

Discussion Papers

Monetary Policy Surprises and Communication Strategies in the Euro Area's Tightening Cycle

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Abstract

This paper investigates the challenges and dynamics of monetary policy normalization in the euro area following the sustained surge in headline inflation in 2021. To analyze the monetary surprises during the ECB's monetary meetings in the tightening cycle, I employ factor decomposition models by Altavilla et al. (2019) and Motto and Özen (2022). I identify five factors associated with conventional policy, short and medium-term forward guidance, conventional asset purchasing programmes and programmes to ensure the transmission of monetary policy. I find substantial monetary surprises during this tightening cycle, though the largest were found in the first policy rate hike in July 2022 and in the policy rate hike in the midst of great financial stress during the banking crisis in March 2023, following the Silicon Valley Bank collapse. Next, I observe that the explicitly communicated outline of the reaction function of the ECB in the March 2023 Governing Council meeting seems to have at least partially contained financial market volatility during the monetary policy decision announcements and limited monetary policy surprises.

Introduction

The initiation of the normalization of monetary policy in the euro area after the surge of headline inflation has posed several challenges for central bankers at the European Central Bank (ECB) in terms of effectively returning the inflation rate to the target in the medium-term. Increasing headline inflation in 2021, which occurred due to a mix of supply side shocks in an environment of loose fiscal and monetary policy, proved to be not only of a transitive nature, but a rather more broad-based and sustained phenomenon. Hence, a significant shift in conducting monetary policy in the euro area was necessary, in order to start tightening financing conditions after a decade-long accommodative monetary policy, to contain medium and long-term inflation expectations as well as to dampen the aggregate demand and consequently limit the inflationary pressures. In the normalization process and in the tightening cycle of the ECB alongside the conventional monetary policy, communication and non-standard measures were also crucial in curtailing financial markets expectations, which are important for effective monetary policy transmission. This analysis contributes to the field of monetary policy in the euro area in two significant ways. Firstly, it examines the dimensions through which announced changes in monetary policy have constituted a monetary surprise during the tightening cycle in the euro area. Secondly, it delves into the evolution of communication throughout this cycle and assesses its effectiveness in enhancing monetary policy transmission.

This paper analyzes the financial market reactions and monetary policy surprises on the day the monetary policy measures were announced by the ECB's Governing Council. This is achieved through a factor model decomposition of the changes of overnight swap index (OIS) yields and Italian bond yield during the monetary policy meeting announcements. This paper relies on the proposed models of Altavilla et al.

(2019) and Motto and Özen (2022) and thus identifies five factors. The identified factors encompass various dimensions of monetary policy changes. The first factor represents the conventional monetary policy aspect, represented by the Target factor, associated with the changes in the policy rate in the Eurosystem. With regard to communication, I examine two factors, Timing and Forward Guidance. Both factors represent the forward guidance dimension of the ECB's monetary policy, where Timing focuses more on the short term, and reflects market expectations' revisions of the monetary policy path of the next few Governing Council meetings. The Forward Guidance factor, on the other hand, reflects the market's revision of the medium-term monetary policy. Two factors are associated with asset purchasing programmes, specifically QE (Quantitative Easing) and Transmission QE, which are designed to influence long-term interest rates and address fragmentation risks in bond markets, respectively.

The results of the analysis show that the ECB's tightening cycle generated numerous significant monetary surprises during the monetary policy event windows. A significant monetary surprise related to the first policy rate hike in this cycle was observed in the Target factor. At the same time, the Transmission QE factor experienced the largest tightening since the Covid-19 pandemic, reflecting tightening surprise over the new Transmission Protection Instrument (TPI), which upon announcement, failed to redirect the financial market dynamic from peripheral countries to risk-free countries. Another Governing Council meeting with large tightening monetary policy surprises was the March 2023 meeting, in the midst of high financial stability uncertainty triggered by the collapse of Silicon Valley Bank (SVB). That meeting gave rise to the most substantial tightening surprise within the Target factor in the dataset. Furthermore, the results suggest that in March 2023, the President of the Governing Council's explicit specification of the ECB's reaction function, while maintaining a data-dependent approach, could have reduced volatility in financial markets and enhanced transmission to upstream indicators. Greater transparency on the part of the ECB could have further diminished monetary surprises.

The body of this paper is organized as follows: Section 1 introduces monetary policy in the euro area and the beginning of post-pandemic inflation. Section 2 presents the data and methodology. Section 3 describes and shows the monetary policy surprises for Governing Council monetary meetings in the tightening cycle. Finally, section 4 concludes the paper and draws some of the monetary policy implications.

1

Monetary Policy in the Euro Area

In the aftermath of the GFC, when the monetary policy hit the ZLB, novel unconventional monetary policy measures were announced for conducting monetary policy, such as asset purchase programmes and forward guidance. If the asset purchase programmes were used in order to compress long-term yields, forward guidance started to play a crucial role as this communication about the future course of their monetary stance aims to influence the financial conditions through reducing uncertainty and consequently steering inflation expectations. Given that the primary tool of central banks directly governs only short-term interest rates, influencing the longer-term interest rates through risk extraction and driving the long-term expectations is the main contribution

of non-standard tools of monetary policy. Thus, the yields of longer-term maturities are steered via the asset purchasing programmes and effectively by the communication strategies of the Governing Council.

The successful implementation of the monetary policy decisions by the ECB relies on effectively transmitting the intended monetary policy stance to financial conditions in the market, and subsequently, to the real economy. The ECB's Governing Council in this tightening cycle has thus chosen to leverage communication as way to achieving it. In this process, there has been a shift away from the previous forward guidance towards a data-dependent, meeting-by-meeting approach. This adjustment has allowed the ECB to promptly adapt its policy, based on the latest economic data at its disposal, which was not feasible under the previous forward guidance framework. This shift not only enhances the ECB's credibility but also ensures alignment with its stated policy trajectory, shaping future policy expectations, which is the Central Bank's aim (Blinder et al., 2008).

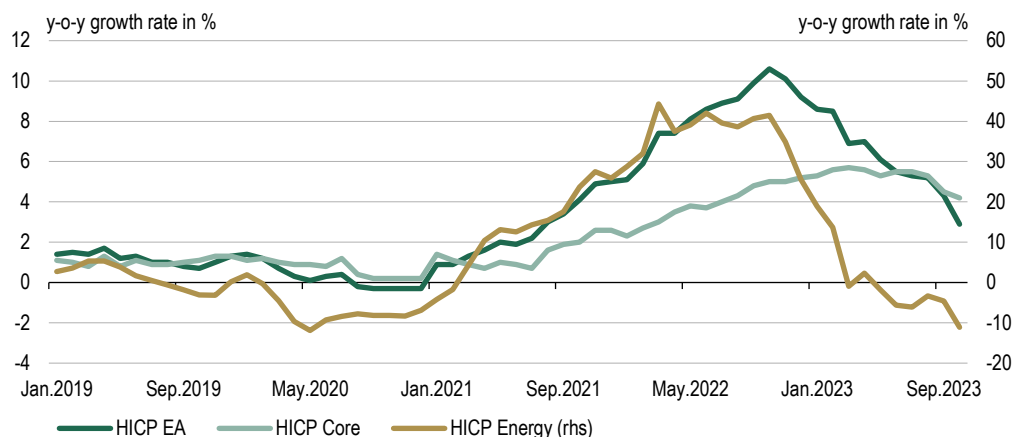
To gauge the financial market's perception of the announced monetary policy decisions, it is useful to analyze short-term tick data reflecting the financial market's sentiment. This can be achieved by monitoring changes in the €STR overnight index swap (OIS) yields, which serve as a proxy for the risk-free rate across various maturities, as well as changes in sovereign bond yields. The high frequency responses of such instruments provide insights into whether the announced measures achieved a change in market interest rates in the desired direction. These insights have also proven crucial during the process of tightening of monetary policy where the question of how the tightening of monetary policy transmitted to financial conditions and inflation expectations.

