock returns. Moreover, firm-level evidence points to an important role for cost pass-through and market power; for instance, Estep and Hanson (1980) and Knox and Timmer (2024) suggest that for firms with pricing power, cash flow expectations need not fall after the news of higher-than-expected inflation, making a positive stock price response plausible. Recently, Schnorpfeil et al. (2025) combine a survey experiment with trading data during the same inflation surge and show that individual investors' beliefs about the stock return–inflation relation are very heterogeneous. Our approach extends these findings by directly eliciting professional forecasters' beliefs about the sign and mechanism of the inflation–return relationship and in contrast to households, most professional forecasters perceive the return-inflation relationship to be negative.

**Roadmap.** The remaining paper is organized as follows. Section 2 introduces the ZEW Survey and our survey design. In Section 3, we explore the narratives the forecasters have about the relationship between inflation and stock returns, and discuss the relationship between their expectations and the choice of a narrative. In Section 4, we present causal evidence from an RCT on the role of economic narratives in expectation formation, and Section 5 illustrates that the economic narratives

are also reflected in the portfolio choice of professional forecasters. In Section 6, we study the persistence of the narratives and Section 7 contains robustness checks. The conclusion follows in Section 8. In the appendix, we provide additional results and the exact wording of the questions.

# 2 Data and Survey Design

In this section, we first introduce the ZEW Survey and illustrate that disagreement among forecasters about the future developments in inflation and DAX returns was elevated in late 2022. We then present the survey design, which we use to elicit economic expectations and narratives.

## 2.1 ZEW Financial Market Survey

The ZEW Survey has been carried out by the Leibniz Centre for European Economic Research in Mannheim every month since December 1991. The survey is a panel survey among financial market experts recruited either from financial institutions or financial divisions of non-financial firms in Germany and consists of two parts. The questions in the *core questionnaire* are asked monthly, and those in *special questionnaires* are asked less frequently. The survey elicits various qualitative and quantitative macroeconomic expectations, including both fixed-horizon and fixed-event forecasts. For example, every month, as part of the core questionnaire, forecasters report fixed-horizon point forecasts of the level of the DAX, the leading German blue-chip index, in six months.[3] Since November 2014, the survey has, in its special questionnaire, asked forecasters every quarter for quantitative fixed-event forecasts of GDP growth in Germany and the euro-area inflation rate (HICP). More specifically, in the first month of each quarter (that is, in January, April, July, and October), forecasters provide their point forecasts of GDP growth in Germany in the current year, the next year, and two years. Similarly, in the second month of each quarter (that is, in February, May, August, and November), participants are asked about their point predictions for this year's inflation, next year's inflation, and inflation in two years.

The number of participating experts fluctuates over time. During the years 2022 and 2023, on average, 171 forecasters answered the monthly core questionnaire, which is a significantly larger number of participants than in the Survey of Professional Forecasters conducted by the Federal Reserve Bank of Philadelphia or the European Central Bank. The personal characteristics of the forecasters, including gender, age, career entry year, sector, and whether stock market forecasting is an official part of their job description, are collected when they enter the panel and are updated regularly, but the forecasters remain anonymous. The ZEW Indicator of Economic Sentiment, a leading indicator for the German economy, is created from the results of the ZEW Survey, and

[3]See Glaser et al. (2019) for a recent paper using the ZEW Survey to study how forecasters form expectations about the DAX index.

its release is one of the most important scheduled news for European stock prices and German government bonds (Kerssenfischer and Schmeling, 2024).[4]

## 2.2 Disagreement about Inflation and Stock Returns in 2022

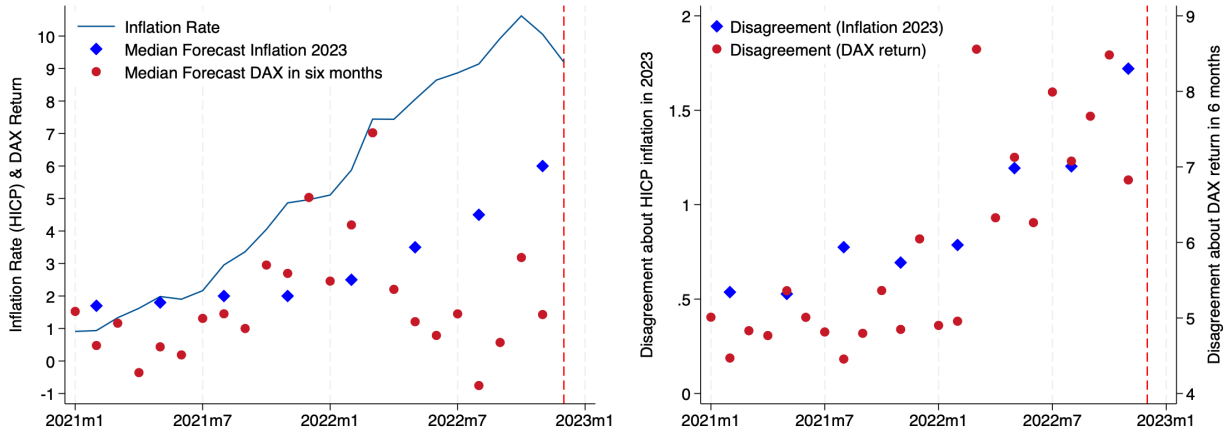



**Figure 1:** The left panel shows the median inflation expectations for euro-area inflation in 2023 (fixed-event forecasts, blue diamonds) and median six-month DAX return expectations (fixed-horizon, red dots). The blue line illustrates actual HICP inflation in the euro area. The right panel illustrates the evolution of disagreement about euro-area inflation in 2023 (left axis, blue diamonds). The red dots illustrate disagreement about DAX returns in six months (computed from implied returns from DAX level forecasts, right-axis). The red dashed line presents December 2022, the month we ran an RCT in the survey.

The left panel of Figure 1 illustrates how inflation (solid line) in the euro area surged from mid-2021 onward before reaching a peak of 10.6% in October 2022. The figure shows the median ZEW Survey fixed-event expectation for euro-area inflation in 2023 (blue diamonds) from February 2021 (corresponding to the 12-quarter-ahead forecast) through November 2022 (corresponding to the 5-quarter-ahead forecast), as the forecast horizon progressively shortens. Consensus inflation expectations rise steadily over this period and peak in the month preceding our RCT, broadly tracking the surge in realized inflation in 2022. The figure also reports fixed-horizon six-month-ahead forecasts of DAX returns (red dots), which show no clear linear relation with the inflation expectations.[5]

The right panel of Figure 1 shows disagreement among the professional forecasters about euro-area inflation in 2023 (blue diamonds, left axis) and DAX return in six months (red dots, right axis). We measure disagreement by the cross-sectional standard deviation of point forecasts. Disagreement about inflation in 2023 increased throughout 2022 and peaked at 1.72 percentage points in November

[4]For further details on the ZEW Survey, see Brückbauer and Schröder (2023). In the ZEW Survey, heterogeneity in professional forecasters' expectations has been documented for inflation Conrad and Lahiri (2025) and interest rates Glas and Schoelkopf (2024).

[5]Based on the opening price of the DAX on the day the forecasters completed the survey, we calculate their expected DAX returns for the next six months.

2022. This level of disagreement regarding future inflation was unprecedented in the ZEW Survey.[6] Similarly, disagreement regarding DAX returns trended upwards in 2022.

### 2.3 Special-Purpose Modules

We contributed questions to four waves of the ZEW Survey between November 2022 and September 2023 and a survey experiment in December 2022. The questions were part of the special questionnaire, which follows the core questionnaire. In November 2022, we first asked the forecasters whether current inflation developments would affect their assessment of the return-risk profile of the DAX for 2023 (see Appendix C.2, question (4)).

We then posed an open-ended question asking forecasters to briefly explain via which mechanisms they believe that inflation will affect the return-risk profile of the DAX in 2023, or why they see no relationship (see Appendix C.2, question (5)). Based on their answers, we prepared short descriptions of the six *narratives* the participants considered most likely. Each narrative consists of a qualitative inflation expectation and a mechanism that describes how inflation affects expectations of risk and returns. In December 2022, we contributed questions about forecasters' inflation, growth, and stock market expectations, asked them to choose the narrative they considered most appropriate from the six, and included a randomized information treatment. In the April 2023 and September 2023 waves, we contributed follow-up questions. Table 1 provides an overview of the questions. The exact wording of the questions is presented in Appendix C.

**Table 1:** Survey structure and contributed questions.

| **Survey Wave** | **Contributed Questions** |
|---|---|
| 07-14 November 2022 | Assessing the Relevance of Inflation for DAX Returns<br>Open-ended text question on the effect of inflation on the DAX in 2023 |
| 05-12 December 2022 | Elicitation of pre-treatment expectations: inflation, GDP growth, and DAX returns in 2023 and 2023-2025<br>Choice of a narrative on the relationship between inflation and DAX returns in 2023<br>Randomized controlled trial: Information treatment<br>Elicitation of post-treatment expectations: inflation, GDP growth, and DAX returns in 2023<br>Hypothetical portfolio choice |
| 06-17 April 2023 | Elicitation of inflation, GDP growth, and DAX return expectations for the next 12 months |
| 04-11 September 2023 | Choice of a narrative on the relationship between inflation and DAX returns in the next 12 and 36 months<br>Elicitation of inflation, GDP growth, and DAX return expectations for the next 12 and 36 months |

Table 2 presents descriptive statistics on the age, experience (as measured by years since career entry), and gender of the 153 forecasters who responded to the special questionnaire in December

[6] While disagreement about inflation typically increases with the level of inflation (Mankiw et al., 2003; Patton and Timmermann, 2010), it is uncommon that it increases with decreasing forecast horizon (Conrad and Lahiri, 2025). For a detailed analysis of the heterogeneity in the ZEW Survey's inflation expectations, see Conrad and Lahiri (2025).

2022, which is at the core of our study.[7] In addition, in December 2022, we asked the forecasters whether they forecast the DAX or inflation themselves. On average, the professional forecasters surveyed are 54 years old and have 31 years of professional experience. Only 5% of the participants are female. 63% reported forecasting the DAX and 50% forecasting inflation. Beyond the information presented in Table 2, we know from previous survey waves that out of the 153 participants who answered the special questionnaire 42% are working for banks, 11% for asset management firms, and 18% for non-financial firms. Approximately 95% of the forecasters work for a German employer, and only one forecaster chose the English questionnaire rather than the German version. On average, forecasters spent around 13 minutes answering our contributed questions in December 2022.

**Table 2:** Forecaster characteristics: Survey wave December 2022.

| | **Answers** | **Mean** | **Standard Dev.** | **Minimum** | **Maximum** |
|---|---|---|---|---|---|
| Age (years) | 103 | 54.29 | 10.67 | 19 | 81 |
| Experience (years) | 99 | 31.33 | 9.71 | 3 | 61 |
| Female | 153 | 0.05 | 0.21 | 0 | 1 |
| DAX Forecaster | 150 | 0.63 | 0.48 | 0 | 1 |
| Inflation Forecaster | 151 | 0.50 | 0.50 | 0 | 1 |

**Notes:** This table provides summary statistics about the 153 forecasters who completed the special questionnaire of the ZEW Survey in the December 2022 wave. The gender, age, and experience of the forecasters were elicited when they entered the panel or in previous waves. Characteristics are missing for some forecasters because some variables were introduced only in later versions of the entry questionnaire, and panel members are free to leave these items unanswered (Brückbauer and Schröder, 2023). In December 2022, we asked the forecasters whether they forecast the DAX or inflation themselves.

# 3 Narratives and Pre-Treatment Expectations

In this section, we explore the narratives the forecasters entertain about the relationship between inflation and stock returns. We first describe how we elicited the economic narratives, and then examine whether the professional forecasters' narratives align with their quantitative expectations.

## 3.1 Questions from the November 2022 wave

**Current Inflation and Expected Return-Risk Profile.** Before we elicited the narratives, we asked the participants how current inflation developments affect their assessment of the return-risk profile of the DAX for the year 2023 (see question (4) in Section C.2).[8] Table A.1 shows that forecasters were divided in their assessment. While 47% of respondents stated that the effect of inflation is slightly or strongly negative, about 22% believed in a slightly or strongly positive effect. In addition, about 30% of participants answered that the effect is neutral or that they don't know whether there is an effect. The observed heterogeneity motivated our open-text question, which explicitly asked about the mechanisms by which participants expect inflation to affect returns.

[7] Forecaster characteristics are collected at the time of their initial entry into the panel and updated on an irregular basis. We use the most recent information available on each forecaster's characteristics.

[8] Here, we ask for the 'return-risk profile' because survey participants are used to this terminology. Every quarter, the ZEW Survey asks participants to assess the return-risk profile of different asset classes. When asking for quantitative expectations in subsequent survey questions, we explicitly ask for returns.

**Open-Ended Text Question on Narratives.** Researchers are increasingly favoring open-ended text questions because they prevent priming (framing) respondents toward specific response choices or mechanisms (e.g., Ferrario and Stantcheva, 2022; Andre et al., 2026*a*,*b*; Haaland et al., 2025). However, a drawback of open-ended text questions is that response rates are often low (e.g., Stantcheva, 2023). We address this drawback by eliciting popular narratives in the November 2022 wave and by asking to select from prespecified narratives in the December 2022 wave.

To learn about the economic models forecasters use when assessing the relationship between inflation and stock market performance in 2023, we ask them to describe the key mechanism:

> `Please describe briefly in full sentences via which mechanisms inflation affects the return-risk profile of the DAX for the year 2023 or why you see no relationship.`

In line with prior research, of the 162 forecasters who participated in the special questionnaire in November 2022, only 64 shared their views on the effect of inflation on DAX returns. However, the answers to the open-ended question are quite detailed, reflecting both macroeconomic understanding and knowledge of the economic conditions at the end of 2022. The answers show that forecasters mainly agree on the economic model of stock price determination. Essentially, all forecasters think of the stock price as the sum of appropriately discounted future cash flows. However, forecasters disagree on the mechanisms through which inflation affects stock prices. Roughly half of the forecasters believe that monetary policy is the dominant mechanism. For these forecasters, the ECB's policy can be described by a Taylor-type rule, and inflation affects stock prices through forecasters' beliefs about future discount rates. Within this group of forecasters, disagreement about the stock market's development in 2023 originates from heterogeneity in assessments of inflationary developments. To illustrate this point, we present two typical answers (summarized and translated from German):

> **Forecaster 1:** *"Decreasing inflation will lead to looser monetary policy and rising stock prices due to lower discount rates."*

> **Forecaster 2:** *"Higher inflation leads to higher interest rates, which decreases discounted cash flows and, thereby, reduces stock prices."*

The second largest group of forecasters refers to profit margins as the most relevant mechanism. Among those forecasters, disagreement arises about firms' ability to raise product prices without adversely affecting consumer demand. Depending on their beliefs, they expect higher or lower future cash flows and, hence, a positive or negative effect of inflation on stock market valuations. Again, we present two typical answers:

> **Forecaster 3:** *"Firms will not be able to pass on increasing costs to their customers. Profit margins and, hence, firm profits will decrease, which reduces stock prices."*

> **Forecaster 4:** *"Profits margins will increase because firms are able to increase product prices while input prices are likely to decrease."*

In their answers, forecasters also refer to the business cycle. They associate high inflation with low growth (partly due to the effect of higher interest rates) and argue that lower demand reduces expected future cash flows and, hence, stock prices. Last, some forecasters argue that the effect of inflation is already fully reflected in current market prices or that inflation has no effect on the stock market.

### 3.2 Questions from the December 2022 wave

**Quantitative Expectations.** In the December 2022 special purpose module, we first elicited quantitative expectations. The updating to new information might depend on prior uncertainty, which is why we asked participants to provide upper and lower bounds of a 90% prediction interval for the expected annual inflation rate in Germany (annual change in HICP, in percent) for the year 2023 and for the period from 2023 to 2025. Similarly, we asked them for the upper and lower bounds of the corresponding prediction intervals for the expected annual growth rate of real gross domestic product (GDP) in Germany and the expected DAX return in 2023.[9] Following Guiso et al. (2002), we construct point forecasts as the midpoint between the upper and lower bounds of the prediction interval.[10] In the subsequent analysis, we use these midpoints as the forecasters' point expectations and classify them as pre-treatment expectations. To limit the influence of extreme outliers, we trim return expectations at the 1% tails, which corresponds to dropping two forecasters with return expectations of $-10$ and 35 percent.

