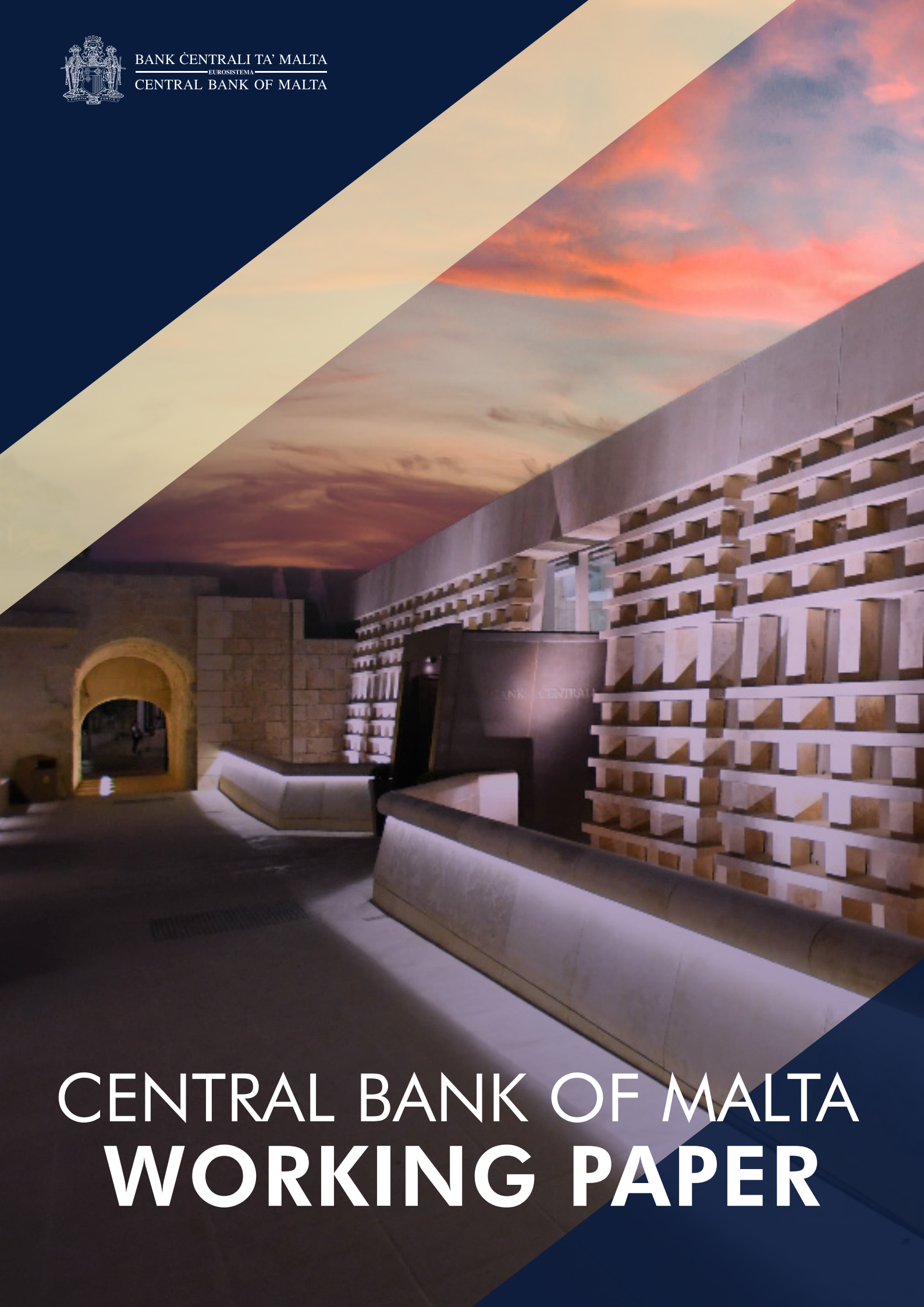

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Market-based Monetary Policy Uncertainty Shocks in the Euro Area

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Abstract

This paper investigates the transmission of monetary policy to financial markets within the Euro area, focusing on the role of uncertainty. While previous research has extensively examined the effects of changes in expected policy rates through event studies of European Central Banks (ECB) announcements, the impact of second moments and uncertainty has been far less explored. We address this gap by introducing a novel market-based measure of uncertainty regarding future interest rates, calculated as the difference in the standard deviation of Overnight Index Swap (OIS) rates in a three-day window around ECB policy announcements. Our findings reveal that ECB announcements generally increase market uncertainty about future interest rates, regardless of the sign of the policy surprise. This increased uncertainty significantly impacts asset prices, leading to higher nominal yields, lower stock market returns, and Euro appreciation against safe-haven currencies.

JEL Classification: F41;F42; F45; E62; C23

Keywords: Monetary Policy Surprises; Monetary Uncertainty; Uncertainty shocks; Asymmetry

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1 Introduction

Understanding the transmission of monetary policy to financial markets is crucial for private investors and economic institutions alike. While extensive research has examined the effects of changes in expected policy rate through event studies of Federal Open Market Committee (FOMC) announcements using high-frequency data, the role of second moments and uncertainty has been far less explored, especially so in the context of Euro Area monetary policy. This paper addresses the gap by employing a new market-based measure of uncertainty regarding future interest rates, both short and long-term, to study in depth uncertainty stemming from ECB announcements and its effects on asset prices within the Euro Area.

Figure 1 highlights several ECB monetary policy announcement dates where the first and second moments of market rates show significant differences in their behavior.

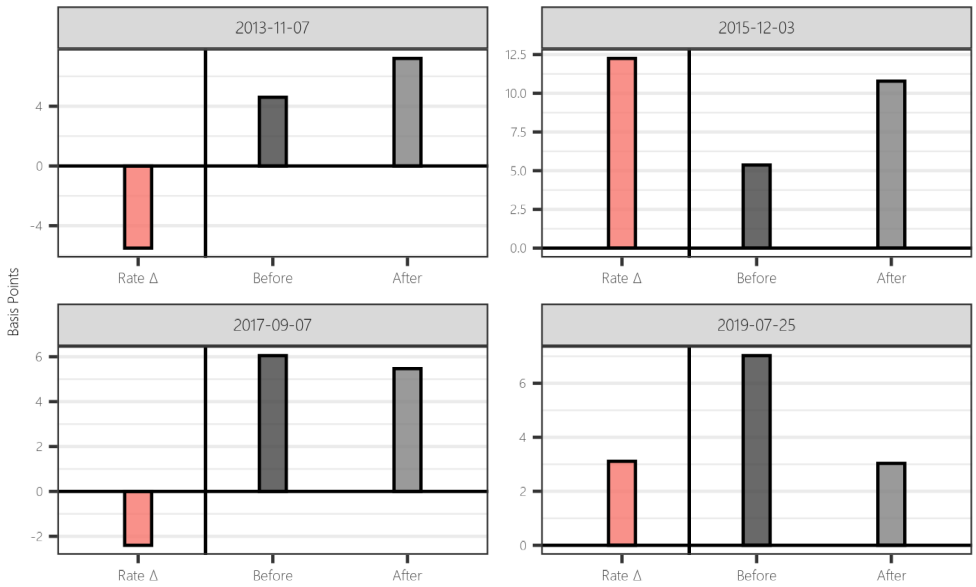

Figure 1: 10Y OIS Rate Change (red bars) and Standard Deviation (grey bars) around selected GovC meetings)

- November 7, 2013: This date corresponds to a negative monetary surprise, with a rate loosening of nearly 5 basis points (bps) and a widening range from 4 to 8 bps. This meeting was one of the first where the ECB introduced forward guidance on the future path of interest rates and seem to have led to divergent views on the financial markets, widening the spreads of OIS rate trades.

- December 3, 2015: This date depicts a significant positive monetary surprise. The financial markets were disappointed by the ECB's decision to increase the size of its QE program, as they had expected a larger increase. The range of quotes roughly doubled, from 5 bps to over 10 bps, but this time with an overall tightening.

- September 7, 2017: The third panel shows a day with almost no monetary surprise, and the range remains unchanged. Such policy dates are rare, as there is usually some news

for the financial markets following a monetary event.

- July 25, 2019: This date shows a tightening but a significant drop in volatility. During this meeting, Mario Draghi, ECB president during this time, hinted more strongly than expected at the possibility of future rate cuts and additional stimulus measures, signalling the ECB's readiness to support the Eurozone economy. In this case, forward guidance was accurate.