1.1 Post-pandemic inflation and monetary policy reaction

Following the Covid-19 pandemic and the economic constraints resulting from forced closures and lockdowns, the euro area economies began a path of recovery towards the end of 2021 and into the beginning of 2022. However, this recovery was marked by persistent supply bottlenecks and rising inflation, primarily driven by several factors, notably significant increases in energy prices such as fuel, gas and electricity. As economic activity was under a path of strong recovery, it led to a positive output gap, with demand outpacing supply. This increased pressure on prices, compounded by shortages of critical components and materials. Additionally, the labor market started improving, initially due to fiscal support and specific pandemic-related measures. While inflation, which stood at 5.1% in January 2022 (Figure 1), initially appeared transitory, the price pressure heavily strengthened once the war in Ukraine was started by Russian aggression in February 2022. This conflict further disrupted trade and exacerbated shortages of materials and inputs, leading to systematically surprising inflation data to the upside.

By the second quarter of 2022, inflation had already reached 7.4%, with core inflation (all items excluding energy, food, alcohol and tobacco) at 3.0% and price pressures becoming increasingly widespread. In response to the continued increase in inflation, in June the ECB decided to commence the normalization of its monetary policy. In its communication it shifted to a data-dependent approach, departing from the explicit forward guidance used during the ZLB era. The first measure was implemented in June when the conclusion of net purchases under the Asset Purchase Programme (APP) was announced as of 1 July 2022.

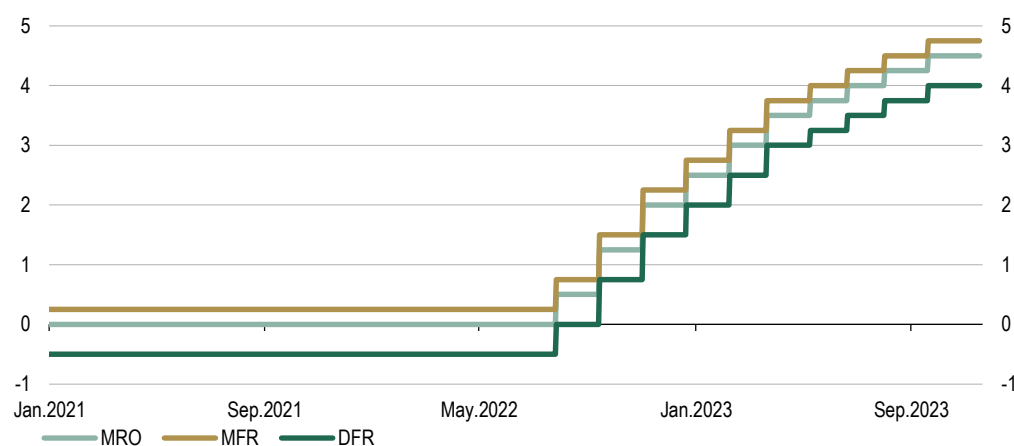
Figure 1: **HICP inflation rates in the euro area**



Source: Eurostat

In the next monetary policy meeting in July 2022, the Governing Council increased the key interest rates in order to fulfill its price stability mandate, as it was becoming clearer that higher headline inflation was not just transitory. Thus the initial policy rate hike was announced of 50 basis points (bps) which marked the beginning of a decisive and swift series of policy rate hikes, as illustrated in Figure 2. Notably, this was the ECB's first step into non-negative territory for policy rates since June 2014. Following this initial ECB policy rate hike, which was the first since July 2011, there have been ten consecutive hikes as of the date of writing, resulting in a cumulative increase of 450 basis points.

Figure 2: **Policy rate hiking of key interest rates in the euro area**



Source: ECB SDW

2

Model and Data

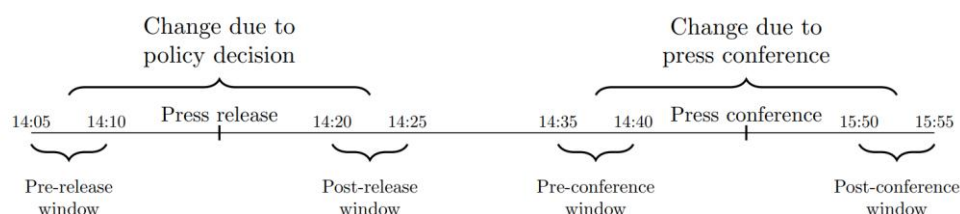
2.1 Governing Council's monetary policy meeting timeline

Monetary policy surprises that occur due to policy changes on the day of announcement are obtained through the high frequency yield changes around announced unconventional and conventional instruments. The ECB's Governing Council monetary policy meeting convenes every six weeks, where they adopt decisions regarding the monetary policy package. This typically involves setting the three key policy rates of the ECB and making adjustments or introducing new unconventional monetary policy instruments if deemed necessary. The outcomes of the monetary policy changes are announced on Thursday, on the day of meeting week via a press release at 14:15. This release includes a concise Monetary Policy Statement outlining the decisions made. The standard monetary policy change takes centre stage in this statement, while any adjustments to unconventional monetary policy measures are also mentioned but are usually elaborated upon in greater detail during the subsequent press conference.

A press conference is conducted at 14:45, chaired by the President and Vice-President of the ECB. During this conference, the President provides more in-depth insights into economic and price dynamics, financial conditions and the background behind the introduced monetary policy changes. This is where the President typically delves into the announced unconventional monetary policy changes and their implementation. Until recently, however, the policy statement included only the conventional part of the monetary policy change, and the details of any unconventional measures were first introduced during the press conference. Following the press conference, a Q&A session is held to address further inquiries.

To comprehensively analyze market reactions and identify monetary policy surprises in response to policy changes, I utilise intraday tick data, focusing on the 5-minute interval before and after each policy window. The detailed timeline of the monetary policy event is illustrated in Figure 3. The intraday data used in this analysis encompasses overnight index swap (OIS) yields, which closely resemble a risk-free rate, and sovereign bond yields. Specifically, the dataset includes yield changes for OIS instruments with various maturities, including 1, 3 and 6 months, as well as 1, 2, 5 and 10 years. Additionally, it incorporates sovereign bond yields for 2, 5 and 10-year bonds for both Italy and Germany. The sourcing of data relies on extending the Ea-MPD database by Altavilla et al. (2019), using the data from Bloomberg. The final database includes all yield changes around monetary policy windows from January 2002 to September 2023. Then, to conduct the factor model decomposition, I follow the approach outlined by Altavilla et al. (2019) and Motto and Özen (2022).

Figure 3: **ECB Governing Council communication timeline at monetary policy meeting**



2.2 Factor model decomposition

First, I extract factors during the press release and press conference and then rotate them using the restrictions provided in Motto and Özen (2022). Thus, following the Altavilla et al. (2019) approach, I identify a single significant factor in the press release window, the Target factor. This factor closely aligns with the monetary surprise arising from changes in the ECB's monetary policy rate. In essence, it mirrors the conventional notion of a monetary policy surprise and loads the most on the 1-month OIS rate.

Continuing with the press conference, I extract and identify four factors. The second factor for a monetary policy event is the Timing factor, which represents a communication dimension of the monetary policy, where it represents the revision of the monetary policy expectations by the markets on the shorter spectrum of the yield curve, i.e. for the next few Governing Council meetings. Thus, this factor loads on the short-term OIS maturities, but excluding the conventional monetary policy dimension, the 1-month OIS rate by construction.

The third factor is the medium-term communication dimension of monetary policy, which aims to steer the medium-term market interest rates by outlining the path of the expected monetary policy in an explicit way. This factor is called Forward Guidance and is notably influenced by medium-term OIS rates, predominantly spanning the two to five-year range.

The next significant factor during the press conference window is referred to as the Quantitative Easing (QE) factor. This factor captures surprises associated with Quantitative Easing instruments that typically seek to reduce the premium related to term or duration risk. Consequently, this factor loads the most on the long-term OIS rates, consistent with the aim of the asset purchase programmes employed by the ECB.