Table 3 reports summary statistics for the elicited upper and lower bounds as well as the midpoints. On average, forecasters expect an inflation rate ($\pi^{\text{pre}}_{i,2023|2022}$) of 6.563% in 2023, considerably below the German inflation rate of 11.3% in November 2022, the most recent inflation rate known to the participants at the time of the survey. Furthermore, long-term inflation expectations from 2023 to 2025 ($\pi^{\text{pre}}_{i,2023-2025|2022}$) are projected to average 4.4%. Expectations for GDP growth in 2023 ($y^{\text{pre}}_{i,2023|2022}$) are 0.39% on average, and the average expected DAX return ($r^{\text{pre}}_{i,2023|2022}$) is 5.272%. These numbers show that, on average, forecasters expected inflation in 2023 to be considerably above the ECB's target, they expected essentially no growth, and a DAX return below its historical average of 7.6% (1992-2021). At the same time, individual forecasters are rather uncertain about developments in 2023 (as measured by the gap between the lower and the upper bound), and considerable disagreement across forecasters is present (as measured by the standard deviation of the midpoints). Ex-post, the inflation rate in Germany in the year 2023 turned out to be 6%, real GDP growth in Germany was $-0.3$%, and the DAX return in 2023 (close 2023 - close 2022) was 20.26%.

**Choice of Narrative.** Based on the respondents' answers to the open-ended text question, we developed six narratives corresponding to the most frequent explanations from the answers in November

[9] For the exact wording of the question, see Appendix C.3.1, questions (1) and (2).

[10] While the midpoint of the prediction interval may not coincide exactly with the conditional mean if the underlying subjective distribution is skewed, it serves as a reasonable approximation. Specifically, for inflation expectations, the subjective densities were probably skewed to the right, so that the midpoints are likely to underestimate the conditional means.

**Table 3:** Descriptive Statistics of the Survey – Pre-treatment expectations.

| | | 90% Prediction Interval | | Midpoint | |
|---|---|---|---|---|---|
| | Obs. | Mean lower bound | Mean upper bound | Mean | Std. dev. |
| Inflation (short-term) $\pi^{\text{pre}}_{i,2023\|2022}$ | 124 | 4.949 | 8.177 | 6.563 | 1.338 |
| Inflation (long-term) $\pi^{\text{pre}}_{i,2023-2025\|2022}$ | 123 | 3.103 | 5.704 | 4.404 | 1.322 |
| GDP growth $y^{\text{pre}}_{i,2023\|2022}$ | 123 | -0.515 | 1.313 | 0.399 | 1.141 |
| DAX return $r^{\text{pre}}_{i,2023\|2022}$ | 106 | -0.362 | 10.905 | 5.272 | 3.775 |

**Notes:** This table provides summary statistics for the inflation, growth, and return expectations elicited before the treatment in December 2022. The pre-treatment expectations are constructed as the midpoint between the upper and lower bound of the 90% prediction interval reported by the forecasters in the survey. Return expectations are trimmed at the 1% tails.

2022. Each narrative combines an outlook for the development of inflation with an economic mechanism that links inflation to the return of the DAX. We ask the forecasters to choose the narrative that, in their opinion, best reflected the relationship between inflation and the return-risk profile of the DAX. We provided the following six narratives:

(A) An easing in the development of inflation, a less restrictive monetary stance by the ECB, and diminishing recession risks have a *positive* impact on the return-risk profile in 2023.

(B) DAX companies will continue to succeed in passing on rising costs to their customers. The profit margins of DAX companies will, therefore, remain unchanged or even increase, which has a *positive* impact on the return-risk profile of the DAX in 2023.

(C) The development of inflation does not impact the return-risk profile of the DAX.

(D) *Positive* and *negative* effects of inflation cancel each other out. Overall, the development of inflation is *neutral* for the return-risk profile of the DAX in 2023.

(E) DAX companies will not succeed in passing on rising costs to their customers. The profit margins of DAX companies will, therefore, decrease, which has a *negative* impact on the return-risk profile of the DAX in 2023.

(F) Persistently high inflation rates, further interest rate hikes by the ECB, and increasing recession risks will have a *negative* impact on the return-risk profile of the DAX in 2023.

Of the 153 forecasters who participated in the December 2022 survey, 136 selected a narrative.[11] Figure 2 shows the absolute frequencies with which each narrative was selected. Most forecasters selected narrative A. Because this narrative assumes a decline in inflation, we refer to these 56 forecasters as *inflation optimists*. The second most popular narrative is F. According to narrative F,

[11] The response rate in December 2022 (89%) is much higher than the response rate in November 2022 (40%). Thus, our elicitation strategy, which combines an ex-ante open-text question for possible narratives with an ex-post narrative selection, successfully elicits participants' own narratives with a high response rate.

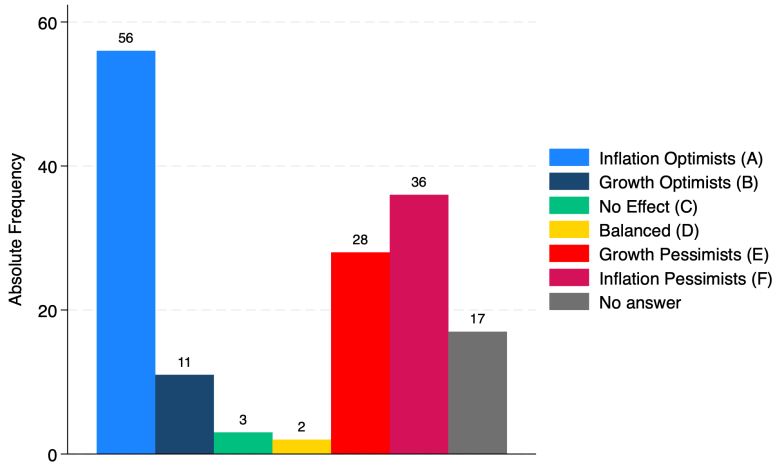



**Figure 2:** Distribution of the forecasters' narratives relating inflation to DAX returns in the December 2022 survey. Among the 153 survey participants, 136 selected a narrative. The figure presents absolute frequencies.

inflation is expected to remain high. We label forecasters who choose narrative F as *inflation pessimists*. Forecasters who choose narratives A or F share the view that monetary policy is the primary mechanism by which inflation affects stock prices. A quarter of the forecasters (39 forecasters) focus on profit margins as the key mechanism (narratives B or E). We label the 11 forecasters who believe in higher profit margins and, hence, higher future cash flows as *growth optimists* and the 28 forecasters who select E as *growth pessimists*. Only five forecasters choose narratives C and D. In the following analysis, we combine those forecasters with the 17 respondents that did not select any narrative into a group that we label as *neutral*. Overall, Figure 2 shows that the forecasters do not only disagree about the development of inflation in 2023 (only narrative A explicitly assumes falling inflation rates) but also about the most relevant mechanism linking the stock market development to inflation.

### 3.3 Pre-Treatment Expectations Align with Selected Narratives

Next, we study whether the point predictions of the survey participants, which we elicited before the selection of the narrative, align with the narrative they consider most plausible. The first three columns of Table 4 show the results of linear regressions of short- and long-term pre-treatment inflation expectations on dummy variables for the selected narratives. The *inflation optimist* narrative serves as the baseline. As shown in Column (1), inflation optimists, on average, expect an annual inflation rate of 6.2%, while inflation pessimists expect a significantly higher inflation rate of 6.9%. Similarly, growth pessimists have significantly higher inflation expectations than inflation optimists.[12] While the narratives have explanatory power for short-term inflation expectations, Col-

[12]The negative relation between the growth outlook and inflation expectations is consistent with the evidence for households and firms. Both sets of agents typically perceive a negative relation between their outlook for inflation and the unemployment rate, which the literature sometimes labels supply side view of inflation (Kamdar, 2019; Coibion et al., 2022).

umn (2) shows that the narratives have no statistically significant explanatory power for long-term inflation expectations. In Column (3), we add inflation expectations for 2023 as a predictor for long-term inflation expectations.[13] Column (3) reveals that short-term inflation expectations strongly influence long-term inflation expectations, while the narrative dummies remain insignificant. The coefficient estimate on short-term expectations is significant and approximately 0.59. This estimate suggests that shocks to short-term inflation expectations have a long-lived effect on long-term inflation expectations (e.g., D'Acunto et al., 2023; Coibion and Gorodnichenko, 2026). In summary, a strong association between the narratives and short-term inflation expectations exists, whereas only quantitative short-term expectations explain long-term inflation expectations.

**Table 4:** Link between narratives and pre-treatment inflation and growth expectations.

| | **Inflation Expectations** | | | **Growth Expectations** | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | $\pi^{pre}_{i,2023\|2022}$ | $\pi^{pre}_{i,2023-2025\|2022}$ | $\pi^{pre}_{i,2023-2025\|2022}$ | $y^{pre}_{i,2023\|2022}$ | $y^{pre}_{i,2023\|2022}$ | $y^{pre}_{i,2023\|2022}$ |
| Growth Optimist | 0.389 | 0.123 | -0.048 | -0.221 | -0.236 | -0.274 |
| | (0.695) | (0.483) | (0.273) | (0.276) | (0.283) | (0.283) |
| Growth Pessimist | 0.559* | 0.182 | -0.088 | -0.930*** | -0.942*** | -0.988*** |
| | (0.300) | (0.269) | (0.261) | (0.247) | (0.257) | (0.251) |
| Inflation Pessimist | 0.644** | 0.258 | -0.008 | -0.606** | -0.608** | -0.649** |
| | (0.318) | (0.371) | (0.270) | (0.268) | (0.285) | (0.268) |
| Neutral | 0.358 | -0.122 | -0.278 | -0.809** | -0.826** | -0.786** |
| | (0.308) | (0.285) | (0.245) | (0.371) | (0.374) | (0.381) |
| $\pi^{pre}_{i,2023\|2022}$ | | | 0.587*** | | -0.027 | |
| | | | (0.085) | | (0.075) | |
| $\pi^{pre}_{i,2023-2025\|2022}$ | | | | | | 0.096 |
| | | | | | | (0.082) |
| Constant | 6.222*** | 4.307*** | 0.596 | 0.821*** | 1.017** | 0.446 |
| | (0.218) | (0.177) | (0.515) | (0.179) | (0.466) | (0.408) |
| Observations | 124 | 123 | 121 | 124 | 121 | 121 |
| Adjusted $R^2$ | 0.010 | -0.024 | 0.341 | 0.078 | 0.077 | 0.089 |

**Notes:** Column (1) presents OLS estimates from a regression of short-term inflation expectations before the treatment on the four narrative groups. The coefficient estimates for the narrative groups provide group-specific intercepts and can be interpreted as the change in inflation expectations relative to inflation optimists who are included in the constant. In Columns (2) and (3) we regress pre-treatment long-term inflation expectations on the four narrative groups as well as short-term inflation expectations in Column (3). Columns (4) to (6) present OLS estimates from regressions of growth-expectations for 2023 on the four narrative groups as well as short- and/or long-term inflation expectations in Columns (5) and (6), respectively. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1

Columns (4) to (6) relate the growth expectations to the narratives. Column (4) shows that growth pessimists and inflation pessimists have significantly lower growth expectations than inflation optimists. Columns (5) and (6) reveal that short- and long-term inflation expectations are insignificant when added to the regression, while the narratives remain significant. Thus, qualitative narratives, which combine an assessment of future inflation with an economic mechanism, contain relevant information about growth expectations beyond what is conveyed by quantitative inflation expectations. Interestingly, the forecasters that expect no effect of inflation on stock returns (i.e., the experts classified as *neutral*) have short-term inflation expectations comparable to those of inflation optimists (see Column (1)), but significantly lower growth expectations (see Column (4)).

[13] Note that the narratives related inflation in 2023 to the return-risk profile of German stocks. Professional forecasters likely have longer term expectations for inflation that revert back to the ECB inflation target from its elevated level.

Table 5 investigates the association between the selected narratives and pre-treatment return expectations for the DAX in 2023. Again, *inflation optimists* serve as the baseline. Column (1) shows that the return expectations of *inflation pessimists* and *growth pessimists* are significantly lower than those of *inflation optimists*. While *inflation optimists* expect a DAX return of 6.8% in 2023, *inflation pessimists* expect a significantly lower return of 4.3%. Consistent with their lower growth expectations, forecasters classified as *neutral* also have lower return expectations. In Columns (2) and (3), we control for short-term and long-term inflation expectations, respectively, and in Column (4), we include long-term inflation expectations in combination with short-term growth expectations. When short-term inflation expectations are added in Column (2), the narratives remain significant predictors of return expectations, while short-term inflation expectations provide no predictive power. This evidence suggests that the narratives, which describe a mechanism and, hence, the sign of inflation's effect on returns, capture relevant information about return expectations that is not included in quantitative short-term inflation expectations.

In addition to the narratives, long-term inflation expectations are significant predictors of return expectations (see Column (3) and (4)), consistent with the interpretation that long-term inflation expectations contain *additional* information about future monetary policy and growth than is captured by forecasters' narratives about the short-term effects of inflation in 2023. When forecasters view stock prices as appropriately discounted future cash flows, long-term expectations are most relevant. Finally, according to Column (4), a one percentage point higher growth expectation increases return expectations by 0.78 percentage points. Consistent with our previous observation that the *neutral* narrative essentially captures low growth expectations, the *neutral* dummy becomes insignificant when controlling for growth expectation.

The estimates presented in Table 5 do not account for the possibility that the effect of long-term inflation expectations on returns might depend on the sign of the effect of inflation on returns implied by the select narrative. While forecasters who select narratives A and E/F disagree on the future course of inflation, they agree that higher inflation negatively affects future returns. In contrast, forecasters who choose narrative B or are classified as neutral believe in a positive or no relationship. Thus, in Table 6, we test the hypothesis that the relation between long-term inflation expectations and return expectations is narrative dependent. In Panel A, we use only data from the December 2022 wave. To address small sample problems and to increase the statistical power of our tests, we add data from additional survey waves in Panels B and C.

Column (1) of Panel A shows parameter estimates from a pooled regression of return expectations on long-term inflation and growth expectations across all forecasters. As expected, the coefficient estimates are similar to those in Column (4) of Table 5. In Columns (2) to (6), we rerun the same regression as in Column (1) but split the sample into groups of forecasters that select certain narratives. In Columns (2) and (3), we focus on forecasters that select narrative A or F, and in Columns (4) and (5), we additionally include those who choose narrative E. Because we know from Table 5 that forecasters who choose narrative A have significantly higher return expectations than those choosing narratives E and F, we include an inflation optimist dummy in Columns (3) and (5).

**Table 5:** Link between narratives and pre-treatment return expectations.

| | (1) $r^{\text{pre}}_{i,2023\|2022}$ | (2) $r^{\text{pre}}_{i,2023\|2022}$ | (3) $r^{\text{pre}}_{i,2023\|2022}$ | (4) $r^{\text{pre}}_{i,2023\|2022}$ |
|---|---|---|---|---|
| Growth Optimist | -2.089 | -2.334 | -2.045 | -1.958 |
| | (1.442) | (1.480) | (1.501) | (1.489) |
| Growth Pessimist | -2.834*** | -3.049*** | -2.720*** | -2.136** |
| | (0.951) | (1.049) | (0.960) | (0.986) |
| Inflation Pessimist | -2.505*** | -2.628*** | -2.136** | -1.689** |
| | (0.874) | (0.974) | (0.876) | (0.848) |
| Neutral | -2.286* | -2.518* | -2.800** | -1.987 |
| | (1.278) | (1.304) | (1.333) | (1.260) |
| $\pi^{\text{pre}}_{i,2023\|2022}$ | | 0.212 | | |
| | | (0.283) | | |
| $\pi^{\text{pre}}_{i,2023-2025\|2022}$ | | | -0.435* | -0.484** |
| | | | (0.244) | (0.224) |
| $y^{\text{pre}}_{i,2023\|2022}$ | | | | 0.781** |
| | | | | (0.341) |
| Constant | 6.807*** | 5.651*** | 8.723*** | 8.304*** |
| | (0.658) | (1.618) | (1.282) | (1.241) |
| Observations | 106 | 102 | 101 | 99 |
| Adjusted $R^2$ | 0.073 | 0.071 | 0.087 | 0.123 |

**Notes:** Columns (1)–(4) present OLS estimates from regressions of return expectations before the treatment on economic narratives and inflation and growth expectations elicited before the treatment (Columns (2) to (4)). Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p < 0.01, **p < 0.05, *p < 0.1

Consistent with the fact that the narratives A, E, and F imply a negative relationship, the estimated coefficients on long-term inflation expectations in Columns (4) and (5) are negative and significant at the 1% level (compared to a significance level of 5% in Column (1)) and larger (in absolute value) than in Column (1). In sharp contrast, in Column (6), when we focus on forecasters that select narrative B or are classified as *neutral*, the coefficient estimate on long-term inflation is positive (and significant at the 10% level). In summary, Panel A provides first evidence in line with our hypothesis that the relation between long-term inflation and return expectations is narrative dependent.

