The Overdelivery Premium: When Monetary Policy Decisions Exceed Market Expectations

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Abstract

A large literature identifies the effects of monetary policy through monetary policy surprises. This paper tests whether these effects differ when the central bank decision exceeds market expectations (it "overdelivers") or falls short of them (it "underdelivers"). Using a panel dataset of 14 advanced economies over three decades, we document a robust "overdelivery premium": overdelivery surprises exert much stronger effects on financial markets, especially for short-maturity interest rates. We explore the channels behind this premium, finding evidence that it is linked to revisions in macroeconomic expectations of private agents. Following an overdelivery tightening, forecasters revise down GDP growth and raise inflation and unemployment projections, whereas underdelivery tightening generates revisions of the opposite sign. This pattern is consistent with overdelivery surprises reflecting central bank information effects, while underdelivery surprises behave like standard monetary policy shocks. In contrast, overdelivery does not appear to shift perceptions of the central bank's reaction function differently than underdelivery. We also show that this asymmetry is specific to monetary policy and does not extend to macroeconomic data surprises, suggesting the premium is not driven by behavioral mechanisms such as reference-dependent utility.

JEL classification: E52, E44, D84.

Keywords: Monetary policy identification, Central bank information effects, Perceived reaction function, Policy rate expectations.

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1 Introduction

A central principle of monetary policy identification is that market surprises, defined as changes in policy expectations around policy announcements, provide the exogenous variation needed for causal inference about monetary transmission. Yet two monetary surprises of identical magnitude can arise from fundamentally different situations. Consider two scenarios in which financial markets experience a 25 basis points (bp) tightening surprise: in the first, the central bank raises rates by 50 bp when markets expected 25 bp, whereas in the second, the central bank reduces rates by 25 bp when markets expected a 50 bp cut. This is not specific to tightening surprises, equivalent scenarios can be imagined for easing surprises. While conventional measures treat these surprises as equivalent, they originate from distinct decision settings (Hamilton and Jordà 2002). In the first, the decision exceeds market expectations, the central bank "overdelivers", whereas in the second, the decision falls short of expectations, so the central bank "underdelivers". Standard macroeconomic models and the empirical literature typically assume that both over- and underdelivery surprises are the same and have a similar impact. Only the surprise component matters, regardless of its direction relative to expectations. This paper investigates whether this distinction matters for asset price responses and, if so, why.

The conceptual motivation for distinguishing over- from underdelivery rests on the information content of central bank decisions. When a central bank overdelivers, the policy action and the surprise move in the same direction, potentially signaling more pronounced economic conditions (Nakamura and Steinsson 2018) or a greater policy response (Bauer et al. 2024). In contrast, when a central bank underdelivers, the policy action and the surprise move in opposite directions, which may reflect either policy caution, disagreement in the committee, changes in the reaction function, or different views of the economic outlook. These distinct configurations could carry different informational signals. Understanding whether investors respond differently to these two types of surprises has important implications for how we interpret monetary policy surprises and their effects on asset prices.

Identifying over- versus underdelivery presents several empirical challenges. First, as monetary policy decisions are generally well anticipated by markets, the number of over- or underdelivery surprises is likely to be small in each economy. This scarcity calls for a cross-country panel approach to achieve sufficient statistical power. Second, the standard approach to measuring monetary surprises using high-frequency changes in policy expectations captures the surprise component of the policy rate but also of additional monetary policy instruments, signals about the future policy path, and term and risk premia. This approach cannot isolate whether the policy rate moved further or not than expected and therefore does not enable categorizing over- or underdelivery. The most relevant alternative measure that would be required for this purpose, futures-based measures of current decision surprises, is available with sufficient history only for the United States and the euro area. For these reasons, we turn to survey-based measures of expectations, specifically the Bloomberg survey of economists, which provides cross-country comparable policy rate forecasts collected shortly before each monetary policy meeting.

Our empirical strategy combines this survey-based expectation measure with a standard event-study framework in a panel of 14 advanced economies over the period 1997-2023. We classify each monetary policy decision as overdelivery, underdelivery, or "as expected" based on whether the policy rate change exceeds, falls short of, or matches the expected change. We then construct cor-

responding monetary surprises, the difference between the realized and expected policy rate, and estimate their effects on a range of asset prices, including short- and long-term interest rates, and stock prices. The use of Bloomberg survey expectations offers three advantages: the surveys are conducted systematically across countries using a comparable methodology, over a long sample, and they capture market expectations of the policy rate, enabling a clear classification of over- and underdelivery decisions.

Our analysis reveals that 18% of decisions are classified as overdelivery decisions and 20% as underdelivery, with the rest representing fully anticipated decisions. These surprises are distributed across countries and time, across positive and negative policy rate changes and across different magnitudes of adjustment.

The central result of this paper is, using panel or individual country dimensions, that overdelivery surprises generate much stronger responses than underdelivery surprises of comparable magnitude. This difference, which we label the "overdelivery premium", is statistically significant and large: for short-maturity interest rates, a one percentage point overdelivery tightening surprise increases rates by around 0.9 percentage points, while an equivalent underdelivery tightening surprise has an effect of around 0.1 percentage points. The premium is most pronounced for short maturities (one-month to one-year rates) and diminishes for longer-term yields, suggesting that over- or underdelivery conveys information primarily about near-term policy intentions.

This overdelivery premium is robust to various measurements and specifications. Crucially, the premium appears symmetrically for tightening and easing decisions: it is not driven by the sign of surprises. The overdelivery premium is also robust to when both the classification and the surprise measure are constructed from high-frequency intraday current-decision surprises, using US and euro area data. Finally, local projections show that the initial overdelivery premium persists for several days without reversal.

Three potential channels could explain the overdelivery premium. First, over- and underdelivery may lead investors to update their beliefs differently about the parameters of the central bank's reaction function. Second, the two types of surprises may carry different information about the central bank's views of current and future economic conditions, a phenomenon known as central bank information effects. Third, market participants may exhibit reference-dependent preferences (Kahneman and Tversky 1979) whereby outcomes are evaluated relative to a reference point (prior expectations), leading them to overreact when central bank decisions exceed expectations but underreact when decisions fall short.

To distinguish among these channels, we implement three separate tests. First, we estimate perceived central bank reaction functions at the forecaster level using cross-sectional regressions of interest rate expectations on inflation and output forecasts from Consensus Economics data (following Bauer et al. 2024), and we examine whether monetary policy surprises lead to revisions in the perceived intercept, smoothing parameter, or responsiveness to inflation or output. Second, we analyze how over- and underdelivery surprises affect professional forecasters' macroeconomic forecasts of inflation, unemployment and GDP growth using Bloomberg and Consensus Economics data. If overdelivery surprises convey signals that the central bank views economic conditions as more pronounced than markets believed, we should observe forecast revisions that move in the opposite direction to what standard monetary policy transmission would predict. Third, to assess whether the overdelivery premium reflects a general behavioral phenomenon of

reference-dependent reactions to news, we examine asset price responses to the surprise component contained in macroeconomic data releases (inflation, industrial production, GDP, unemployment) based on Bloomberg data, and test whether "overdelivery" of macroeconomic news (i.e. data releases that exceed expectations) also generates stronger market reactions.

Estimates from these tests point toward central bank information effects as the primary explanation for the overdelivery premium. Overdelivery surprises lead to significant revisions in macroeconomic forecasts in directions consistent with information effects: a tightening overdelivery surprise raises inflation forecasts and lowers unemployment forecasts, while an easing overdelivery surprise has the opposite effects. In contrast, underdelivery surprises generate forecast revisions consistent with standard monetary policy transmission: tightening surprises lower inflation and raise unemployment forecasts, and so only for longer forecasting horizons. The differential forecast responses are particularly strong for inflation, where overdelivery tightening surprises increase one-year-ahead inflation forecasts by 0.76 percentage points, while underdelivery tightening surprises decrease them by 0.14 percentage points. These patterns suggest that in the case of an overdelivery tightening, investors infer that the central bank views economic conditions as justifying a more restrictive policy stance, and they update their economic outlook accordingly.

When measuring perceived reaction functions, we find that overdelivery surprises lead to upward revisions in the estimated intercept (the neutral rate) but neither significantly affect the estimated policy responsiveness to inflation or output, nor the perceived smoothing parameter. This pattern suggests that overdelivery conveys information about the level of appropriate policy, consistent with signals about the central bank's assessment of economic conditions.

Finally, we find no evidence of an overdelivery premium for macroeconomic data releases: over- and underdelivery of macroeconomic news generate statistically similar interest rate responses. This result rules out the reference-dependent utility explanation and suggests that the overdelivery premium is specific to monetary policy.

One potential interpretation of these findings is that overdelivery provides clearer signals of the central bank's views than underdelivery. Central banks usually implement policy changes gradually and often signal their intentions in advance through speeches, minutes, and forward guidance. When a central bank overdelivers, this suggests that both, economic conditions have evolved more rapidly than anticipated, and policymakers have confidence in the need for policy adjustment. In contrast, underdelivery could reflect either policy caution, uncertainty about the economy, preferences for policy smoothing or internal committee disagreement. The multiplicity of interpretations creates a signal extraction problem making the information content more ambiguous and leading to weaker market reactions.

This paper makes two contributions. First, it documents a novel empirical regularity in monetary policy transmission: overdelivery surprises have stronger effects on interest rates than underdelivery surprises, particularly at short horizons. Second, the paper provides evidence on when and why central bank information effects may emerge. Various works have established that monetary policy announcements can convey information about the central bank's views about the economic outlook (Ellingsen and Söderström 2001, Campbell et al. 2012, Nakamura and Steinsson 2018, Jarociński and Karadi 2020, Miranda-Agrippino and Ricco 2021).[1] Yet, recent works chal-

[1]See also Cieslak and Schrimpf (2019), Lakdawala and Schaffer (2019), Lunsford (2020), Kerssenfischer (2022), Golez and Matthies (2025) and Pelin (2025).

lenge the existence and regularity of these information effects (Karnaukh and Vokata 2022, Bauer and Swanson 2023, Hoesch et al. 2023).[2] Despite the prominence of this debate, there is limited understanding of which features of policy decisions can be associated with information effects. Our results reconcile earlier findings and suggest that such information effects may be present but are restricted to overdelivery episodes, while underdelivery generates responses consistent with standard monetary policy transmission. This distinction helps clarify the conditions under which central bank decisions are most likely to shape market beliefs about economic fundamentals.

The closest paper to ours is Hamilton and Jordà (2002), who use a nonlinear hazard model of the federal funds rate target to show that an unexpected policy tightening and not delivering an anticipated easing have different effects on macroeconomic forecasts, an asymmetry masked in standard linear VARs. Their focus is on modeling the policy decision process itself and on how the *source* of a forecast error affects macroeconomic predictions. In contrast, our contribution lies in documenting heterogeneous asset-price reactions: they are dramatically stronger when central banks overdeliver relative to expectations and linking it to information effects. Whereas their seminal work emphasizes nonlinearities in the policy rule, we show that nonlinearities arise in the transmission of monetary policy surprises.

Our paper complements the large literature on the identification of monetary policy (Romer and Romer 2004, Ramey 2016). Seminal studies such as Cook and Hahn (1989), Krueger and Kuttner (1996), Kuttner (2001), Cochrane and Piazzesi (2002), Bernanke and Kuttner (2005), Gürkaynak et al. (2005a), along with more recent contributions including Gertler and Karadi (2015), Altavilla et al. (2019), Wolf (2020) and Swanson (2021), have focused on measuring the unexpected component of policy decisions using market-based surprises.[3] Our contribution is to show that not all surprises of a given size are equivalent: their effects depend critically on whether they arise from the central bank exceeding or falling short of expectations. Standard identification strategies confound two different types of shocks. Our findings suggest that future works on monetary policy transmission may benefit from incorporating the over- and underdelivery distinction when using monetary surprises.

This paper also contributes to the literature documenting heterogeneous effects of monetary policy related to the sign of policy changes (Cover 1992, Weise 1999, Tenreyro and Thwaites 2016, Adrian et al. 2024, Hubert and Portier 2025), the magnitude of shocks (Angrist et al. 2018, Ascari and Haber 2022), and the environment (Olivei and Tenreyro 2007, Paul 2020, Alpanda et al. 2021, Berger et al. 2021, Eichenbaum et al. 2022, Amodeo 2026). Our results introduce a new dimension of heterogeneity: over- and underdelivery depends on the interaction between the policy action and prior expectations. This distinction generates large differences in the monetary transmission even after controlling for the sign, size, and economic context of policy decisions. Understanding this dimension of heterogeneity is essential for assessing the effects of monetary policy.

[2]The debate remains active, with several recent works further exploring central bank information effects (Jarociński and Karadi 2025, Ricco and Savini 2025, Miranda-Agrippino and Williams 2026).

[3]See also Rigobon and Sack (2004), D'Amico and Farka (2011), Barakchian and Crowe (2013), Acosta (2024), Boehm and Kroner (2024), Aruoba and Drechsel (2024), Acosta et al. (2025), Hack et al. (2025).

2 Over- and underdelivery monetary policy surprises

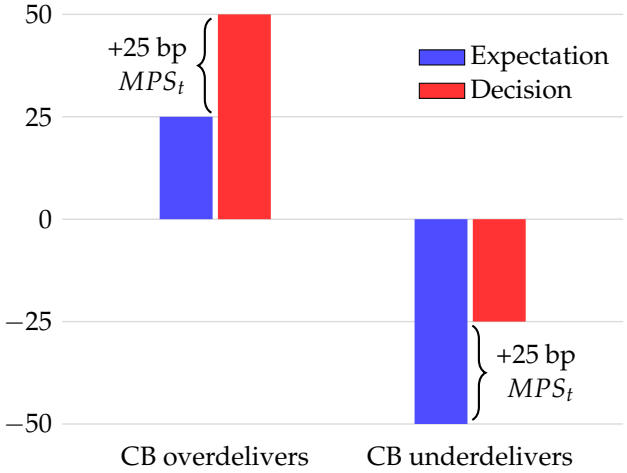
2.1 Categorizing surprise types

Central to our analysis is the distinction between "overdelivery" and "underdelivery" monetary policy surprises. We define a monetary policy surprise as overdelivery when the central bank's action exceeds what investors anticipated in terms of magnitude, regardless of the direction of the policy change. Conversely, underdelivery surprises occur when the central bank's action falls short of market expectations.