Our study makes two significant contributions. First, we introduce a novel uncertainty measure based on high-frequency market prices in narrow windows around ECB policy announcements: We calculate the measure as the difference between the standard deviation of OIS rates at different tenors in a 3-days window before and after the monetary event. To address problems of tick data availability and computational feasibility, based on the seminal work by Parkinson (1980), we calculate a proxy standard deviation for each instrument as the daily high-low range of individual rates. This model-free measure enables us to analyze changes in monetary policy uncertainty around ECB announcements across the whole yield curve spectrum. We refer to these shifts as monetary policy uncertainty (MPU) surprises rather than shocks. When changes are orthogonal to the state of the economy, as in VAR set ups, they are usually called policy shocks. Since our deviations are unexpected by definition, they are orthogonal to the information set of financial market participants and hence, called (market-based) policy uncertainty surprises (pp. 9-10, Altavilla et al. (2019)).

Compared to Fed policy announcements that, on average, decrease monetary policy uncertainty (Bauer et al. (2021)), we find ECB announcements to have a more varied effect and, if anything, on average, to increase uncertainty in markets on the future path of interest rates.[1] This increase does not depend on the type of first moment surprise (hawkish or dovish), but is positively related to its magnitude.

The second contribution of the paper is to highlight an uncertainty channel in the transmission of ECB actions to financial markets. Changes in policy uncertainty significantly impact asset prices, distinct from the effects of shifts in expectations or conventional high-frequency policy surprises (Altavilla et al. (2019)). We find that increased uncertainty around ECB announcements leads to higher nominal yields, negatively affects the stock market by lowering Euro Stoxx 50 and S&P 500 returns, and causes the euro to appreciate vis-a-vis safe haven currencies.

The observed effect on asset prices aligns with a risk-based explanation. When uncertainty increases, investors demand a higher return for bearing additional risk, which is reflected in higher risk premia (Swanson (2006), Rudebusch et al. (2006)). This increase in risk premia leads to higher yields on bonds and other fixed-income securities, as investors require greater compensation for the perceived increase in risk. In the context of the stock market, higher uncertainty typically results in lower stock prices. This is because the increased risk premia raise the discount rate applied to future cash flows, reducing the present value of these cash flows and, consequently, the stock prices (De Pooter et al. (2021)). Additionally, heightened uncertainty can lead to greater market volatility, which further discourages investment in equities as investors seek safer, more predictable returns. In a nutshell, the overall effect is a re-pricing of assets to reflect the higher level of risk in the market.

[1] Bauer et al. (2021) construct their measure of monetary policy uncertainty around Fed announcements from daily changes in the variance of short-term Eurodollar futures. In contrast to our measure though, given the focus on monetary policy, a disadvantage of Eurodollar derivatives is that their underlying rate is LIBOR.

This paper is organized as follows: Chapter 2 provides a review of the existing literature on monetary policy uncertainty and central bank information shocks. Chapter 3 presents a description of the data used to construct the indices, accompanied by summary statistics and correlation analyses. Chapter 4 introduces a straightforward regression model to examine the relationship between uncertainty and key financial variables. Finally, Chapter 5 concludes the paper.

2 Literature Review

This paper relates to three different strands of the literature: first and foremost, research that employs market-based metrics of second moments to explore how risk and uncertainty influence the transmission of monetary policy to financial markets, second, work on the isolation of monetary policy shocks[2], and third, studies on text-based measures of uncertainty and central bank communication. Swanson (2006) was among the first to show that option-based US short-rate uncertainty decreased from 1989 to 2003, particularly around FOMC announcements post-1994, attributing this to greater Fed transparency. Bundick et al. (2017) found that increased short-rate uncertainty positively impacts term premia around these announcements. De Pooter et al. (2021) noted that the impact of monetary policy surprises on long-term yields is contingent on short-rate uncertainty, attributing this to Primary Dealers' bond inventory management. Kroencke et al. (2021) identified an "FOMC risk shift" as a distinct aspect of FOMC announcement effects, characterized by changes in risk spreads and the VIX independent of conventional policy surprises, and linked this to stock returns. Finally, Bauer et al. (2021) contribute to the literature introducing a novel, market-based measure of policy uncertainty derived from Eurodollar futures and options prices. Their research highlights the cyclical nature of uncertainty around FOMC announcements, showing that these announcements significantly reduce uncertainty, which then gradually increases until the next meeting. They demonstrate that changes in policy uncertainty have distinct effects on asset prices, including bonds, stocks, and exchange rates, separate from conventional policy surprises. In contrast to the literature, that focused exclusively on the US, we concentrate on the Euro Area. We show that, while FED announcements tend to decrease uncertainty about the future path of monetary policy, ECB announcements have a much more varied effect and, if anything, they increase uncertainty. We confirm the existence of an "uncertainty channel" of policy announcements for the Euro Area.

Our study contributes to the literature on monetary policy shocks, particularly research that measures such shocks using high-frequency market prices in narrow windows around policy announcements (e.g.,Kuttner (2001); Cochrane and Piazzesi (2002);Bernanke and Kuttner (2005); Guerkaynak et al. (2005); Altavilla et al. (2019)). These studies use changes in risk-free market rates before and after policy statements as proxies for monetary policy shocks. Specifically, Altavilla et al. (2019) extract three factors from OIS changes, each loading on different segments of the risk-free yield curve (short, medium, and long end). They demonstrate that these extracted factors, or monetary shocks, significantly and sizably affect sovereign yields, stock returns, and exchange rates. We take the aforementioned work a step further by using changes in the constructed variance of OIS returns before and after policy statements to construct monetary policy

[2]The identification of first moment monetary policy shocks will not be covered in this literature analysis. More information is provided by Jarocinski and Karadi (2020).

uncertainty shocks for the Euro Area. These shocks represent changes in market participants' uncertainty regarding the path of risk-free rates following a monetary policy announcement. The advantage of this measure over more complicated methods is that it has a very clear economic interpretation and that it is available at a daily frequency.

Finally, in recent years, a plethora of research has emerged concerning the text analysis of central bank information shocks. Specifically, there is a growing body of literature exploring how the way of central bank communication affects asset prices. For example, Hansen et al. (2019) study the Bank of England's Inflation Report using machine learning. They show that communication about uncertainty can more easily explain the reaction of future interest rate expectations. Similarly, Gebauer and Schumacher (2024) identified the sentiment in ECB monetary statements on various topics, such as inflation and economic outlook. They extracted communication shocks for each topic and sentiment, demonstrating that these shocks impact macroeconomic outcomes. The closest paper to ours is Mumtaz et al. (2023), which shows that more complex communication during Bank of England monetary events is associated with larger volatility of SONIA rates. Our approach, however, differs significantly, as we focus on the ECB and Euro Area and classify large changes in volatility ex-post, not focusing on the reasons behind the larger dispersion, but rather producing new data to study its effect on financial assets.

3 Data

3.1 Concept and Summary Statistics

We use daily high and low quotes for Overnight Index Swaps (OIS) at different maturities (3 months, 6 months, 1 year, 2 years, and 10 years) from Reuters Refinitiv. These instruments display the market participants' beliefs about future short-term interest rate movements and hence, carry information on how monetary announcements are perceived. To calculate the proxy standard deviation for each instrument, we take the average high-low range over the 3 days before and after each Governing Council meeting and subtract the latter from the former to determine the change.[3] More formally:

$$\text{MPU}_{m,t} = \left(\frac{1}{3} \sum_{i=-3}^{-1} (H_{m,t+i} - L_{m,t+i}) \right) - \left(\frac{1}{3} \sum_{i=1}^{3} (H_{m,t+i} - L_{m,t+i}) \right) \tag{1}$$

Where $H_{m,t}$ represents the high quote for the OIS at maturity (m) and $L_{m,t}$ represents the low quote for the OIS at maturity (m) on governing council day (t). Following the extreme value approach from Parkinson (1980) [4] we proxy uncertainty before and after the announcement using the range between high and low values. The difference in this proxied standard deviation between before and after the announcement then describes an exogenous shift in market uncertainty for each time horizon. This allows us to create a uncertainty index for different horizons[5], similar to the monetary policy surprises by Altavilla et al. (2019). Hence the index itself displays the difference in uncertainty measured in basis points after each policy announcement.

[3] In choosing the window, there is clear precision/recall trade-off. We experiment with other windows' sizes, with highly correlated results.

[4] Parkinson (1980) shows that the variance of a rate of return is the diffusion constant of the underlying random walk process. The extreme value method provides a better estimate of that diffusion constant that traditional methods do, as it is more sensitive to variations in the constant.