The last factor is the Transmission QE factor, introduced by Motto and Özen (2022). Transmission QE or the Market Stabilizing QE factor encompasses surprises related to announced policy packages, asset purchase programmes and changes to these programmes designed to stabilise markets, address market segmentation and liquidity issues, and ensure the effectiveness of monetary policy transmission, such as the Securities Markets Programme (SMP), the Outright Monetary Transactions (OMT), the Transmission Protection Instrument (TPI) and some dimensions of the Pandemic Emergency Purchase Programme (PEPP), leveraging the flexibility to deviate from the capital key rule imposed on the APP. All these programmes were announced by the ECB with the aim of restoring a more uniform transmission mechanism across the euro area countries to reverse the flight-to-safety dynamics which in times of significant financial stress is a self-fulfilling dynamic, even if the fundamental financial state of the periphery countries is not as critical as the disproportionate increase in debt costs would suggest. As argued by Motto and Özen (2022) this factor leads to a small increase in risk-free rates, a substantial increase in stock prices along with a decline in periphery-country sovereign yields, thus representing a new dimension of monetary policy.

2.3 Factor identification

The extracted factors by themselves lack the above-described economic interpretation, thus a rotation of the factors is necessary. Restrictions were used based on the method applied in Motto and Özen (2022), where the authors extended the identification methodology of Swanson (2021) and Altavilla et al. (2019). First, it is assumed that the risk-free rate factors Timing, FG and QE do not load on the 1-month OIS yield change, implying that the change in policy rate is announced already in the monetary policy

statement. Next, it is assumed that the Transmission QE does not load on risk-free rates or that it generates an opposite reaction of sovereign yields of periphery countries compared to the risk-free rate, implying the reverse of flight-to-safety dynamics. Further, it is assumed that the QE factor exhibits the smallest variance in the pre-financial crisis period, while the transmission QE factor has the smallest variance outside the sovereign-debt crisis, COVID-19 pandemic and interest rate hiking cycle.¹

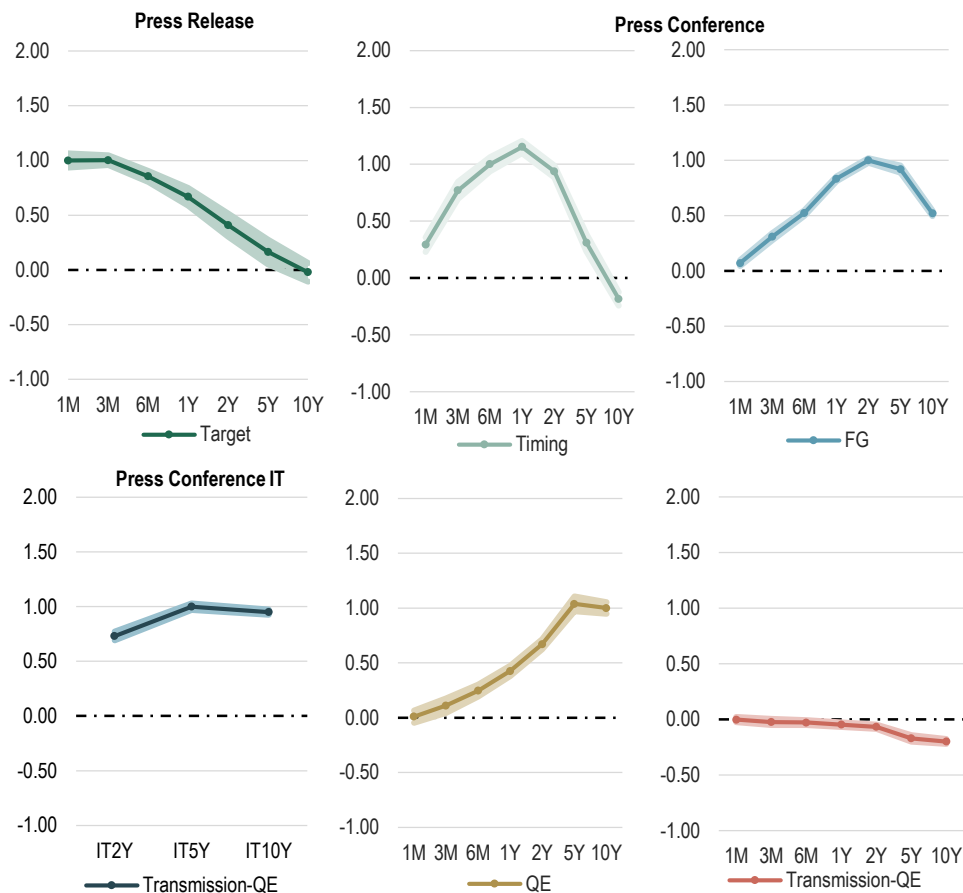
Once the factors are rotated, the factors obtained are identified up to scale. I then scale Target, Timing, FG, QE and Transmission QE factors such that each factor has a unit effect on one-month OIS, six-month OIS, two-year OIS, ten-year OIS and 5-year Italian sovereign bond yield respectively, thus the factor scores are positively correlated with their respective securities. As a result the factor scores are reported in basis points. The factors' scores, which are defined by their loadings, can be read as similar to a basis points change of the reference security by which the factor is scaled and are not to be compared with each other, but with their historical scores. The factors can be thus interpreted as an easing factor, or accommodative monetary policy surprise in the case of a negative factor, and tightening factors in the case of a positive factor. In the case of Transmission QE though, a negative reading of the factor corresponds to a fall in the periphery yields, proxied by the 5-year Italian sovereign yield changes, and a positive factor to decreasing 5-year Italian sovereign yields. Note that this factor does not load on risk-free yields, or it makes the periphery yields move in the opposite direction compared to the risk-free yields, where the reference yields here are the 5-year risk-free rates.

¹ For a more comprehensive description of the methodology used to identify the factors, please refer to Motto and Özen (2022), Appendix A.

Figure 4: Factor loadings

Source: Bloomberg, own estimates.

Note: The figure shows the estimated factor loadings for press release and press conference windows, in basis points. These loadings are obtained by regressing each OIS yield maturity on to the extracted and rotated factors. Target, Timing, FG and QE have a unit effect on 6-month, 2-year 10-year OIS, respectively. The chart at bottom left represents the factor loadings for



Transmission QE for the press conference window on Italian sovereign yields, which has a unit effect on the 5-year Italian sovereign yield. The shaded area indicates the 90% confidence interval.

Upon extracting, rotating and scaling the factors for all monetary policy dimensions to exert a unit effect on the corresponding asset yield change, I estimate the loadings that define each factor by regressing the rotated factors on OIS yield changes across various maturities, namely on the 1-month, 3-month, 6-month, 1-year, 2-year, 5-year and 10-year OIS. The loadings shown in Figure 4 were thus deduced from these regressions, with the shaded regions representing 90% confidence intervals. Notably, the shape of these loadings aligns with the theoretical intent behind the ECB's monetary policy instruments. For instance, the Target factor predominantly loads with short-term maturity OIS yields as this factor represents the surprise of the change in the conventional monetary policy of setting the short-term policy rate. Timing represents the shorter-term forward guidance, as it is most closely aligned with changes in the 6-month to 1-year OIS yields. The FG factor, which represents the medium-term forward guidance, exhibits, similarly to Timing, a hump-shaped pattern. Conversely, asset purchase programmes, announced to extract the duration risk and compress yields in longer-term horizons, have an impact on long-term risk-free rates. However, in terms of Transmission QE, factor loadings are subtle and have a negative opposite sign compared to Italian sovereign bond yields. Transmission QE exhibits strong loading with changes in

Italian sovereign bond yields, where the magnitude is similar across all the maturities in the sample. As this factor aims to stabilise and decrease the spreads between the periphery countries and risk-free rates, the negative loading of Transmission QE on OIS yields suggests a reversal of the flight-to-safety dynamic as described above.