To illustrate this distinction, consider two scenarios in which financial markets experience an identical 25 bp tightening surprise. In the first scenario, the central bank raises rates by 50 bp when markets expected 25 bp such that the decision and the surprise move in the same direction. In the second scenario, the central bank reduces rates by 25 bp when markets expected a 50 bp cut. In this case, the decision and the surprise move in opposite directions. While conventional measures of monetary policy surprises would treat these two events as equivalent (both generating a +25 bp tightening surprise), they originate from fundamentally different decision environments. The first represents overdelivery: the policy action reinforces and exceeds expectations. The second represents underdelivery: the policy action falls short of expectations.

Figure 1 illustrates this conceptual distinction graphically. The left panel shows an overdelivery scenario where the decision exceeds expectations by moving further in the anticipated direction. The right panel shows an underdelivery scenario where the decision falls short of expectations, moving less than anticipated. Three comments are worth making. First, while this example involves 50 bp (expected) changes, over- and underdelivery are not restricted to large (expected) adjustments. Second, overdelivery can occur from an expected status quo, just as underdelivery can arise from a status quo decision. Third, while our representation is intentionally schematic, the average magnitude of monetary policy surprises in our sample is approximately 3 bp.

Figure 1: Over/underdelivery monetary policy surprises



Formally, let $\mathbb{E}_{t-j}[r_m]$ denote the market expectation of the policy rate change at meeting m formed at day $t-j$, where j represents the number of days between the expectation formation and the policy announcement. Let r_m represent the actual policy rate announced at meeting m on

day t and r_{m-1} the policy rate from the previous meeting $m-1$. We define overdelivery and underdelivery monetary policy surprises as the difference between the realized and expected policy rate change (Rudebusch 1998):

$$MPS_t^{More} = \begin{cases} r_m - \mathbb{E}_{t-j}[r_m] & \text{if } |\Delta r_m| > |\mathbb{E}_{t-j}[r_m] - r_{m-1}| \\ 0 & \text{otherwise} \end{cases}$$

$$MPS_t^{Less} = \begin{cases} r_m - \mathbb{E}_{t-j}[r_m] & \text{if } |\Delta r_m| < |\mathbb{E}_{t-j}[r_m] - r_{m-1}| \\ 0 & \text{otherwise} \end{cases}$$

where $\Delta r_m = r_m - r_{m-1}$ represents the actual change in the policy rate at meeting m. The classification hinges on comparing the absolute magnitude of the actual policy rate change to the absolute magnitude of the expected change. When the central bank moves the policy rate by more than the market anticipated ($\Delta r_m > \mathbb{E}_{t-j}[r_m] - r_{m-1}$ when $\mathbb{E}_{t-j}[r_m] - r_{m-1} > 0$, or conversely $\Delta r_m < \mathbb{E}_{t-j}[r_m] - r_{m-1}$ when $\mathbb{E}_{t-j}[r_m] - r_{m-1} < 0$), we classify this as overdelivery and assign the surprise to MPS_t^{More}.[4] When the central bank moves by less than anticipated, we classify this as underdelivery and assign the surprise to MPS_t^{Less}. Importantly, this classification is independent of the sign of the surprise: both positive (tightening) and negative (easing) surprises can be either overdelivery or underdelivery events.

A special case arises when the central bank maintains the status quo (no rate change) but financial markets had expected a change. These events are classified as underdelivery, since the actual decision ($\Delta r_m = 0$) necessarily falls short in magnitude of any non-zero expected change ($|\mathbb{E}_{t-j}[r_m] - r_{m-1}| > 0$). This classification is consistent with our conceptual framework: a status quo decision when change was expected represents the central bank doing less than anticipated.

2.2 Bloomberg monetary policy surprises

We construct our monetary policy surprise measures using Bloomberg survey data, which captures market participants' expectations of central bank policy rate decisions. The Bloomberg survey polls a panel of professional forecasters, including analysts from investment banks, asset managers, and economic research institutions, asking them to predict the level of the policy rate that will be announced at the upcoming monetary policy meeting. Surveys are typically conducted in the week prior to each policy announcement, with response deadlines generally set a few days before the meeting. For each meeting, Bloomberg reports the mean and median expectation, as well as the distribution of forecasts (including the high, low, and number of respondents).

Our approach builds on the established literature that uses the difference between actual policy decisions and prior market expectations to identify monetary policy surprises (Kuttner 2001, Gürkaynak et al. 2005a). The key advantage of Bloomberg survey data for our purposes is threefold. First, the surveys are conducted systematically across countries using a comparable methodology, enabling us to construct a balanced panel of policy surprises for multiple economies. Second, the surveys directly elicit expectations about the level of the policy rate decision, not expectations about futures prices or other derivative instruments, which allows us to cleanly identify

[4] We observe no instances where the actual and the expected rate change have the opposite sign, that is, no cases where markets expected a rate hike but the central bank cut rates, or vice versa. Accordingly, for brevity we can write the definitions of MPS_t^{More} and MPS_t^{Less} using absolute values.

whether the central bank exceeded or fell short of expectations in terms of the actual policy instrument. Third, Bloomberg surveys have sufficient historical coverage to provide meaningful sample sizes for our analysis, spanning three decades for major economies.

We validate the relevance of these Bloomberg-based surprises by documenting their impact on asset prices. Table 1 reports results from estimating:

$$\Delta Y_{c,t} = \alpha + \beta \cdot MPS_{c,t} + \gamma_c + \gamma_{year} + \epsilon_{c,t} \tag{1}$$

where $\Delta Y_{c,t}$ represents the daily change in various asset prices in country c at date t, $MPS_{c,t} = r_m - \mathbb{E}_{t-j}[r_m]$ is the Bloomberg-based monetary policy surprise, and γ_c and γ_{year} are country and year fixed effects, respectively. We only include observations on the days of monetary policy announcements. The results confirm that Bloomberg surprises generate statistically significant and economically meaningful responses across different asset classes. Short-term interest rates respond strongly, with a one percentage point surprise generating approximately 70-80 bp responses at the one-month to three-month maturity, declining to 37 bp at the one-year maturity. The effects diminish at longer maturities (27, 17, and 14 bp for two-, five-, and ten-year rates respectively). Stock prices respond negatively to tightening surprises, consistent with the contractionary effects of unexpected monetary tightening. These patterns confirm that Bloomberg-based surprises capture genuine policy shocks that move asset prices in expected directions.[5]

Table 1: Relevance test for Bloomberg surprises

	1m	**3m**	**6m**	**12m**
$MPS_{c,t}$	0.666***	0.669***	0.787***	0.373***
	[0.19]	[0.19]	[0.24]	[0.07]
R^2	0.24	0.25	0.27	0.16
Obs	2 064	2 214	1 968	2 210
	2y	**5y**	**10y**	**Stock**
$MPS_{c,t}$	0.267***	0.174***	0.142***	-0.808*
	[0.04]	[0.03]	[0.03]	[0.44]
R^2	0.09	0.04	0.04	0.03
Obs	2 259	2 381	2 381	2 378

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (1) using OLS. The dependent variable is the daily change in the indicated asset prices for country c on date t, regressed on the Bloomberg-based monetary policy surprise. The constant and the country and year fixed effects are not reported.

Our dataset encompasses 14 advanced economies: Australia, Canada, the Czech Republic, Iceland, Israel, Japan, South Korea, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, the euro area, and the United States. The sample period extends from 1997 (or the first available date for each country) through 2023, encompassing 2 381 monetary policy announcements. Table 2 presents descriptive statistics for this sample, breaking down observations by surprise category and characteristics.

Of the 2 381 total observations, 1 482 (62%) were fully anticipated by investors, meaning the actual policy rate decision exactly matched the mean Bloomberg expectation. The remaining 899

[5]The correlation of Bloomberg surprises with high-frequency target shocks (from Gürkaynak et al. 2005a extended by Acosta et al. 2024) in the US is 0.71 and with 1-week OIS (from Altavilla et al. 2019) is 0.66.

observations constitute our identifying sample of monetary surprises, with 419 (18% of total observations) classified as overdelivery and 480 (20%) classified as underdelivery. This distribution reveals that monetary policy surprises occur with significant frequency even during a period with enhanced central bank communication and forward guidance, and that overdelivery and underdelivery events are roughly balanced in terms of occurrence.

Table 2: Descriptive statistics

Occurrences					
Total	**As Expected**	**Overdelivery**		**Underdelivery**	
2 381	1 482	419		480	
		Pos surp.	**Neg surp.**	**Pos surp.**	**Neg surp.**
		216	203	279	201
		$\leq$ 25 bp	**$>$ 25 bp**	**$\leq$ 25 bp**	**$>$ 25 bp**
		261	158	457	23

Absolute MP surprises					
	Nb. Obs	Mean	SD	Min	Max
$\lvert MPS_{c,t}\rvert$	2 381	0.03	0.08	0.00	1.17
$\lvert MPS^{More}_{c,t}\rvert$	419	0.13	0.12	0.01	0.90
$\lvert MPS^{Less}_{c,t}\rvert$	480	0.06	0.09	0.01	1.17
$\lvert MPS^{More}_{c,t}\rvert$ for positive $MPS^{More}_{c,t}$	216	0.10	0.10	0.01	0.61
$\lvert MPS^{Less}_{c,t}\rvert$ for positive $MPS^{Less}_{c,t}$	279	0.06	0.11	0.01	1.17
$\lvert MPS^{More}_{c,t}\rvert$ for negative $MPS^{More}_{c,t}$	203	0.16	0.14	0.01	0.90
$\lvert MPS^{Less}_{c,t}\rvert$ for negative $MPS^{Less}_{c,t}$	201	0.06	0.06	0.01	0.30

Note: This table reports descriptive statistics for the full sample of monetary policy announcements across 14 advanced economies over 1997–2023. The top panel shows the number of decisions classified as "as expected", "overdelivery", and "underdelivery", further distinguishing positive and negative surprises and the distribution of surprise magnitudes. The bottom panel reports summary statistics for the Bloomberg-based monetary policy surprise $MPS_{c,t}$ and its over- and underdelivery components. Surprise measures are expressed in percentage points and absolute values.

The distribution of surprises across positive and negative rate changes is also relatively balanced. Among overdelivery surprises, 216 involve positive surprises (policy tightening beyond expectations) while 203 involve negative surprises (policy easing beyond expectations). Similarly, underdelivery surprises comprise 279 positive and 201 negative instances. This symmetry is important because it suggests that our results are unlikely to be driven by asymmetries related to the business cycle or the direction of monetary policy adjustments.

Table 2 also categorizes surprises by the magnitude of the actual policy rate change. Most surprises involve standard adjustments of 25 bp or less: 261 overdelivery and 457 underdelivery observations fall into this category. Larger adjustments exceeding 25 bp are less frequent but still constitute an important share of the sample, with 158 overdelivery and 23 underdelivery observations. The relative scarcity of large underdelivery surprises reflects the fact that when central banks make large policy adjustments (e.g., 50 or 75 bp), they typically exceed rather than fall short of expectations.

The bottom panel of Table 2 presents summary statistics for the monetary policy surprises themselves, measured in absolute values. The mean overdelivery surprise is 0.13 percentage points with a standard deviation of 0.12, while the mean underdelivery surprise is 0.06 percentage points with a standard deviation of 0.09. This difference indicates that when central banks

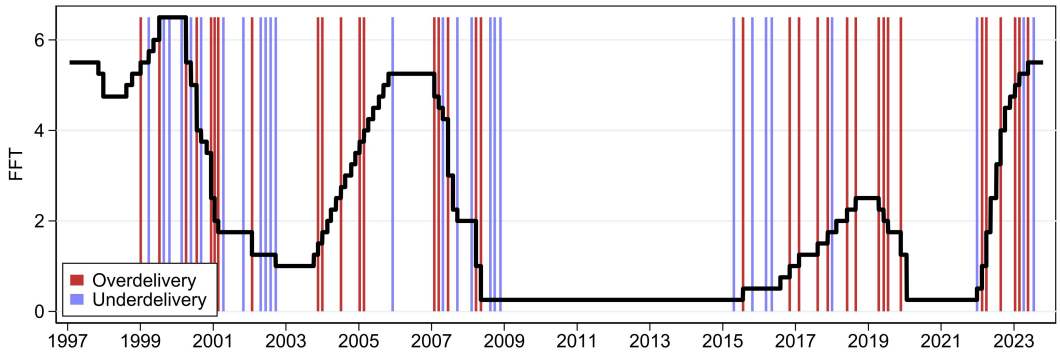
exceed expectations, they tend to do so by larger margins than when their decisions fall short of expectations. The asymmetry is particularly pronounced for negative (easing) surprises, where overdelivery events average 0.16 percentage points compared to 0.06 percentage points for underdelivery events. For positive (tightening) surprises, the difference is smaller but still notable: 0.10 percentage points for overdelivery versus 0.06 percentage points for underdelivery.

This difference in magnitudes raises an important identification concern: if overdelivery surprises are systematically larger than underdelivery surprises, any differential market response could simply reflect the larger size of the shocks rather than a qualitative difference in how investors interpret central bank decisions that exceed versus fall short of expectations. We address this concern directly in our empirical analysis through standardization tests and sample restrictions that control for surprise magnitude, allowing us to isolate the pure effect of exceeding versus falling short of expectations.

2.3 Over- and underdelivery in the United States

Figure 2 illustrates the time series of overdelivery and underdelivery surprises for the United States over our sample period. The figure plots the federal funds target rate (black line) along with vertical bars indicating the timing of overdelivery surprises (red bars) and underdelivery surprises (blue bars). Several patterns are worth noting. First, both types of surprises occur throughout the sample period, not just during particular episodes or crisis periods. Second, overdelivery and underdelivery events cluster during periods of active monetary policy adjustments. Third, during periods when the policy rate is constant (such as 2009-2015 at the effective lower bound), surprises are necessarily underdelivery events, since any expected change combined with a status quo decision creates a gap where the central bank did less than anticipated. Appendix Figure A1 presents the equivalent figure for the euro area, showing similar patterns.

Figure 2: Over/underdelivery FOMC policy rate decisions



Note: This figure displays the distribution of over- (red bars) and underdelivery (blue bars) monetary policy surprises over time in the United States. The black line plots the Federal Fed Funds target in percentage points.