Panel B reports results for the same regressions but an extended sample. In addition to the data from the December 2022 wave, we include data from two follow-up surveys conducted in April and September 2023. In these surveys, the same forecasters were asked to provide point predictions for Germany's real GDP growth and the DAX return over the next 12 months (denoted by $y_{i,t+12|t}$ and $r_{i,t+12|t}$, respectively), as well as for the annual inflation rate over the next 36 months (denoted by $\pi_{i,t+36|t}$). We assume that in April 2023, the forecasters still entertained the same narratives as in December 2022. In September 2023, the forecasters were asked to update the narratives by choosing from the same set as in December 2022. In the regressions in Panel B, we include wave-specific dummy variables.[14] The results from the extended sample in Panel B strengthen the results from Panel A: For forecasters who believe in a negative relationship between inflation and returns, the

[14]Because the December wave elicits calendar-year expectations as midpoints of prediction intervals while the follow-up surveys elicit 12-month point forecasts, the wave fixed effects absorb mean differences across these closely related forecasts, beyond the changing macroeconomic situation. They restrict the slope coefficients to be constant across waves. However, a joint test of wave-specific slopes for inflation and growth expectations does not reject this restriction, although the coefficient on inflation expectations is somewhat smaller in the April 2023 wave.

coefficient on long-term inflation is significantly negative in Columns (2)–(5), but insignificant in Column (6) for forecasters that entertain narrative B or are neutral.

In Panel C, we further exploit the panel structure of the ZEW Survey and combine point forecasts for euro-area inflation and German GDP growth with forecasters' narratives. We use DAX return expectations and inflation expectations from the second month of each quarter (February, May, August, and November) between February 2022 and November 2023, together with GDP growth expectations collected in the first month of the same quarter. Together with the narratives elicited in December 2022 and September 2023, we then re-estimate the same specifications as before. For waves before December 2022, we assign forecasters the narrative they selected in December 2022.[15] For survey waves between December 2022 and September 2023, we assign forecasters the narrative elicited in December 2022. From September 2023 onward, we use the updated narrative elicited in September 2023 and, for forecasters who did not report an updated narrative in the follow-up survey, we use their narrative from December 2022. Panel C shows that inflation expectations are not significantly associated with expected DAX returns for the surveys in 2022 and 2023. In contrast, conditioning on forecasters who subscribe to a narrative implying a negative relationship between inflation and stock returns yields a negative coefficient on inflation expectations, as shown in Columns (2)–(5). The magnitude of this coefficient increases further when we restrict the sample to forecasters who selected a negative-relationship narrative in both December 2022 and September 2023 (Columns (3) and (5)). Finally, Column (6) is estimated for forecasters who did not choose a negative-relationship narrative, and we find no significant effect of inflation on returns for this sample.

In summary, by running regressions on subsamples defined by narratives, Table 6 reveals that the relationship between long-term inflation and return expectations is narrative-dependent. In contrast, when analyzing the quantitative expectations data without controlling for the narratives, this dependence is masked.

[15] Our estimates document that the narrative elicited in December 2022 is associated with return expectations reported earlier in the same year but they do not establish that forecasters already entertained this narrative at the time.

**Table 6:** Narratives affect the link between pre-treatment inflation and return expectations.

| | **Panel A: December 2022 (pre-treatment)** | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ |
| $\pi^{\text{pre}}_{i,2023-2025\|2022}$ | -0.554** | -0.765*** | -0.680** | -0.775*** | -0.684*** | 1.054* |
| | (0.213) | (0.250) | (0.264) | (0.238) | (0.248) | (0.591) |
| $y^{\text{pre}}_{i,2023\|2022}$ | 0.996*** | 0.858** | 0.699* | 0.896** | 0.652* | 1.263** |
| | (0.352) | (0.424) | (0.413) | (0.402) | (0.388) | (0.560) |
| Inflation Optimist | | | 1.648* | | 1.876** | |
| | | | (0.843) | | (0.762) | |
| Constant | 7.380*** | 8.863*** | 7.564*** | 8.609*** | 7.389*** | -0.613 |
| | (1.108) | (1.313) | (1.325) | (1.225) | (1.207) | (3.113) |
| Observations | 99 | 65 | 65 | 81 | 81 | 18 |
| Adjusted $R^2$ | 0.100 | 0.116 | 0.143 | 0.124 | 0.169 | 0.192 |
| Narratives | all | AF | AF | AEF | AEF | B, Neutral |

| | **Panel B: Combination of three survey waves** | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ |
| $\pi_{i,t+36\|t}$ | -0.352** | -0.589*** | -0.506*** | -0.524*** | -0.448** | 0.071 |
| | (0.150) | (0.175) | (0.183) | (0.180) | (0.182) | (0.390) |
| $y_{i,t+12\|t}$ | 1.422*** | 1.272*** | 1.094*** | 1.312*** | 1.063*** | 1.646*** |
| | (0.253) | (0.317) | (0.308) | (0.307) | (0.293) | (0.426) |
| Inflation Optimist | | | 1.453** | | 1.757*** | |
| | | | (0.559) | | (0.498) | |
| Constant | 6.280*** | 7.831*** | 6.670*** | 7.285*** | 6.196*** | 3.500* |
| | (0.820) | (1.006) | (1.067) | (0.972) | (0.951) | (1.915) |
| Observations | 306 | 187 | 187 | 233 | 233 | 73 |
| Adjusted $R^2$ | 0.143 | 0.159 | 0.185 | 0.133 | 0.171 | 0.133 |
| Wave Fixed-Effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Narratives | all | AF | AF | AEF | AEF | B, Neutral |

| | **Panel C: Utilizing the panel structure (2022 and 2023)** | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | $r_{i,t+6\|t}$ | $r_{i,t+6\|t}$ | $r_{i,t+6\|t}$ | $r_{i,t+6\|t}$ | $r_{i,t+6\|t}$ | $r_{i,t+6\|t}$ |
| Inflation Expectations | -0.365 | -0.654** | -0.959** | -0.598* | -0.788** | -0.476 |
| | (0.228) | (0.248) | (0.397) | (0.313) | (0.290) | (0.533) |
| Growth Expectations | 1.125*** | 1.174*** | 1.782*** | 1.352*** | 1.778*** | 0.577 |
| | (0.287) | (0.274) | (0.484) | (0.187) | (0.300) | (0.517) |
| Observations | 809 | 420 | 278 | 542 | 360 | 148 |
| Adjusted $R^2$ | 0.075 | 0.082 | 0.101 | 0.085 | 0.098 | 0.055 |
| Wave Fixed-Effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Narratives | all | AF | always AF | AEF | always AEF | B, Neutral |

**Notes:** Columns (1) to (6) present OLS estimates from regressions of return expectations before the treatment on growth expectations in 2023 and inflation expectations for the period from 2023 to 2025 for different samples based on the different narratives. In Panel A, we include only answers from the December 2022 wave, and in Panel B, we additionally include the surveys from April and September 2023. The narratives used for December 2022 and April 2023 are the narratives elicited in December 2022, and in September 2023, we use the narratives elicited in September 2023. In Panel B, wave-fixed effects are used. Panel C presents results of regressing implied six-month DAX return expectations on inflation expectations and growth expectations. DAX return and inflation expectations are measured in the second month of each quarter (February, May, August, and November). GDP growth expectations are measured in the first month of the same quarter and merged to subsequent survey waves within the quarter. Inflation and growth expectations refer to the current calendar year in all survey waves except November, where we use expectations for the following year. All specifications include survey-wave fixed effects, with February 2022 as the reference wave. Column (1) uses the full sample. Column (2) restricts the sample to respondents assigned to AF narratives and in Column (3) only forecasters who choose twice A or F are included. Column (4) includes respondents assigned to AEF narratives (narratives 1, 5, and 6). Column (5) further restricts the sample to respondents who were consistently assigned to an AEF narrative in both December 2022 and September 2023. Column (6) includes respondents assigned to B or neutral narratives, not expecting a negative relationship. All expectations are winsorized at the 1st and 99th percentiles within survey waves. In Panel C, robust standard errors clustered at the survey-period level are reported in parentheses. We cluster at the survey-wave level to account for common macroeconomic shocks within a wave. Clustering at the forecaster level instead leaves the point estimates unchanged and does not affect significance at the 10% level. Notation: ***p < 0.01, **p < 0.05, *p < 0.1

# 4 Treatment Effects on Inflation and Return Expectations

After we elicited the quantitative expectations and the narratives, we conducted an RCT in the December 2022 wave. The intention of the RCT is twofold. First, we aim to causally change the inflation expectations of the treated forecasters. Second, the RCT allows us to test whether the effect of the update in the inflation expectation on stock return expectations depends on the narrative the forecaster entertains.

## 4.1 Information Treatment about Future Inflation

In the RCT, we confronted the survey participants with a statement by Joachim Nagel, the President of the German Bundesbank, about the outlook for inflation in Germany in 2023. The Bundesbank publishes its official macroeconomic forecasts for Germany twice a year, in June and December. On June 10, 2022, the Bundesbank released a forecast of 4.5% HICP inflation for 2023. When we asked survey participants before the treatment how relevant the Bundesbank's inflation forecasts are for their own forecasts, 74% answered that the Bundesbank's forecasts are somewhat or highly relevant (see Figure A.3). Between June 2022 and December 2022, inflation in Germany continued to rise, and survey participants closely followed these developments.

In the RCT, survey participants were randomly assigned to a treatment or control group.[16] Participants in the treatment group were confronted with a statement that Joachim Nagel made at the Deutsche Bundesbank's symposium *Banking Supervision in Dialogue* on November 8, 2022:[17]

> `Bundesbank President Joachim Nagel regularly comments on the inflation outlook for Germany. In November 2022, he commented as follows: "The inflation rate in Germany is likely to remain high in the coming year. I think it is likely that the annual average for 2023 will be a seven before the decimal point".`

Survey participants had to answer the questions of the December 2022 wave between December 05 and 12. On December 16, after the survey was closed, the Bundesbank released a new forecast of 7.2% inflation in Germany in 2023.

After the information treatment, all participants were asked again about their expectations for GDP growth, annual inflation in Germany, and the DAX return in 2023. To avoid asking the same questions as before the treatment, we now elicited growth, return, and inflation expectations as point estimates to alleviate concerns about survey fatigue and experimenter demand effects (Weber et al., 2022). In addition, after the treatment, the question about growth expectations was asked before the question about inflation expectations.[18]

[16] Of the 153 forecasters, 74 were assigned to the treatment group and 79 to the control group. Post-treatment inflation expectations are available for 68 and 70 forecasters, respectively.

[17] In line with professional standards, the quotation guarantees the accuracy of the statement.

[18] Table A.3 provides summary statistics for the posterior expectations. The mean inflation expectation in the treatment group was 6.40%, compared to 5.92% in the control group. DAX return expectations were higher in the treatment

### 4.2 Do Expectations Move towards the Provided Signal?

Next, we test the hypothesis that the post-treatment inflation expectations for 2023 of the forecasters in the treatment group are closer to the 7% forecast mentioned by the Bundesbank president than those of the forecasters in the control group. Column (1) of Table 7 presents a simple regression of the absolute difference between forecasters' post-treatment inflation expectations $\pi^{\text{post}}_{i,2023|2022}$ and the treatment value of 7% on a treatment dummy and a constant. The parameter estimate on the treatment dummy is significant at the 5% level and implies that the expectations of treated forecasters are, on average, 0.39 percentage points closer to the 7% forecast than those of untreated forecasters. This estimate provides causal evidence that providing publicly available information about the inflation outlook does not only shift the expectations of households towards the provided signal (Coibion et al., 2022; Weber et al., 2025) but also has the power to move professional forecasters' expectations.

**Table 7:** Causal effect of information treatment on inflation expectations.

| | (1) OLS | (2) LPM |
|---|---|---|
| | $\left\lvert\pi^{\text{post}}_{i,2023\|2022} - 7\right\rvert$ | $\mathbf{1}\left\{\left\lvert\pi^{\text{post}}_{i,2023\|2022} - 7\right\rvert < \left\lvert\pi^{\text{pre}}_{i,2023\|2022} - 7\right\rvert\right\}$ |
| Treatment | -0.390** | 0.226*** |
| | (0.186) | (0.082) |
| Distance Measure | | 0.048 |
| | | (0.039) |
| Treatment × Distance Measure | | 0.120** |
| | | (0.060) |
| Constant | 1.411*** | 0.232*** |
| | (0.143) | (0.055) |
| Observations | 121 | 121 |
| Adjusted $R^2$ | 0.027 | 0.101 |

**Notes:** Column (1) reports OLS estimates of a regression of the absolute deviation from the 7% mentioned in the treatment on the treatment dummy and a constant. Column (2) presents results of a linear probability model where the dependent variable is equal to one if $\left\lvert\pi^{\text{post}}_{i,2023|2022} - 7\right\rvert < \left\lvert\pi^{\text{pre}}_{i,2023|2022} - 7\right\rvert$, and zero otherwise. We regress the outcome variable on the treatment, a demeaned distance measure $\widetilde{\max}\left\{\left\lvert 7 - \pi^{\text{lower-bound, pre}}_{i,2023|2022}\right\rvert;\ \left\lvert\pi^{\text{upper-bound, pre}}_{i,2023|2022} - 7\right\rvert\right\}$ that measures how far away from the value of 7% the forecaster was before the treatment, and their interaction. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p < 0.01, **p < 0.05, *p < 0.1

Before the treatment, uncertainty about future inflation was high, and forecasters were characterized by heterogeneous pre-treatment expectations. Thus, we also test the hypothesis that treated forecasters are more likely to update their expectations towards the 7% forecast when they considered extreme inflation outcomes as plausible. Since forecasters may either be concerned about upside or downside risks, we measure how extreme pre-treatment inflation expectations were by

$$\max\left\{\left\lvert 7 - \pi^{\text{lower-bound, pre}}_{i,2023|2022}\right\rvert;\ \left\lvert\pi^{\text{upper-bound, pre}}_{i,2023|2022} - 7\right\rvert\right\},$$

i.e., the maximum of the absolute difference of 7% and the pre-treatment lower/upper-bound for inflation reported by the forecaster. Column (2) reports results of a linear probability model where

group with a mean of 5.82% compared to 4.78% in the control group, while growth expectations were almost identical across both groups (see Table A.3).