3 Monetary Policy Surprises During the Hiking Cycle

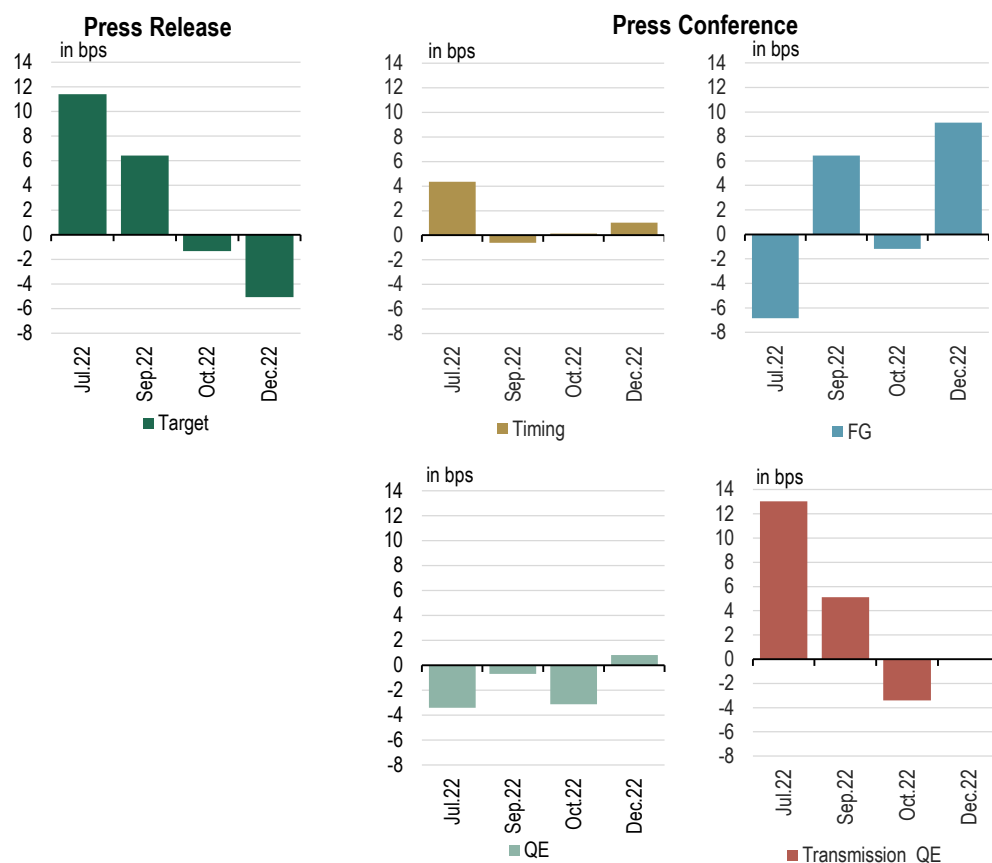
Using the estimated loadings and factors, which have been rotated to reflect the economic interpretation of monetary policy packages upon their announcement, we can conduct an analysis of the Governing Council meetings during the ECB's ongoing hiking cycle that began in July 2022. By observing market reactions following the press release issuances and during press conferences, we can develop an understanding of how the market perceived the implemented monetary policy package announced at these meetings. This analysis enables us to decompose the extent to which certain aspects of the policy package have surprised the market as monetary policy deviations, and further identify the specific monetary policy dimensions involved. Such decomposition is vital for assessing whether the employed communication strategy and policy measures have effectively steered financial conditions in alignment with the newly established monetary policy stance. In this section, I will present the monetary surprises that unfolded during specific Governing Council meetings, and delve into more detail regarding those meetings that had a significant impact on the further conducting of monetary policy.

3.1 2022 – The beginning of the hiking cycle

The Figure 5 illustrates the monetary policy surprises identified by the factor analysis divided into two sections, the press release and the press conference parts, focusing on the meetings with policy rate hikes that transpired in the year 2022. Analyzing the figure reveals the turbulent nature of the initial policy rate hike in July 2022, which brought forth numerous monetary surprises across all dimensions.

In July 2022 the governing council in response to the still-increasing inflation decided to raise policy rates by 50 basis points and to address the possible monetary policy transmission impairment it introduced the Transmission Protection Instrument (TPI), designed to support the effective transmission of monetary policy across all member states. Prior to the meeting, Italian bonds faced intense pressure as political uncertainties loomed, leading to disproportionately rising borrowing costs compared to other euro area countries. These developments stoked fears of another debt crisis in the euro area and could possibly led to impaired transmission of monetary policy. However, to this date the TPI has not been used, as its mere existence has been sufficient to reassure the markets over time. Additionally, the PEPP program, with its flexibility in reinvestments and the ability to deviate from the capital key of member states, serves a similar role in containing fragmentation tensions if needed, pending the actual deployment of the TPI.

Figure 5: Factor scores since July 2022 until the end of the year for press release and press conference



Source: Bloomberg, own estimates.

Note: This figure shows the estimated factors in basis points. The factor model approach, which, follows a methodology by Motto and Özen (2022), decomposes high-frequency changes in sovereign and risk-free yields around Press Release into Target factor (1M OIS), and Press Conference into Timing (6M OIS), Forward Guidance (2Y OIS), QE (10Y OIS) and Transmission QE factor (5Y IT yield). Factors are scaled such, that they have a unit effect on the reference asset yield. Negative values correspond to monetary easing and positive to policy tightening. The data period for estimation of factors covers Governing Council meetings from 3 January 2002 to 15 December 2022.

The market's response, in terms of monetary surprises, to this Governing Council meeting reached historical highs. The most pronounced monetary policy surprise emerged along the Target dimension, as the consequence of prior signaling of a rate hike of only 25 bps. This divergence amounted to a substantial Target surprise of nearly 12 bps, marking at the time the largest tightening monetary surprise since the disappointment of a lack of rate cut in October 2011 (Figure A.1). The Timing factor, while slightly smaller in magnitude, ranked as the fourth largest tightening factor in the analyzed dataset. This factor aligned with the Governing Council's expressed strategy of gradually normalizing policy to bring inflation back to the target within the medium term. Interestingly, there was a surprise associated with the Forward Guidance (FG) dimension occurring during the press conference, indicating an easing dimension. This might reflect market expectations of a relatively rapid conclusion of the normalization path due to the communication that the inflation was still of transitory nature and that the hikes were front-loaded at the time.

Regarding the Transmission QE factor, it emerged as a significant market tightening surprise during the press conference, meaning that it did not calm the markets as wanted, and that the spread of the periphery yields and risk-free yields widened. As a result, the yield spread between Italian and German 10-year bonds widened to 246.6

basis points during President Lagarde's press conference. This sentiment was reflected in media news headlines. Bloomberg reported, "*Ghosts of 2012 Haunt Europe as Rate Hikes Begin*"², and Reuters published an article titled "*Analysis: ECB's new tool fails to impress as Italy confronts political paralysis*"³. The latter article pointed out that some market participants viewed the new toolkit as cumbersome and not as easily deployable as the markets had expected. The President's repeated statements expressing the hope not to actually use the instrument added to the market's disappointment.

Leading up to the next Governing Council meeting in September 2022, new HICP inflation data reported a surge to 9.1%. The inflation outlook was also revised upward, as reflected in the September 2022 MPE projections, which anticipated inflation remaining above the target until the end of the projection horizon. The Governing Council decision of a 75 bps increase in policy rates surprised the markets to the upside, although not to the same extent as the previous meeting. Consequently, the monetary surprise identified by the factor model was substantial along the Target dimension. On the communication front an emphasis on a meeting-by-meeting and data-dependent approach, framed within the commitment to promptly bring inflation back to the target, significantly drove the Forward Guidance factor toward tightening. This resulted in the largest Forward Guidance tightening surprise since 2011.