The cross-country variation in surprise frequency is documented in Appendix Table A1, which reports the number of overdelivery and underdelivery observations for each country in our sample. All countries experience both types of surprises, though the exact frequencies vary with the number of policy meetings in each sample and the predictability of each central bank's policy decisions. Countries with longer sample periods and more frequent policy meetings (such as the United States with 35 overdelivery and 27 underdelivery events, or the euro area with 23 overdelivery and 57 underdelivery events) mechanically contribute more to our identifying variation.

3 The overdelivery premium

3.1 Empirical framework

Our central empirical approach estimates the differential impact of overdelivery versus underdelivery monetary policy surprises on asset prices. We employ the following cross-country panel regression specification:

$$\Delta Y_{c,t} = \alpha + \beta_M \, MPS_{c,t}^{More} + \beta_L \, MPS_{c,t}^{Less} + \gamma_c + \gamma_{year} + \epsilon_{c,t} \tag{2}$$

where $\Delta Y_{c,t}$ is the daily change in a given asset price in country c at date t, $MPS_{c,t}^{More}$ is an overdelivery monetary surprise measured using Bloomberg survey data, $MPS_{c,t}^{Less}$ is an underdelivery monetary surprise measured using Bloomberg survey data, and γ_c is a country fixed effect and γ_{year} is a year fixed effect. Equation 2 is estimated with OLS and heteroskedasticity-robust standard errors.

The key parameters of interest are β_M and β_L, which measure the response of asset prices to overdelivery and underdelivery monetary surprises, respectively. Our primary hypothesis centers on the difference $\beta_M - \beta_L$, which we label the "overdelivery premium". A positive and statistically significant difference would indicate that investors respond more strongly when central banks exceed expectations compared to when they fall short.

Table 3: Over- vs. underdelivery monetary surprises

	1m	**3m**	**6m**	**12m**
$MPS_{c,t}^{More}$	0.937***	0.902***	0.951***	0.504***
	[0.26]	[0.26]	[0.30]	[0.08]
$MPS_{c,t}^{Less}$	0.100***	0.124***	0.119	0.139**
	[0.04]	[0.04]	[0.08]	[0.07]
Diff *More–Less*	0.836***	0.779***	0.832***	0.365***
	[0.266]	[0.261]	[0.311]	[0.108]
R^2	0.30	0.29	0.30	0.19
Obs	2 064	2 214	1 968	2 210
	2y	**5y**	**10y**	**Stock**
$MPS_{c,t}^{More}$	0.311***	0.169***	0.156***	-0.958
	[0.04]	[0.04]	[0.03]	[0.55]
$MPS_{c,t}^{Less}$	0.172**	0.185**	0.112	-0.370
	[0.09]	[0.08]	[0.06]	[0.72]
Diff *More–Less*	0.139	-0.016	0.044	-0.588
	[0.10]	[0.09]	[0.07]	[0.94]
R^2	0.09	0.04	0.04	0.03
Obs	2 259	2 381	2 381	2 378

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS_{c,t}^{More}$) and underdelivery ($MPS_{c,t}^{Less}$) monetary policy surprises. The constant and the country and year fixed effects are not reported.

Table 3 uses the average Bloomberg survey expectation to compute the monetary surprise and presents our baseline findings across different asset classes and maturities. Table A2 uses the median of survey expectations and displays similar results. The central result of this paper is a striking asymmetry in how investors process monetary policy surprises. For short-term interest

rates (1-month to 12-month maturities), overdelivery surprises generate larger market responses than underdelivery surprises of equivalent magnitude.

The magnitudes are economically significant. A one percentage point overdelivery surprise generates responses ranging from 94 bp at the 1-month maturity to 50 bp at the 12-month maturity. In contrast, equivalent underdelivery surprises produce responses of only 10 to 14 bp across the same maturities. This yields an overdelivery premium of 84, 78, 83, and 37 bp for the 1-month, 3-month, 6-month, and 12-month maturities respectively, all statistically significant at the 1% level. To put these magnitudes in perspective, overdelivery surprises have effects that are approximately nine times larger than underdelivery surprises at short maturities. This heterogeneity means that investors interpret these surprises differently, and as a consequence, that the standard identification approach, which treats surprises of the same magnitude similarly, may actually confound two different types of shocks.

The overdelivery premium attenuates as we move to longer maturities. At the 2-year horizon, the coefficient on overdelivery surprises falls to 31 bp compared to 17 bp for underdelivery surprises, and the difference is no longer statistically significant. For 5-year and 10-year rates, both types of surprises generate similar responses around 15-17 bp, with no meaningful premium. This maturity pattern suggests that the overdelivery premium primarily affects investors' perceptions of factors governing near-term monetary policy rather than long-run term premia. Notably, the asymmetry does not extend to stock prices. Both overdelivery and underdelivery surprises generate statistically insignificant and similar responses, suggesting that the information content of over- versus underdelivery does not translate into differential equity valuations.

While the significant differential impact on interest rates up to one year might suggest that signals regarding the future policy path are driving the effect, our analysis focuses strictly on surprises to the current policy rate decision. Furthermore, using the target and path surprise series of Acosta et al. (2024) for the US, we find no evidence that overdelivery events are characterized by larger path surprises. On the contrary, underdelivery decisions are associated with larger path surprises on average (10 bp versus 8 bp for overdelivery decisions), although this difference is not statistically significant.

3.2 Does overdelivery reflect sign asymmetry?

A natural concern is whether our overdelivery premium simply reflects previously documented asymmetries related to the sign of monetary policy changes. The literature has established that tightening and easing shocks can have different effects on asset prices and the real economy. To address this, Table 4 decomposes our results by both the overdelivery/underdelivery distinction and the sign of the surprise.

The results show that the overdelivery premium exists for both positive (tightening) and negative (easing) surprises. For positive surprises, overdelivery generates responses of 83 bp at the 1-month maturity versus 6 bp for underdelivery (a difference of 77 bp). For negative surprises, the same pattern emerges: overdelivery produces 99 bp responses versus 21 bp for underdelivery, yielding a 78 bp premium.

Table 4: Combining overdelivery and sign asymmetry

	1m	3m	6m	12m
$\lvert MPS^{More}_{c,t}\rvert$ for positive $MPS^{More}_{c,t}$	0.834***	0.786***	0.801***	0.656***
	[0.16]	[0.14]	[0.16]	[0.17]
$\lvert MPS^{More}_{c,t}\rvert$ for negative $MPS^{More}_{c,t}$	0.991**	0.957**	1.015**	0.414***
	[0.39]	[0.37]	[0.42]	[0.07]
$\lvert MPS^{Less}_{c,t}\rvert$ for positive $MPS^{Less}_{c,t}$	0.063	0.116**	0.185**	0.107
	[0.04]	[0.05]	[0.09]	[0.08]
$\lvert MPS^{Less}_{c,t}\rvert$ for negative $MPS^{Less}_{c,t}$	0.212**	0.142	0.020	0.248**
	[0.10]	[0.09]	[0.16]	[0.11]
Diff *More–Less* Pos.	0.771***	0.670***	0.616***	0.549***
	[0.157]	[0.141]	[0.175]	[0.179]
Diff *More–Less* Neg.	0.779**	0.815**	0.995**	0.166
	[0.392]	[0.381]	[0.454]	[0.129]
R^2	0.30	0.30	0.31	0.20
Obs	2 064	2 214	1 968	2 210

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from an augmented specification of Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the Bloomberg-based monetary policy surprise decomposed into tightening and easing overdelivery and underdelivery components. The constant and the country and year fixed effects are not reported.

Importantly, the overdelivery premia for positive and negative surprises are statistically indistinguishable from each other across all short maturities. This rules out the possibility that our results simply capture sign asymmetries in monetary transmission. The overdelivery premium appears to be a distinct phenomenon that operates symmetrically for both tightening and easing decisions.

3.3 Robustness analysis

We provide several robustness checks to ensure the main finding is not driven by particular measurement choices, sample characteristics, or estimation procedures. Beyond using median expectations from the Bloomberg survey (Appendix Table A2), we address potential concerns about the error structure by clustering standard errors at different levels (Appendix Table A3). When we cluster at the year level, the overdelivery premium remains highly significant. When we cluster simultaneously at the year and country levels to account for both serial correlation and cross-country dependencies, our core results remain unchanged, confirming that neither time-series nor cross-sectional correlation drives our findings.

Appendix Table A4 assesses whether the overdelivery premium holds in the time-series dimension within individual countries or reflects cross-sectional variation across our 14-country panel. Knowing that this sort of test aggravates the small sample issue, we estimate our baseline specification separately for the Euro area and the United States.[6] For the Euro area, overdelivery surprises generate significant responses at the 1-, 3-, and 6-month maturities, compared to statistically insignificant responses for underdelivery surprises. For the United States, overdelivery coefficients are consistently larger (35, 66, and 13 bp) than underdelivery coefficients (22, 16, and near-zero), though the differences are not statistically significant, possibly due to larger standard errors in the smaller country-specific sample. These results suggest that the overdelivery premium

[6] Appendix Table A4 also shows evidence of the overdelivery premium when excluding these two countries.

is not an artifact of pooling countries but reflects a more fundamental pattern that also emerges within individual economies.

Another potential concern is whether our results simply reflect the larger average magnitude of overdelivery surprises (13 bp) compared to underdelivery surprises (6 bp) documented in Table 2. We address this in two ways. First, we restrict the sample to exclude the largest overdelivery events (those exceeding two standard deviations), which equalizes the average magnitudes of the two types of surprises. Second, we standardize both surprise measures to have unit variance, ensuring that coefficients are directly comparable. Appendix Table A5 shows that the overdelivery premium holds under both approaches. This confirms that the asymmetric response reflects a qualitative difference in how investors interpret central bank decisions that exceed versus fall short of expectations, rather than a mechanical consequence of surprise magnitudes.

Appendix Table A6 verifies that extreme observations do not drive our results. When we exclude policy rate changes exceeding 75 bp in absolute value (which removes 24 observations) or when we instead exclude monetary surprises exceeding 75 bp (removing 21 observations), the overdelivery premium remains sizable and significant. The consistency of these results indicates that our findings are not driven by crisis episodes or unusual policy actions.

Appendix Table A7 explores whether the effects of overdelivery depend on whether the central bank changes rates or maintains the status quo. When we exclude all status quo decisions, overdelivery surprises continue to generate much stronger responses than underdelivery surprises. When we instead exclude observations where the market expected a status quo (i.e., where $\mathbb{E}_{t-j}[r_m] = r_{m-1}$), the overdelivery premium remains. These results confirm that the premium is not driven by the prevalence of status quo decisions in the underdelivery category. Does the overdelivery premium differ for "standard" 25 bp adjustments versus larger "unusual" adjustments? Appendix Table A8 splits the sample by the absolute size of the policy rate change. We find that the overdelivery premium exists for both standard (changes of 25 bp or less) and large adjustments (changes exceeding 25 bp).

To further clarify the role of status quo decisions, Appendix Table A9 explicitly separates three categories: overdelivery (decision and surprise move in same direction), a status quo decision when a rate change was expected (a special form of underdelivery), and underdelivery with actual policy change (decision and surprise move in opposite directions, excluding status quo). The overdelivery premium holds, confirming that exceeding expectations generates stronger effects. If the decision and the surprise move in the opposite direction, we do not find any significant market reaction. This means that the smaller response of underdelivery surprises in the earlier results is entirely driven by the cases of status quo decisions when a rate change was expected.

One interpretation of the overdelivery premium is that some decisions announce the launch of a new policy cycle (Hamilton and Jordà 2002). Appendix Table A10 investigates whether the overdelivery premium differs at the start of a new tightening or easing cycle versus during an ongoing cycle. Overdelivery surprises during ongoing cycles generate similar responses as those at the start of cycles. The differences are not statistically significant, indicating that the premium operates both when the central bank is initiating or within a policy cycle. In addition, Appendix Table A11 separates the sample by whether the policy decision occurs during a tightening or easing cycle. The overdelivery premium appears in both contexts, confirming that the phenomenon is not specific to one type of monetary policy cycle.

Another potential interpretation is that overdelivery surprises might signal a frontloading of a future policy action, thereby affecting expectations for subsequent meetings. In addition, Herbert et al. (2025) document that monetary surprises have fundamentally different effects on interest rates when surprises about the current policy stance ("Target surprises") and about the policy stance further ahead ("Path" surprises) have opposite signs, a phenomenon that could explain our results. To address this, Appendix Table A12 includes the change in 1-month-ahead policy rate expectations as an additional control variable. Even after controlling for revisions to next-month policy expectations (or alternatively for revisions to policy expectations three months out), the overdelivery premium remains sizable and significant and is not driven by differential effects on the expected path of future policy decisions.

Following Jarociński and Karadi (2020), we decompose our surprises into "pure monetary policy" shocks (where policy surprises and stock prices move in opposite directions) and "central bank information" shocks (where they move in the same direction). Appendix Table A13 shows that the overdelivery premium appears for both types of shocks. This suggests that overdelivery surprises reflect both signals about policy and some central bank information effects.

3.4 Market-based monetary surprises

A potential limitation of our Bloomberg-based surprise measures is their temporal structure. Bloomberg survey expectations are formed a few days before policy announcements, creating a window during which new macroeconomic information or financial market developments could alter the information environment. If market participants update their expectations based on intervening events, our measured surprises might reflect stale expectations rather than actual policy surprises at the moment of the announcement.

Table 5: Using daily changes in OIS rates as *MPS*

	1m	**3m**	**6m**	**12m**
$MPS^{More}_{c,t}$	0.623***	0.609***	0.558***	0.326***
	[0.12]	[0.09]	[0.10]	[0.08]
$MPS^{Less}_{c,t}$	0.260***	0.214**	0.286***	0.278**
	[0.09]	[0.08]	[0.08]	[0.13]
Diff *More–Less*	0.363**	0.395***	0.272**	0.048
	[0.142]	[0.118]	[0.129]	[0.156]
R^2	0.19	0.21	0.18	0.08
Obs	1 726	1 858	1 651	1 878

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on daily changes in OIS rates as a measure of the monetary policy surprise using the Bloomberg classification for overdelivery and underdelivery categories. The constant and the country and year fixed effects are not reported.