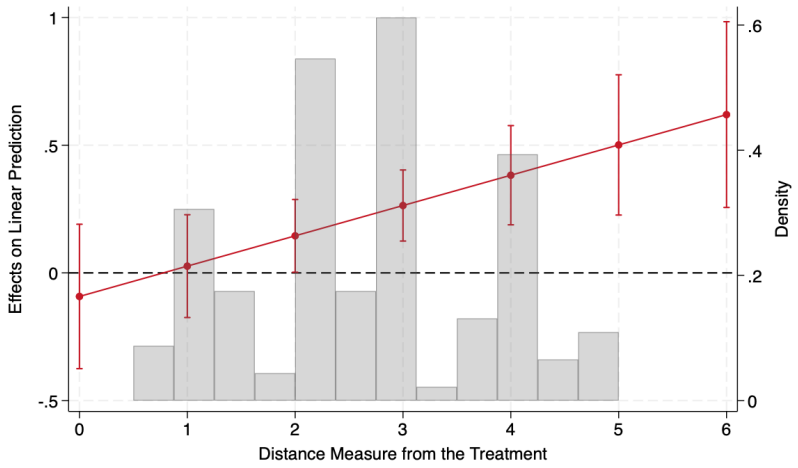



**Figure 3:** Average marginal treatment effect over the distance measure $\max\left\{\left|7-\pi_{i,2023|2022}^{\text{lower-bound, pre}}\right|;\ \left|\pi_{i,2023|2022}^{\text{upper-bound, pre}}-7\right|\right\}$ with 90% confidence intervals. Estimates are based on Column (2) of Table 7.

the dependent variable is equal to one if $\left|\pi_{i,2023|2022}^{\text{post}}-7\right| < \left|\pi_{i,2023|2022}^{\text{pre}}-7\right|$ and zero otherwise. The explanatory variables are the treatment dummy, the demeaned distance measure, and their interaction. Indeed, the parameter estimates confirm that treated forecasters are more likely to update towards 7% the larger the distance between their pre-treatment lower/upper bound and 7%. Figure 3 plots the average marginal treatment effect. The marginal effect is significant when the pre-treatment distance exceeds two percentage points.

### 4.3 Forecasters with Different Narratives Update Return Expectations Differently

In the previous section, we provided causal evidence that forecasters revise their inflation expectations in response to the information treatment. Next, we examine whether these revisions in inflation expectations lead to adjustments in return expectations, and, specifically, whether the updating of return expectations is narrative-dependent.

We begin in Table 8 by regressing post-treatment return expectations for 2023 $r_{i,2023|2022}^{\text{post}}$ on pre-treatment return expectations and long-term inflation expectations for the full sample of forecasters. Column (1) of Table 8 reports a positive and statistically significant coefficient on pre-treatment return expectations, indicating persistence in beliefs. The coefficient is less than one which can reflect different survey question formats, noise in subjective expectations, or mean revision and is consistent with evidence in the literature. We find no statistically significant relationship between pre-treatment long-term inflation expectations and return expectations, likely reflecting the relationship between pre-treatment inflation expectations and pre-treatment return expectations. In Column (2), we include a treatment dummy and its interaction with demeaned pre-treatment return expectations.[19]

[19] We demean pre-treatment return expectations so that the coefficient on the treatment dummy measures the treatment effect for a forecaster with average pre-treatment return expectations instead of one expecting a zero DAX return.

The treatment dummy is significant at the 5% level and indicates that the post-treatment return expectations of the treated forecasters are, on average, 1.346 percentage points higher than those of the untreated forecasters. The size of the treatment effect does not depend on pre-treatment return expectations.

**Table 8:** Causal effect of information treatment on return expectations.

| | (1) $r^{\text{post}}_{i,2023\|2022}$ | (2) $r^{\text{post}}_{i,2023\|2022}$ | (3) $r^{\text{post}}_{i,2023\|2022}$ | (4) $r^{\text{post}}_{i,2023\|2022}$ | (5) $r^{\text{post}}_{i,2023\|2022}$ | (6) $r^{\text{post}}_{i,2023\|2022}$ | (7) $r^{\text{post}}_{i,2023\|2022}$ |
|---|---|---|---|---|---|---|---|
| Treatment | | 1.346** | 1.299** | 1.950** | 1.370** | 1.620** | 1.028 |
| | | (0.613) | (0.597) | (0.843) | (0.648) | (0.659) | (1.606) |
| $\tilde{\pi}^{\text{pre}}_{i,2023-2025\|2022}$ | -0.147 | -0.177 | -0.525** | -0.586** | -0.562*** | -0.499* | -0.432 |
| | (0.276) | (0.219) | (0.227) | (0.224) | (0.183) | (0.283) | (1.249) |
| $\tilde{r}^{\text{pre}}_{i,2023\|2022}$ | 0.685*** | 0.767*** | 0.678*** | 0.637*** | 0.670*** | 0.669*** | 0.729 |
| | (0.141) | (0.186) | (0.135) | (0.158) | (0.132) | (0.131) | (0.463) |
| Uncertainty | | | | | | -0.092 | |
| | | | | | | (0.190) | |
| Treatment $\times \tilde{r}^{\text{pre}}_{i,2023\|2022}$ | | -0.308 | | | | | |
| | | (0.243) | | | | | |
| Treatment $\times$ $\tilde{\pi}^{\text{pre}}_{i,2023-2025\|2022}$ | | | 0.984** | 1.354* | 1.232*** | 0.933** | 0.281 |
| | | | (0.409) | (0.701) | (0.463) | (0.455) | (1.589) |
| Treatment $\times$ Uncertainty | | | | | | 0.887** | |
| | | | | | | (0.441) | |
| Constant | 5.422*** | 4.835*** | 4.824*** | 4.867*** | 4.918*** | 4.950*** | 4.591*** |
| | (0.319) | (0.429) | (0.426) | (0.548) | (0.432) | (0.417) | (1.264) |
| Observations | 91 | 91 | 91 | 59 | 74 | 74 | 17 |
| Adjusted $R^2$ | 0.435 | 0.469 | 0.474 | 0.496 | 0.504 | 0.549 | 0.164 |
| Narratives | all | all | all | AF | AEF | AEF | B, Neutral |

**Notes:** In Column (1), we report results of regressing return expectations after the treatment on demeaned pre-treatment long-term inflation expectations and demeaned return expectations for 2023. In Column (2), we report results of regressing return expectations after the treatment on pre-treatment long-term inflation expectations, the treatment dummy, demeaned return expectations for 2023, and the interaction of demeaned return expectations with the treatment dummy. The mean of $r^{\text{pre}}_{2023|2022}$ is 5.272%. In Column (3), we report results of regressing return expectations after the treatment on pre-treatment long-term inflation expectations, the treatment dummy, demeaned return expectations for 2023, and the interaction of demeaned long-term inflation expectations with the treatment dummy. Columns (4) to (7) report results of estimating the regression in Column (3) for different subsamples. Long-term inflation expectations (pre-treatment) $\tilde{\pi}^{\text{pre}}_{2023-2025|2022}$ are demeaned. The mean of $\pi^{\text{pre}}_{2023-2025}$ is 4.404%. In Column (6), we also include pre-treatment inflation uncertainty (difference between the upper and lower bound of the inflation 90% prediction interval), which has a mean of 3.229 percentage points. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1

In Column (3), we test whether the size of the treatment effect depends on long-term inflation expectations. Since most forecasters believe inflation is negatively related to stock market returns, we expect a positive sign for the interaction term. Indeed, the estimate for the coefficient on the interaction term is 0.984 and significant at the 5% level. The higher the pre-treatment inflation expectation of the treated forecaster, the stronger the forecaster updates inflation expectations downwards (see Table 7) and the stronger the upward revision in return expectations. A treated forecaster with pre-treatment long-term inflation expectation at the mean increases her return expectation by 1.299 percentage points upwards.[20]

In the remaining columns of Table 8, we run regressions for subsamples of forecasters defined by the selected narratives. In Column (4), we estimate the same regression as in Column (3), but for

[20]The long-term inflation expectations mean of 4.404% refers to the average annual inflation rate over 2023–2025, so forecasters expected disinflation over the horizon. The revision in return expectations rises from an insignificant 0.409 percentage points at the first quartile of long-term inflation expectations to 1.885 percentage points at the third.

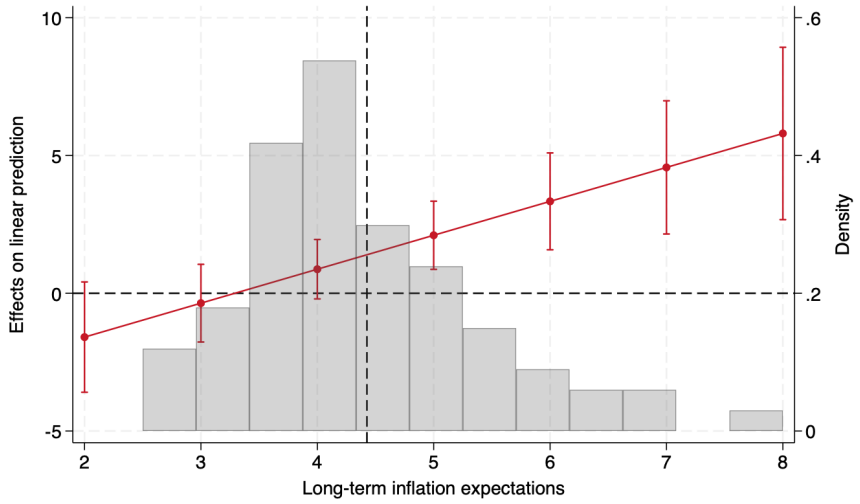



**Figure 4:** Average marginal treatment effects for forecasters who are either inflation optimists, inflation pessimists or growth pessimists (A, E, and F), with 90% confidence intervals. Estimates are based on Column (5) of Table 8. The vertical dashed line indicates the mean of long-term inflation expectations at 4.404%.

the subsample of forecasters that are either *inflation optimists* (narrative A) or *pessimists* (narrative F). These forecasters believe in monetary policy as the main transmission channel and in a negative inflation-stock-return relationship. Indeed, both the coefficient estimates on the treatment dummy and the interaction term increase in magnitude, supporting the hypothesis that the treatment effect size is narrative-dependent. When we also add *growth pessimists* (narrative E) to the sample, this evidence is further strengthened, with the interaction term now significant at the 1% level (see Column (5)). Figure 4 visualizes the average marginal treatment implied by the estimates from Column (5). The figure shows that the marginal effect is particularly strong for treated forecasters with above-average pre-treatment inflation expectations. For forecasters who believe in narratives A, E, or F and have high pre-treatment inflation expectations, the information treatment leads to a downward revision of the 2023 inflation expectation and, hence, an upward revision of their 2023 return expectations.[21]

In Column (6), we additionally control for pre-treatment inflation uncertainty. This allows us to test whether those forecasters who were more uncertain about future inflation update their return expectations more strongly. We measure pre-treatment inflation uncertainty by the width of the 90% prediction interval for inflation in 2023. Column (6) confirms that the effect of the treatment depends on pre-treatment inflation uncertainty. More uncertain forecasters adjust their return expectations upward more strongly. This effect on returns is plausible when investors, as in our sample, have pro-cyclical return expectations. Thus, Column (6) shows that the information treatment affects return expectations through complementary channels.

[21] We want to acknowledge that we did not ask for long-term inflation expectations after the RCT, but, from our findings in Table 4, it is reasonable to expect that those forecasters who updated short-term inflation expectations adjusted long-term inflation expectations accordingly.

Finally, the regression in Column (7) is based on *growth optimists* and *neutral* forecasters. For those forecasters, treatment effects are insignificant, consistent with previous results but the sample consists of only 17 forecasters.

In summary, the evidence in Table 8 is in line with our hypothesis that forecasters update return expectations in response to new information about future inflation through the lens of the narrative they entertain about the inflation-stock return relationship. In principle, even if all forecasters have similar pre-treatment inflation expectations, the updating of return expectations might be heterogeneous due to differences in narratives. In our sample, the narrative of a negative inflation-stock return relationship prevails, and forecasters concerned about upside inflation risk respond most strongly to the information treatment.

## 5 Hypothetical Portfolio Choice

Finally, at the end of the survey, the forecasters participated in a hypothetical portfolio choice. Respondents were asked to assume that on January 1, 2023, they would invest one million euros over the next twelve months in a portfolio consisting of the DAX and a risk-free (fixed-rate) investment with an annual interest rate of 2 percent and then had to choose what percentage they would invest in the DAX.[22] Figure 5 shows the histogram of the selected DAX shares. Half of the 135 forecasters would invest at least 60 percent in the DAX. On average, the forecasters would invest 54.8% in the DAX.

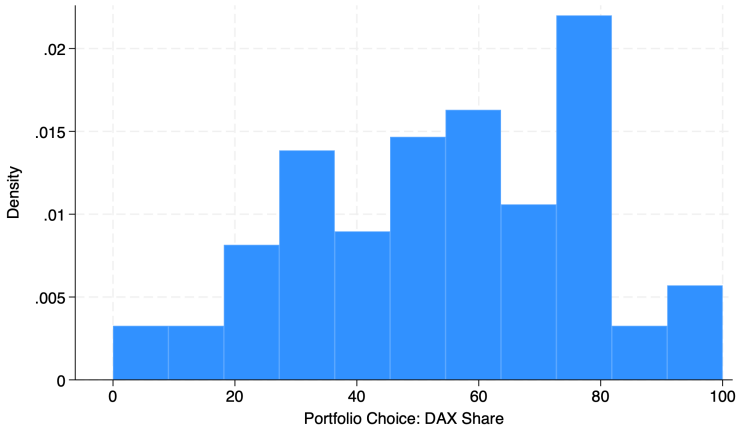



**Figure 5:** Histogram of DAX share in the December 2022 survey.

Table 9 examines the role of pre-treatment return expectations and long-term inflation expectations in explaining the hypothetical DAX shares. For the full sample, Column (1) shows a significantly positive link between the chosen DAX share and pre-treatment return expectations, while pre-treatment long-term inflation expectations are insignificant. This changes when partitioning the sample according to the forecasters' beliefs about the inflation-stock return relationship. When re-

[22] Based on the evidence in Hackethal et al. (2023) and in line with Beutel and Weber (2026), we did not incentivize the portfolio choice.

stricting the sample to those forecasters who expect a negative inflation–stock return relationship, Columns (2) and (3) show that long-term inflation expectations are significantly negatively associated with the DAX share. In contrast, Column (4) shows that inflation expectations are insignificant for those who believe in a positive or no relationship between inflation and returns. Thus, without knowing the narrative a forecaster entertains, the existence of the link between long-term inflation expectations and portfolio choice would be easily masked.[23]

In Column (5), we regress the chosen DAX share on dummy variables for the different narratives. Based on the full sample, we find that the narratives explain 15% of the variation in the DAX share. Consistent with their definitions, the DAX share of *inflation pessimists* is on average 18.53 percentage points lower than the DAX share of *inflation optimists*, who invest on average 64.44% in the DAX. The DAX share of forecasters labeled as *neural* is 17.74 percentage points lower than the DAX share of *inflation optimists*. This can be explained by our finding from Table 4 that *neutral* forecasters have significantly lower growth expectations. Importantly, the narratives remain relevant even after controlling for pre-treatment return and inflation expectations (see Column (6)), providing further evidence that the narratives contain information beyond the point forecasts. Thus, two forecasters with similar point forecasts for expected returns and inflation can – depending on the narratives they entertain – make very different portfolio decisions. Overall, the portfolio choice of the professional forecasters is narrative dependent, and narratives contain information beyond point estimates of inflation and return expectations.

**Table 9:** Regression of the DAX share on economic narratives and pre-treatment expectations.

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | DAX share | DAX share | DAX share | DAX share | DAX share | DAX share |
| $\pi^{\text{pre}}_{i,2023-2025\|2022}$ | -3.067 | -4.851** | -4.446** | 1.717 | | -3.004* |
| | (1.920) | (1.996) | (1.862) | (4.037) | | (1.726) |
| $r^{\text{pre}}_{i,2023\|2022}$ | 2.621** | 1.218 | 2.023* | 4.698** | | 2.119* |
| | (1.110) | (1.223) | (1.194) | (1.756) | | (1.141) |
| Growth Optimist | | | | | 5.564 | 9.660 |
| | | | | | (8.678) | (8.271) |
| Growth Pessimist | | | | | -20.356*** | -16.637*** |
| | | | | | (5.244) | (6.116) |
| Inflation Pessimist | | | | | -18.527*** | -10.403* |
| | | | | | (5.088) | (6.245) |
| Neutral | | | | | -17.744*** | -15.219* |
| | | | | | (6.519) | (7.816) |
| Constant | 54.558*** | 72.832*** | 63.520*** | 26.636 | 64.436*** | 63.234*** |
| | (11.111) | (12.926) | (12.125) | (19.202) | (2.714) | (11.145) |
| Observations | 99 | 64 | 81 | 18 | 135 | 99 |
| Adjusted $R^2$ | 0.175 | 0.120 | 0.168 | 0.316 | 0.149 | 0.240 |
| Narratives | all | AF | AEF | B, Neutral | all | all |

**Notes:** Columns (1) to (4) present results of regressing the DAX portfolio share (between 0% and 100%) on pre-treatment long-term inflation and return expectations for different samples based on the different narratives. Columns (5) and (6) are OLS estimates where we regress the DAX portfolio share on the economic narratives. In Column (6), we control for pre-treatment long-term inflation and return expectations. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p < 0.01, **p < 0.05, *p < 0.1

[23] As a robustness check, we control for DAX risk expectations, proxied by expected volatility for 2023. Expected volatility does not differ significantly across narrative groups, its coefficient is statistically insignificant, and the results in Table 9 remain unchanged.