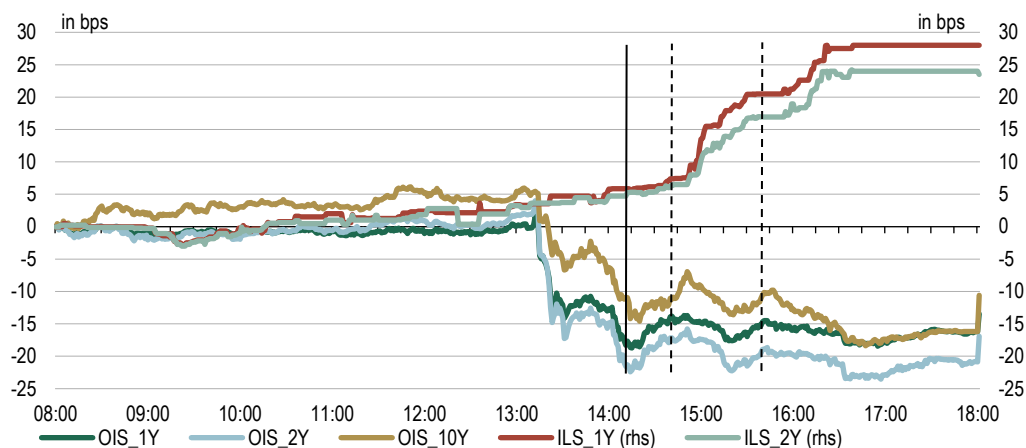
October 2022 brought an interesting prospect of contrary reaction of financial markets despite the significant tightening of monetary policy. For the meeting, the discouraging Purchasing Managers' Index (PMI) started to indicate a cooling of economic activity in the euro area. There was also some political pressure on the ECB to avoid overly aggressive demand constriction in an effort to alleviate inflationary pressures.⁴ Energy inflation on the other hand remained the primary driver of headline inflation at 40.7%, and food prices were on the rise, reaching 11.8%. Market participants were also expecting the Governing Council to start the process of shrinking the balance sheet of the Eurosystem or changing the conditions to the third targeted longer-term refinancing operations (TLTRO III). Ultimately, the Governing Council announced a policy package that included a 75 basis points rate hike, retroactive adjustments to the terms of the TLTRO III programme, with the possibility of early repayment, and the setting of the remuneration rate for minimum reserves at the DFR. The more dovish communication about the future hikes and the absence of a QT announcement led to financial market reactions in the opposite direction, reflected in the subdued factors illustrated in Figure 5, with many of them in the easing territory.

² <https://www.bloomberg.com/news/articles/2022-07-22/ecb-rate-hikes-trigger-debt-crisis-flashbacks#xj4y7vzkg>

³ <https://www.reuters.com/markets/europe/ecbs-new-tool-fails-impress-italy-confronts-political-paralysis-2022-07-21/>

⁴ Meloni Slams ECB Rate Hiking in Widening Political Backlash: <https://www.bloomberg.com/news/articles/2022-10-25/meloni-slams-ecb-rate-hiking-in-widening-political-backlash#xj4y7vzkg>

Figure 6: OIS and ILS intraday yield changes from 8:00 AM on the day of October 2022 Governing Council meeting



Source: Bloomberg, own calculations.

Note: All series are plotted as a difference to the first registered yield on the day of GovC meeting. The black solid vertical line indicates the release of Monetary Policy decisions and the two black dashed vertical lines indicate the beginning and end of the press conference by the President of the Governing Council.

Additionally, the downward surprise to financial markets is reflected in the cumulative changes in OIS yields, when compared to yields at 8:00 am on the meeting day (Figure 6). This trend during the press conference indicated a failure in communication, as higher interest rates were not immediately transmitted to upstream indicators. By the end of the day, OIS yields had fallen by approximately 15-20 basis points, against the background of a dovish Governing Council communication, along with the disappointment over the lack of a QT announcement.⁵ Furthermore, there were notable cumulative changes in Inflation-Linked Swaps (ILS) yields, which measure the market's expectations for inflation in the one to two-year horizon. These yields increased by 25 and 30 basis points for the 1-year and 2-year periods, respectively. This unexpected rise in inflation expectations contradicted the theoretical belief that a tightening monetary policy should have a dampening effect on inflation expectations. As a result, it became evident that the Governing Council's communication in October had not been successful, despite the significant policy rate hike.

In the December 2022 meeting, the direction of the policy change was evident, as the inflation rate was reported at 10.1% (down from 10.6% in October), fueled by strengthening food inflation. Eurosystem projections revised the average inflation for 2022 up to 8.4%. Against this backdrop, the Governing Council announced a policy package that included a 50 bps rate hike and the announcement of an initiation of quantitative tightening in the Asset Purchase Programme (APP) portfolio, with a monthly reduction of €15 billion. The smaller than expected hike resulted in an easing surprise in the Target factor of -5 bps. The communication during the December press conference seemed to carry a more hawkish tone, evident in a substantial tightening surprise along the FG factor. This was a consequence of the President suggesting additional hiking of the same size in the future, and as many as necessary. This hawkish communication effectively transmitted the notion of further and stronger monetary policy tightening to the markets.

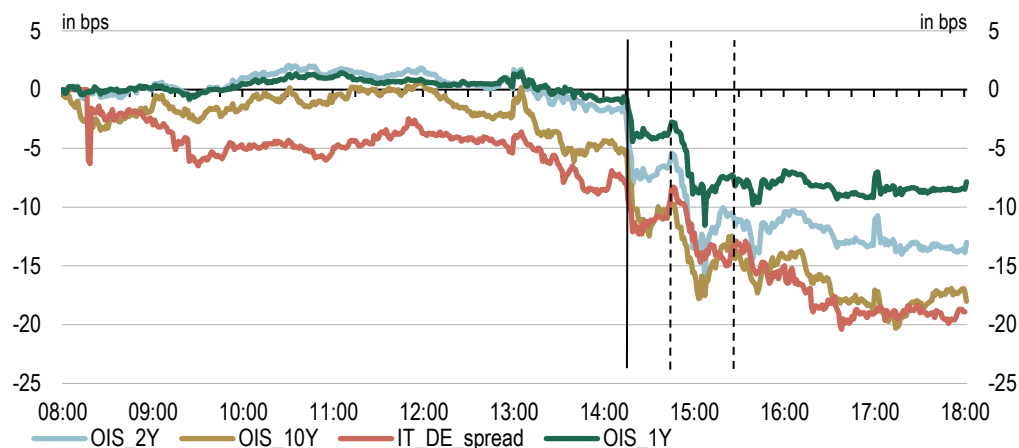
⁵ "ECB convinces markets it is about to turn more dovish" (Financial Times): <https://www.ft.com/content/eca8351a-ae8e-494d-a5d0-3a7584413394>

3.2 2023 – Lower pace of the policy rate hiking

By the end of 2022, headline inflation had started to subside, and this trend persisted into early 2023. However, underlying inflation pressures remained pronounced. Core inflation in February 2023 remained persistently high at an annual rate of 5.2%. Amid concerns of potential second-round effects, the central bank maintained its stance on the trajectory of monetary policy, opting for a continued tightening approach.

The initial meeting of 2023 in February saw an expected 50 bps interest rate hike, resulting in a relatively moderate tightening surprise within the target factor (Figure 8). However, as in the October meeting, communication again failed to transmit the tightening of the monetary policy stance to market interest rates. This is visible in the cumulative OIS yield changes in Figure 7, where the overall change in yields at the end of the day of the Governing Council meeting ended -5 to -20 bps lower compared to before the Governing Council levels for OIS 1Y, 2Y and 10Y respectively.