To address this concern, we construct alternative surprise measures using overnight indexed swap (OIS) rates, which capture market expectations formed immediately before policy decisions. Table 5 maintains our Bloomberg-based classification of over- versus underdelivery (since we need a clear benchmark for what was "expected" to determine whether the central bank exceeded or fell short of expectations), but uses daily changes in short-maturity OIS rates (from 1 week to 1 month, depending on data availability) as the surprise measure itself. These market-based measures capture expectations formed immediately before policy decisions, minimizing the window

for information contamination. The results using OIS-based surprises confirm our main findings. Overdelivery surprises generate larger responses than underdelivery surprises. The overdelivery premia are 36, 40, and 27 bp for the 1-, 3-, and 6-month maturities, all statistically significant.

3.5 High-frequency current-decision surprises

For the United States and the Euro area, we can further validate our findings using high-frequency intraday current-decision surprises, where both the classification of over/underdelivery and the measurement of the surprise come from intraday market-based data rather than surveys. For the US, we use 30-minute changes in federal funds futures (FF1) around FOMC announcements. For the Euro area, we use 30-minute changes in 1-week OIS rates around ECB announcements.

Table 6: High-frequency current-decision surprises

	United States							
	ED1	**ED2**	**ED3**	**ED4**	**T2Y**	**T5Y**	**T10Y**	**SP500**
MPS_t^{More}	0.939***	0.908***	0.893***	0.835***	0.563***	0.423***	0.255***	-3.125
	[0.15]	[0.16]	[0.15]	[0.16]	[0.08]	[0.10]	[0.09]	[2.26]
MPS_t^{Less}	0.719***	0.421**	0.224	0.141	0.137	0.066	0.007	-4.754**
	[0.14]	[0.17]	[0.22]	[0.26]	[0.20]	[0.17]	[0.11]	[1.92]
Diff *More–Less*	0.220	**0.487****	**0.668****	**0.695****	**0.425****	0.358	0.248	1.629
	[0.21]	[0.24]	[0.27]	[0.31]	[0.21]	[0.20]	[0.14]	[2.96]
R^2	0.53	0.31	0.20	0.14	0.11	0.06	0.03	0.06
Obs	215	215	215	215	215	215	215	210
	Euro area							
	OIS1M	**OIS3M**	**OIS6M**	**OIS1Y**	**DE2Y**	**DE5Y**	**DE10Y**	**STOXX**
MPS_t^{More}	0.862***	0.778***	0.616***	0.469***	0.289***	0.132	-0.005	-0.015***
	[0.08]	[0.07]	[0.09]	[0.11]	[0.10]	[0.07]	[0.04]	[0.00]
MPS_t^{Less}	0.667***	0.499***	0.380***	0.311***	0.251***	0.141**	-0.016	-0.031**
	[0.09]	[0.08]	[0.06]	[0.05]	[0.07]	[0.06]	[0.05]	[0.01]
Diff *More–Less*	0.195	**0.279****	**0.236****	0.158	0.038	-0.010	0.011	0.016
	[0.12]	[0.11]	[0.11]	[0.12]	[0.12]	[0.09]	[0.06]	[0.01]
R^2	0.75	0.76	0.68	0.48	0.21	0.06	0.00	0.06
Obs	281	281	281	281	281	281	281	281

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) at the country level using OLS (dropping country and year fixed effects). The dependent variables are equivalent to those in the baseline specification. ED denotes Eurodollar futures rates, T stands for treasury yields. OIS denotes overnight index swap rates, DE stands for German government bond yields. These dependent variables are regressed on the overdelivery and underdelivery surprises, measured as the intraday change in current-month future contracts (FF1) for the US and 1-week OIS rates for the EA, and categorized based on these intraday policy rate surprises (not the Bloomberg expectations). To do so, the "As expected" category is defined when policy rate surprises are smaller than half their standard deviation. The constant is not reported.

Table 6 presents results for both central banks using these high-frequency measures. For the United States, overdelivery surprises generate strong responses across the term structure of Eurodollar futures (ED1 through ED4, representing 3-month interest rate expectations at various horizons) and Treasury yields. The overdelivery premium is particularly pronounced for ED2 through ED4 contracts, all statistically significant. The premium holds at the 2-year maturity and disappears at longer maturities. For the Euro area, the pattern is similar but somewhat more muted. Overdelivery surprises generate responses of 86, 78, 62, and 47 bp across OIS maturities from 1 month to 1 year, compared to 67, 50, 38, and 31 bp for underdelivery surprises. The premium is 28 and 24 bp at the 3- and 6-month horizons, statistically significant at the 5% level, and vanishes at longer maturities.

These high-frequency results are particularly compelling because they address potential concerns about the timing of expectation formation and the measurement of surprises, although they are subject to the small sample issue of the time-series approach. The fact that we find evidence of the overdelivery premium even when using 30-minute windows around policy announcements provides strong evidence that the phenomenon represents an actual difference in how investors process central bank decisions.

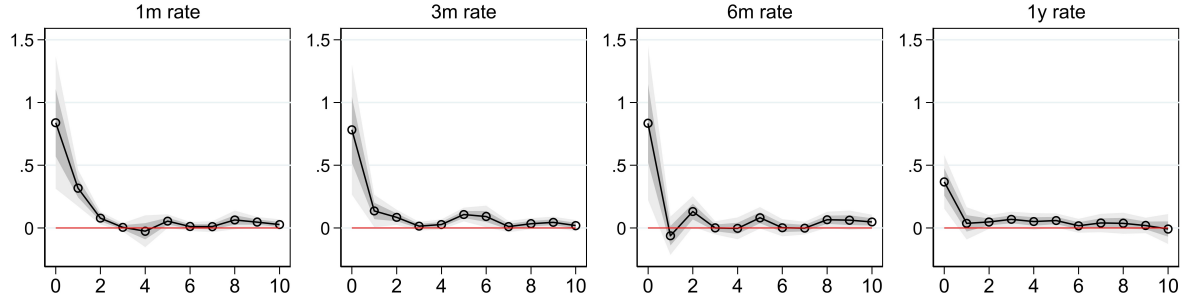
3.6 Persistence

Do the differential responses to over- and underdelivery surprises persist beyond the initial announcement, or do they quickly reverse as investors reassess the information content of policy decisions? To address this question, we estimate local projections extending the baseline specification of Equation 2 to horizons of 1 through 10 days after the announcement:

$$\Delta Y_{c,t+h} = \alpha_h + \beta_{M,h} MPS_{c,t}^{More} + \beta_{L,h} MPS_{c,t}^{Less} + \gamma_c + \gamma_{year} + \epsilon_{c,t+h} \tag{3}$$

where $\Delta Y_{c,t+h}$ represents the daily change in asset prices on day $t+h$. Figure 3 plots the difference $\beta_{M,h} - \beta_{L,h}$ over horizons $h = 0, 1, \ldots, 10$. For the 1-month maturity, the overdelivery premium is 84 bp on impact, it still is significant at about 30 bp on day 1, and is close to zero (and mostly no longer statistically significant) through day 10. Similar patterns emerge for 3-, 6-, and 12-month maturities: sharp initial effects followed by small and largely insignificant effects subsequently. As these local projections are not cumulative, this implies that the overdelivery premium persists over the subsequent week and a half.

Figure 3: Effect over 10 days



Note: These figures show the dynamic effects on 1-month to 12-month interest rates over 10 days for the difference $\beta_M - \beta_L$ estimated with Equation (3). Shaded areas represent 68% and 95% confidence intervals.

Importantly, we observe no reversal of the initial overdelivery premium. If investors were systematically overreacting to overdelivery surprises and then correcting this overreaction, we would expect the difference to turn negative. Instead, the premium remains positive or null throughout the 10-day window, suggesting that the differential response reflects information rather than a temporary behavioral bias that markets subsequently unwind.

3.7 Potential channels

Three potential mechanisms could explain why overdelivery surprises generate stronger market responses than underdelivery surprises.

First, over- and underdelivery may carry different information about the central bank's views of current and future economic conditions, a phenomenon known as central bank information effects. If overdelivery conveys a stronger signal that policymakers perceive economic conditions as justifying more aggressive action, investors may revise their macroeconomic forecasts accordingly, amplifying the initial surprise.

Second, the two types of surprises may lead investors to update their beliefs about the parameters of the central bank's reaction function differently. If overdelivery signals a more aggressive reaction function, this would manifest as larger revisions to expected future policy paths and interest rates.

Third, the asymmetry could reflect behavioral factors such as reference-dependent preferences, whereby investors evaluate outcomes relative to a reference point (prior expectations) and systematically overreact when central banks exceed this benchmark but underreact when they fall short. In the following three sections, we explore each of these channels in turn to determine how they may account for the overdelivery premium.

4 Signals about policymakers' views of the state of the economy

One potential explanation for the overdelivery premium is that over- and underdelivery surprises carry different information about the central bank's assessment of economic conditions. A growing literature documents that monetary policy announcements can convey "central bank information effects", namely when policy decisions reveal the central bank's views about the state of the economy, leading investors to revise their macroeconomic forecasts in ways that can either reinforce or offset the standard channel of monetary transmission. In the classic example of Ellingsen and Söderström (2001) and subsequent work by Nakamura and Steinsson (2018) and Jarociński and Karadi (2020), an unexpected rate hike could lead investors to infer that the central bank perceives stronger economic conditions than previously believed, prompting upward revisions to growth and inflation forecasts. This, in turn, could then prompt beliefs about a future endogenous monetary policy response, i.e. a further increase in future interest rates.

If central bank information effects explain the overdelivery premium, we should observe differential patterns in how macroeconomic forecasts respond to over- versus underdelivery surprises. Specifically, for overdelivery tightening surprises (the central bank raising rates by more than expected), information effects would manifest as upward revisions to inflation forecasts and downward revisions to unemployment forecasts, the opposite of what standard monetary transmission would predict, but in line with the overdelivery premiun, i.e. the stronger interest rate responsiveness documented above. For underdelivery tightening surprises, we would expect forecast revisions consistent with standard monetary policy effects: lower inflation and higher unemployment expectations.

4.1 Do monetary surprises affect macro forecast revisions?

To test for central bank information effects, we examine how professional forecasters revise their macroeconomic projections following monetary policy announcements. We estimate specifications similar to our baseline asset price regressions:

$$\Delta F^X_{c,t} = \alpha + \beta\, MPS_{c,t} + \gamma_c + \gamma_{year} + \epsilon_{c,t} \tag{4}$$

$$\Delta F^X_{c,t} = \alpha + \beta_M\, MPS^{More}_{c,t} + \beta_L\, MPS^{Less}_{c,t} + \gamma_c + \gamma_{year} + \epsilon_{c,t} \tag{5}$$

where $\Delta F^X_{c,t}$ represents the revision to forecasts of variable X (inflation, unemployment or GDP growth) in country c following the monetary policy decision at time t. We use two sources of forecast data to capture both short-term and medium-term expectation revisions. For near-term forecasts (nowcasts), we employ Bloomberg survey data, which polls professional forecasters about upcoming macroeconomic data releases. These surveys are conducted in the days before the subsequent data release (equivalently to the survey that defines our monetary policy surprises). For longer-horizon forecasts, we use Consensus Economics data, which provides monthly forecasts for current-calendar-year (CY) and next-calendar-year (NY) inflation, unemployment and GDP growth. From these, we furthermore construct 1-year-ahead (1Y) forecasets following Dovern et al. 2012).

We match the forecasts to monetary policy decisions based on survey response deadlines. For each policy meeting, we compute the change in forecasts as the difference between the first survey conducted after the meeting and the last survey conducted before the meeting. Our forecast revision sample spans the same countries and time period as our baseline asset price analysis, subject to data availability. Bloomberg nowcast data are available for 1 719 to 1 859 observations depending on the variable, while Consensus Economics data are available for 1 284 to 1 789 observations.

Table 7 presents results for inflation and unemployment forecast revisions. The upper panel shows that standard monetary policy surprises (without distinguishing over- from underdelivery) generate positive and significant revisions to inflation forecasts across all horizons (left panel) and small and mostly insignificant revisions to unemployment forecasts: the effect on the nowcast is significant at the 1% level but disappears at longer horizons. A one percentage point tightening surprise leads to an 0.84 percentage point upward revision in the inflation nowcast and 0.51 percentage points for 1-year-ahead inflation.

This positive relationship between tightening surprises and inflation forecast revisions is consistent with central bank information effects: when the central bank raises rates by more than expected, forecasters infer that policymakers perceive greater inflation pressure than markets had recognized, leading to upward rather than downward revisions to inflation expectations. This pattern aligns with the findings of Nakamura and Steinsson (2018) for the United States, but has been challenged by Bauer and Swanson (2023) who document that the omission of recent macroeconomic news generate this positive relationship, an issue we will come back to later.

When we distinguish over- from underdelivery, a clear pattern emerges for both inflation and unemployment forecast revisions. Overdelivery tightening surprises generates large and highly significant upward revisions to inflation forecasts (0.76 percentage points for 1-year-ahead forecasts for instance) and lead to significant downward revisions in unemployment forecasts (-0.32 percentage points for 1-year-ahead forecasts). These negative revisions are inconsistent with standard monetary transmission, which would predict that unexpected tightening raises unemployment, but consistent with information effects: forecasters infer from the central bank's aggressive

action that policymakers view inflationary pressures and labor market conditions as stronger than previously believed.

Table 7: Macro forecast responses to monetary surprises

	CPI inflation				Unemployment			
	Nowcast	CY	1Y	NY	Nowcast	CY	1Y	NY
$MPS_{c,t}$	0.837***	0.644***	0.509***	0.321**	-0.147***	-0.166	-0.121	-0.106
	[0.14]	[0.21]	[0.09]	[0.15]	[0.05]	[0.12]	[0.06]	[0.08]
R^2	0.15	0.04	0.20	0.01	0.02	0.05	0.09	0.06
Obs	1 859	1 789	1 789	1 789	1 719	1 284	1 284	1 284
	CPI inflation				Unemployment			
	Nowcast	CY	1Y	NY	Nowcast	CY	1Y	NY
$MPS^{More}_{c,t}$	1.102***	1.067***	0.757***	0.551***	-0.259***	-0.424**	-0.323***	-0.380***
	[0.17]	[0.31]	[0.09]	[0.19]	[0.06]	[0.19]	[0.06]	[0.08]
$MPS^{Less}_{c,t}$	-0.286	-0.454	-0.135	-0.276**	0.239	0.241	0.196**	0.323**
	[0.35]	[0.27]	[0.11]	[0.13]	[0.15]	[0.14]	[0.09]	[0.15]
Diff *More–Less*	1.388***	1.521***	0.893***	0.828***	-0.498***	-0.665***	-0.519***	-0.703***
	[0.40]	[0.44]	[0.14]	[0.24]	[0.17]	[0.25]	[0.12]	[0.17]
R^2	0.16	0.05	0.22	0.02	0.02	0.05	0.10	0.07
Obs	1 859	1 789	1 789	1 789	1 719	1 284	1 284	1 284

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equations (4) and (5) using OLS. The dependent variable is the revision in the indicated macroeconomic forecast at different horizons (Nowcast, Current Year, 1 Year ahead, Next Year) for country c at date t, regressed on the (overdelivery and underdelivery) Bloomberg-based monetary policy surprises. The constant and the country and year fixed effects are not reported.