[5] The horizons are 3 and 6 months, 1, 2, 5 and 10 years.

Figure 2 shows the resulting measure for the 10-year OIS for all monetary policy meetings after July 2011.[6] [7] A rising MPU corresponds to an increase in the proxied standard deviation of the 10-year OIS following the ECB policy announcements i.e. a higher dispersion of OIS quotes, and the other way around. These deviations are expressed in basis points.

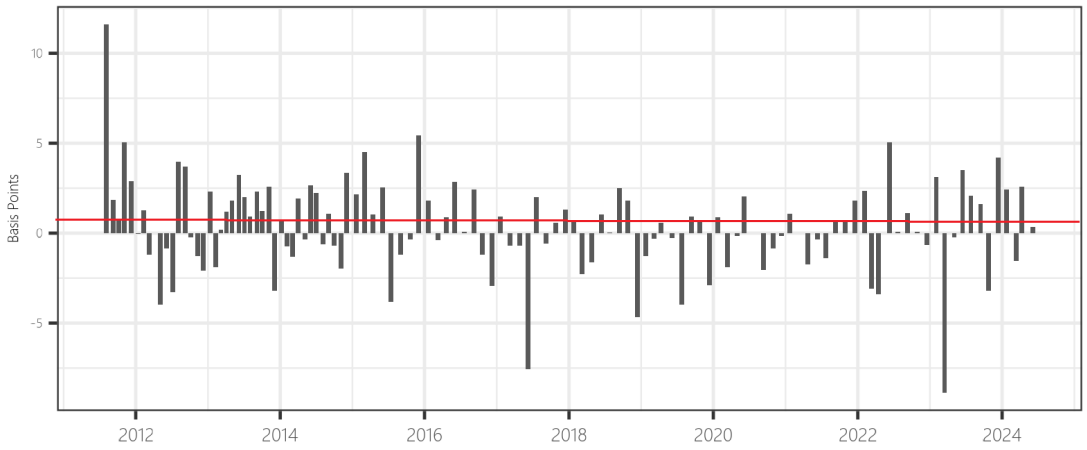

Figure 2: Monetary Policy Uncertainty Surprises (10Y OIS), by Governing Council (red line - average value)

We find that ECB announcements and policy actions have a varied effect on uncertainty about the path of 10Y interest rates. Overall, the mean is clearly positive thus uncertainty increases around most of them (57%).

Tenor	N.obs.	MPU>0	MPU<0	MPU>0 (%)
3mnt	195	109	86	55.9
6mnt	196	112	84	57.1
1Y	195	120	75	61.5
2Y	196	114	82	58.2
5Y	117	63	54	53.8
10Y	114	65	49	57

Table 1: Share of MPU Increases by Tenor

This result is robust across rate horizon (Table 1) and contrasts significantly with the results Bauer et al. (2021) found for FED announcements, where the vast majority of meetings leads to a decline in uncertainty. Moreover, in the Euro Area the volatility levels show a stable pattern over time. This consistency in key moments suggests that while the immediate market response may vary based on the horizon under consideration, the underlying trend of increased uncertainty remains a persistent feature of policy announcements.

[6] For all rates, with the exception of the 5 and 10Y, we have data from 2005 to September 2024.
[7] For the complete MPU time series plots, refer to the Appendix.

Table 2 provides detailed summary statistics for MPU surprises. The average value of these changes is relatively small, yet consistently positive, ranging from 0.3 bps for the 3-months to 0.5 bps for the 2-Year OIS.

	(1)	(2)	(3)	(4)	(5)
Tenor	N	Mean	SD	Min	Max
3-Month	196	0.00328	0.0264	-0.185	0.180
6-Month	196	0.00347	0.0286	-0.285	0.136
1-Year	196	0.00309	0.0316	-0.353	0.095
2-Year	196	0.00445	0.0344	-0.289	0.138
5-Year	115	0.00349	0.0333	-0.114	0.224
10-Year	117	0.00358	0.0257	-0.0887	0.116

Table 2: Summary Statistics of MPU Surprises by Tenor.

The standard deviation of the surprises is nearly ten times larger than the mean, highlighting a significant degree of variability across time, with the 2-Year tenor that exhibits the highest degree. This spread in values indicates that while uncertainty generally rises following announcements, the extent of this rise is far from uniform. Distinct patterns emerge across short-, medium-, and long-term horizons. Specifically, we observe similar behavior pairwise for the 3- and 6-month , the 1- and 2-year and the 5- and 10-year horizon, consistent with different portions of the yield curve. The 5- and 10-year horizons display the largest degree of variation. In contrast, for shorter horizons like the 3-month OIS rate, uncertainty appears to exert a less pronounced influence, potentially because short-term rates are less sensitive to shifts in expectations.

3.2 Correlation Analysis with Macroeconomic Indicators

This section highlights key findings on the behavior of our indices and their dynamics over time. Table 3 reports correlation coefficients with various measures, such as inflation dynamics and monetary policy behavior.

During the reviewed period, monetary policy uncertainty in the Euro Area tends to be higher when inflation is low and lower when inflation is high. At first glance, this may seem counterintuitive, as one might expect that large policy shifts, such as rate hikes during inflationary spikes, would elevate uncertainty. However, as shown below, periods characterized by stable or easing monetary policy are associated with higher uncertainty levels. In contrast, periods of high inflation or active policy tightening exhibit lower market uncertainty, particularly for the 1-year maturity. This pattern is likely influenced by the Zero Lower Bound (ZLB) phase, which marked a major period of easing monetary policy.

This relationship suggests that it is not merely the magnitude of policy adjustments driving uncertainty but rather the type of announcement, their predictability or the clarity of communication surrounding these changes. For instance, during inflationary periods, potential policy hikes often receive extensive media coverage, allowing market participants to become more in-

formed and reducing uncertainty. This interpretation aligns with the absent correlation between uncertainty and monetary surprises discussed in the next chapter.

When market participants perceive clear and consistent guidance from central banks, even positive surprises do not necessarily lead to higher uncertainty. Instead, agents might view these adjustments as part of a credible strategy to combat inflation. Similarly, during periods requiring monetary easing at the Zero Lower Bound (ZLB), the ECB had to implement unconventional monetary policies to achieve a more expansive effect despite the natural threshold. While the correlations are not statistically significant for either maturity, the results still suggest that such unconventional policies correlate with higher uncertainty.

Inflation/ MP Phases - Correlations

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	10-Year	5-Year	2-Year	1-Year	6-Month	3-Month
High Inflation >2%	-0.0215	-0.0753	-0.0977	-0.0958	-0.1263*	-0.0576
Low Inflation ≤2%	0.0215	0.0753	0.089	0.0774	-0.1077	0.0418
Interest Rate i	-0.0879	-0.0637	-0.0624	-0.0468	-0.0956	-0.0041
Hike $\Delta i > 0$	-0.0567	0.1443	-0.0786	-0.1281*	-0.0382	-0.0927
Ease $\Delta i < 0$	0.1153	0.0896	0.0632	0.0402	0.0282	-0.0018
Unchanged $\Delta i = 0$	-0.0469	-0.1723*	0.0015	0.0525	0.0028	0.0627
CISS	0.1512*	0.205**	0.1703**	0.138**	0.1429**	0.0905
BBD EPU	-0.113	0.0203	0.0085	0.039	0.1266	0.2434

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Correlation of uncertainty indices with different maturities (row) with various measures (column). Inflation is measured by HICP, and monetary policy behavior is instrumented by the MRO. CISS is the Composite Indices of Systematic Stress. The BBD EPU index corresponds to the average EPU index for Germany, France, Italy and Spain taken from the Economic Policy Uncertainty website following Baker et al. (2016).

We further compare our new uncertainty indices with two established measures: the weekly Composite Index of Systemic Stress (CISS)[8], a daily measure developed by the European Central Bank to monitor and assess systemic stress in the financial system, and the Economic Policy Uncertainty (EPU) Index[9], which aggregates policy-related content from major newspapers in Germany, France, Italy, and Spain into a monthly weighted average. The CISS exhibits a consistently positive and significant correlation with our index, particularly at medium and longer-term maturities. As the CISS is also a market-based measure of risk, tracking real-time stress levels in the financial system, both indices share a common origin (Kremer et al. (2012)). This suggests that heightened uncertainty around interest rates and increased volatility in other financial instruments are closely interlinked. Higher stress in the financial system could either lead to more heterogeneous beliefs about monetary policy or elevated monetary policy

[8]Source: Eurostat, https://data.ecb.europa.eu/data/datasets/CISS
[9]Source: Economic Policy Uncertainty website, https://www.policyuncertainty.com.

uncertainty directly influences investor sentiment.