# 6 Relevance of Economic Narratives in Subsequent Survey Waves

In this section, we examine whether the narratives from December 2022 can explain stock return expectations in subsequent waves of the ZEW Survey and, if so, how persistent their explanatory power is for return expectations throughout 2023. First, we regress DAX return expectations over the next six months, calculated based on the point forecasts for the level of the DAX from the core questionnaire of the ZEW Survey, on the point forecasts (made every quarter) for inflation in the euro area, GDP growth in Germany, and the economic narratives elicited in December 2022.[24] Figure 6 illustrates the coefficient estimates for the economic narratives (elicited in December 2022) across all surveys from February to August. Overall, the estimates confirm that the economic narratives elicited in December continue to have explanatory power for return expectations until August 2023, and inflation and growth pessimists have significantly lower return expectations than inflation optimists after controlling for inflation and growth expectations.

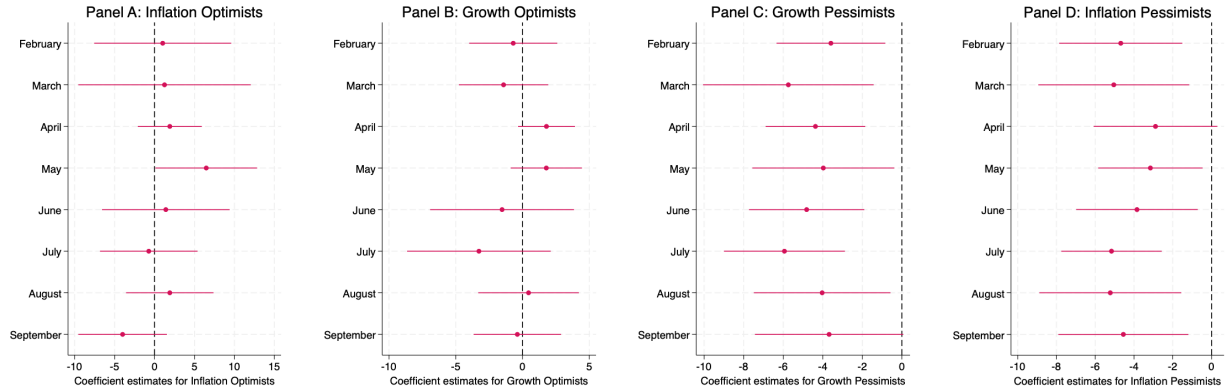



**Figure 6:** Coefficient estimates for the narrative specific intercepts from a regression of return expectations for the next six months on inflation and growth expectations and the narratives in the follow-up surveys in 2023 with 95% confidence intervals. Table A.5 reports the regression results. The regressions include inflation and growth expectations as control variables and Inflation Optimists are the baseline in the regression. For February to August 2023 we use the narratives elicited in December 2022, for September 2023 we use the updated narratives from September 2023.

Moreover, in September 2023, we re-elicited forecasters' narratives to study whether the forecasters believe that the dominant economic mechanism is still the same as in December 2022 but, potentially, have updated their beliefs about the future state of the economy. The forecasters had to select one of the same six narratives as in December 2022, which, in their opinion, best reflects the relationship between the development of inflation and the return-risk profile of the DAX over the next 12 months (for the question, see section C.5). We find that disagreement about the different narratives does not decrease and 43 out of 105 forecasters give the same answer as in December 2022 (see bivariate distribution of the narratives in the two survey waves in Table A.4). As in the first wave in December 2022, most forecasters in September 2023 are inflation optimists (41 forecasters), followed by inflation pessimists (21 forecasters) and growth pessimists (16 forecasters).

[24] We do not report a regression for the expectations from January 2023 because we would use growth and inflation expectations from a survey before our experiment.

As inflation in Germany fell to 4.3% by September 2023 and the deposit facility rate rose to 4%, the level of disagreement over 2023 inflation forecasts decreased considerably. Consequently, six forecasters changed their narrative from inflation pessimist to optimist without changing their underlying belief in a subjective model that postulates a negative relationship between inflation and returns. However, eleven forecasters switched from inflation optimists to inflation pessimists, and eleven forecasters moved from growth pessimists and optimists to narratives focusing on the monetary policy channel. Seventeen forecasters did not participate in the follow-up survey or did not respond to the question. For September 2023, the bottom row of coefficient estimates in Figure 6 shows that after controlling for growth and long-term inflation expectations, forecasters who are inflation pessimists in September 2023 have significantly lower return expectations than inflation and growth optimists - consistent with the definition of the economic narratives.

# 7 Robustness Checks

In this section, we confirm that our results are robust to classifying forecasters by their stated support for the narratives rather than by their most-preferred narrative, to excluding forecasters who did not select a narrative, to using the bounds of the 90% prediction interval, to winsorizing the expectations of the professional forecasters, and to using short-term instead of long-term inflation expectations. The corresponding tables are deferred to Appendix A.

**Support for Narratives.** In the December 2022 survey, we also asked the forecasters to separately evaluate the six narratives concerning the relationship between inflation developments and the expected return-risk profile of the DAX on a five-point Likert scale ranging from strongly disagree to strongly agree. Of the 151 forecasters who answered this question, 133 forecasters classified as supporting the AEF view (negative relationship) and 116 of those choose narrative A, E, or F as their primary narrative (55, 26, and 35 forecasters, respectively). The remaining respondents either reported no clear preference across narratives (four forecasters), nine selected narrative B as their primary narrative, or did not designate any of the six narratives as their primary view (four forecasters). From the 34 forecasters supporting B, 10 choose B as the main narrative, 19 A, 4 F and 1 Neutral. Table A.6 confirms that the results of Table 6 are robust to the broader classification scheme that assigns forecasters to a narrative group whenever they express agreement with the corresponding narrative, rather than relying exclusively on their most-preferred narrative.

**Exclusion of Forecasters who did not select a Narrative.** Throughout the analysis, we group forecasters who did not select a narrative and forecasters who do not think that inflation affects return expectation into one group. Table A.7 replicates Tables 4 and 5 and confirms that the pre-treatment results are not driven by forecasters who did not select one of the six narratives. The same holds for the updating of expectations after the treatment, see Tables A.8 and A.9.

**Using the Bounds instead of the Center of the Prediction Interval.** To avoid asking the same question twice, we ask the forecaster before the treatment about the upper and lower bound of the 90% prediction interval for inflation, growth, and returns. By taking the midpoint from the prediction interval, we construct pre-treatment expectations. Our results from Table 5 hold when using the lower and upper bounds instead of the midpoint, as shown in Table A.10. In Table A.11, we confirm the results from Table 8 using the pre-treatment prediction interval bounds to study the updating of return expectations after the treatment.

**Winsorization of Expectations at 5% level.** In Table A.12, we winsorize the pre-treatment inflation and return expectations as well as post-treatment expectations and show that the updating of expectations is not driven by outliers.

**Replicating Table 5 using Short-term Inflation Expectations.** Last, we replicate Table 5 using the inflation expectations for the year 2023 instead of the long-term inflation expectations to study the link between inflation and return expectations. Panel A in Table A.13 confirms that in December 2022, the short-term inflation expectations are not relevant for explaining variation in return expectations. However, when we pool all three survey waves, we get a negative coefficient for the short-term inflation expectations for forecasters who believe in a negative relationship but not for the full sample or forecasters who believe in a positive relationship.

# 8 Conclusion

This paper contributes to the growing literature on the role of subjective models and economic narratives, providing the first evidence for the role of economic narratives of professional forecasters. The professional forecasters in the ZEW Survey entertained different narratives about the development of inflation and stock returns in the high inflation environment in 2022 and 2023. Their quantitative expectations for inflation, output growth, and stock returns are consistent with the narratives they selected and the narratives have explanatory power next years' inflation, return, and growth expectations beyond their point forecasts. Furthermore, using an information treatment embedded in the survey, we provide causal evidence for the effects of the narratives on how professional forecasters update stock market forecasts in response to new information. When provided with an information treatment concerning the future development of inflation, the narratives that forecasters entertain affect how they update their stock market expectations. We find that narratives reveal the mental models forecasters use to interpret economic developments. This additional layer helps to explain heterogeneity in economic expectations that would otherwise be hidden behind similar point expectations. Our findings highlight that reduced-form regressions which ignore narrative heterogeneity can mistakenly interpret an insignificant coefficient as no perceived relationship, when in reality beliefs are split between positive and negative links that cancel in the aggregate.

Providing common signals does not necessarily result in a convergence of beliefs if agents subscribe to different narratives. One of our insights is that professional forecasters predominantly view

the link between inflation and equity returns as operating through a contractionary monetary policy response, implying a negative relationship between the two, in line with empirical evidence from Kim et al. (2025). In contrast, households tend to believe that higher inflation is associated with higher stock returns (e.g., Schnorpfeil et al., 2025). This divergence in beliefs between professionals and households has implications for both asset pricing and policy, as heterogeneity in expectations about the effects of inflation on returns can help account for systematic differences in portfolio choices. In a heterogeneous-beliefs equilibrium, this divergence implies that the sign and magnitude of the inflation–return relation and the level of risk premia may reflect which narratives dominate in the marginal investor's beliefs and how strongly they map inflation news into expected returns and portfolio demand. Moreover, if a common policy impulse is not transmitted homogeneously because of different heterogeneous narratives, the effects of monetary policy may be attenuated. Since households appear to rely on professional economists rather than on policymakers directly when forming expectations (Gründler et al., 2026), the narrative heterogeneity we document is a plausible source of dispersion in household beliefs. The Bernanke (2024) report argues that publishing a small set of alternative scenarios alongside the baseline forecast can clarify both the policy rationale and view of monetary transmission. Because professional forecasters interpret news through heterogeneous narratives and because common signals need not induce convergence when narratives differ, the scenario communication can be viewed as an attempt to make the relevant mechanisms explicit and thereby shape, and potentially coordinate, the narratives that agents use in expectation formation. Additionally, our results highlight the importance of identifying the mechanism respondents use when updating their expectations in survey experiments because the same signal can produce different, even opposite, revisions in expectations depending on that underlying mental model (Bulutay and Schoelkopf, 2026).

An open question is how professional forecasters form and revise their narratives, how the arrival of specific shocks reallocates weight across competing mechanisms, and whether narrative choice is state dependent. In our sample we find that observables such as professional experience do not affect narrative selection, suggesting that other channels such as central bank communication, education, interaction with other experts or stochastic recall of stored mechanisms could explain narrative selection. For the latter, Kuang et al. (2026) offer a memory-based microfoundation for narrative heterogeneity, showing that which mechanism an agent retrieves and applies can vary randomly across otherwise identical individuals.

## Author Contributions

Christian Conrad: Conceptualization, Methodology, Project administration, Survey Design, Writing - Review & Editing; Julius Theodor Schoelkopf: Conceptualization, Methodology, Software, Formal analysis, Visualization, Writing - Original Draft, Writing - Review & Editing; Michael Weber: Conceptualization, Survey Design, Methodology, Writing - Review & Editing; Frank Brueckbauer: Data Collection.

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# Appendix

# A Additional Tables

**Table A.1:** Answers to Question C.2.4 on the Effect of Current Inflation Developments on the Return-Risk Profile of the DAX.

| Response Category | Frequency | Share (%) |
|---|---|---|
| Strongly positive | 3 | 1.85 |
| Slightly positive | 33 | 20.37 |
| Neutral | 31 | 19.14 |
| Slightly negative | 58 | 35.80 |
| Strongly negative | 18 | 11.11 |
| Don't know | 19 | 11.73 |
| Total | 162 | 100.00 |

**Notes:** Distribution of responses to the question on how current developments of inflation affect the assessment of the return-risk profile of the DAX for the year 2023 from the contributed survey questions in November 2022.

**Table A.2:** Balancedness across the treatment and control group.

| | **Treatment Group** | | | | | **Control Group** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Obs. | Mean | Std. dev. | Min. | Max. | Obs. | Mean | Std. dev. | Min. | Max. |
| **Panel A: Forecaster characteristics** | | | | | | | | | | |
| Female | 74 | 0.041 | 0.199 | 0 | 1 | 79 | 0.051 | 0.221 | 0 | 1 |
| Age (years) | 48 | 55.062 | 9.945 | 29 | 81 | 55 | 53.618 | 11.311 | 19 | 74 |
| Experience (years) | 44 | 31.318 | 9.601 | 11 | 61 | 55 | 31.345 | 9.876 | 3 | 52 |
| DAX Forecaster | 72 | 0.611 | 0.491 | 0 | 1 | 78 | 0.654 | 0.479 | 0 | 1 |
| Inflation Forecaster | 73 | 0.479 | 0.503 | 0 | 1 | 78 | 0.513 | 0.503 | 0 | 1 |
| **Panel B: Pre-treatment expectations** | | | | | | | | | | |
| Inflation (midpoint) | 61 | 6.700 | 1.267 | 3.12 | 10 | 63 | 6.430 | 1.400 | 2.75 | 9 |
| Inflation (lower bound) | 61 | 5.263 | 1.459 | 2 | 9 | 63 | 4.644 | 1.566 | 2 | 8 |
| Inflation (upper bound) | 61 | 8.138 | 1.655 | 3.25 | 12 | 63 | 8.216 | 1.904 | 3.50 | 15 |
| Return (midpoint) | 51 | 5.322 | 3.151 | -2.50 | 10 | 55 | 5.225 | 4.303 | -3 | 22.50 |
| Return (lower bound) | 51 | 0.312 | 7.879 | -20 | 8.30 | 55 | -0.987 | 8.327 | -22 | 15 |
| Return (upper bound) | 51 | 10.332 | 5.618 | 2.75 | 30 | 55 | 11.436 | 5.380 | 3 | 30 |
| Growth (midpoint) | 59 | 0.343 | 1.117 | -3 | 3.25 | 64 | 0.450 | 1.169 | -2.25 | 3.50 |
| Growth (lower bound) | 59 | -0.554 | 1.370 | -5 | 2.80 | 64 | -0.479 | 1.511 | -6 | 3 |
| Growth (upper bound) | 59 | 1.241 | 1.257 | -2 | 4 | 64 | 1.379 | 1.253 | -4 | 4 |

**Notes:** This table provides summary statistics about the forecasters and their pre-treatment expectations for forecasters who participated in the ZEW Survey in December 2022 separately for the treatment and the control group. For 153 forecasters, personal characteristics were elicited when they entered the panel or in previous waves. Return expectations are trimmed at the 1% tails

**Table A.3:** Summary Statistics – Expectations after the treatment.

| | **Treatment Group** | | | | | **Control Group** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Obs. | Mean | Std. dev. | Min. | Max. | Obs. | Mean | Std. dev. | Min. | Max. |
| Inflation $\pi^{\text{post}}_{i,2023\|2022}$ | 68 | 6.396 | 1.195 | 3 | 9.50 | 70 | 5.917 | 1.415 | 2 | 8.50 |
| Growth $y^{\text{post}}_{i,2023\|2022}$ | 61 | -0.044 | 1.109 | -2 | 2.90 | 67 | -0.004 | 1.470 | -7 | 3 |
| DAX Return $r^{\text{post}}_{i,2023\|2022}$ | 47 | 5.819 | 4.351 | -15 | 15 | 55 | 4.776 | 4.389 | -12 | 15 |

**Notes:** This table provides summary statistics for the macroeconomic expectations elicited as point predictions after the treatment. We report summary statistics separately for the treatment and the control group.