In stark contrast, underdelivery tightening surprises produce smaller forecast revisions that have the opposite sign, and usually only appear for longer forecast horizons: we find a negative effect on inflation forecasts (significant for next-year forecasts) and a positive effect on unemployment forecasts (significant for 1-year and next-year forecasts). These coefficients for underdelivery are consistent with standard monetary transmission: tightening monetary policy leads, after some time, to lower inflation and higher unemployment forecasts.[7]

The magnitude of these differential effects is striking. For next-year inflation forecasts, arguably the most policy-relevant horizon, a one percentage point overdelivery tightening surprise raises inflation expectations by 0.55 percentage points, while the same-size underdelivery tightening surprise produces a -0.28 percentage point revision. The differences between overdelivery and underdelivery effects are large and significant across all forecast horizons for different macroeconomic variables. It provides compelling evidence that overdelivery surprises may trigger central bank information effects. The pattern is remarkably consistent: overdelivery conveys information effects that dominate standard monetary transmission, while underdelivery generates responses consistent with a standard monetary policy channel.

4.2 Revisions to macro forecasts in the United States

To provide additional validation and address potential concerns about the role of a potential omitted variable bias, we replicate our analysis using high-quality US data that allow us to control for macroeconomic data releases. Bauer and Swanson (2023) demonstrate that controlling for same-day macroeconomic news is crucial for isolating pure monetary policy effects on forecasts, since

[7] Appendix Table A14 presents results for GDP growth forecasts, showing an equivalent pattern: overdelivery surprises lead to upward revisions in GDP forecasts, while underdelivery surprises generate downward revisions.

policy announcements sometimes coincide with important economic data releases that could independently affect expectations.

Table 8 presents results for the United States using the methodology and data from Bauer and Swanson (2023). The upper left panel shows that standard monetary policy surprises, using Bauer and Swanson (2023)'s measures based on high-frequency federal funds and Eurodollar futures changes, have no significant effect on 1-year-ahead inflation or unemployment forecasts when we do not control for macroeconomic releases (although the point estimates have signs that are consistent with information effects). The upper right panel adds controls for recent macroeconomic data surprises using Bauer and Swanson (2023)'s series. With these controls, monetary surprises continue to show no significant effects on macro forecasts (with both point estimates now having signs consistent with the standard monetary policy channel), confirming that FOMC surprises do not systematically convey information effects once we account for economic news.

Table 8: Focusing on US data and controlling for macro releases

	No controls		w/ BS23's macro releases	
	CPI_{1Y}	$Unemp_{1Y}$	CPI_{1Y}	$Unemp_{1Y}$
MPS_t	0.689	-0.263	-0.086	0.617
	[0.81]	[0.38]	[0.37]	[0.36]
R^2	0.03	0.00	0.49	0.43
Obs	151	151	151	151
	No controls		w/ BS23's macro releases	
	CPI_{1Y}	$Unemp_{1Y}$	CPI_{1Y}	$Unemp_{1Y}$
MPS_t^{More}	2.393**	-0.913**	1.064*	0.658
	[1.10]	[0.44]	[0.55]	[0.46]
MPS_t^{Less}	-1.050	1.320	-1.279***	1.421**
	[0.84]	[0.96]	[0.45]	[0.65]
Diff *More–Less*	3.443**	-2.232**	2.343***	-0.763
	[1.38]	[1.05]	[0.75]	[0.75]
R^2	0.15	0.05	0.53	0.44
Obs	151	151	151	151

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (4) and (5) at the country level (dropping country and year fixed effects) using OLS. The dependent variable is the revision in the indicated macroeconomic forecast at the 1-year horizon, regressed on Bauer and Swanson (2023)'s monetary policy surprises (in the lower panel categorized as over- and underdelivery using the Bloomberg-based classification). Both equations are augmented with the set of Bauer and Swanson (2023)'s macroeconomic data surprises in the right panel. The constant is not reported.

However, when we distinguish between overdelivery and underdelivery surprises (lower panels), a striking pattern emerges. Without macroeconomic controls, overdelivery surprises generate large and significant forecast revisions: 2.39 percentage points for inflation and -0.91 percentage points for unemployment, with the sign of the revision being consistent with information effects. Underdelivery surprises produce opposite-signed and insignificant revisions. The difference in the effects of over and underdelivery surprises is sizable and significant at the 5% level.

Critically, these differential effects persist even after controlling for macroeconomic data releases. With Bauer-Swanson controls, overdelivery surprises continue to generate sizable forecast revisions: 1.06 percentage points for inflation (significant at the 10% level) and 0.66 percentage points for unemployment (insignificant but with the sign consistent with information effects). Underdelivery surprises produce revisions of -1.28 percentage points for inflation (significant at

the 1% level) and 1.42 percentage points for unemployment (significant at the 5% level), both consistent with standard monetary transmission. The differences in the effect of the two same-magnitude surprises are large (and highly statistically significant for inflation).

These US results are particularly compelling because they demonstrate that the overdelivery premium in forecast revisions is not an artifact of omitted macroeconomic news. Even when we account for recent economic data releases, overdelivery FOMC decisions continue to generate inflation forecast responses consistent with information effects, while underdelivery decisions generate responses consistent with standard monetary policy. This supports our interpretation that overdelivery provides signals about the central bank's economic assessment, while underdelivery is processed as a standard policy shock.

The US evidence also helps reconcile the findings in the central bank information literature as Bauer and Swanson conclude that monetary policy surprises do not exhibit systematic information effects. When pooling overdelivery surprises (which do exhibit information effects) together with underdelivery surprises (which do not), the averaging of these opposing effects can help explain the absence of information effects, while our decomposition reveals that such effects are present but restricted to overdelivery episodes.

5 Revisions to the perceived central bank reaction function

5.1 Estimating perceived central bank reaction function parameters

An alternative explanation for the overdelivery premium is that investors interpret over- and underdelivery surprises as signals about the central bank's reaction functions, the systematic relationship between policy rates and macroeconomic conditions (see the recent literature on perceived reaction functions, e.g., Bauer et al. 2024, Bocola et al. 2024, Sutherland 2026). If overdelivery indicates a more aggressive stance toward inflation or output stabilization, or reveals new information about the neutral rate, investors would revise their expectations of future policy accordingly, generating larger interest rate responses.

To test this channel, we follow the methodology of Bauer et al. (2024) to estimate perceived central bank reaction function parameters from survey data. The approach exploits cross-sectional variation in professional forecasters' expectations to infer the policy rule that market participants believe the central bank is following. Specifically, for each country c and month t, we estimate the following cross-sectional regression across individual forecasters i:

$$\mathbb{E}_{i,c,t}[r_{c,t+h_1}] = \phi_{c,t} + \phi^{\pi}_{c,t}\,\mathbb{E}_{i,c,t}[\pi_{c,t+h_2}] + \phi^{y}_{c,t}\,\mathbb{E}_{i,c,t}[y_{c,t+h_2}] + \epsilon_{i,c,t} \tag{6}$$

where $\mathbb{E}_{i,c,t}[r_{c,t+h_1}]$ is forecaster i's expectation of the policy rate at horizon h_1, $\mathbb{E}_{i,c,t}[\pi_{c,t+h_2}]$ and $\mathbb{E}_{i,c,t}[y_{c,t+h_2}]$ are their inflation and output forecasts at horizon h_2, and $\phi_{c,t}$, $\phi^{\pi}_{c,t}$ and $\phi^{y}_{c,t}$ represent the perceived intercept, inflation response coefficient, and output response coefficient of the central bank's reaction function.

We implement this approach using Consensus Economics Forecasts, which provide monthly survey data on inflation, GDP growth, and interest rate expectations from professional forecasters across our sample countries. Our baseline specification uses 1-year-ahead inflation and GDP forecasts (constructed as weighted averages of current-year and next-year forecasts following Dovern

et al. 2012) to predict 3-month-ahead policy rate expectations. For comparison, we plot in Appendix Figure A3 our measure of the perceived inflation response in the US together with the one of Bauer et al. (2024) using Blue Chip expectations. Because of the potential small sample of survey respondents in some countries, as a robustness test, we estimate an alternative version of Equation 4 in which we pool current and next year horizons of macroeconomic forecasts and 3-month and 12-month interest rate forecasts of each individual. This combination of horizons balances the need for sufficient variation with a relevant representation of the central bank reaction function.

The estimated parameters $\{\hat{\phi}_{c,t}, \hat{\phi}^{\pi}_{c,t}, \hat{\phi}^{y}_{c,t}\}$ provide time-varying measures of how market participants perceive the central bank's policy rule. Changes in $\hat{\phi}^{\pi}_{c,t}$ or $\hat{\phi}^{y}_{c,t}$ would indicate revisions to beliefs about the central bank's responsiveness to inflation or output conditions. Changes in $\hat{\phi}_{c,t}$ could reflect updates about the neutral rate.

We supplement this analysis with a measure of perceived policy inertia and estimate:

$$\mathbb{E}_{i,c,t}[r_{c,t+12m}] = \alpha_{c,t} + \rho_{c,t}\,\mathbb{E}_{i,c,t}[r_{c,t+3m}] + \epsilon_{i,c,t} \tag{7}$$

where $\rho_{c,t}$ captures the degree of perceived policy persistence or interest rate smoothing. A higher $\rho_{c,t}$ indicates that forecasters expect policy rates to adjust gradually over time, while a lower value suggests expectations of more rapid policy adjustments. Our sample for this analysis spans 1999 (or first availability) through 2023 and includes all countries in our baseline sample except Iceland, for which Consensus Economics data are not available to us. We match each month's estimated reaction function parameters to monetary policy decisions based on the survey response deadline, ensuring that the parameter estimates reflect beliefs formed before the policy announcement.

5.2 Do monetary surprises affect the perceived reaction function?

To test whether monetary policy surprises lead investors to revise their beliefs about central bank reaction functions, we estimate the following specification:

$$\Delta\hat{\phi}^{j}_{c,t} = \alpha + \beta\, MPS_{c,t} + \gamma_c + \gamma_{year} + \epsilon_{c,t} \tag{8}$$

where $\Delta\hat{\phi}^{j}_{c,t}$ represents the change in the estimated perceived reaction function parameter $j \in \{\text{constant}, \pi, y, \rho\}$ from month $t-1$ to month t, and $MPS_{c,t}$ is the monetary policy surprise. We then extend Equation 6 to distinguish between overdelivery and underdelivery surprises:

$$\Delta\hat{\phi}^{j}_{c,t} = \alpha + \beta_M\, MPS^{More}_{c,t} + \beta_L\, MPS^{Less}_{c,t} + \gamma_c + \gamma_{year} + \epsilon_{c,t} \tag{9}$$

Table 9 presents the results. The upper panel shows that standard monetary policy surprises (without distinguishing over- from underdelivery) have no significant effect on the perceived inflation response coefficient ($\hat{\phi}^{\pi}$) or output response coefficient ($\hat{\phi}^{y}$). The point estimates are small and statistically insignificant: -0.14 for inflation and -0.22 for output when using 1-year-ahead forecasts. Similarly, surprises do not significantly affect the perceived inertia parameter $\hat{\rho}$.

Table 9: Changes in perceived reaction function parameters

	1Y horizon			CY & NY horizons pooled			Inertia
	Inflation	GDP	constant	Inflation	GDP	constant	3m-1y
$MPS_{c,t}$	-0.141	-0.219	1.208**	0.077	-0.077	0.595	0.002
	[0.14]	[0.17]	[0.49]	[0.07]	[0.11]	[0.31]	[0.27]
R^2	0.00	0.01	0.01	0.02	0.02	0.02	0.03
Obs	1 753	1 753	1 753	1 756	1 756	1 756	1 753
	1Y horizon			CY & NY horizons pooled			Inertia
	Inflation	GDP	constant	Inflation	GDP	constant	3m-1y
$MPS^{More}_{c,t}$	-0.093	-0.377	1.992***	0.106	-0.142	1.115***	0.241
	[0.19]	[0.23]	[0.64]	[0.09]	[0.14]	[0.36]	[0.39]
$MPS^{Less}_{c,t}$	-0.266	0.192	-0.834	0.000	0.094	-0.760	-0.622
	[0.30]	[0.26]	[0.95]	[0.15]	[0.15]	[0.50]	[0.51]
Diff *More–Less*	0.173	-0.569	2.826**	0.106	-0.236	1.875***	0.864
	[0.40]	[0.38]	[1.24]	[0.18]	[0.19]	[0.63]	[0.72]
R^2	0.00	0.01	0.01	0.02	0.02	0.02	0.03
Obs	1 753	1 753	1 753	1 756	1 756	1 756	1 753

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (8) and (9) using OLS. The dependent variable is the change in the perceived inflation and output responsiveness or perceived constant (estimated with Equation 6) or smoothing parameter (estimated with Equation 7) in country c at date t, regressed on the (overdelivery and underdelivery) Bloomberg-based monetary policy surprises. The constant and the country and year fixed effects are not reported.

However, monetary surprises do lead to significant revisions in the estimated intercept ($\hat{\phi}$): a one percentage point surprise increases the intercept by 1.21 percentage points when using 1-year-ahead forecasts, and by 0.60, although not significant, when pooling current-year and next-year forecast horizons. This suggests that investors interpret monetary surprises primarily as conveying information about the appropriate level of policy rates, potentially reflecting revisions to beliefs about the neutral rate or other factors shifting the entire policy rule, rather than about the central bank's cyclical responsiveness.