In contrast, the correlation between the EPU and MPU is low and statistically insignificant, indicating that these indices capture different dimensions of uncertainty. The EPU, derived from news announcements, reflects immediate market reactions to policy-related news and events. It captures how current news shapes short-term market sentiment and investor perceptions of present economic conditions. Thus, this measure can be used for political uncertainty rather than financial markets related. On the other hand, our MPU indicators measure the uncertainty priced into financial markets, representing longer-term market expectations and risks associated with monetary policy.[10]

Thus, our market-based OIS monetary policy uncertainty index appears to provide a comprehensive measure of financial rather than policy-related uncertainty across different horizons. It captures the short-term volatility influenced by current events while also reflecting longer-term dynamics and structural expectations, making it a reliable measure that integrates both immediate and extended perspectives on uncertainty in monetary policy. This dual capability suggests that the OIS-based index can serve as a versatile tool for understanding how uncertainty affects both near-term economic conditions and the shaping of long-run investment and policy expectations.

3.3 Monetary Policy and Monetary Policy Uncertainty Surprises

In this subchapter, we examine the dynamics between the well-known monetary surprises and our monetary uncertainty surprises. While the terminology may appear similar, the two concepts capture fundamentally different aspects of monetary policy. Table 4 shows the five GovC with the biggest increase in our identified monetary policy uncertainty index and ranked by size. For each entry, the table reports the dates, monetary policy (MP) surprises (from Altavilla et al. (2019)), monetary policy uncertainty (MPU) surprises, the decisions taken, and a short description of the context. At a first glance, the table contains both instances of positive and negative monetary policy surprise, already hinting at a weak relationship between MP and MPU surprises. Moreover, these cases illustrate how ECB decisions involving unexpected changes or new policy paths (independently from the direction), highly increase the uncertainty surrounding monetary policy in the Eurozone. Table 5 displays the same information, but for the top 5 decreases in uncertainty. Also in this case, we do not detect any relationship between first, captured by the monetary surprises, and its second moment, proxied through our uncertainty indicators.

[10] Baxa et al. (2023) finds a similar result for the the FED MPU.

GovC Date	MPU Surprise	MP Surprise	Decision	Description
2011-08-04	11.6	-3.40	ECB decided to keep interest rates unchanged.	The Governing Council expressed significant concerns about the risks to the economic outlook, particularly due to the sovereign debt crisis in the Eurozone. President Jean-Claude Trichet emphasized the heightened uncertainty and the need for strong vigilance.
2015-12-03	5.42	12.2	ECB announced a series of measures including a cut in the deposit rate by 10 basis points to -0.30% and an extension of the asset purchase program (APP).	President Mario Draghi‘s announcements were seen as less aggressive than expected, leading to increased uncertainty about the ECB‘s commitment to combat low inflation.
2011-11-03	5.07	-1.6	ECB unexpectedly cut interest rates by 25 basis points.	In his first meeting as ECB President, Mario Draghi emphasized the need for decisive action to support the economy, leading to a rate cut. This shift in policy direction created uncertainty about the future path of monetary policy under new leadership.
2022-06-09	5.07	3.10	ECB announced the end of net asset purchases under the asset purchase program (APP) and signaled future interest rate hikes.	The ECB‘s decision to end net asset purchases and signal future rate hikes is a response to rising inflation. This shift towards tightening monetary policy has raised questions about the timing and pace of rate hikes and their impact on economic recovery.
2015-03-05	4.52	-2.2	ECB launched an expanded asset purchase program (APP) and maintained low interest rates.	The announcement of such a large-scale asset purchase program and the commitment to maintaining low interest rates until inflation approached the target added to market uncertainty about the long-term effects of these measures.

Table 4: GovC announcements with the largest increases in monetary policy uncertainty ranked by their size.

GovC Date	MPU Surprise	MP Surprise	Decision	Description
2023-03-16	-8.87	1.30	ECB increased the three key interest rates by 50 basis points.	The Governing Council decided to increase the three key ECB interest rates by 50 basis points to ensure the timely return of inflation to the 2% medium-term target. President Christine Lagarde emphasized the resilience of the Euro Area banking sector and the ECB‘s readiness to provide liquidity support if needed. She also highlighted the importance of a data-dependent approach to policy rate decisions due to elevated uncertainty.
2017-06-08	-7.56	-0.910	ECB kept interest rates unchanged but signaled a shift towards less accommodative monetary policy.	The ECB kept interest rates unchanged but signaled a shift towards less accommodative monetary policy. President Mario Draghi mentioned that the urgency for further actions had diminished, providing clarity and reducing market uncertainty.
2018-12-13	-4.67	-1.34	ECB confirmed the end of its net asset purchases under the asset purchase programme (APP).	The ECB confirmed the end of its net asset purchases under the APP by the end of December 2018. President Draghi highlighted the ECB‘s confidence in the sustained convergence of inflation to its target, which reduced uncertainty.
2019-07-25	-3.99	3.11	ECB signaled potential future rate cuts and a resumption of asset purchases.	The ECB signaled potential future rate cuts and a resumption of asset purchases if inflation did not move towards its target. Draghi‘s clear communication about the ECB‘s readiness to act helped reduce market uncertainty.
2012-05-03	-3.97	0.730	ECB kept interest rates unchanged but emphasized its readiness to act if necessary.	The ECB kept interest rates unchanged but emphasized its readiness to act if necessary to support the Euro Area economy. President Draghi reassured about the ECB‘s commitment to maintaining price stability and supporting the economy, which reduced uncertainty.

Table 5: GovC announcements with the largest decreases in monetary policy uncertainty ranked by their size.

Moving to a graphical comparison, we see that monetary policy uncertainty surprises are less volatile compared to monetary surprises and the correlation between the two variables seems relatively weak (Figure 3).

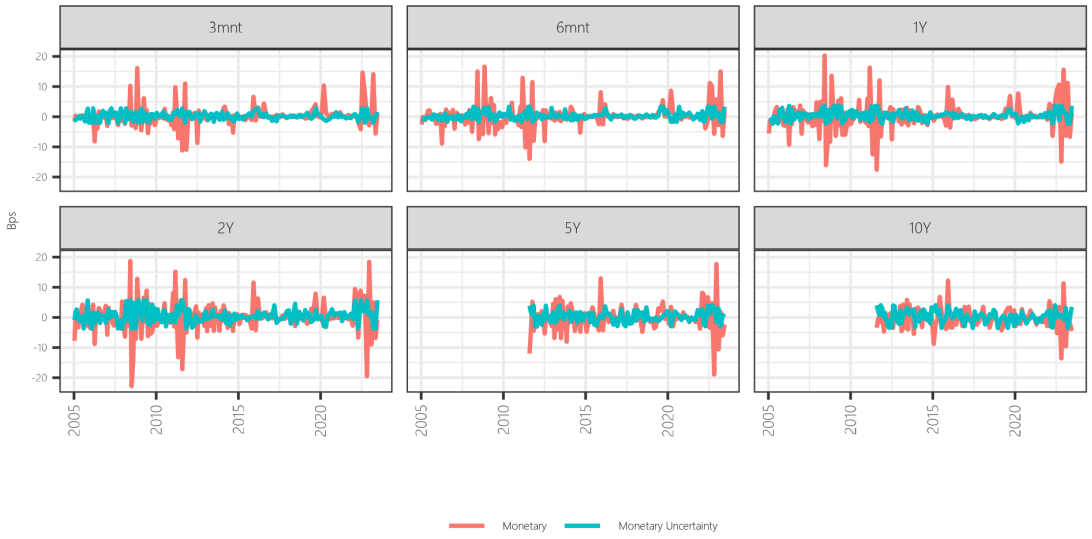

Figure 3: Monetary Policy Uncertainty (blue) and Surprises (red) in bps over different horizons, by monetary policy announcement

Formally, we calculate the Pearson correlation between the two for all different maturities in the first panel of Figure 4. We confirm the absence of a pattern and economically significantly correlations. We conclude that increases in uncertainty are not specific to hawkish (positive) or dovish (negative) surprises. This result contrasts with Bauer et al. (2021) who find for the US a mild and positive correlation between the two. Thus, estimates of the financial market impact of GovC announcements do not need to include policy surprises alongside policy uncertainty surprises, or, in other words, we can exclude the presence of an omitted variable bias as both are seemingly uncorrelated.