**Table A.4:** Joint distribution of the economic narratives in December 2022 and September 2023.

| | **September 2023** | | | | | | |
|---|---|---|---|---|---|---|---|
| **December 2022** | Inflation Optimist | Growth Optimist | Neutral | Growth Pessimist | Inflation Pessimist | No answer | Total |
| Inflation Optimist | **23** | 2 | 0 | 3 | 11 | 4 | 43 |
| Growth Optimist | 1 | **3** | 1 | 0 | 1 | 2 | 8 |
| Neutral | 1 | 0 | **1** | 0 | 1 | 0 | 3 |
| Growth Pessimist | 6 | 1 | 0 | **6** | 3 | 2 | 18 |
| Inflation Pessimist | 6 | 2 | 0 | 4 | **5** | 4 | 21 |
| No answer | 4 | 0 | 0 | 3 | 0 | **5** | 12 |
| Total | 41 | 8 | 2 | 16 | 21 | 17 | 105 |

**Notes:** This contingency table displays the number of forecasters who answered the question about the most likely scenario about future inflation in the ZEW Survey in December 2022 (rows) and September 2023 (columns).

**Table A.5:** Regression of return expectations for the next six months on inflation and growth expectations as well as narratives.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| | $r_{i,202308\|202302}$ | $r_{i,202309\|202303}$ | $r_{i,202310\|202304}$ | $r_{i,202311\|202305}$ | $r_{i,202312\|202306}$ | $r_{i,202401\|202307}$ | $r_{i,202402\|202308}$ | $r_{i,202403\|202309}$ |
| $\pi_{i,2023\|202302}$ | -0.032 | 0.160 | -0.242 | | | | | |
| | (0.698) | (0.875) | (0.324) | | | | | |
| $y_{i,2023\|202301}$ | 0.690 | 0.667 | | | | | | |
| | (0.517) | (0.671) | | | | | | |
| Growth Optimist (202212) | -0.697 | -1.421 | 1.792* | 1.782 | -1.532 | -3.265 | 0.451 | |
| | (1.659) | (1.678) | (1.071) | (1.344) | (2.707) | (2.705) | (1.887) | |
| Growth Pessimist (202212) | -3.589** | -5.741*** | -4.370*** | -3.972** | -4.816*** | -5.937*** | -4.030** | |
| | (1.383) | (2.163) | (1.266) | (1.806) | (1.465) | (1.538) | (1.730) | |
| Inflation Pessimist (202212) | -4.683*** | -5.042** | -2.891* | -3.153** | -3.845** | -5.161*** | -5.223*** | |
| | (1.597) | (1.952) | (1.604) | (1.356) | (1.575) | (1.303) | (1.834) | |
| Neutral (202212) | -1.012 | -0.889 | -1.882 | -1.185 | -1.458 | 0.935 | 0.791 | |
| | (1.250) | (2.469) | (1.328) | (1.360) | (1.871) | (1.475) | (1.231) | |
| $y_{i,2023\|202304}$ | | | 1.052* | 0.373 | -0.066 | | | |
| | | | (0.566) | (0.644) | (0.435) | | | |
| $\pi_{i,2023\|202305}$ | | | | -1.066* | -0.068 | 0.576 | | |
| | | | | (0.547) | (0.662) | (0.538) | | |
| $y_{i,2023\|202307}$ | | | | | | 0.482 | 1.333* | |
| | | | | | | (0.569) | (0.704) | |
| $\pi_{i,2023\|202308}$ | | | | | | | -0.095 | |
| | | | | | | | (0.501) | |
| $\pi_{i,2024\|202308}$ | | | | | | | | 1.139** |
| | | | | | | | | (0.547) |
| $y_{i,2024\|202307}$ | | | | | | | | 2.516** |
| | | | | | | | | (1.178) |
| Growth Optimist (202309) | | | | | | | | -0.388 |
| | | | | | | | | (1.638) |
| Growth Pessimist (202309) | | | | | | | | -3.679* |
| | | | | | | | | (1.876) |
| Inflation Pessimist (202309) | | | | | | | | -4.548*** |
| | | | | | | | | (1.678) |
| Neutral (202309) | | | | | | | | -1.630 |
| | | | | | | | | (2.387) |
| Constant | 1.019 | 1.249 | 1.910 | 6.473** | 1.410 | -0.724 | 1.910 | -3.999 |
| | (4.317) | (5.412) | (2.014) | (3.205) | (4.013) | (3.072) | (2.742) | (2.775) |
| Observations | 90 | 76 | 88 | 95 | 84 | 92 | 73 | 68 |
| Adjusted $R^2$ | 0.135 | 0.113 | 0.142 | 0.084 | 0.065 | 0.213 | 0.159 | 0.218 |

**Notes:** Columns (1) to (8) present OLS estimates of regressions from DAX Return Expectation for the next six months on inflation and growth expectations in the euro area as well as the economic narratives. In Columns (1) to (7), we use growth and inflation expectations for the current year; in Column (8), we use growth and inflation expectations for the next year as well as the narratives elicited in September 2023. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1

**Table A.6:** Support for narratives affects the link between pre-treatment inflation and return expectations.

| | (1) $r^{\text{pre}}_{i,2023\|2022}$ | (2) $r^{\text{pre}}_{i,2023\|2022}$ | (3) $r^{\text{pre}}_{i,2023\|2022}$ | (4) $r^{\text{pre}}_{i,2023\|2022}$ | (5) $r^{\text{pre}}_{i,2023\|2022}$ |
|---|---|---|---|---|---|
| $\pi^{\text{pre}}_{i,2023-2025\|2022}$ | -0.679*** | -0.677*** | -0.562 | 0.552 | -0.453 |
| | (0.229) | (0.229) | (0.450) | (0.734) | (0.431) |
| $y^{\text{pre}}_{i,2023\|2022}$ | 0.947** | 0.942** | 1.645* | 0.276 | 1.252 |
| | (0.371) | (0.369) | (0.957) | (0.707) | (0.820) |
| Constant | 7.912*** | 7.902*** | 7.813*** | 3.475 | 7.727*** |
| | (1.181) | (1.179) | (2.128) | (4.296) | (2.186) |
| Observations | 92 | 94 | 26 | 12 | 33 |
| Adjusted $R^2$ | 0.110 | 0.109 | 0.099 | -0.154 | 0.054 |
| Narrative-Support | AF | AEF | B | Neutral | B, Neutral |

**Notes:** Columns (1) to (5) present OLS estimates from regressions of return expectations before the treatment on growth expectations in 2023 and inflation expectations for the period from 2023 to 2025 for different samples based on the different narratives. Support for a narrative is determined based on the answers of a five-point Likert scale ranging from strongly disagree to strongly agree. Because forecasters rate each of the six narratives separately, the groups are not mutually exclusive. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1

**Table A.7:** Link between pre-treatment expectations and narratives where we exclude forecasters who did not choose one of the narratives.

| | Inflation Expectations | | | Growth Expectations | | | Return Expectations | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | $\pi^{pre}_{i,2023\|2022}$ | $\pi^{pre}_{i,2023-2025\|2022}$ | $\pi^{pre}_{i,2023-2025\|2022}$ | $y^{pre}_{i,2023\|2022}$ | $y^{pre}_{i,2023\|2022}$ | $y^{pre}_{i,2023\|2022}$ | $r^{pre}_{i,2023\|2022}$ | $r^{pre}_{i,2023\|2022}$ | $r^{pre}_{i,2023\|2022}$ | $r^{pre}_{i,2023\|2022}$ |
| Growth Optimists | 0.389 | 0.123 | -0.049 | -0.221 | -0.240 | -0.272 | -2.089 | -2.345 | -2.039 | -1.953 |
| | (0.697) | (0.484) | (0.273) | (0.276) | (0.284) | (0.282) | (1.445) | (1.482) | (1.508) | (1.496) |
| Growth Pessimists | 0.559* | 0.182 | -0.090 | -0.930*** | -0.946*** | -0.986*** | -2.834*** | -3.064*** | -2.714*** | -2.131** |
| | (0.301) | (0.269) | (0.262) | (0.248) | (0.258) | (0.250) | (0.953) | (1.053) | (0.960) | (0.988) |
| Inflation Pessimists | 0.644** | 0.258 | -0.010 | -0.606** | -0.613** | -0.645** | -2.505*** | -2.644*** | -2.123** | -1.678* |
| | (0.319) | (0.372) | (0.270) | (0.268) | (0.286) | (0.268) | (0.876) | (0.980) | (0.877) | (0.851) |
| Neutral | 0.698 | 0.303 | -0.052 | -0.056 | -0.069 | -0.121 | -1.557 | -1.884 | -1.457 | -1.412 |
| | (0.458) | (0.371) | (0.307) | (0.599) | (0.612) | (0.579) | (2.180) | (2.176) | (2.325) | (2.100) |
| $\pi^{pre}_{i,2023\|2022}$ | | | 0.590*** | | -0.019 | | | 0.238 | | |
| | | | (0.086) | | (0.075) | | | (0.292) | | |
| $\pi^{pre}_{i,2023-2025\|2022}$ | | | | | | 0.081 | | | -0.464* | -0.510** |
| | | | | | | (0.082) | | | (0.249) | (0.230) |
| $y^{pre}_{i,2023\|2022}$ | | | | | | | | | | 0.781** |
| | | | | | | | | | | (0.368) |
| Constant | 6.222*** | 4.307*** | 0.577 | 0.821*** | 0.967** | 0.511 | 6.807*** | 5.490*** | 8.846*** | 8.414*** |
| | (0.219) | (0.177) | (0.529) | (0.180) | (0.466) | (0.408) | (0.660) | (1.671) | (1.302) | (1.272) |
| Observations | 114 | 114 | 112 | 115 | 112 | 113 | 99 | 95 | 95 | 94 |
| Adjusted $R^2$ | 0.011 | -0.029 | 0.343 | 0.075 | 0.071 | 0.084 | 0.070 | 0.068 | 0.077 | 0.115 |

**Notes:** Column (1) presents OLS estimates from a regression of short-term inflation expectations before the treatment on the four narrative groups. The coefficient estimates for the narrative groups provide group-specific intercepts and can be interpreted as the change in inflation expectations relative to inflation optimists who are included in the constant. In Columns (2) and (3) we regress pre-treatment long-term inflation expectations on the four narrative groups as well as short-term inflation expectations in Column (3). Columns (4) to (6) present OLS estimates from a regression of growth-expectations for 2023 on the four narrative groups as well as short- and/or long-term inflation expectations in Columns (5) and (6), respectively. Columns (7)–(10) present OLS estimates from regressions of return expectations before the treatment on economic narratives and inflation and growth expectations elicited before the treatment (Columns (8) to (10)). Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1

**Table A.8:** Causal effect of information treatment on inflation expectations (exclusion of forecasters who did not choose one of the narratives).

| | (1) OLS $\left\|\pi^{\text{post}}_{i,2023\|2022} - 7\right\|$ | (2) LPM $\mathbf{1}\left\{\left\|\pi^{postt} - 7\right\| < \left\|\pi^{pre} - 7\right\|\right\}$ |
|---|---|---|
| Treatment | -0.393** | 0.214** |
| | (0.194) | (0.085) |
| $\widetilde{\max}\left\{\left\|7 - \pi^{\text{lower-bound, pre}}_{i,2023\|2022}\right\|;\ \left\|\pi^{\text{upper-bound, pre}}_{i,2023\|2022} - 7\right\|\right\}$ | | 0.042 |
| | | (0.041) |
| Treatment $\times$ $\widetilde{\max}\left\{\left\|7 - \pi^{\text{lower-bound, pre}}_{i,2023\|2022}\right\|;\ \left\|\pi^{\text{upper-bound, pre}}_{i,2023\|2022} - 7\right\|\right\}$ | | 0.143** |
| | | (0.064) |
| Constant | 1.433*** | 0.232*** |
| | (0.149) | (0.057) |
| Observations | 112 | 112 |
| Adjusted $R^2$ | 0.036 | 0.104 |

**Notes:** In this Table, we exclude forecasters who did not choose one of the narratives. Column (1) reports OLS estimates of a regression of the absolute deviation from the 7% mentioned in the treatment on the treatment dummy and a constant. Column (2) presents results of a linear probability model where the dependent variable is equal to one if $\left|\pi^{\text{post}}_{i,2023|2022} - 7\right| < \left|\pi^{\text{pre}}_{i,2023|2022} - 7\right|$, and zero otherwise. We regress the outcome variable on the treatment, a demeaned distance measure $\widetilde{\max}\left\{\left|7 - \pi^{\text{lower-bound, pre}}_{i,2023|2022}\right|;\ \left|\pi^{\text{upper-bound, pre}}_{i,2023|2022} - 7\right|\right\}$ that measures how far away from the value of 7% the forecaster was before the treatment, and their interaction. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p < 0.01, **p < 0.05, *p < 0.1

**Table A.9:** Causal effect of information treatment on return expectations (exclusion of forecasters who did not choose one of the narratives)

| | (1) $r^{\text{post}}_{i,2023\|2022}$ | (2) $r^{\text{post}}_{i,2023\|2022}$ | (3) $r^{\text{post}}_{i,2023\|2022}$ | (4) $r^{\text{post}}_{i,2023\|2022}$ | (5) $r^{\text{post}}_{i,2023\|2022}$ | (6) $r^{\text{post}}_{i,2023\|2022}$ | (7) $r^{\text{post}}_{i,2023\|2022}$ |
|---|---|---|---|---|---|---|---|
| Treatment | | 1.600** | 1.463** | 1.950** | 1.370** | 1.620** | 2.228 |
| | | (0.653) | (0.628) | (0.843) | (0.648) | (0.659) | (2.214) |
| $\tilde{\pi}^{\text{pre}}_{i,2023-2025}$ | -0.130 | -0.161 | -0.491** | -0.586** | -0.562*** | -0.499* | 0.098 |
| | (0.288) | (0.222) | (0.245) | (0.224) | (0.183) | (0.283) | (1.587) |
| $\tilde{r}^{\text{pre}}_{i,2023\|2022}$ | 0.686*** | 0.786*** | 0.679*** | 0.637*** | 0.670*** | 0.669*** | 0.699 |
| | (0.150) | (0.194) | (0.143) | (0.158) | (0.132) | (0.131) | (0.589) |
| Uncertainty | | | | | | -0.092 | |
| | | | | | | (0.190) | |
| Treatment $\times\tilde{r}^{\text{pre}}_{i,2023\|2022}$ | | -0.386 | | | | | |
| | | (0.253) | | | | | |
| Treatment $\times$ $\tilde{\pi}^{\text{pre}}_{i,2023-2025\|2022}$ | | | 0.941** | 1.354* | 1.232*** | 0.933** | -0.357 |
| | | | (0.414) | (0.701) | (0.463) | (0.455) | (1.959) |
| Treatment $\times$ Uncertainty | | | | | | 0.887** | |
| | | | | | | (0.441) | |
| Constant | 5.396*** | 4.704*** | 4.724*** | 4.867*** | 4.918*** | 4.950*** | 3.818* |
| | (0.349) | (0.465) | (0.467) | (0.548) | (0.432) | (0.417) | (1.856) |
| Observations | 86 | 86 | 86 | 59 | 74 | 74 | 12 |
| Adjusted $R^2$ | 0.428 | 0.478 | 0.472 | 0.496 | 0.504 | 0.549 | 0.060 |
| Narratives | all | all | all | AF | AEF | AEF | B, Neutral |