The lower panel of Table 9 distinguishes between overdelivery and underdelivery surprises. The pattern for the inflation and output response coefficients remains unchanged: neither type of surprise generates significant revisions to $\hat{\phi}^{\pi}$ or $\hat{\phi}^{y}$. The differences between overdelivery and underdelivery effects are also statistically insignificant. For the intercept $\hat{\phi}$, however, overdelivery surprises generate significant revisions: 1.99 percentage points using 1-year-ahead forecasts, and 1.12 percentage points when pooling forecast horizons. In contrast, underdelivery surprises produce smaller and insignificant intercept revisions. The difference between overdelivery and underdelivery effects is 2.83 percentage points for 1-year-ahead forecasts and 1.88 percentage points for pooled horizons, both significant at the 5% level.

If investors interpreted overdelivery as a signal by the central bank that it would respond more aggressively to inflation going forward, we would expect to see increases in $\hat{\phi}^{\pi}$. Similarly, if overdelivery indicated greater concern about output stabilization, $\hat{\phi}^{y}$ should increase.[8]

The fact that investors do not differentially revise their beliefs about the central bank's responsiveness to inflation or output suggests that the overdelivery premium does not primarily operate through learning about the systematic component of monetary policy. Rather than about how aggressively the central bank will respond to economic developments, overdelivery appears to

[8]These findings also hold when differentiating expansions from recessions and high from low inflation regimes and when allowing for dynamic effects.

convey information about the level of appropriate policy, consistent with signals about either the neutral rate or the central bank's assessment of current economic conditions.

6 Over- and underdelivery for macroeconomic news

Although the earlier evidence suggests that central bank information effects play a role in generating the overdelivery premium, a behavioral explanation could also account for our findings: reference-dependent preferences. If investors evaluate outcomes relative to a reference point, in our case their prior expectations, they might systematically overreact when realized values exceed the reference point but underreact when realized values fall short.

This concept, formalized in prospect theory (Kahneman and Tversky 1979) and the subsequent behavioral economics literature, posits that individuals experience utility gains and losses relative to expectations rather than in absolute terms.[9] Applied to our setting, investors might interpret overdelivery surprises as generating larger "surprise" than underdelivery surprises of equivalent magnitude. This psychological asymmetry could produce differential market reactions even in the absence of any informational differences between over- and underdelivery.

To distinguish between the information effect channel and the reference-dependent preferences channel, we conduct a placebo test using macroeconomic data releases. If reference-dependent utility is a key characteristic of how investors process economic news, we should observe a similar overdelivery premium for macroeconomic surprises: data releases that exceed expectations by more than the change in the indicator (analogous to monetary overdelivery surprises) should generate larger market responses than releases that fall short of expectations. Conversely, if the overdelivery premium is specific to monetary policy announcements, reflecting the unique informational content of central bank decisions, we should find no such asymmetry for macroeconomic data releases.

6.1 Constructing macroeconomic over/underdelivery surprises

We construct measures of over- and underdelivery for macroeconomic data releases using the same conceptual framework we applied to monetary policy decisions. Let X_t denote the realized value of a macroeconomic indicator at time t, $\mathbb{E}_{t-j}[X_t]$ denote the market expectation formed at time $t-j$, and X_{t-1} denote the previous release of the indicator. This definition mirrors our monetary policy classification: overdelivery occurs when the change in the indicator (from the previous release to the current release) exceeds in absolute magnitude what markets had expected, while underdelivery occurs when the actual change falls short of the expected change. We define macroeconomic overdelivery and underdelivery surprises as:

$$Macro_t^{More} = \begin{cases} X_t - \mathbb{E}_{t-j}[X_t] & \text{if } |X_t - X_{t-1}| > |\mathbb{E}_{t-j}[X_t] - X_{t-1}| \\ 0 & \text{otherwise} \end{cases}$$

$$Macro_t^{Less} = \begin{cases} X_t - \mathbb{E}_{t-j}[X_t] & \text{if } |X_t - X_{t-1}| < |\mathbb{E}_{t-j}[X_t] - X_{t-1}| \\ 0 & \text{otherwise} \end{cases}$$

[9] Santoro et al. (2014) develop a structural model in which households display reference-dependent preferences to account for asymmetries in the transmission of monetary policy.

We implement this approach using the Bloomberg survey data that we already employed for constructing the monetary policy surprises. The survey covers also other major macroeconomic releases, of which we study: consumer price index (CPI) inflation, industrial production (IP) growth, unemployment rates, and GDP growth. We then estimate specifications similar to our baseline monetary policy regressions:

$$\Delta Y_{c,t} = \alpha + \beta_M \, Macro_{c,t}^{More} + \beta_L \, Macro_{c,t}^{Less} + \gamma_c + \gamma_{year} + \epsilon_{c,t} \tag{10}$$

where $\Delta Y_{c,t}$ represents the daily change in interest rates in country c on the day of the macroeconomic release at time t. Our sample includes all available Bloomberg survey data for the various macroeconomic releases across our 14 countries from 1997 through 2023, yielding between 822 and 3,091 observations depending on the macroeconomic release and interest rate maturity. To ensure comparability across different releases and countries, we normalize all surprises by the standard deviation of the realized values for each indicator in each country. This way, our coefficients capture the market response to standardized surprise magnitudes rather than raw basis point or percentage point deviations.

6.2 The effect of macroeconomic news

Table 10 presents results for CPI inflation and industrial production surprises. The upper panel shows that standard CPI surprises, without distinguishing over- from underdelivery, generate positive and significant responses in interest rates at medium and longer maturities. A one-standard-deviation positive inflation surprise (indicating higher-than-expected inflation) increases 5-year rates by 1.33 percentage points. Industrial production surprises show a similar pattern, with positive surprises (stronger-than-expected production) raising interest rates significantly at most maturities. This pattern aligns with standard asset pricing responses to inflation or output news: higher-than-expected inflation or output leads investors to anticipate tighter monetary policy going forward, raising nominal interest rates across the term structure.

Each panel of Table 10 also tests whether these macroeconomic surprises exhibit an overdelivery premium analogous to what we found for monetary policy. The differences between overdelivery and underdelivery effects are statistically insignificant at all maturities for both inflation and industrial production surprises. In addition, they lack any consistent pattern as some point estimates are positive (overdelivery larger), others negative (underdelivery larger).

Appendix Table A15 presents equivalent results for unemployment and GDP surprises. For unemployment, standard surprises generate the expected negative relationship with interest rates at most maturities: positive unemployment surprises (higher-than-expected unemployment) lower interest rates. The opposite sign results for GDP growth surprises. However, as was already the case for CPI inflation and industrial production, we find no evidence of an overdelivery premium. This stands in contrast to our monetary policy results, where overdelivery surprises generated systematically and significantly larger responses across all short maturities.

The absence of an overdelivery premium for macroeconomic data releases provides compelling evidence against reference-dependent preferences as an explanation for the main result of this paper. It suggests that the overdelivery premium reflects something specific to central bank decisions rather than a feature of how investors process economic information. This interpretation

Table 10: Macroeconomic data surprises

	Inflation surprises						
	1m	3m	6m	1y	2y	5y	10y
CPI surprises$_{c,t}$	0.178	0.173	0.507***	0.736***	1.062***	1.334***	0.955***
	[0.14]	[0.16]	[0.13]	[0.15]	[0.12]	[0.18]	[0.16]
R^2	0.01	0.01	0.03	0.02	0.04	0.07	0.05
Obs	2 535	2 958	2 767	2 804	2 981	3 091	3 079
	1m	3m	6m	1y	2y	5y	10y
CPI surprises$^{More}_{c,t}$	0.235	0.232	0.405**	0.605***	1.019***	1.382***	1.013***
	[0.18]	[0.21]	[0.17]	[0.21]	[0.14]	[0.27]	[0.24]
CPI surprises$^{Less}_{c,t}$	0.082	0.072	0.685***	0.951***	1.136***	1.254***	0.860***
	[0.23]	[0.23]	[0.18]	[0.21]	[0.19]	[0.17]	[0.16]
Diff *More–Less*	0.153	0.161	-0.280	-0.346	-0.117	0.128	0.153
	[0.30]	[0.32]	[0.24]	[0.29]	[0.24]	[0.33]	[0.29]
R^2	0.01	0.01	0.03	0.02	0.04	0.07	0.05
Obs	2 535	2 958	2 767	2 804	2 981	3 091	3 079
	Industrial production surprises						
	1m	3m	6m	1y	2y	5y	10y
IP surprises$_{c,t}$	0.089	0.462**	0.404**	0.524***	0.456***	0.395***	0.371***
	[0.18]	[0.18]	[0.16]	[0.15]	[0.14]	[0.12]	[0.12]
R^2	0.01	0.02	0.01	0.02	0.03	0.02	0.03
Obs	1 920	1 920	1 920	1 936	1 929	1 936	1 926
	1m	3m	6m	1y	2y	5y	10y
IP surprises$^{More}_{c,t}$	0.143	0.549**	0.465**	0.682***	0.447**	0.410***	0.386***
	[0.24]	[0.22]	[0.21]	[0.20]	[0.18]	[0.15]	[0.14]
IP surprises$^{Less}_{c,t}$	-0.003	0.314	0.301	0.252	0.472**	0.369**	0.346
	[0.27]	[0.30]	[0.24]	[0.21]	[0.21]	[0.18]	[0.20]
Diff *More–Less*	0.146	0.235	0.164	0.430	-0.025	0.041	0.040
	[0.36]	[0.37]	[0.31]	[0.28]	[0.28]	[0.23]	[0.25]
R^2	0.01	0.02	0.01	0.02	0.03	0.02	0.03
Obs	1 920	1 920	1 920	1 936	1 929	1 936	1 926

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (10) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the (overdelivery and underdelivery) components of the macroeconomic data surprises. The constant and the country and year fixed effects are not reported.

is strengthened by the fact that macroeconomic data releases share many features with monetary policy announcements. Both types of events are widely anticipated, heavily surveyed, and have clear benchmark expectations that could serve as reference points. Both types generate significant immediate market reactions. And both types are released on predetermined schedules with limited scope for strategic timing.

That the overdelivery premium only applies to monetary policy announcements points toward the central bank information effects channel. Monetary policy decisions are unique in that they reflect not just mechanical responses to observed data but also the policymakers' interpretation of economic conditions, their forecasts of future developments, and their judgment about appropriate policy in the face of uncertainty. When a central bank overdelivers, it reveals information about all these dimensions, providing a richer signal than a simple data release about one economic variable.

Finally, these results have implications for understanding the broader literature on asset price responses to macroeconomic news. Andersen et al. (2003), Gürkaynak et al. (2005b), and Faust et al. (2007) documents that inflation, employment, and production surprises move asset prices in predictable ways, with responses that vary by maturity in patterns consistent with their implications for monetary policy. Our findings complement this literature by showing that these data surprises operate through standard information channels rather than behavioral asymmetries, and that the over- vs. underdelivery distinction matters uniquely for central bank announcements.

7 Why such an asymmetry?

Our evidence suggests that the overdelivery premium operates primarily through central bank information effects rather than reaction function revisions or behavioral biases. But this raises another fundamental question: why do overdelivery and underdelivery surprises carry such different information content?

When a central bank overdelivers, it moves policy further than markets anticipated, in the direction that markets already expected. This provides a clear, unambiguous signal that policymakers view economic conditions as justifying more aggressive action. The decision to exceed expectations requires multiple conditions to be satisfied simultaneously: the economic data must have evolved beyond what markets perceived, policymakers must have strong confidence in their assessment to deviate from market expectations, and the policy committee must reach consensus on the larger adjustment.

These conditions combine to make overdelivery a strong signal. Modern central banks have increasingly emphasized the importance of transparency and predictability, and usually take policy adjustments in a gradual manner. For a central bank to overcome its preferences for predictability and policy smoothing, the evidence supporting more aggressive action must be strong. When investors observe overdelivery, they can reasonably infer that the central bank had reasons justifying the larger move, has confidence in that assessment, and has achieved internal agreement.

In contrast, underdelivery is inherently ambiguous and creates a fundamental signal extraction problem for investors. When a central bank moves less than expected, this outcome is consistent with multiple possible explanations: (1) uncertainty about whether incoming data represent persistent trends or temporary fluctuations, (2) a desire to smooth policy adjustments to avoid market volatility even when the economic assessment aligns with market expectations, (3) internal disagreement within the policy committee, such that only small or no rate changes could be agreed upon, or (4) a cautious approach to policymaking with preference for gradualism regardless of data developments. Crucially, investors cannot easily distinguish among these interpretations. This signal extraction problem fundamentally limits the information content that investors can extract from underdelivery decisions.

The signal extraction asymmetry can explain why underdelivery generates forecast revisions consistent with standard monetary transmission. Investors process underdelivery primarily as a conventional policy shock without strong informational content because its ambiguity prevents confident extraction of signals about the central bank's economic assessment.

8 Conclusion

This paper documents a novel asymmetry in monetary policy transmission: when central banks exceed market expectations, what we call "overdelivery", investors respond more strongly than when policy decisions fall short of expectations. Using Bloomberg survey data to classify over 2 300 monetary policy decisions across 14 advanced economies from 1997 to 2023, we find that overdelivery surprises generate interest rate responses up to nine times larger than underdelivery surprises of equivalent magnitude at short maturities. This "overdelivery premium" is large, statistically robust, and distinct from previously documented asymmetries related to the sign or size of policy changes.

We explore three potential explanations for this premium: revisions to perceived central bank reaction functions, central bank information effects, and reference-dependent preferences. The evidence points toward central bank information effects. Overdelivery surprises lead professional forecasters to revise their macroeconomic expectations in directions consistent with learning about the central bank's information, raising inflation forecasts and lowering unemployment forecasts following tightening overdelivery, contrary to standard monetary transmission. Underdelivery surprises, in contrast, generate forecast revisions consistent with conventional monetary policy effects. Crucially, we find no similar overdelivery premium for macroeconomic data releases, ruling out general behavioral explanations such as reference-dependent utility and confirming that the asymmetry is specific to monetary policy announcements.

The key to understanding this asymmetry lies in the signal extraction problem facing investors. Overdelivery provides a clear signal: for a central bank to exceed expectations despite institutional preferences for gradualism and predictability, economic conditions must justify more aggressive action, and policymakers must have confidence in that assessment. Underdelivery, by contrast, is fundamentally ambiguous: it could reflect uncertainty about the economy, preferences for policy smoothing, internal committee disagreement, or institutional caution. This multiplicity of interpretations creates a signal extraction problem that limits the information investors can extract from underdelivery decisions, explaining why these surprises generate much weaker market responses even if they have comparable magnitudes.