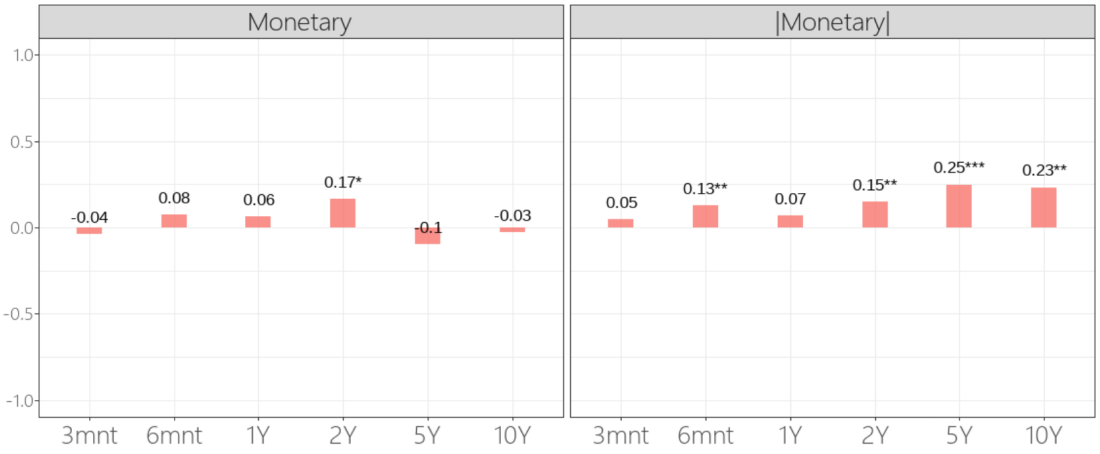

Figure 4: Monetary Policy and Monetary Policy Uncertainty - Correlation

The second panel of Figure 4 shows the correlation between monetary uncertainty surprises and the absolute value of monetary surprises. In this case, we detect a precise pattern: a mild positive correlation that increases together with the maturity horizon. This means that larger first moment surprises, independently from them being positive or negative, increase uncertainty related to the future path of monetary policy. This observed correlation highlights the importance of implementing especially large policy shifts clearly: Thus, by addressing the sources of uncertainty, central banks can help stabilize market expectations.

4 Simple Model and Estimation Results

This section examines the validity of our indices in the context of the pre-existing literature. For this, we analyze the effects of our identified uncertainty index on several financial indicators such as exchange rates, stock markets, and nominal yields. Before that, to transform the MPU indices into shock variable, we normalize each index to be standard normally distributed. Then, these shocks can then be used as regressors in our simple model:

$$Y_t^{(n)} = \beta_0 + \beta_i MPU_t^n + \epsilon_t$$

where Y represents different variables of interest, such as stock returns, exchange rates, or various maturities of the yield curve. Similarly, the independent variable MPU_t^n captures different uncertainty indices, with n denoting the maturities of the OIS rates. In cases where the dependent variable can be expressed in terms of maturity or tenor, n on the left hand side of the equation would denote the same tenor of the MPU variable. The time index t depends on the availability of the dependent variable. While the exchange rate is publicly available on a daily level, we transform the shock variable to a monthly frequency for the other estimations. [11] Out of construction, the shock series is exogenous and hence, this simple estimation via OLS does

[11] Since there are never two Governing Councils in one month, we just assign them accordingly and leave other months empty.

not require further controls.[12]

Following Jackson et al. (2020), uncertainty shocks can have amplified effects depending on their level. Hence, we capture possible non-linearities by expanding the model to differentiate between positive and negative uncertainty shocks: in concrete terms, we estimate the equation above restricting the shock variable to positive or negative values in independent estimations ($MPU_{t,n} \in \mathbb{R}^+ \quad | MPU_{t,n} \in \mathbb{R}^-$).[13]

4.1 Exchange Rate Dynamics

4.1.1 Spot Exchange Rates

While much has been done on the dynamics between first-moment monetary policy shocks and exchange rate dynamics (i.a.Eichenbaum and Evans (1995), Kim and Lim (2018), Carvalho et al. (2024)), limited attention has been given to second-moment monetary policy shocks. Nevertheless, already Hodrick (1989) demonstrated the importance of incorporating risk and uncertainty to determine spot exchange rates, claiming that whether the domestic exchange rate appreciates or depreciates depends on the nature of the shock itself and market's risk perception.

According to standard CAPM theory, sudden increases in monetary uncertainty lead to a request for higher risk premia for assets denominated in the affected currency. This, in turn, implies a depreciation of the currency, if the additional risk premium is not met and investors' demand decreases. Yet, empirical evidence suggests that, in some cases, uncertainty can instead lead to appreciation. Mueller et al. (2017) provide evidence for this, arguing that uncertainty may improve the hedging properties of the currency if the latter is perceived as safer than its foreign counterpart.[14] Higher uncertainty can result in tighter monetary policy to smooth interest rates, attracting capital inflows that appreciate the currency. In line with CAPM, currencies that hedge against global risk (low-beta currencies), such as the US dollar, can therefore appreciate during uncertain times (e.g. Beckmann and Czudaj (2017)). Thus, higher uncertainty can increase the excess returns of the US dollar relative to other currencies (e.g. Bauer et al. (2021),Gruendler (2023)) serving as a possible substitute even in times of domestic uncertainty. This portfolio rebalancing in light of hedging opportunities explains the appreciation of the US dollar relative to foreign currencies. However, while Manasse et al. (2024) find a significant depreciation of the British Pound in response to heightened political uncertainty, there is scant research on the specific effects of monetary uncertainty on the Euro Area's exchange rate. Therefore, whether increased Euro Area monetary uncertainty generates high excess returns, and boosts demand for Euros, or elevates investor risk aversion, prompting a shift to alternative currencies, is a question worth investigating.

We analyze the effects of Euro Area monetary policy uncertainty over various horizons on the US Dollar, the British Pound, the Japanese Yen, and the Swiss Franc, each relative to the Euro. [15] Since we employ a simple regression of monetary uncertainty on the exchange rate, we

[12] We carry out an additional check for exogeneity estimating the autoregression coefficients for our MPUs. We do not find evidence that previous uncertainty surprises, up to a quarter before, help predict present ones.

[13] Negative uncertainty shocks are generally considered to have a larger impact on financial assets than positive ones(e.g. Caldara and Iacoviello (2022)).

[14] Under conditions where the Purchasing Power Parity (PPP) holds, prices are flexible, and monetary policy follows a Taylor rule with interest rate smoothing, the slope of the Uncovered Interest Parity (UIP) relationship turns negative.

[15] All exchange rate processes are taken from the Eurostat website on a daily frequency.

do not account for various transmission channels that might influence the final outcome, such as the effect on bond yields, stock markets, or correlations with first-moment monetary shocks.

USD/EUR - Non-Linear regression

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	10-Year	5-Year	2-Year	1-Year	6-Month	3-Month
Decrease -	0.022	0.036*	0.006	0.011	0.010	0.007
	(0.018)	(0.021)	(0.014)	(0.011)	(0.011)	(0.011)
Increase +	0.025	-0.012	0.018	0.010	-0.045**	-0.017
	(0.018)	(0.014)	(0.015)	(0.021)	(0.020)	(0.017)
Observations	116	115	195	195	195	195
R-squared	0.037	0.033	0.013	0.005	0.035	0.018

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Non-linear Estimation Results of a one Std. Dev. Shock in MPU on the USD/EUR exchange rate, daily frequency.

Our findings support the inconsistencies among the literature. On the one side, the results indicate that the Euro appreciates vis-a-vis the US dollar (Table 6) and, especially, the Swiss Franc (Table 7), whenever monetary uncertainty within the Euro Area is larger than its mean. On the other side, the results are very small and only significant for certain maturities. This indicates that while the Euro may be regarded as a safe currency, it is less so than the U.S. dollar and Swiss Franc.