Figure 7: OIS and ILS intraday yield changes since 8:00 on the day of February 2023 Governing Council meeting

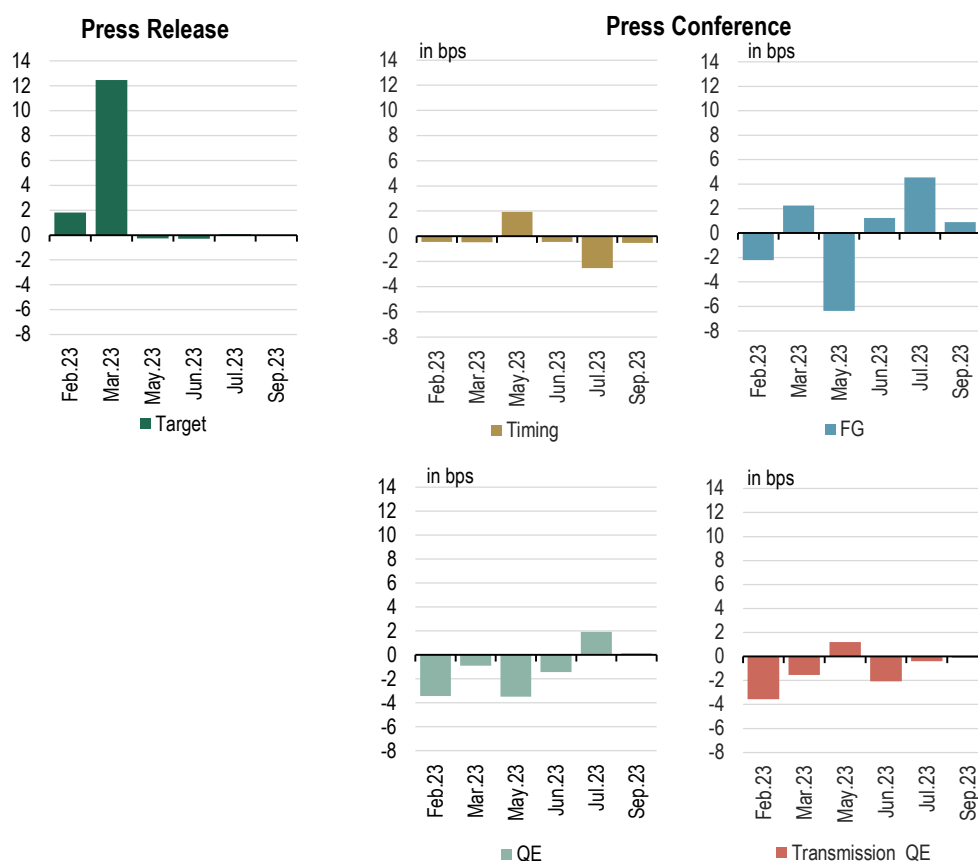


Source: Bloomberg, own calculations.

Note: All series are plotted as a difference from the first registered yield on the day of GovC meeting. The black solid vertical line indicates the release of Monetary Policy decisions and the two black dashed vertical lines indicate the beginning and end of the press conference by the President of the Governing Council.

In March 2023, a wave of banking uncertainty and subsequent bank runs unfolded, as a consequence of a combination of the rapid hiking cycle and inadequate banking management. This development led to one of the largest bank failures in US history, namely Silicon Valley Bank (SVB). The banking crisis spread to several other banks, which later extended into Europe, prompting Credit Suisse to be taken over by UBS. Despite these developments, the stability of the euro area banking system held firm, underpinned by robust liquidity positions and capitalization of European banks. During this period of financial instability, the prevailing sentiment in the overall financial market indicated that participants expected a more accommodative monetary policy. This expectation stemmed from concerns about financial instability and the potential implications of such instability, which could lead to reduced aggregate demand and, consequently, lower headline inflation. This change in the expectations for the future conducting of monetary policy is clearly depicted in Figure 9. Prior to the March banking crisis events, the market expectations for the terminal rate, i.e. the expectations of peak level of the policy rate in the tightening cycle, were on the rise and eventually surpassed 4%. However, once the financial uncertainty unfolded, markets heavily corrected their expectations regarding the terminal rate to the downside, to below 3.5%.

Figure 8: Factor scores since February 2023 until the last observed Governing Council meeting in the sample, July 2023



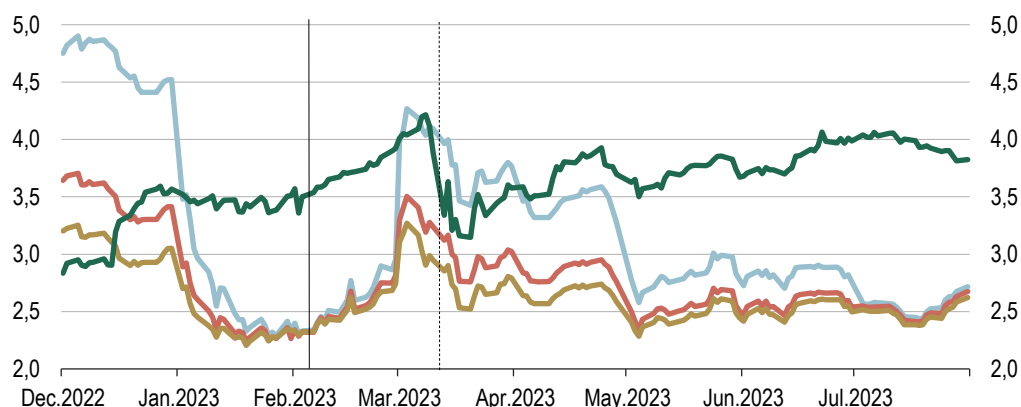
Source: Bloomberg, own estimates.

Note: This figure shows the estimated factors in basis points. The factor model approach, which follows a methodology by Motto and Özen (2022), decomposes high-frequency changes in sovereign and risk-free yields around Press Release into Target factor (1M OIS), and Press Conference into Timing (6M OIS), Forward Guidance (2Y OIS), QE (10Y OIS) and Transmission QE factor (5Y IT yield). Factors are scaled such, that they have a unit effect on the reference asset yield. Negative values correspond to monetary easing and positive to policy tightening. The data period for estimation of factors covers Governing Council meetings from 3 January 2002 to 14 September 2023.

In tandem with the terminal rate adjustments, the expected inflation over one, two and three-year periods, as implied by inflation-linked swaps (ILS), also experienced a decline in response to the financial market instability, reflecting the financial market's perception of a lower level of expected inflation across all three maturities.

The ECB maintained its confidence in the stability of the European banking landscape and demonstrated its commitment to the primary mandate of price stability by announcing a further 50 bps rate increase in policy rates at the 16 March Governing Council meeting. This decision generated a substantial market surprise, reflected by the most pronounced Target factor in the sample, amounting to close to 13 basis points. As a result of the meeting, the expected terminal rate recovered after the meeting, and rose almost to four percent again at the end of April.

Figure 9: ILS yields and expected terminal rate during the financial system uncertainty



Source: Bloomberg, own estimates.

Note: The figure shows the inflation linked swaps of 1Y, 2Y and 3Y. The expected terminal rate is computed as the maximum value of the estimated €STR forward curve within the 2-year horizon. The solid vertical line indicates the February Governing Council meeting. The dashed vertical line indicates the SVB failure.

Another important task for the March Governing Council meeting was to link the financial market reactions to the macroeconomic outlook. The President of the Governing Council explicitly outlined the central bank's reaction function, comprised of three integral components: the assessment of inflation outlook in light of incoming economic and financial data, the dynamics of underlying inflation and the strength of monetary policy transmission. This strategic shift aimed to curtail financial market volatility stemming from the release of much economic or financial data that markets saw as potentially influencing the ECB's decision-making process, spurring unwanted volatility after such releases. It also contributed to mitigating substantial monetary surprises in subsequent meetings included in the dataset.

Following this explicit outline of reaction function, only two noteworthy monetary surprises emerged compared to historical factors' values in subsequent meetings. In May the smaller policy rate increment of 25 bps could have signaled the potential proximity of the end of the current hiking cycle resulting in the easing Forward Guidance factor of -6 bps. On the other hand, there was a tightening surprise along the FG dimension at the July meeting, as President Lagarde's explicit phrasing of "... *future decisions will ensure that the key ECB interest rates will be set at sufficiently restrictive levels for as long as necessary...*" resonated as a tightening surprise for the markets, impacting medium-term yield reactions and propelling the Forward Guidance factor into the tightening zone.