These findings have important implications for monetary policy strategy and communication. Overdelivery generates strong market effects but may trigger undesirable expectation dynamics. More broadly, our analysis contributes to understanding when and why central bank information effects arise, showing that the clarity embedded in overdelivery decisions make them particularly potent signals about policymakers' views of economic fundamentals. In addition, the overdelivery premium suggests that the standard high-frequency identification approach, which treats surprises of the same magnitude similarly, may actually confound two different types of shocks.

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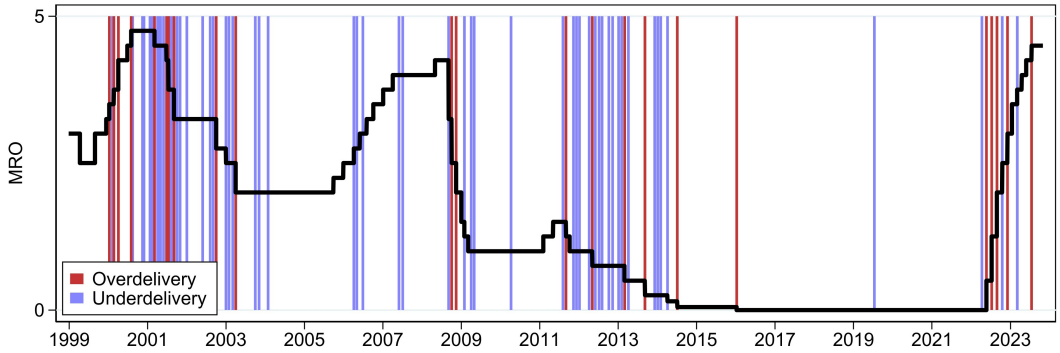
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APPENDIX
For online publication

Figure A1: Over/underdelivery ECB policy rate decisions



Note: This figure displays the distribution of over- (red bars) and underdelivery (blue bars) monetary policy surprises over time in the euro area. The black line plots the Main Refinancing Operations (MRO) rate in percentage points.

Table A1: Over-/Underdelivery occurrences by country

Country	Overdelivery	Underdelivery
Australia	32	39
Canada	38	30
Czech Republic	33	24
Euro area	23	57
Iceland	14	12
Israel	57	64
Japan	2	17
Norway	39	35
New Zealand	35	30
South Korea	27	58
Sweden	37	22
Switzerland	7	16
United Kingdom	40	49
USA	35	27
Total	419	480

Note: The table shows the number of overdelivery and underdelivery surprises in each country.

Table A2: Median Bloomberg survey expectations

	1m	**3m**	**6m**	**12m**
$MPS^{More}_{c,t}$	0.733***	0.735***	0.797***	0.414***
	[0.24]	[0.24]	[0.27]	[0.06]
$MPS^{Less}_{c,t}$	0.076**	0.087**	0.125	0.100
	[0.03]	[0.03]	[0.07]	[0.06]
Diff *More–Less*	0.658***	0.647***	0.671**	0.314***
	[0.235]	[0.236]	[0.273]	[0.084]
R^2	0.25	0.26	0.27	0.16
Obs	2 064	2 214	1 968	2 210
	2y	**5y**	**10y**	**Stock**
$MPS^{More}_{c,t}$	0.281***	0.170***	0.146***	-0.769
	[0.04]	[0.03]	[0.02]	[0.49]
$MPS^{Less}_{c,t}$	0.150	0.151**	0.070	-0.345
	[0.08]	[0.07]	[0.05]	[0.72]
Diff *More–Less*	0.131	0.019	0.076	-0.424
	[0.09]	[0.08]	[0.05]	[0.88]
R^2	0.09	0.04	0.04	0.03
Obs	2 259	2 381	2 381	2 378

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS^{More}_{c,t}$) and underdelivery ($MPS^{Less}_{c,t}$) monetary policy surprises. The constant and the country and year fixed effects are not reported.

Table A3: Clustering standard errors

	1m	**3m**	**6m**	**12m**
	Clustered at the year level			
$MPS_{c,t}^{More}$	0.937***	0.902***	0.951***	0.504***
	[0.25]	[0.25]	[0.31]	[0.09]
$MPS_{c,t}^{Less}$	0.100**	0.124**	0.119	0.139
	[0.05]	[0.05]	[0.08]	[0.07]
Diff *More–Less*	0.836***	0.779***	0.832**	0.365***
	[0.262]	[0.234]	[0.317]	[0.110]
R^2	0.30	0.29	0.30	0.19
Obs	2 064	2 214	1 968	2 210
	Clustered at the year and country levels			
$MPS_{c,t}^{More}$	0.937**	0.902**	0.951**	0.504***
	[0.36]	[0.32]	[0.35]	[0.14]
$MPS_{c,t}^{Less}$	0.100	0.124***	0.119	0.139
	[0.05]	[0.03]	[0.07]	[0.09]
Diff *More–Less*	0.836	0.779**	0.832	0.365**
	[0.383]	[0.323]	[0.397]	[0.157]
R^2	0.30	0.29	0.30	0.19
Obs	2 064	2 214	1 968	2 210

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS_{c,t}^{More}$) and underdelivery ($MPS_{c,t}^{Less}$) monetary policy surprises. The constant and the country and year fixed effects are not reported.

Table A4: Individual estimates for EA/US

	1m	**3m**	**6m**	**12m**
	Euro area			
$MPS^{More}_{EA,t}$	0.088***	0.068***	0.061***	0.091
	[0.03]	[0.02]	[0.02]	[0.05]
$MPS^{Less}_{EA,t}$	-0.070	-0.057	-0.023	0.177
	[0.06]	[0.04]	[0.04]	[0.09]
Diff *More–Less*	0.158**	0.125***	0.084**	-0.085
	[0.069]	[0.044]	[0.041]	[0.104]
R^2	0.09	0.06	0.05	0.03
Obs	282	282	282	282
	United States			
$MPS^{More}_{US,t}$	0.349**	0.662***	0.127	0.280**
	[0.17]	[0.25]	[0.10]	[0.14]
$MPS^{Less}_{US,t}$	0.218	0.155	-0.005	0.234
	[0.21]	[0.10]	[0.10]	[0.13]
Diff *More–Less*	0.132	0.507	0.132	0.046
	[0.261]	[0.268]	[0.140]	[0.188]
R^2	0.03	0.12	0.01	0.06
Obs	213	213	213	213
	All countries except EA/US			
$MPS^{More}_{c,t}$	1.061***	0.993***	1.070***	0.570***
	[0.29]	[0.29]	[0.33]	[0.09]
$MPS^{Less}_{c,t}$	0.085**	0.117***	0.147	0.136
	[0.04]	[0.04]	[0.08]	[0.07]
Diff *More–Less*	0.975***	0.876***	0.923***	0.434***
	[0.295]	[0.291]	[0.344]	[0.115]
R^2	0.29	0.28	0.30	0.19
Obs	1 569	1 719	1 473	1 715

Note: Clustered standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS^{More}_{c,t}$) and underdelivery ($MPS^{Less}_{c,t}$) monetary policy surprises. The constant, the year fixed effects and in the lowest panel the country fixed effects are not reported.

Table A5: Tackling size difference in surprises

	1m	**3m**	**6m**	**12m**
	Excluding large $MPS^{More}_{c,t}$			
$MPS^{More}_{c,t}$	0.904***	0.608***	0.585***	0.445***
	[0.19]	[0.13]	[0.18]	[0.12]
$MPS^{Less}_{c,t}$	0.094***	0.121***	0.121	0.141**
	[0.04]	[0.04]	[0.08]	[0.07]
Diff *More–Less*	0.810***	0.486***	0.465**	0.304**
	[0.194]	[0.142]	[0.198]	[0.144]
R^2	0.13	0.10	0.08	0.07
Obs	1 936	2 072	1 851	2 084
	Standardized monetary surprises			
$MPS^{More}_{c,t}$	0.166***	0.161***	0.168***	0.089***
	[0.05]	[0.05]	[0.05]	[0.01]
$MPS^{Less}_{c,t}$	0.011***	0.013***	0.012	0.015**
	[0.00]	[0.00]	[0.01]	[0.01]
Diff *More–Less*	0.155***	0.148***	0.156***	0.074***
	[0.047]	[0.046]	[0.054]	[0.016]
R^2	0.29	0.29	0.30	0.19
Obs	2 064	2 214	1 968	2 210

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS^{More}_{c,t}$) and underdelivery ($MPS^{Less}_{c,t}$) monetary policy surprises. The constant and the country and year fixed effects are not reported. In the upper panel, we truncate the $MPS^{More}_{c,t}$ distribution to get an average magnitude of 0.06 (by removing values outside 2 SD) to match the distribution of $MPS^{Less}_{c,t}$. In the lower panel, we normalize both monetary surprises to have 1-unit SD.

Table A6: Excluding outliers in the policy rate change and *MPS*

	1m	**3m**	**6m**	**12m**
	Excl. policy change outliers: <-75bp or >75bp			
$MPS_{c,t}^{More}$	0.570***	0.482***	0.498***	0.411***
	[0.06]	[0.05]	[0.05]	[0.04]
$MPS_{c,t}^{Less}$	0.107***	0.129***	0.129	0.141**
	[0.04]	[0.04]	[0.08]	[0.07]
Diff *More–Less*	0.463***	0.353***	0.369***	0.270***
	[0.075]	[0.069]	[0.095]	[0.083]
R^2	0.19	0.19	0.19	0.14
Obs	2 040	2 187	1 942	2 189
	Excl. MPS outliers: <-75bp or >75bp			
$MPS_{c,t}^{More}$	0.718***	0.666***	0.727***	0.527***
	[0.10]	[0.08]	[0.09]	[0.08]
$MPS_{c,t}^{Less}$	0.154***	0.195***	0.110	0.274***
	[0.05]	[0.05]	[0.08]	[0.07]
Diff *More–Less*	0.564***	0.472***	0.617***	0.253**
	[0.111]	[0.097]	[0.121]	[0.112]
R^2	0.26	0.26	0.29	0.20
Obs	2 060	2 209	1 965	2 207

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS_{c,t}^{More}$) and underdelivery ($MPS_{c,t}^{Less}$) monetary policy surprises. The constant and the country and year fixed effects are not reported.

Table A7: Excluding (expected) status quo decisions

	1m	**3m**	**6m**	**12m**
	Excluding status quo decisions			
$MPS_{c,t}^{More}$	0.894***	0.896***	0.924***	0.504***
	[0.28]	[0.26]	[0.30]	[0.08]
$MPS_{c,t}^{Less}$	0.011	0.161	0.296	0.090
	[0.08]	[0.16]	[0.28]	[0.18]
Diff *More–Less*	0.884***	0.734**	0.628	0.414**
	[0.29]	[0.30]	[0.38]	[0.20]
R^2	0.40	0.39	0.39	0.32
Obs	513	576	490	546
	Excluding expected status quo decisions			
$MPS_{c,t}^{More}$	1.007***	0.971***	1.031***	0.505***
	[0.31]	[0.30]	[0.34]	[0.09]
$MPS_{c,t}^{Less}$	0.121**	0.131**	0.164	0.142**
	[0.05]	[0.05]	[0.11]	[0.07]
Diff *More–Less*	0.886***	0.840***	0.867**	0.363***
	[0.32]	[0.30]	[0.37]	[0.11]
R^2	0.36	0.35	0.36	0.26
Obs	849	933	787	912

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS_{c,t}^{More}$) and underdelivery ($MPS_{c,t}^{Less}$) monetary policy surprises. The constant and the country and year fixed effects are not reported.

Table A8: Differentiating the magnitude of policy rate changes

	1m	**3m**	**6m**	**12m**
$MPS^{More}_{c,t}$ | $\lvert\Delta r_t\rvert \leq$25 bp	0.560***	0.510***	0.553***	0.413***
	[0.06]	[0.05]	[0.06]	[0.05]
$MPS^{More}_{c,t}$ | $\lvert\Delta r_t\rvert >$25 bp	1.136***	1.096***	1.115***	0.565***
	[0.38]	[0.37]	[0.41]	[0.13]
$MPS^{Less}_{c,t}$ | $\lvert\Delta r_t\rvert \leq$25 bp	0.113***	0.121***	0.123	0.119
	[0.04]	[0.04]	[0.08]	[0.07]
$MPS^{Less}_{c,t}$ | $\lvert\Delta r_t\rvert >$25 bp	-0.180	0.277	0.212	0.677***
	[0.30]	[0.31]	[0.24]	[0.24]
Diff *More–Less* | $\lvert\Delta r_t\rvert \leq$25 bp	0.447***	0.389***	0.430***	0.294***
	[0.07]	[0.06]	[0.10]	[0.08]
Diff *More–Less* | $\lvert\Delta r_t\rvert >$25 bp	1.315***	0.819	0.903**	-0.112
	[0.48]	[0.46]	[0.44]	[0.27]
R^2	0.32	0.32	0.32	0.19
Obs	2 064	2 214	1 968	2 210

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS^{More}_{c,t}$) and underdelivery ($MPS^{Less}_{c,t}$) monetary policy surprises. The constant and the country and year fixed effects are not reported.

Table A9: Same vs. opposite directions (isolating status quo)

	1m	**3m**	**6m**	**12m**
$MPS^{More}_{c,t}$	0.938***	0.903***	0.951***	0.504***
	[0.26]	[0.26]	[0.30]	[0.08]
$MPS^{SQ}_{c,t}$	0.154***	0.133***	0.114	0.157***
	[0.05]	[0.05]	[0.09]	[0.06]
$MPS^{Less}_{c,t}$	-0.052	0.097	0.147	0.088
	[0.05]	[0.10]	[0.15]	[0.18]
Diff *More–Less*	0.989***	0.805***	0.804**	0.416**
	[0.27]	[0.28]	[0.33]	[0.20]
Diff *More–SQ*	0.784***	0.769***	0.837***	0.347***
	[0.27]	[0.26]	[0.31]	[0.10]
Diff *SQ–Less*	0.205***	0.036	-0.032	0.070
	[0.07]	[0.11]	[0.17]	[0.19]
R^2	0.30	0.29	0.30	0.19
Obs	2 064	2 214	1 968	2 210

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS^{More}_{c,t}$) and underdelivery ($MPS^{Less}_{c,t}$) monetary policy surprises, where the latter are split into underdelivery cases where an interest rate change was expected but not delivered ($MPS^{SQ}_{c,t}$) and the remaining cases. The constant and the country and year fixed effects are not reported.