CHF/EUR - Basic regression

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	10-Year	5-Year	2-Year	1-Year	6-Month	3-Month
Decrease -	0.023*	0.028*	-0.004	0.009	0.001	-0.017
	(0.014)	(0.0163)	(0.016)	(0.019)	(0.018)	(0.020)
Increase +	-0.006	-0.020*	0.037	0.005	-0.085**	0.017
	(0.014)	(0.0110)	(0.025)	(0.037)	(0.034)	(0.029)
Observations	116	115	195	195	195	195
R-squared	0.026	0.051	0.011	0.001	0.031	0.005

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Non-linear Estimation Results of a one Std. Dev. Shock in MPU on the CHF/EUR exchange rate

4.1.2 Exchange Rate Volatility

We now turn our attention to exchange rate volatility. Existing literature has extensively explored the responsiveness of exchange rate volatility to political and monetary uncertainty shocks in the Euro Area (Krol (2014), Pastorek (2023), Ilzetzki et al. (2023)). Notably, Pastorek (2023) finds that while national economic policy uncertainty has a negligible impact, union-wide uncertainty exerts a positive and significant influence on euro exchange rate volatility. Similarly, Bartsch (2019) differentiates between political and non-political uncertainty, demonstrating that interest rate uncertainty has an even larger effect on exchange rate volatility compared to political uncertainty.

The transmission of monetary policy uncertainty to exchange rate volatility operates through risk premiums and shifts in investor expectations. Increased uncertainty heightens the perceived risk of holding certain currencies, as future interest rate paths and economic stability become ambiguous. This leads to higher risk premiums and amplified exchange rate fluctuations as investors adjust their positions in response to potential changes. When central banks provide unclear or inconsistent policy signals, investors struggle to form accurate expectations about future monetary conditions. This uncertainty raises forecast errors, further fueling volatility as market participants respond to conflicting signals about monetary policy direction (Beckmann and Czudaj (2017)).

Table 8 reports the impact of our MPU on the exchange rate volatility of common currencies relative to the Euro. The dependent variable is expressed in terms of the average standard deviation of the exchange rate for five days after the announcement. Hence, the coefficients can be interpreted as a change in the standard deviation relative to its average.[16] The results are particularly significant for the USD/EUR and CHF/EUR exchange rates, with both showing consistently positive responses. Notably, the impact on the variance of the Swiss Franc relative to the Euro is especially large and highly statistically significant, underscoring the Franc's sensitivity to changes in Euro Area uncertainty. This might be due to the fact that the Swiss economy is surrounded by the Euro Area and highly interlinked in its financial and goods markets. The results for the Pound and Yen are not significant, exactly the same as for the US-Dollar exchange rates in Beckmann and Czudaj (2017).

[16]The window is to capture any late effect stemming from the indicator covering information up to three days after the announcement.

EXCHANGE RATE VOLATILITY - Basic regressions

	(1)	(2)	(3)	(4)
VARIABLES	USD/EUR	GBP/EUR	JPY/EUR	CHF/EUR
10-Year	0.062	0.006	-0.0290	0.218***
	(0.039)	(0.052)	(0.040)	(0.000)
5-Year	0.096**	0.041	0.025	0.196***
	(0.040)	(0.053)	(0.041)	(0.061)
2-Year	0.074*	0.044	0.008	0.119*
	(0.044)	(0.049)	(0.042)	(0.062)
1-Year	0.079*	0.044	-0.001	0.101
	(0.044)	(0.049)	(0.042)	(0.062)

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Non-linear Estimation Results of a one Std. Dev. Shock in MPU on the standard deviation of an exchange rate relative to its average deviation

In line with previous findings, the effect of uncertainty amplifies over longer horizons, showing larger and more significant impacts as the time frame extends (Beckmann and Czudaj (2017)).[17] This observation underscores the idea that the transmission of monetary policy uncertainty primarily operates through longer-term maturities, which encapsulate market expectations about future economic conditions. In contrast, short-term uncertainty tends to act more as noise, introducing transient disruptions without meaningful implications for the broader monetary policy framework.

4.2 Equity Markets

This section covers the effect of monetary uncertainty on the stock market. In the same fashion as Bauer et al. (2021), we analyze its impact on the Euro STOXX and the S&P500. In contrast to exchange rates, the relationship between monetary policy uncertainty and stock market returns is well-documented, with higher uncertainty typically leading to lower and more volatile returns (e.g. Baker et al. (2016), Li et al. (2020),Ferrara and Angino (2021)).

The transmission is driven by a few key mechanisms that link investor expectations, risk premiums, and economic fundamentals to stock market performance. First of all, uncertainty surrounding monetary policy often influences investors' sentiment, leading to risk-averse behavior. In uncertain times, investors may become more sensitive to negative news or worsening economic indicators, which exacerbates stock market volatility, causing rapid sell-offs, price swings, and lower overall returns (Baker et al. (2016)). Another possible channel operates via demand. Following Gulen and Ion (2016), high monetary policy uncertainty can cause firms to delay or reduce investment, as companies struggle to foresee the future cost of borrowing and demand conditions. Reduced investment, in turn, lowers corporate earnings growth expectations, leading to lower stock valuations. When companies hesitate on capital expenditures and

[17] Thus, we exclude the 3- and 6-month horizons from this analysis, as their effects are minor and can be reasonably neglected.

expansion plans, the anticipated slowdown in revenue growth and profitability translates into reduced returns in the stock market. Lastly, Bernanke and Kuttner (2005) show that uncertainty about future monetary policy affects expectations of future interest rates, which are central to discounting future cash flows. When uncertainty is high, investors may use higher discount rates for valuing stocks due to the potential for sudden rate hikes or cuts, reducing the present value of expected future cash flows and thereby lowering stock prices.

Eur-STOXX Return - Non-Linear regression

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	10-Year	5-Year	2-Year	1-Year	6-Month	3-Month
Decrease -	0.015**	0.013	0.006	0.004	0.005	-0.001
	(0.007)	(0.008)	(0.005)	(0.004)	(0.273)	(0.006)
Increase +	-0.021***	-0.018***	-0.012**	-0.014*	-0.012**	-0.001
	(0.007)	(0.006)	(0.006)	(0.008)	(0.006)	(0.005)
Observations	116	115	195	195	195	195
R-squared	0.086	0.074	0.021	0.020	0.027	0.001

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Returns as log deviations responding to a one standard deviation shock in uncertainty.

Our findings in Table 9 and 10 support the hypothesis that stock returns decline in response to an uncertainty shock. Table 9 presents the non-linear effects of a one-standard-deviation increase in monetary policy uncertainty on EUR STOXX returns.[18] The effect of an MPU increase is negative across all maturities, but the 3-month one. Furthermore these effects intensify at longer OIS horizons: an 10-year MPU shock can result in a reduction of returns by up to 2.1%, a substantial decline that has material implications for investors and market participants alike. These finding suggests that investors may be pricing in future risk and economic uncertainty when uncertainty signals are elevated and underline the importance of accounting for monetary uncertainty in investments' strategies.

[18]Data from Eurostat, return is calculated by log-differences.

SP500 Return - Non-Linear regression

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	10-Year	5-Year	2-Year	1-Year	6-Month	3-Month
Decrease -	0.014**	0.015**	0.007*	0.005	0.005	-0.003
	(0.006)	(0.006)	(0.004)	(0.003)	(0.004)	(0.005)
Increase +	-0.016***	-0.016***	-0.006	-0.007	-0.008	-0.003
	(0.005)	(0.004)	(0.005)	(0.007)	(0.005)	(0.005)
Observations	116	115	195	195	195	195
R-squared	0.083	0.121	0.017	0.015	0.019	0.007

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10: Returns as log deviations responding to a one standard deviation shock in uncertainty.

For the S&P 500, the effects of monetary policy uncertainty are similar but generally smaller in magnitude. This is likely attributed to the composition of the S&P 500, which primarily consists of U.S.-based companies, only partially influenced by monetary policy developments in the Euro Area.[19] Despite this, the impact of uncertainty remains significant for long-horizon measures, with a standard deviation shock for 10-year MPU depressing stock market returns by 1.6%, indicating that fluctuations in monetary policy in the Euro Area can still lead to considerable losses in returns for U.S. equities. Interestingly, the results also suggest that a decline in volatility, particularly when associated with clear and informative policy announcements, can positively influence stock market returns in a roughly symmetric way (+1.4%): when investors perceive monetary policy decisions clearly and with less ambiguity, it can foster a more stable investment environment, encouraging increased capital flows into equities. This duality highlights the straightforward relationship between monetary policy uncertainty and stock market dynamics, where heightened uncertainty can suppress returns, while reduced volatility can enhance market performance.