**Notes:** In this Table, we exclude forecasters who did not choose one of the narratives. In Column (1), we report results of regressing return expectations after the treatment on demeaned pre-treatment long-term inflation expectations and demeaned return expectations for 2023. In Column (2), we report results of regressing return expectations after the treatment on pre-treatment demeaned long-term inflation expectations, the treatment dummy, demeaned return expectations for 2023, and the interaction of demeaned return expectations with the treatment dummy. The mean of $r^{\text{pre}}_{2023|2022}$ is 5.272%. In Column (3), we regress return expectations after the treatment on demeaned pre-treatment long-term inflation expectations, the treatment dummy, demeaned return expectations for 2023, and the interaction of demeaned long-term inflation expectations with the treatment dummy. Columns (4) to (7) report results of estimating the regression from Column (3) for different subsamples. Long-term inflation expectations (pre-treatment) $\tilde{\pi}^{\text{pre}}_{2023-2025|2022}$ are demeaned. The mean of $\pi^{\text{pre}}_{2023-2025}$ is 4.404%. In Column (6), we also include pre-treatment inflation uncertainty (difference between the upper and lower bound of the inflation 90% prediction interval). Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p < 0.01, **p < 0.05, *p < 0.1

**Table A.10:** Link between narratives and pre-treatment return expectations, using the upper and lower bounds of the 90% prediction interval for both the dependent and the independent variables.

| | (1) $r^{\text{lower-bound, pre}}_{i,2023\|2022}$ | (2) $r^{\text{lower-bound, pre}}_{i,2023\|2022}$ | (3) $r^{\text{lower-bound, pre}}_{i,2023\|2022}$ | (4) $r^{\text{upper-bound, pre}}_{i,2023\|2022}$ | (5) $r^{\text{upper-bound, pre}}_{i,2023\|2022}$ | (6) $r^{\text{upper-bound, pre}}_{i,2023\|2022}$ |
|---|---|---|---|---|---|---|
| Growth Optimist | -1.095 | -1.422 | -0.744 | -3.082** | -3.349** | -3.276** |
| | (3.296) | (3.273) | (3.036) | (1.449) | (1.548) | (1.389) |
| Growth Pessimist | -3.724* | -4.573** | -2.878 | -1.943 | -1.707 | -1.291 |
| | (2.016) | (1.866) | (2.007) | (1.452) | (1.316) | (1.303) |
| Inflation Pessimist | -4.167** | -2.792 | -2.057 | -0.844 | -2.002 | -1.446 |
| | (2.024) | (1.900) | (1.897) | (1.552) | (1.581) | (1.569) |
| Neutral | -4.357 | -4.097 | -1.718 | -0.216 | -0.822 | -1.471 |
| | (2.822) | (2.755) | (2.671) | (1.436) | (1.129) | (1.170) |
| $\pi^{\text{lower-bound, pre}}_{i,2023\|2022}$ | | 2.539*** | | | -1.401*** | |
| | | (0.519) | | | (0.287) | |
| $\pi^{\text{upper-bound, pre}}_{i,2023\|2022}$ | | -1.726*** | | | 1.216*** | |
| | | (0.516) | | | (0.245) | |
| $\pi^{\text{lower-bound, pre}}_{i,2023-2025\|2022}$ | | | 1.442** | | | -1.963*** |
| | | | (0.584) | | | (0.443) |
| $\pi^{\text{upper-bound, pre}}_{i,2023-2025\|2022}$ | | | -0.913*** | | | 0.499*** |
| | | | (0.339) | | | (0.177) |
| $y^{\text{lower-bound, pre}}_{i,2023\|2022}$ | | | 2.314*** | | | -0.578 |
| | | | (0.711) | | | (0.391) |
| $y^{\text{upper-bound, pre}}_{i,2023\|2022}$ | | | -0.537 | | | 0.278 |
| | | | (0.840) | | | (0.402) |
| Constant | 1.907 | 3.247 | 3.349 | 11.707*** | 9.276*** | 14.659*** |
| | (1.253) | (3.207) | (2.719) | (0.925) | (2.012) | (1.951) |
| Observations | 106 | 102 | 99 | 106 | 102 | 99 |
| Adjusted $R^2$ | 0.022 | 0.270 | 0.248 | -0.008 | 0.205 | 0.197 |

**Notes:** Columns (1)–(3) report OLS estimates from regressions of the lower bound of the 90% prediction interval for return expectations, measured before the treatment, on the narratives as well as the upper and lower bounds of the prediction intervals for inflation and growth expectations. Columns (4)–(6) present analogous regressions, but with the dependent variable being the upper bound of the 90% prediction interval for return expectations. Columns (2) and (5) control for the bounds of short-term inflation expectations, whereas Columns (3) and (6) control for the bounds of long-term inflation and growth expectations. All explanatory variables are measured prior to treatment. As in the main text, return expectations are trimmed at the 1% tails, which drops two forecasters. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1

**Table A.11:** Causal effect of information treatment on return expectations using the the pre-treatment prediction interval bounds.

| | (1) $r^{\text{post}}_{i,2023\|2022}$ | (2) $r^{\text{post}}_{i,2023\|2022}$ | (3) $r^{\text{post}}_{i,2023\|2022}$ | (4) $r^{\text{post}}_{i,2023\|2022}$ | (5) $r^{\text{post}}_{i,2023\|2022}$ | (6) $r^{\text{post}}_{i,2023\|2022}$ | (7) $r^{\text{post}}_{i,2023\|2022}$ | (8) $r^{\text{post}}_{i,2023\|2022}$ |
|---|---|---|---|---|---|---|---|---|
| $\pi^{\text{upper-bound, pre}}_{i,2023-2025\|2022}$ | -0.143 | | -0.129 | | | | | |
| | (0.162) | | (0.124) | | | | | |
| $\pi^{\text{lower-bound, pre}}_{i,2023-2025\|2022}$ | | 0.180 | | | | | | |
| | | (0.299) | | | | | | |
| $r^{\text{upper-bound, pre}}_{i,2023\|2022}$ | 0.380*** | 0.392*** | | 0.379*** | 0.154 | 0.263* | 0.210 | -0.146 |
| | (0.092) | (0.106) | | (0.087) | (0.119) | (0.152) | (0.151) | (0.302) |
| $r^{\text{lower-bound, pre}}_{i,2023\|2022}$ | 0.330*** | 0.340*** | | 0.332*** | 0.139 | 0.206* | 0.249** | 0.324 |
| | (0.081) | (0.076) | | (0.076) | (0.102) | (0.115) | (0.100) | (0.203) |
| Treatment | | | 1.280** | 1.285** | 2.251** | 1.262* | 1.612** | -0.565 |
| | | | (0.582) | (0.603) | (0.848) | (0.721) | (0.724) | (1.231) |
| $\tilde{r}^{\text{upper-bound, pre}}_{i,2023\|2022}$ | | | 0.321*** | | | | | |
| | | | (0.107) | | | | | |
| Treatment $\times \tilde{r}^{\text{upper-bound, pre}}_{i,2023\|2022}$ | | | 0.066 | | | | | |
| | | | (0.179) | | | | | |
| $\tilde{r}^{\text{lower-bound, pre}}_{i,2023\|2022}$ | | | 0.398*** | | | | | |
| | | | (0.096) | | | | | |
| Treatment $\times$ $\tilde{r}^{\text{lower-bound, pre}}_{i,2023\|2022}$ | | | -0.201 | | | | | |
| | | | (0.127) | | | | | |
| $\tilde{\pi}^{\text{upper-bound, pre}}_{i,2023-2025\|2022}$ | | | | -0.341** | -0.559** | -0.506** | -0.684** | 0.274 |
| | | | | (0.134) | (0.226) | (0.203) | (0.314) | (0.822) |
| Treatment $\times$ $\tilde{\pi}^{\text{upper-bound, pre}}_{i,2023-2025\|2022}$ | | | | 0.904*** | 1.137*** | 1.041*** | 0.851* | -0.425 |
| | | | | (0.292) | (0.334) | (0.340) | (0.461) | (0.925) |
| Uncertainty | | | | | | | 0.438 | |
| | | | | | | | (0.438) | |
| Treatment $\times$ Uncertainty | | | | | | | 0.489 | |
| | | | | | | | (0.569) | |
| Constant | 2.209 | 0.712 | 5.777*** | 0.852 | 3.272** | 1.904 | 2.466 | 6.834* |
| | (1.430) | (1.840) | (0.916) | (1.073) | (1.492) | (1.726) | (1.680) | (3.566) |
| Observations | 91 | 91 | 91 | 91 | 60 | 76 | 76 | 17 |
| Adjusted $R^2$ | 0.435 | 0.431 | 0.497 | 0.498 | 0.307 | 0.339 | 0.362 | 0.266 |
| Narratives | all | all | all | all | AF | AEF | AEF | B, Neutral |

**Notes:** In Column (1) and (2), we report results of regressing return expectations after the treatment on the upper-bound/lower-bound of pre-treatment long-term inflation expectations and the upper- and lower-bound of return expectations for 2023. In Column (3), we regress return expectations after the treatment on the upper-bound of pre-treatment long-term inflation expectations, the treatment dummy, the demeaned upper- and lower-bound of return expectations for 2023, and the interaction of demeaned upper- and lower-bound of return expectations with the treatment dummy. Columns (4) to (8) report results of regressing return expectations after the treatment on the pre-treatment bounds of the return expectations, the treatment dummy and the interaction of the treatment dummy with the demeaned upper-bound of pre-treatment inflation expectations for different subsamples. In Column (7), we also include pre-treatment inflation uncertainty (difference between the upper and lower bound of the inflation 90% prediction interval) The upper/lower bound of the prediction interval for pre-treatment long-term inflation expectations $\tilde{\pi}^{\text{upper, pre}}_{2023-2025}/\tilde{\pi}^{\text{lower, pre}}_{2023-2025}$ are demeaned. The mean of $\pi^{\text{upper, pre}}_{2023-2025}$ is 5.704%, the mean of $\pi^{\text{lower, pre}}_{2023-2025}$ is 3.103. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1

**Table A.12:** Regression where we winsorize post- and pre-treatment expectations at the 5% level.

| | (1) $\left\lvert\pi^{\text{post}}_{i,2023\lvert2022} - 7\right\rvert$ | (2) $\mathbf{1}\left\{\left\lvert\pi^{\text{post}}_{i,2023\lvert2022} - 7\right\rvert < \left\lvert\pi^{\text{pre}}_{i,2023\lvert2022} - 7\right\rvert\right\}$ | (3) $r^{\text{post}}_{i,2023\lvert2022}$ | (4) $r^{\text{post}}_{i,2023\lvert2022}$ | (5) $r^{\text{post}}_{i,2023\lvert2022}$ | (6) $r^{\text{post}}_{i,2023\lvert2022}$ | (7) $r^{\text{post}}_{i,2023\lvert2022}$ | (8) $r^{\text{post}}_{i,2023\lvert2022}$ | (9) $r^{\text{post}}_{i,2023\lvert2022}$ |
|---|---|---|---|---|---|---|---|---|---|
| Treatment | -0.389** | 0.217*** | | 1.049* | 0.992* | 1.445* | 1.048* | 1.235** | 0.934 |
| | (0.176) | (0.081) | | (0.544) | (0.532) | (0.773) | (0.586) | (0.586) | (1.489) |
| Distance Measure | | 0.039 | | | | | | | |
| | | (0.042) | | | | | | | |
| Treatment × Distance Measure | | 0.130** | | | | | | | |
| | | (0.063) | | | | | | | |
| $\tilde{r}^{\text{pre}}_{i,2023\lvert2022}$ | | | 0.775*** | 0.937*** | 0.758*** | 0.795*** | 0.804*** | 0.788*** | 0.654 |
| | | | (0.142) | (0.195) | (0.139) | (0.190) | (0.136) | (0.130) | (0.412) |
| Treatment × $\tilde{r}^{\text{pre}}_{i,2023\lvert2022}$ | | | | -0.451* | | | | | |
| | | | | (0.241) | | | | | |
| $\tilde{\pi}^{\text{pre}}_{i,2023-2025\lvert2022}$ | | | -0.091 | -0.129 | -0.643** | -0.619* | -0.613** | -0.551* | -0.461 |
| | | | (0.321) | (0.263) | (0.295) | (0.326) | (0.257) | (0.279) | (1.144) |
| Treatment × $\tilde{\pi}^{\text{pre}}_{i,2023-2025\lvert2022}$ | | | | | 1.153** | 1.480* | 1.448** | 1.136** | 0.384 |
| | | | | | (0.486) | (0.810) | (0.552) | (0.488) | (1.461) |
| Uncertainty | | | | | | | | -0.224 | |
| | | | | | | | | (0.196) | |
| Treatment × Uncertainty | | | | | | | | 0.896** | |
| | | | | | | | | (0.392) | |
| Constant | 1.385*** | 0.236*** | 5.394*** | 4.982*** | 4.918*** | 4.936*** | 4.982*** | 5.040*** | 4.533*** |
| | (0.134) | (0.055) | (0.292) | (0.368) | (0.373) | (0.488) | (0.389) | (0.377) | (1.148) |
| Observations | 121 | 121 | 91 | 91 | 91 | 59 | 74 | 74 | 17 |
| Adjusted $R^2$ | 0.031 | 0.096 | 0.460 | 0.505 | 0.496 | 0.529 | 0.541 | 0.577 | 0.146 |
| Narratives | all | all | all | all | all | AF | AEF | AEF | B, Neutral |

**Notes:** This Table reports the post-treatment results where we winsorize top and bottom 2.5% of the dependent variable and pre-treatment expectations. Columns (1) to (2) replicate Table 7 with the winsorized expectations. Column (1) reports OLS estimates of a regression of the absolute deviation from the 7% mentioned in the treatment on the treatment dummy and a constant. Column (2) presents results of a linear probability model where the dependent variable is equal to one if $\left\lvert\pi^{\text{post}}_{i,2023\lvert2022} - 7\right\rvert < \left\lvert\pi^{\text{pre}}_{i,2023\lvert2022} - 7\right\rvert$, and zero otherwise. We regress the outcome variable on the treatment, a demeaned distance measure $\widetilde{\max}\left\{\left\lvert 7 - \pi^{\text{lower-bound, pre}}_{i,2023\lvert2022}\right\rvert; \left\lvert\pi^{\text{upper-bound, pre}}_{i,2023\lvert2022} - 7\right\rvert\right\}$ that measures how far away from the value of 7% the forecaster was before the treatment, and their interaction. Columns (3) to (9) replicate Table 8 with the winsorized expectations. In Column (3), we report results of regressing return expectations after the treatment on demeaned pre-treatment long-term inflation expectations and demeaned return expectations for 2023. In Column (4), we additionally include the treatment and the interaction of pre-treatment return expectations with the treatment. In Columns (5) to (9), we regress return expectations after the treatment on pre-treatment long-term inflation expectations, the treatment dummy, demeaned return expectations for 2023, and the interaction of demeaned return expectations with the treatment dummy for different subsamples. Column (8) additionally includes pre-treatment uncertainty. The mean of the winsorized $r^{\text{pre}}_{2023\lvert2022}$ is 5.12%. Columns (6) to (9) report results of estimating the regression from Column (5) for different subsamples. Long-term inflation expectations (pre-treatment) $\tilde{\pi}^{\text{pre}}_{2023-2025\lvert2022}$ are demeaned. The mean of the winsorized $\pi^{\text{pre}}_{2023-2025}$ is 4.467%. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p < 0.01, **p < 0.05, *p < 0.1

**Table A.13:** Link between inflation and return expectations before treatment when using short-term inflation expectations.