The last meeting covered in this analysis was the September 2023 meeting. The September 2023 ECB staff projections indicated a significant downgrade in the short-term outlook for economic activity, particularly for 2023, which was projected to grow by only 0.7%. Inflation had a minor upward revision of 0.2 percentage points for 2023, along with slight upward revisions for 2024 and 2025, suggesting elevated inflation levels above the target rate until the second half of 2025. The policy rate increase of 25 bps was accompanied by relatively dovish communication in response to weakening macroeconomic indicators. The statement read: "*Based on its current assessment, the Governing Council considers that the key ECB interest rates have reached levels that, maintained for a sufficiently long duration, will make a substantial contribution to the timely return of inflation to the target. The Governing Council's future decisions will ensure that the key ECB interest rates will be set at sufficiently restrictive levels for as*

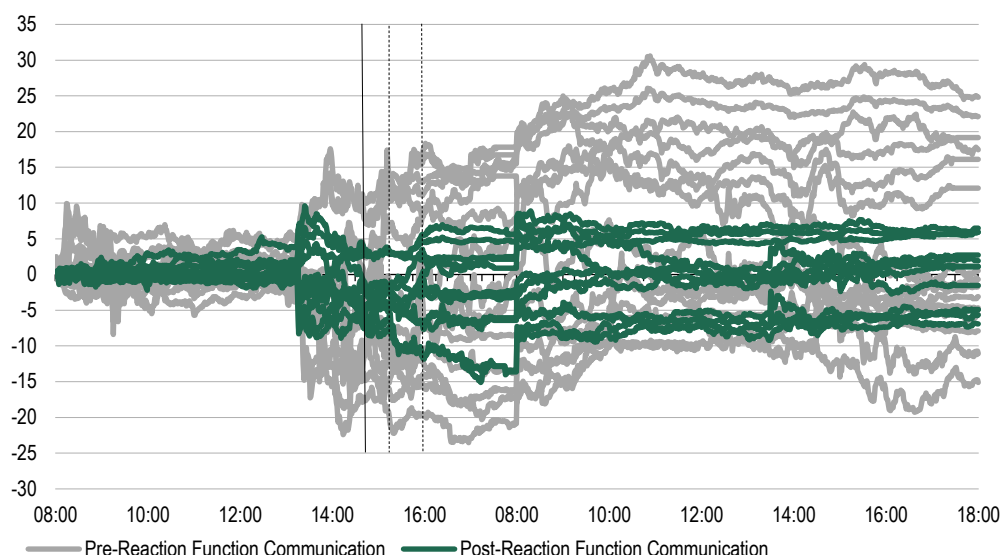
long as necessary." This communication strategy avoided any unintended easing surprises and aligned well with market expectations. It also hinted at the possibility that the central bank had potentially reached the terminal rate level while remaining open to taking further action if needed, particularly in response to upward inflation risks. This was further supported by the absence of substantial factors during the press conference.

4 Impact of ECB's Communication Approach

Communication played a crucial role in this tightening process of monetary policy and the period of high inflationary pressures, as an important factor in anchoring and directing inflation expectations. Additionally, it can serve as a critical step in mitigating the potential for secondary inflationary effects. The previous sections in this paper have demonstrated how the formulation, announcement and communication strategy of various monetary policy packages can influence markets and lead to monetary surprises among market participants across various dimensions.

While forward guidance proved to be an effective strategy for reducing uncertainty and influencing longer-term interest rates during the period of monetary easing, the shift towards monetary normalization brought new challenges. In this new era of high inflation and monetary normalization, the ECB found it increasingly difficult to provide explicit forward guidance as the ECB now had to consider a data-dependent approach, where policy decisions were contingent on incoming data, which made the communication of future policy decisions more challenging. The shift to data-contingent monetary policy decisions was crucial to retain the flexibility to respond swiftly to new data and have the possibility to alter its outlook for monetary policy. This led to relatively large monetary surprises in many monetary meetings, especially at the beginning of the hiking cycle. Explicit forward guidance in this economic and inflationary environment could potentially lock the central bank into a predetermined path for policy changes, which might not be optimal given the changing circumstances. Therefore, the transition towards a communication strategy that emphasised the data-dependent approach was necessary. However, this approach led the volatility in the financial markets, linked to uncertainty over how the macroeconomic data releases impact the monetary policy decisions. Balancing the need for data dependence with the market's desire for guidance proved to be a delicate task for the ECB.

Figure 10: Cumulative intraday OIS yields changes of 1, 2 and 10Y from 8:00 am on the day of Governing council meetings from July 2022 to September 2023



Source: Bloomberg, own calculations.

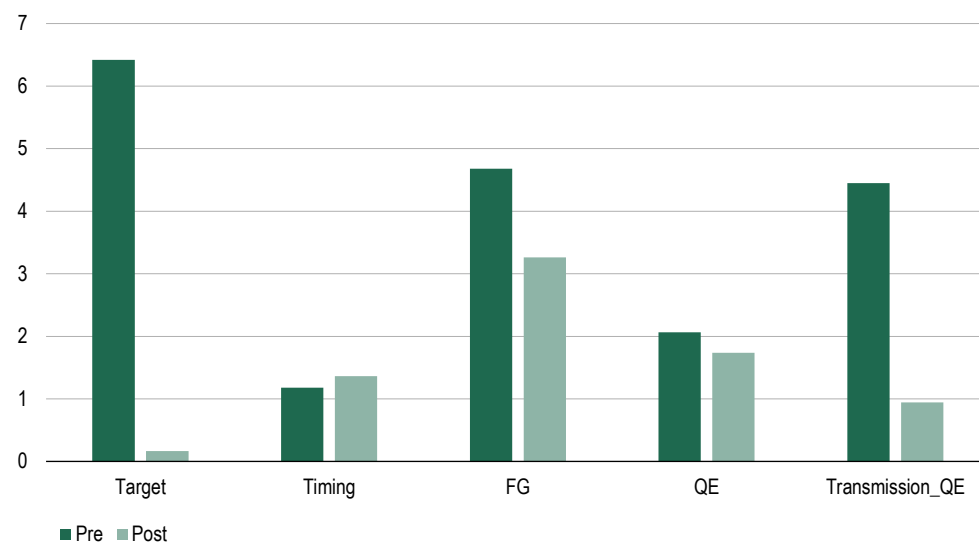
Note: All series are plotted as a difference from the first registered yield on the day of Governing Council meetings over the hiking cycle from July 2022 to September 2023. The black solid vertical line indicates the release of Monetary Policy decisions and the two black dashed vertical lines indicate the beginning and end of the press conference by the President of the Governing Council.

This prompted a shift in communication strategy during the March 2023 meeting, when President Lagarde explicitly clarified the ECB's reaction function, aiming for simplicity and clarity. This clear and transparent specification aligns with the concept emphasised by King (2009) that suggested that effective central bank communication should be transparent, comprehensible to the public and provide informative insights into the economic outlook. The explicit and clear presentation of the reaction function may have contributed to a greater sense of calm in subsequent monetary policy meetings. It could signify that the path of monetary policy became more transparent, substantially reducing uncertainty. This is evident in Figure 10, which illustrates cumulative OIS yield changes with tick data on the days of the Governing Council meetings during the hiking cycle from July 2022 to September 2023. The grey lines represent OIS changes for meetings before the ECB's reaction function was publicly communicated in March 2023, while the green lines depict OIS yield changes for meetings following the unveiling of the reaction function. It appears that each meeting, once the reaction function became known, corresponded to a lesser extent to volatility in OIS yields. This is particularly evident in the time period surrounding the press release and press conference on the day of the meeting, marked by the solid and dashed lines, respectively. However, it is important to note that this period of improved communication effectiveness might also be influenced by the overall calmer economic context, characterised by a declining inflation trend and the gradual conclusion of the tightening cycle. This is not causal identification but nevertheless, the trend of negative OIS yields was observed even in meetings with substantial policy rate hikes, but volatility significantly diminished after March 2023.