In a nutshell, monetary policy uncertainty generally exerts a negative effect on stock market returns, as evidenced by both the EUR STOXX and S&P 500 indices. While the S&P 500 experiences smaller declines due to its focus on U.S.-based companies, significant losses in returns are still observed, particularly in response to long-horizon uncertainty measures. This can be explained by the fact that many investors stem from the Euro Area and are affected by domestic uncertainty. Conversely, when volatility decreases and monetary policy announcements are clear and informative, stock market returns can improve.

4.3 Nominal Yields

According to theory, yield curve's components are driven by expectations about the future path of the interest rate as well as the term premium. Since expectations themselves are driven by information, uncertainty surrounding monetary policy announcements supposedly have a large

[19]There is extensive literature on monetary spillovers between both the US and EU (see for example Ca Zorzi et al. (2021), Lakdawala et al. (2021), Chiang (2021) However, these spillover effects are not studied in this paper.

effect on them.[20]

Table 11 illustrates the impact of separate positive and negative uncertainty shocks on nominal Euro area yields. A positive shock results in an increase in nominal yields, ranging from 3 to approximately 7 basis points (bps), depending on the maturity. This increase signals a rise in the risk premia demanded by investors during times of uncertainty. Essentially, when uncertainty increases, investors require higher yields as compensation for the additional risk they perceive in the market. This behavior is consistent across different maturities, although the magnitude of the increase varies.

Yield Curves - Basic regression

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	10-Year	5-Year	2-Year	1-Year	6-Month	3-Month
Decrease -	-0.116	-0.348	-0.345**	-0.195	-0.222	-0.449**
	(0.214)	(0.223)	(0.157)	(0.132)	(0.150)	(0.188)
Increase +	0.680***	0.432***	0.485**	0.555**	0.0257	0.303**
	(0.215)	(0.150)	(0.191)	(0.260)	(0.189)	(0.148)
Observations	111	110	190	190	190	190
R-squared	0.088	0.079	0.048	0.031	0.012	0.045

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Nonlinear effect of a change in a one standard deviation shock in MPU of different horizon on its corresponding yield curve end.

In contrast, shocks that reduce uncertainty tend to depress yields. For instance, the yields for the 3-month and 2-year maturities decrease by 4 and 3 basis points, respectively. However, these reductions are less systematic compared to the increases observed with positive shocks. This asymmetry in the response to uncertainty shocks suggests that the market reacts more strongly to increases in uncertainty than to decreases, as for other assets. These findings well align with existing literature on the impact of monetary policy uncertainty on nominal yields (Leippold and Matthys (2022), Bauer et al. (2021)).

Moreover, the results have important implications for understanding the behaviour of the yield curve under different conditions of monetary policy uncertainty. If we assume that short-term MPU shocks have a different impact on yields at longer maturities, the results suggest that the overall shape of the yield curve is influenced significantly by the level of uncertainty in the market. This is an area that warrants further investigation, as it could provide deeper insights into the relationship between monetary policy, market expectations, and yield curve dynamics.

5 Conclusion

Our study provides significant insights into the transmission of monetary policy within the Euro Area, focusing on the role of monetary policy uncertainty. By introducing a novel market-

[20]Data from Eurostat on Euro Area yields at the 3 month, 6 month, 1 year, 2 year, 5 year and 10 year maturity.

based measure of uncertainty, we are able to dissect the effects of ECB announcements on financial markets. This research fills a critical gap in the macro-finance literature, which has predominantly focused on the first-moment effects of monetary policy surprises, often neglecting the implications of policy uncertainty.

We develop a new MPU index based on high-frequency market data. This measure captures the changes in the standard deviation of OIS rates around ECB announcements, providing a comprehensive view of the change in uncertainty across different maturities. Our analysis reveals that most of the times ECB announcements increase market uncertainty regarding future interest rates, contrasting with the generally stabilizing effect observed in Federal Reserve (Fed) announcements (Bauer et al. (2021)). This increase in uncertainty is positively correlated with the magnitude of the policy surprise, regardless of whether the surprise is hawkish or dovish. We identify a new uncertainty channel, distinct from the usual conventional expectations channel in the transmission to financial assets: an increase in the MPU leads to higher nominal yields, lower stock market returns, as well as greater volatility and a mild appreciation of the euro against safe-haven currencies. These findings are consistent with existing literature and support the validity of our indicators. Furthermore, it underscores the the importance of considering policy uncertainty in addition to traditional policy surprises when assessing the impact of monetary policy.

It is important to notice that this study is meant as a first step in the study of policy uncertainty in the Euro Area, rather than a comprehensive assessment. We see different avenues for future research. First, although we find most often an increase in monetary policy uncertainty following ECB announcements, in contrast to the Fed, we do not investigate the reason for this. Possible explanations could relate to the complexity of the language used by the ECB compared to the Fed (e.g. Mumtaz et al. (2023)), the underlying more complex environment underpinning policy decisions or a higher heterogeneity in risk aversion or marginal utility of European market participants compared to the American market. Second, in this paper we concentrated on transmission of uncertainty to financial markets. Another important question, especially from a central bank standpoint, is how uncertainty shocks affect macroeconomic outcomes such as credit, output and, ultimately, inflation. Husted et al. (2020), for example, find, for the US, that positive shocks to monetary policy uncertainty raise credit costs and lower output with about the same dynamic pattern as contractionary monetary shocks.

In conclusion, our study underscores the critical role of policy uncertainty in the transmission of monetary policy to financial assets within the Euro Area. By introducing a novel measure of MPU and analyzing its effects on financial markets, we provide a deeper understanding of how ECB announcements influence market behavior. These insights are essential for both policymakers and market participants. Future research should continue to explore the interplay between policy uncertainty and market responses, further refining our understanding of this pivotal aspect of monetary and financial economics.

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Appendix A

A1.1 Additional Summary Statistics

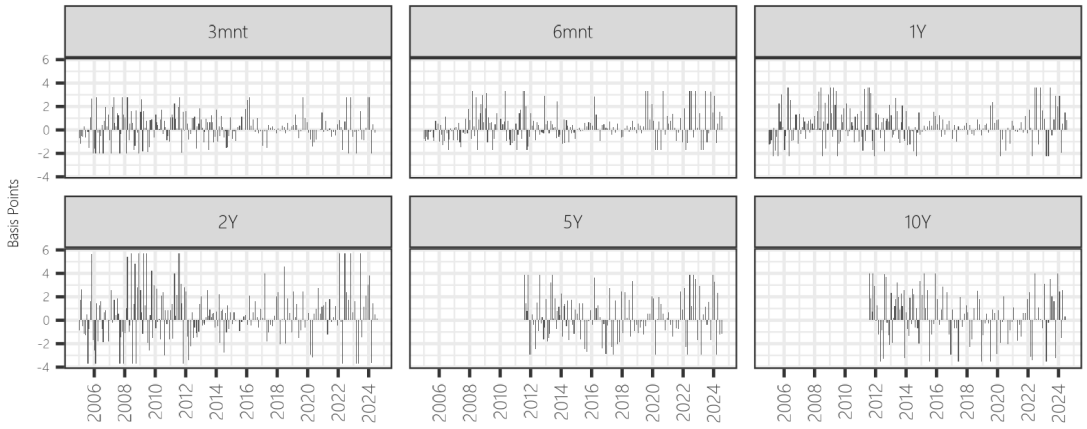

Figure 5: MPU index, all Tenors

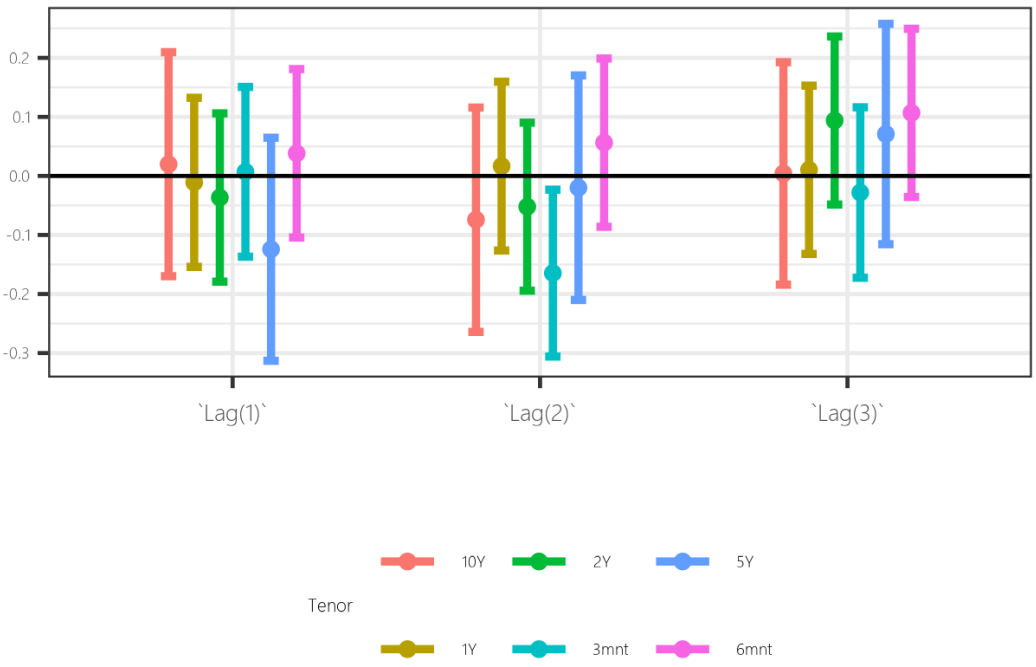

Figure 6: Autoregression Coefficients for MPU Surprises at Different Tenors, up to Three Lags. 95% error bands displayed.