| | Panel A: December 2022 (pre-treatment) | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ | $r^{\text{pre}}_{i,2023\|2022}$ |
| $\pi^{\text{pre}}_{i,2023\|2022}$ | 0.123 | -0.222 | -0.082 | -0.106 | 0.053 | 0.886 |
| | (0.252) | (0.312) | (0.338) | (0.287) | (0.309) | (0.530) |
| $y^{\text{pre}}_{i,2023\|2022}$ | 0.976*** | 0.857* | 0.677 | 0.911** | 0.639* | 1.133* |
| | (0.360) | (0.457) | (0.417) | (0.427) | (0.381) | (0.547) |
| Inflation Optimist | | | 2.070** | | 2.302*** | |
| | | | (0.915) | | (0.847) | |
| Constant | 4.198** | 6.915*** | 4.870* | 5.853*** | 3.832* | -1.432 |
| | (1.755) | (2.103) | (2.445) | (1.950) | (2.196) | (3.980) |
| Observations | 100 | 65 | 65 | 81 | 81 | 19 |
| Adjusted $R^2$ | 0.063 | 0.049 | 0.098 | 0.052 | 0.124 | 0.152 |
| Narratives | all | AF | AF | AEF | AEF | B, Neutral |

| | Panel B: Combination of three survey waves | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ | $r_{i,t+12\|t}$ |
| $\pi_{i,t+12\|t}$ | -0.234 | -0.375** | -0.310* | -0.399** | -0.328* | 0.089 |
| | (0.142) | (0.171) | (0.177) | (0.178) | (0.182) | (0.284) |
| $y_{i,t+12\|t}$ | 1.444*** | 1.306*** | 1.106*** | 1.398*** | 1.127*** | 1.477*** |
| | (0.258) | (0.323) | (0.309) | (0.319) | (0.300) | (0.416) |
| April 2023 | -3.560*** | -3.140*** | -3.011*** | -3.685*** | -3.463*** | -3.055** |
| | (0.657) | (0.734) | (0.730) | (0.760) | (0.741) | (1.346) |
| September 2023 | -1.995*** | -2.395*** | -2.351*** | -2.429*** | -2.340*** | -1.039 |
| | (0.605) | (0.637) | (0.620) | (0.674) | (0.648) | (1.358) |
| Inflation Optimist | | | 1.615*** | | 1.901*** | |
| | | | (0.552) | | (0.510) | |
| Constant | 6.318*** | 7.649*** | 6.371*** | 7.536*** | 6.280*** | 3.649 |
| | (1.028) | (1.194) | (1.291) | (1.240) | (1.290) | (2.191) |
| Observations | 313 | 189 | 189 | 236 | 236 | 77 |
| Adjusted $R^2$ | 0.145 | 0.143 | 0.177 | 0.139 | 0.182 | 0.123 |
| Narratives | all | AF | AF | AEF | AEF | B, Neutral |

**Notes:** Columns (1) to (6) present OLS estimates from regressions of return expectations for the next twelve months before the treatment on growth expectations and short-term inflation expectations for the next twelve months for different samples based on the different narratives. In Panel A, we only include answers from the December 2022 wave, and in Panel B, we also include the surveys from April and September 2023. The narratives used for December 2022 and April 2023 are the narratives elicited in December 2022, and in September 2023, we use the narratives elicited in September 2023. The regressions in Panel B include time-fixed effects. Numbers in parentheses are heteroskedasticity robust standard errors (Eicker-Huber-White). Notation: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1

# B Additional Figures

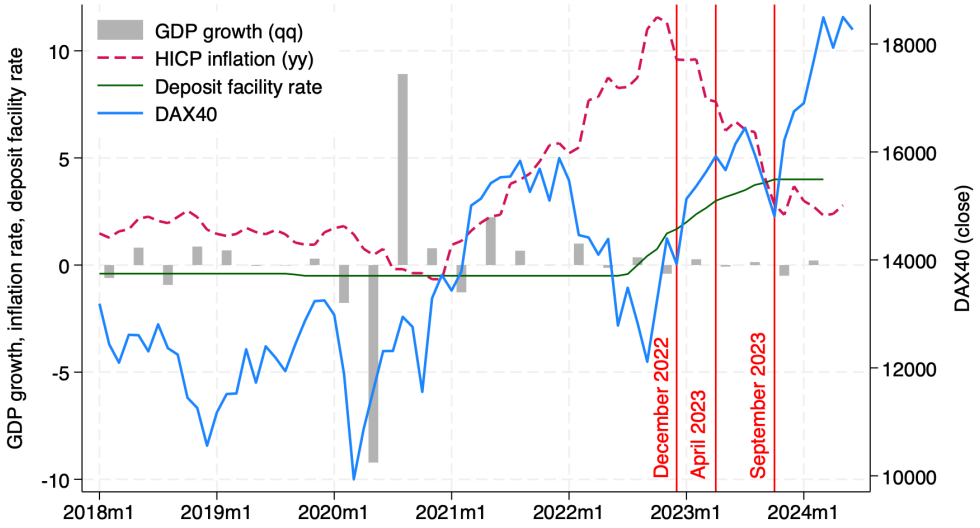



**Figure A.1:** This figure plots the trajectory of HICP inflation (year-on-year) and GDP growth (quarter-on-quarter) in Germany, the ECB deposit facility rate (left axis), and the DAX40 (right axis) around our survey period. The data was obtained from Deutsche Bundesbank and YahooFinance. The red lines present the time our survey experiment (December 2022) and the two follow-up surveys were conducted.

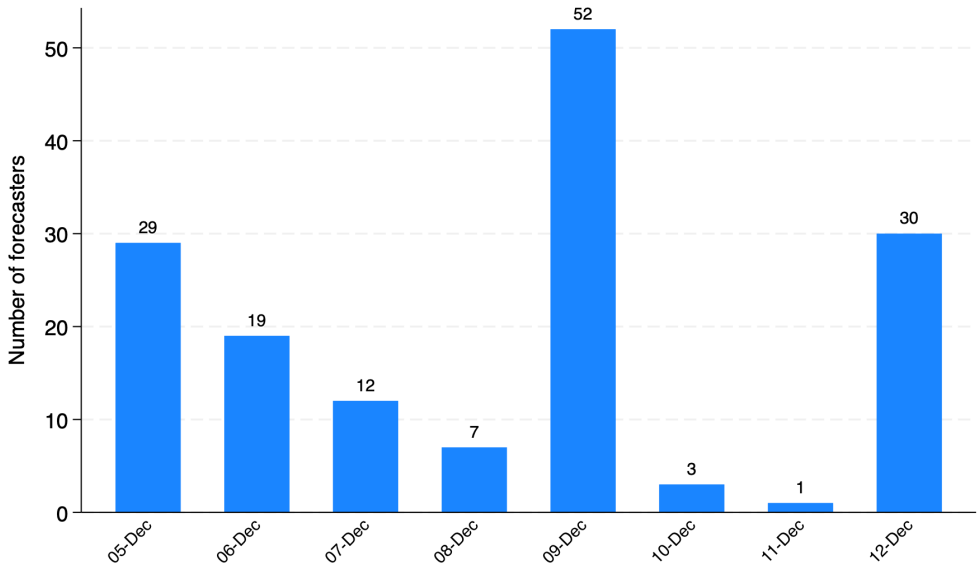



**Figure A.2:** Distribution of submission dates for the December 2022 wave.

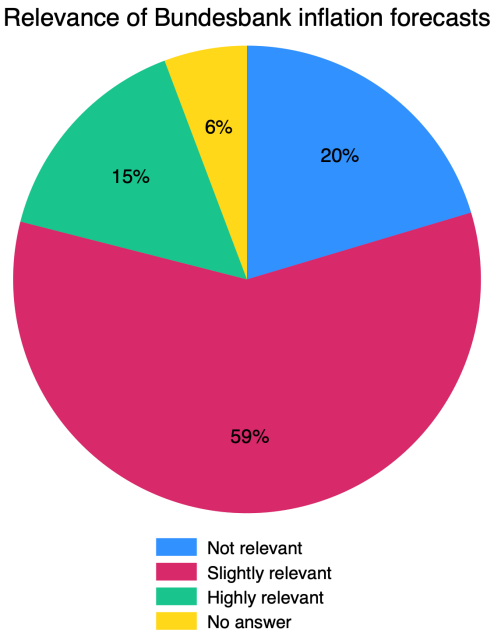



**Figure A.3:** Pie chart about the importance of the Bundesbank inflation forecasts for the expectation formation process (December 2022).

# C Questions in the ZEW Survey

In this section, we provide the questions asked to the financial market professionals in the ZEW Survey. All participants used the online version of the questionnaire. The participants were able to choose between the English and German questionnaire, the German questionnaire is available upon request.

## C.1 Core Questionnaire (in 2022)

We use the following questions from the Core questionnaire throughout our paper:

(6b) Six months ahead, I expect the DAX to stand at [....] points.

(S1) Point forecast of the annual inflation rate in the euro area (annual average change of the HICP, in percent):

| Year | 2022 | 2023 | 2024 |
|---|---|---|---|
| Forecast | [....] % | [....] % | [....] % |

(S1) Point forecast of the growth rate of the German GDP: For the yearly values, please indicate the annual real GDP growth rate.

| Year | 2022 | 2023 | 2024 |
|---|---|---|---|
| Forecast | [....] % | [....] % | [....] % |

## C.2 Special Survey Questions in November 2022

(4) How do current developments of inflation affect your assessment of the return-risk profile of the DAX for the year 2023?

| strongly positive | slightly positive | neutral | slightly negative | strongly negative | don't know |
|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

(5) Please describe briefly in full sentences via which mechanisms inflation affects the return-risk profile of the DAX for the year 2023 or why you see no relationship. [....]

## C.3 Special Survey Questions in December 2022

Dear financial market expert, at the end of 2022, we would like to ask you more detailed questions than usual about your outlook for the German economy, inflation trends in Germany, and the performance of the DAX as part of our special questions section. We will make the results available to you in a particularly detailed form in our Financial Market Report. Thank you for your participation.

### C.3.1 Questions Before the Treatment

1. With a probability of 90 per cent, the annual inflation rate in Germany (annual average change of the HICP, in percent) and the annual growth rate of real German GDP for the year 2023 and the years between 2023 and 2025 will lie between the following values:

| | Lower bound of the 90 percent confidence interval | Upper bound of the 90 percent confidence interval | No estimate |
|---|---|---|---|
| Inflation rate, Germany, 2023 | [....] | [....] | ☐ |
| Avg. annual inflation rate, Germany per year, 2023-2025 | [....] | [....] | ☐ |
| Growth rate of annual real German GDP, 2023 | [....] | [....] | ☐ |

2. With a probability of 90 percent, the annual return of the DAX for the year 2023 and the years between 2023 and 2025 will lie between the following values:
   Note: Between 2011 and 2021, the average annual DAX return was 8.9 percent with a standard deviation of 14.7 percent.

| | Lower bound of the 90 percent confidence interval | Upper bound of the 90 percent confidence interval | No estimate |
|---|---|---|---|
| DAX return, 2023 | [....] | [....] | ☐ |
| Average annual DAX return per year, 2023 – 2025 | [....] | [....] | ☐ |

3. Do you agree or disagree with the following statements about the relationship between the developments of inflation and the return-risk profile of the DAX in 2023?

| | Strongly agree | Agree | Undecided | Disagree | Strongly disagree | No answer |
|---|---|---|---|---|---|---|
| An easing in the development of inflation, a less restrictive monetary stance by the ECB, and diminishing recession risks have a *positive* impact on the return-risk profile in 2023. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| DAX companies will continue to succeed in passing on rising costs to their customers. The profit margins of DAX companies will, therefore, remain unchanged or even increase, which has a *positive* impact on the return-risk profile of the DAX in 2023. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| The development of inflation does not impact the return-risk profile of the DAX. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Positive and negative effects of inflation cancel each other out. Overall, the development of inflation is neutral for the return-risk profile of the DAX in 2023. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| DAX companies will not succeed in passing on rising costs to their customers. The profit margins of DAX companies will, therefore, decrease, which has a *negative* impact on the return-risk profile of the DAX in 2023. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Persistently high inflation rates, further interest rate hikes by the ECB, and increasing recession risks will have a *negative* impact on the return-risk profile of the DAX in 2023. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

4. From the following statements, please select the one that, in your opinion, best reflects the relationship between the development of inflation and the return-risk profile of the DAX in 2023:

   A An easing in the development of inflation, a less restrictive monetary stance by the ECB, and diminishing recession risks have a *positive* impact on the return-risk profile in 2023.

   B DAX companies will continue to succeed in passing on rising costs to their customers. The profit margins of DAX companies will, therefore, remain unchanged or even increase, which has a *positive* impact on the return-risk profile of the DAX in 2023.

   C The development of inflation does not impact the return-risk profile of the DAX.

   D *Positive* and *negative* effects of inflation cancel each other out. Overall, the development of inflation is *neutral* for the return-risk profile of the DAX in 2023.

   E DAX companies will not succeed in passing on rising costs to their customers. The profit margins of DAX companies will, therefore, decrease, which has a *negative* impact on the return-risk profile of the DAX in 2023.

   F Persistently high inflation rates, further interest rate hikes by the ECB, and increasing recession risks will have a *negative* impact on the return-risk profile of the DAX in 2023.

5. My expectations with respect to the following areas are mainly based on

| | My own analyses | Analyses by experts in my company | Analyses from external sources | No answer |
|---|---|---|---|---|
| Inflation, Germany | ☐ | ☐ | ☐ | ☐ |
| Developments of the DAX | ☐ | ☐ | ☐ | ☐ |

6. How relevant are the inflation forecasts of Bundesbank for your own inflation forecasts for Germany?

| Not relevant | Slightly relevant | Highly relevant | No answer |
|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ |

### C.3.2 Questions After the Information Treatment

6. I expect the growth rate of annual real German GDP in **2023** to come in at [....] percent.

7. My forecast for the annual inflation rate in Germany (annual average change of the HICP, in percent) in 2023 is [....] percent.

8. For the year 2023, what are your forecasts for the return of the DAX and volatility of the DAX (standard deviation of the annual DAX returns)?

| | Point forecast in percent | No estimate |
|---|---|---|
| DAX return, 2023 | [....] | [....] |
| DAX volatility, 2023 | [....] | [....] |

10. Assume that on January 1, 2023 you invest 1 million euros over the next twelve months in a portfolio consisting of the DAX and a risk-free investment with an annual interest rate of 2 percent. What proportion would you personally invest in the DAX in the current situation? Share DAX: [....] percent

## C.4 Questions Contributed in April 2023

Special questions: Inflation, GDP growth and DAX returns

1. Looking ahead 12 and 36 months, what are your forecasts for the annual inflation rate for Germany?

| | Point forecast in percent | No estimate |
|---|---|---|
| Inflation rate in 12 months (HICP April 2024 vs. HICP April 2023) | [....] | ☐ |
| Average inflation rate over the next 36 months (HICP April 2026 vs. HICP April 2023) | [....] | ☐ |

2. Looking ahead 12 months, what are your forecasts for the annual growth rate of German real GDP and the return on the DAX?

| | Point forecast in percent | No estimate |
|---|---|---|
| German real GDP growth in 12 months (GDP Q1 2024 vs. GDP Q1 2023) | [....] | ☐ |
| Return of the DAX over the next 12 months (DAX April 2024 vs. DAX April 2023) | [....] | ☐ |

## C.5 Questions Contributed in September 2023

Special questions: Inflation, GDP growth and DAX returns

1. Looking ahead 12 and 36 months, what are your forecasts for the annual inflation rate for Germany?

| | Point forecast in percent | No estimate |
|---|---|---|
| Inflation rate in 12 months (HICP September 2024 vs. HICP September 2023) | [....] | ☐ |
| Average inflation rate over the next 36 months (HICP September 2026 vs. HICP September 2023) | [....] | ☐ |

2. Looking ahead 12 months, what are your forecasts for the annual growth rate of German real GDP and the return on the DAX?

| | Point forecast in percent | No estimate |
|---|---|---|
| German real GDP growth in 12 months (GDP Q3 2024 vs. GDP Q3 2023) | [....] | ☐ |
| Return of the DAX over the next 12 months (DAX September 2024 vs. DAX September 2023) | [....] | ☐ |

3. From the following statements, please select the one that, in your opinion, best reflects the relationship between the development of inflation and the return-risk profile of the DAX over the next 12 months:

   A An easing in the development of inflation, a less restrictive monetary stance by the ECB, and diminishing recession risks have a *positive* impact on the return-risk profile of the DAX.

   B DAX companies will continue to succeed in passing on rising costs to their customers. The profit margins of DAX companies will, therefore, remain unchanged or even increase, which has a *positive* impact on the return-risk profile of the DAX.

   C The development of inflation does not impact the return-risk profile of the DAX.

   D *Positive* and *negative* effects of inflation cancel each other out. Overall, the development of inflation is *neutral* for the return-risk profile of the DAX.

   E DAX companies will not succeed in passing on rising costs to their customers. The profit margins of DAX companies will, therefore, decrease, which has a *negative* impact on the return-risk profile of the DAX.

   F Persistently high inflation rates, further interest rate hikes by the ECB, and increasing recession risks will have a *negative* impact on the return-risk profile of the DAX.