Table A10: The overdelivery premium at the start/during a cycle

	1m	**3m**	**6m**	**12m**
$MPS^{More}_{c,t}$ Ongoing	1.003***	0.938***	0.980***	0.478***
	[0.33]	[0.32]	[0.36]	[0.10]
$MPS^{More}_{c,t}$ Start	0.718***	0.771***	0.830***	0.585***
	[0.16]	[0.19]	[0.17]	[0.09]
$MPS^{Less}_{c,t}$	0.100***	0.124***	0.118	0.139**
	[0.04]	[0.04]	[0.08]	[0.07]
Diff *More* Ongoing–Start	0.284	0.167	0.150	-0.107
	[0.35]	[0.35]	[0.38]	[0.13]
R^2	0.30	0.30	0.31	0.19
Obs	2 064	2 214	1 968	2 210

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery monetary policy surprises during a monetary policy cycle ($MPS^{More}_{c,t}$ Ongoing) and at the start of a cycle ($MPS^{More}_{c,t}$ Start) and on the underdelivery monetary policy surprises($MPS^{Less}_{c,t}$). The constant and the country and year fixed effects are not reported.

Table A11: The overdelivery premium in tightening vs. easing cycles

	1m	**3m**	**6m**	**12m**
$MPS^{More}_{c,t}$ Easing	0.991***	0.947***	0.996**	0.416***
	[0.38]	[0.36]	[0.41]	[0.07]
$MPS^{More}_{c,t}$ Tightening	0.824***	0.800***	0.833***	0.663***
	[0.16]	[0.14]	[0.16]	[0.17]
$MPS^{Less}_{c,t}$ Easing	0.079	0.138**	0.249***	0.118
	[0.04]	[0.06]	[0.09]	[0.08]
$MPS^{Less}_{c,t}$ Tightening	0.158**	0.076	-0.053	0.210**
	[0.07]	[0.07]	[0.13]	[0.10]
Diff *More–Less* Easing	0.912**	0.808**	0.747	0.298***
	[0.39]	[0.37]	[0.41]	[0.10]
Diff *More–Less* Tightening	0.666***	0.724***	0.885***	0.453**
	[0.19]	[0.17]	[0.22]	[0.21]
R^2	0.30	0.30	0.31	0.20
Obs	2 064	2 214	1 968	2 210

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS^{More}_{c,t}$) and underdelivery ($MPS^{Less}_{c,t}$) monetary policy surprises, separately for easing and tightening cycles. The constant and the country and year fixed effects are not reported.

Table A12: Next decision frontloaded:
Controlling for policy expectations over next-month and 3-month ahead

	1m	**3m**	**6m**	**12m**
		Next month ahead		
$MPS^{More}_{c,t}$	.	0.249***	0.305***	0.335***
		[0.09]	[0.10]	[0.06]
$MPS^{Less}_{c,t}$	.	0.041	-0.013	0.082
		[0.03]	[0.08]	[0.06]
$\Delta rate_{1m}$	.	0.745***	0.688***	0.290***
		[0.16]	[0.17]	[0.08]
Diff *More–Less*	.	0.208**	0.319***	0.252***
		[0.09]	[0.11]	[0.09]
R^2	.	0.66	0.64	0.26
Obs	.	2 064	1 818	2 025
		3-month ahead		
$MPS^{More}_{c,t}$	.	.	0.173**	0.284***
			[0.08]	[0.06]
$MPS^{Less}_{c,t}$	.	.	-0.049	0.068
			[0.07]	[0.06]
$\Delta rate_{3m}$	.	.	0.764***	0.384***
			[0.11]	[0.09]
Diff *More–Less*	.	.	0.222**	0.216***
			[0.10]	[0.08]
R^2	.	.	0.74	0.30
Obs	.	.	1 968	2 043

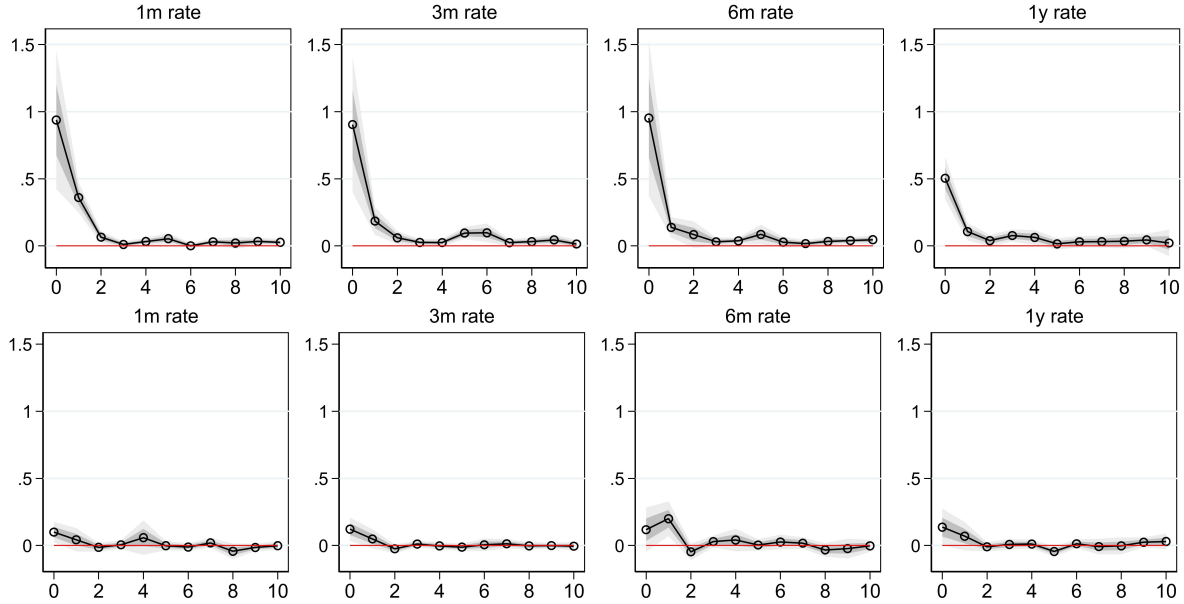
Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS^{More}_{c,t}$) and underdelivery ($MPS^{Less}_{c,t}$) monetary policy surprises. The constant and the country and year fixed effects are not reported. Changes in 1-month (upper panel) and 3-month (lower panel) interest rates are added as a control.

Table A13: MP news vs. CB information effects

	1m	3m	6m	12m	2y	5y	10y	Stock
$MPS^{More}_{c,t}$ MP-dom	1.156***	1.205***	1.242***	0.460***	0.341***	0.197***	0.191***	-4.698***
	[0.43]	[0.40]	[0.47]	[0.08]	[0.06]	[0.05]	[0.03]	[0.57]
$MPS^{More}_{c,t}$ CBI-dom	0.665***	0.483***	0.541***	0.542***	0.259***	0.125**	0.104***	4.321***
	[0.16]	[0.13]	[0.15]	[0.14]	[0.05]	[0.05]	[0.04]	[0.54]
$MPS^{Less}_{c,t}$ MP-dom	0.225***	0.300***	0.156	0.332***	0.393***	0.354***	0.193**	-7.137***
	[0.08]	[0.08]	[0.14]	[0.11]	[0.12]	[0.09]	[0.08]	[0.83]
$MPS^{Less}_{c,t}$ CBI-dom	0.046	0.043	0.059	0.053	0.072	0.105	0.072	4.846***
	[0.03]	[0.03]	[0.07]	[0.06]	[0.07]	[0.08]	[0.06]	[1.18]
Diff *More–Less* MP-dom	0.931**	0.905**	1.086**	0.128	-0.052	-0.157	-0.002	2.439**
	[0.441]	[0.411]	[0.491]	[0.137]	[0.138]	[0.108]	[0.092]	[1.032]
Diff *More–Less* CBI-dom	0.619***	0.439***	0.482***	0.490***	0.187**	0.019	0.032	-0.525
	[0.16]	[0.13]	[0.17]	[0.15]	[0.09]	[0.09]	[0.07]	[1.30]
R^2	0.31	0.33	0.34	0.19	0.10	0.05	0.04	0.15
Obs	2 064	2 214	1 968	2 210	2 259	2 381	2 381	2 378

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (2) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the overdelivery ($MPS^{More}_{c,t}$) and underdelivery ($MPS^{Less}_{c,t}$) monetary policy surprises. The constant and the country and year fixed effects are not reported. Whether a policy decision is classified as dominated by pure monetary policy and central bank information effects follows the discrete decomposition ("poor's man approach") of Jarociński and Karadi (2020).

Figure A2: Persistence



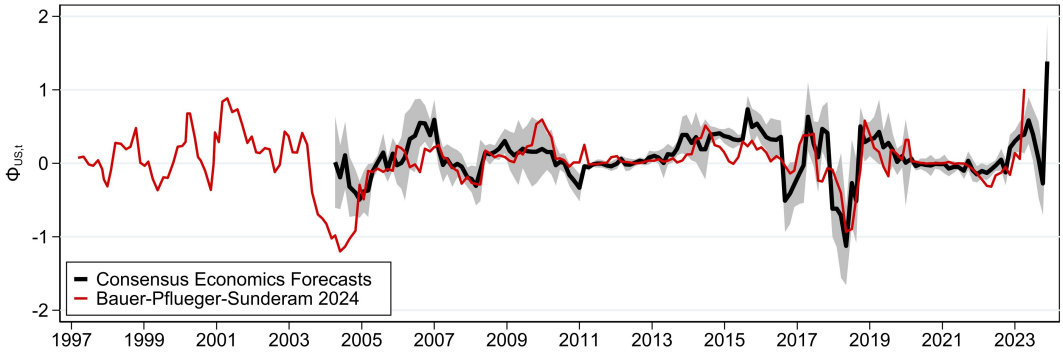
Note: These figures show the dynamic effects on 1-month to 12-month interest rates over 10 days for β_M (upper panel) and β_L (lower panel) estimated with Equation (3). Shaded areas represent 68% and 95% confidence intervals.

Table A14: GDP forecast responses to monetary surprises

	Nowcast	CY	1Y	NY
$MPS_{c,t}$	-2.200	0.627	0.372	-0.423
	[1.32]	[0.39]	[0.20]	[0.23]
R^2	0.01	0.02	0.14	0.04
Obs	902	1 789	1 789	1 789
	Nowcast	CY	1Y	NY
$MPS^{More}_{c,t}$	-0.809	1.232**	0.668**	-0.573
	[1.45]	[0.55]	[0.27]	[0.33]
$MPS^{Less}_{c,t}$	-5.645	-0.950***	-0.397**	-0.032
	[3.77]	[0.36]	[0.17]	[0.17]
Diff *More–Less*	4.836	2.182***	1.065***	-0.541
	[4.39]	[0.69]	[0.33]	[0.39]
R^2	0.01	0.03	0.15	0.04
Obs	902	1 789	1 789	1 789

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equations (4) and (5) using OLS. The dependent variable is the revision in GDP growth forecast at different horizons (Nowcast, Current Year, 1 Year ahead, Next Year) for country c at date t, regressed on the (overdelivery and underdelivery) Bloomberg-based monetary policy surprises. The constant and the country and year fixed effects are not reported.

Figure A3: Perceived inflation coefficient in the US



Note: This figure plots the comparison of our measure of perceived inflation responsiveness coefficient (black line with 95% confidence interval) for the US across time estimated with Equation (6) together with the equivalent measure from Bauer et al. (2024).

Table A15: Over/Underdelivery for macroeconomic news

	GDP surprises						
	1m	3m	6m	1y	2y	5y	10y
GDP surprises$_{c,t}$	-0.097	-0.057	-0.066	0.372**	0.461**	0.441***	0.303**
	[0.18]	[0.16]	[0.21]	[0.17]	[0.19]	[0.16]	[0.14]
R^2	0.05	0.03	0.13	0.06	0.06	0.07	0.06
Obs	822	928	909	959	1 031	1 047	1 046
	1m	3m	6m	1y	2y	5y	10y
GDP surprises$^{More}_{c,t}$	-0.012	0.047	0.016	0.630***	0.589**	0.408	0.374**
	[0.20]	[0.15]	[0.16]	[0.20]	[0.26]	[0.21]	[0.18]
GDP surprises$^{Less}_{c,t}$	-0.232	-0.225	-0.195	0.021	0.279	0.487**	0.203
	[0.33]	[0.34]	[0.48]	[0.29]	[0.28]	[0.24]	[0.22]
Diff *More–Less*	0.220	0.272	0.211	0.609	0.310	-0.079	0.171
	[0.37]	[0.37]	[0.51]	[0.35]	[0.37]	[0.31]	[0.28]
R^2	0.05	0.03	0.13	0.06	0.06	0.07	0.06
Obs	822	928	909	959	1 031	1 047	1 046
	Unemployment surprises						
	1m	3m	6m	1y	2y	5y	10y
Unemployment surprises$_{c,t}$	0.111	0.139	-0.067	-0.076	-0.196**	-0.287***	-0.203**
	[0.14]	[0.13]	[0.12]	[0.10]	[0.09]	[0.08]	[0.09]
R^2	0.04	0.03	0.02	0.02	0.02	0.03	0.02
Obs	2 271	2 531	2 505	2 722	2 852	2 852	2 852
	1m	3m	6m	1y	2y	5y	10y
Unemployment surprises$^{More}_{c,t}$	0.345	0.400	0.053	0.139	-0.301	-0.339**	-0.266
	[0.36]	[0.32]	[0.29]	[0.22]	[0.19]	[0.15]	[0.15]
Unemployment surprises$^{Less}_{c,t}$	-0.010	-0.022	-0.141**	-0.201	-0.132	-0.256***	-0.165
	[0.10]	[0.08]	[0.07]	[0.11]	[0.09]	[0.10]	[0.11]
Diff *More–Less*	0.355	0.422	0.194	0.340	-0.169	-0.083	-0.101
	[0.38]	[0.34]	[0.29]	[0.25]	[0.21]	[0.17]	[0.18]
R^2	0.04	0.03	0.02	0.02	0.02	0.03	0.02
Obs	2 271	2 531	2 505	2 722	2 852	2 852	2 852

Note: Robust standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01. Parameters are estimated from Equation (10) using OLS. The dependent variable is the daily change in the indicated asset price for country c on date t, regressed on the (overdelivery and underdelivery) components of the macroeconomic data surprises. The constant and the country and year fixed effects are not reported.