A1.2 Additional Exchange Rate Estimation Results

EXCHANGE RATES - Basic regressions

	(1)	(2)	(3)
VARIABLES	USD/EUR	CHF/EUR	GBP/EUR
10-Year	0.023**	0.009	-0.007
	(0.010)	(0.008)	(0.004)
5-Year	0.004	-0.004	0.002
	(0.010)	(0.008)	(0.005)
2-Year	0.012	0.015	0.004
	(0.009)	(0.015)	(0.006)
1-Year	0.011	0.008	0.003
	(0.009)	(0.016)	(0.006)
6-Month	-0.003	-0.020	0.010*
	(0.009)	(0.015)	(0.006)
3-Month	-0.001	-0.006	0.003
	(0.009)	(0.015)	(0.006)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Linear Estimation Results of a one Std. Dev. Shock in MPU on various exchange rates.

GBP/EUR - Non-Linear regression

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	10-Year	5-Year	2-Year	1-Year	6-Month	3-Month
Decrease -	-0.002	-0.004	0.003	-0.001	0.004	0.011
	(0.008)	(0.009)	(0.009)	(0.007)	(0.007)	(0.007)
Increase +	-0.012	0.006	0.004	0.016	0.029**	-0.012
	(0.008)	(0.006)	(0.009)	(0.013)	(0.012)	(0.011)
Observations	116	115	195	195	195	195
R-squared	0.028	0.010	0.002	0.007	0.031	0.017

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 13: Non-linear Estimation Results of a one Std. Dev. Shock in MPU on the GBP/EUR exchange rate.

JPY/EUR - Non-linear regression

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	10-Year	5-Year	2-Year	1-Year	6-Month	3-Month
Decrease -	0.257	-0.276	-1.224	-0.726	-1.020	-3.574*
	(2.536)	(2.854)	(1.744)	(1.449)	(1.632)	(2.079)
Increase +	-0.998	1.107	1.310	1.460	1.392	2.721*
	(2.530)	(1.928)	(2.120)	(2.843)	(2.068)	(1.645)
Observations	116	115	195	195	195	195
R-squared	0.001	0.003	0.004	0.002	0.004	0.025

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 14: Non-linear Estimation Results of a one Std. Dev. Shock in MPU on the JPY/EUR exchange rate.

Appendix B

B1.1 Comparison with other Uncertainty Indices

Table 3 presents the correlations between our monetary policy uncertainty index across all maturities and various measures, including two that capture uncertainty. The Economic Policy Uncertainty (EPU) Index for Europe, constructed following the method of Baker et al. (2016), who applied it on US data, shows no significant correlation with our index.

Although both indices assess uncertainty in the Euro Area, their differing methodologies lead to significant discrepancies. First, the EPU is derived from news articles in Germany, France, Italy, Spain, and the UK, combined into a single measure. Consequently, it incorporates UK-related uncertainty, which may be relevant for political and trade concerns but less so for Euro Area monetary policy. Moreover, as the UK is no longer in the EU, its uncertainty no longer directly affects the Euro Area aggregate. In contrast, our index strictly captures **uncertainty within the currency union about monetary policy**.

Second, the EPU captures uncertainty from news articles, whereas our index relies on market data. As a result, the EPU primarily reflects policy changes and events that attract media attention, while our index focuses on financial markets and policy surprises from ECB press statements. **Monetary policy rarely makes direct headlines and is mainly of interest to financial markets rather than the general public**: even in times of high policy uncertainty, the ECB may not necessarily face price stability challenges. These fundamental differences explain why the two indices capture distinct concepts and exhibit, on average, weak co-movement.

Figure 7 compares the two over time, highlighting periods where their movements diverge or converge strongly. In October and November of 2004, the EPU spiked due to uncertainty from the U.S. presidential election, while ECB-related uncertainty declined as the central bank maintained its accommodation stance, supporting their strive for maintaining price stability. In 2008, the EPU surged in response to the financial crisis, accompanied by a moderate rise in

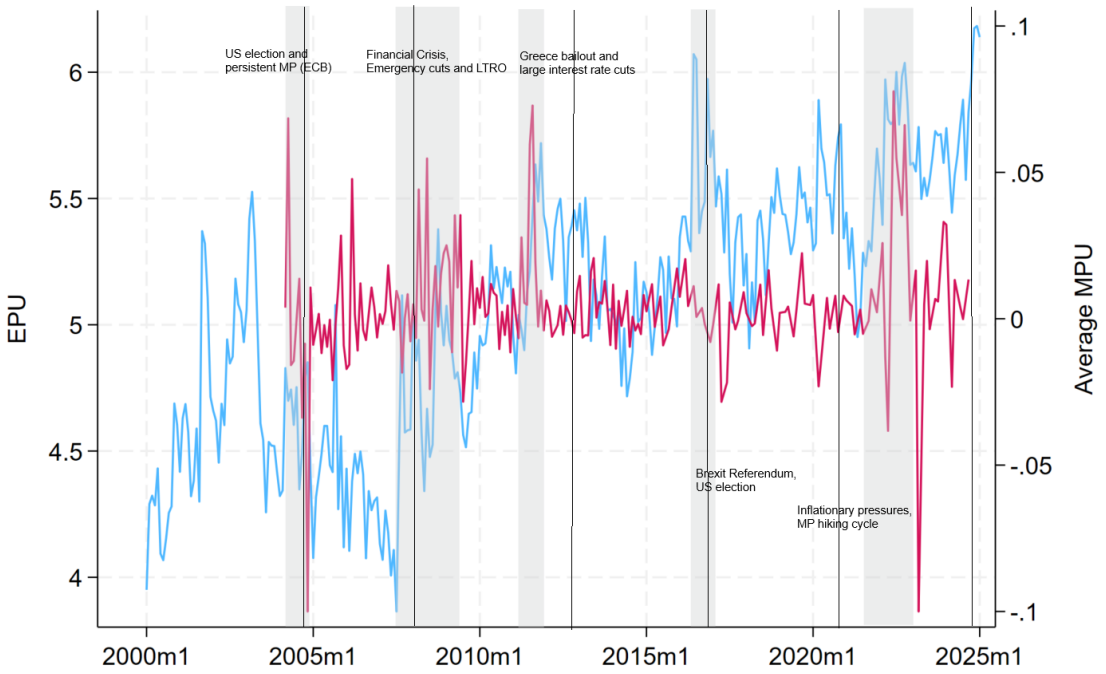

Figure 7: Comparison of EPU (blue, left) (following Baker et al. (2016)) with an average of our MPU indices across maturities (red, right) across time. Grey areas cover periods with with either strong convergence or divergence. Black lines identify months in which an US election took place.

our MPU index as the ECB introduced emergency rate cuts and LTRO measures. Historically, unconventional monetary policies have led to increased market uncertainty, thus the introduction of LTRO measures possibly caused the MPU index to rise.

During the financial and sovereign debt crises, both indices moved similarly, but this pattern ended with Brexit and the election of President Trump in 2016, which triggered sharp increases in the EPU due to political uncertainty in Europe. Meanwhile, monetary policy was constrained by the ZLB and had limited market impact on uncertainty. However, as inflation accelerated, both indices began co-moving again. After the pandemic, rising prices heightened political uncertainty and monetary challenges, leading to increased media coverage and thus, uncertainty in both markets. This observation is similar to the financial and sovereign debt crises, when nominal events influenced real variables and became significant for the general public.