The reduction in volatility and, consequently, lower monetary surprises can be further exemplified by examining the average size of the monetary surprises implied by the factor model. Figure 11 illustrates the difference in the average size of each factor before and after the communication of the reaction function. In this figure, we observe that the monetary surprises for all factors, except the Timing factor, were larger before the ECB communicated its reaction function during the press conference in the March 2023 meeting. This communication appears to have, at least partially, alleviated some of the uncertainty regarding the central bank's future monetary policy path and its response

to new data. As a result, the predictability of monetary policy changes in response to economic data improved, contributing to an enhanced signal-to-noise ratio.

Figure 11: Average size of the monetary surprise of each factor for the pre and post-reaction function communication



Source: Banka Slovenije, own estimates.

Note: This figure shows the average of the absolute estimated factors in period of the hiking cycle before the specification of the reaction function and after the specification.

5

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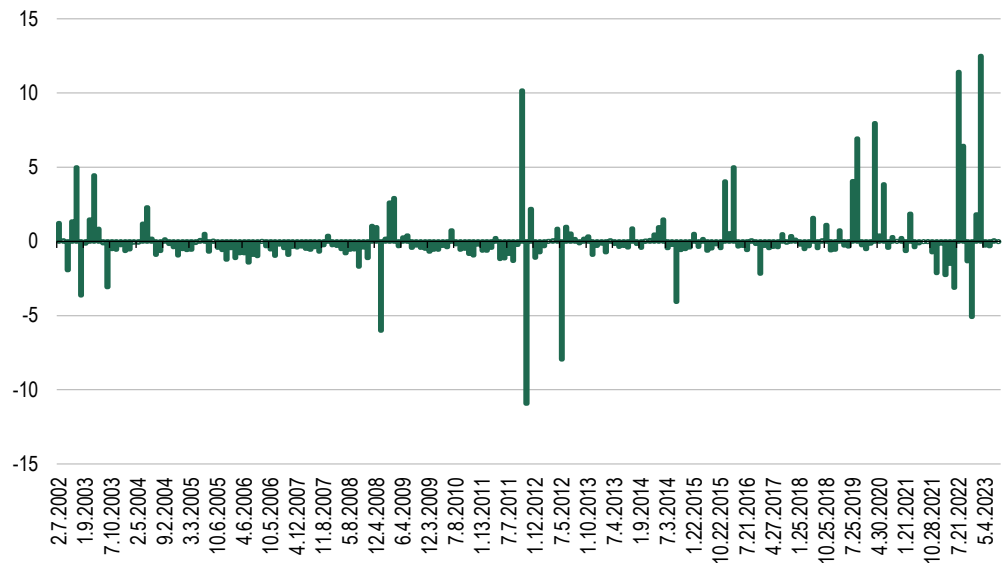
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Appendix

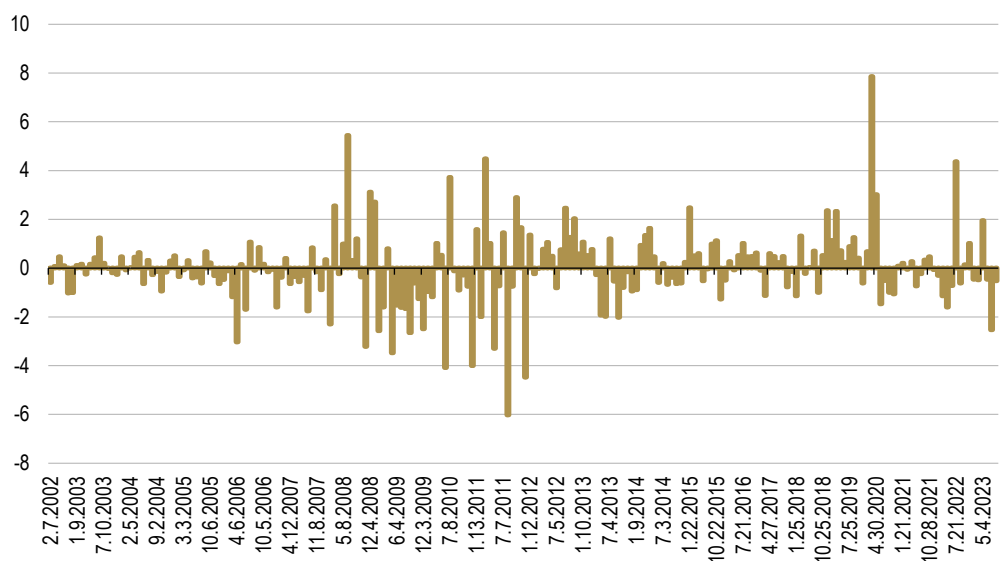
Figure A.1.: Identified factor values of Target dimension across the entire sample



Source: Bloomberg, own estimates.

Note: This figure shows the estimated factors in basis points. The factor model approach, which follows a methodology by Motto and Özen (2022), decomposes high-frequency changes in sovereign and risk-free yields around press release into Target factor. The factor is scaled such, that it has a unit effect on the 1M OIS yield. Negative values correspond to monetary easing and positive to policy tightening. The data period for estimation of factors covers Governing Council meetings from 3 January 2002 to 14 September 2023.

Figure A.2: Identified factor values of Timing dimension across the entire sample



Source: Bloomberg, own estimates.

Note: This figure shows the estimated factors in basis points. The factor model approach, which follows a methodology by Motto and Özen (2022), decomposes high-frequency changes in sovereign and risk-free yields around press conference into Timing factor. The factor is scaled such, that it has a unit effect on the 6M OIS yield. Negative values correspond to monetary easing and positive to policy tightening. The data period for estimation of factors covers Governing Council meetings from 3 January 2002 to 14 September 2023.

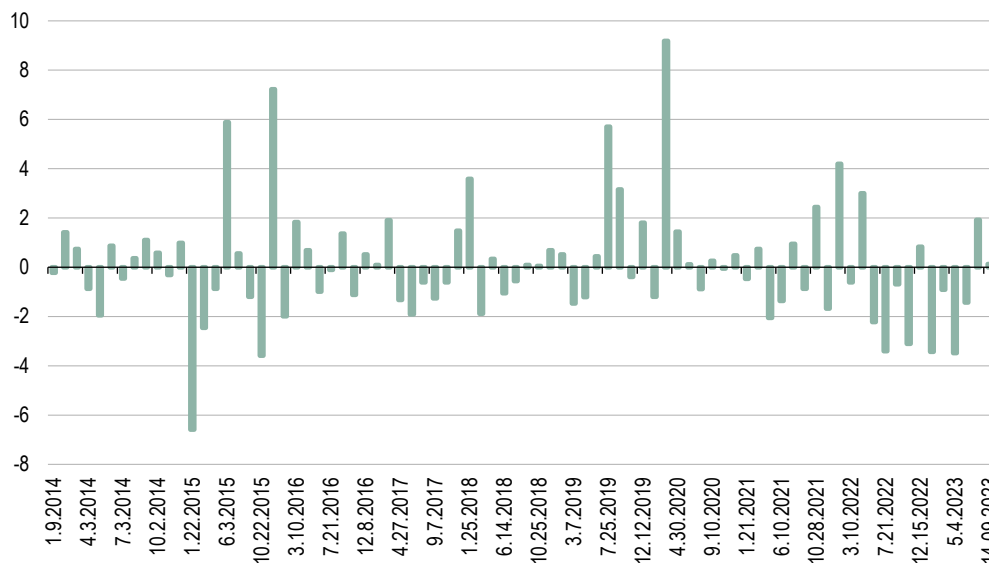
Figure A.3: Identified factor values of FG dimension across the entire sample



Source: Bloomberg, own estimates.

Note: This figure shows the estimated factors in basis points. The factor model approach, which follows a methodology by Motto and Özen (2022), decomposes high-frequency changes in sovereign and risk-free yields around press conference into forward guidance factor. The factor is scaled such, that it has a unit effect on the 2Y OIS yield. Negative values correspond to monetary easing and positive to policy tightening. The data period for estimation of factors covers Governing Council meetings from 3 January 2002 to 14 September 2023.

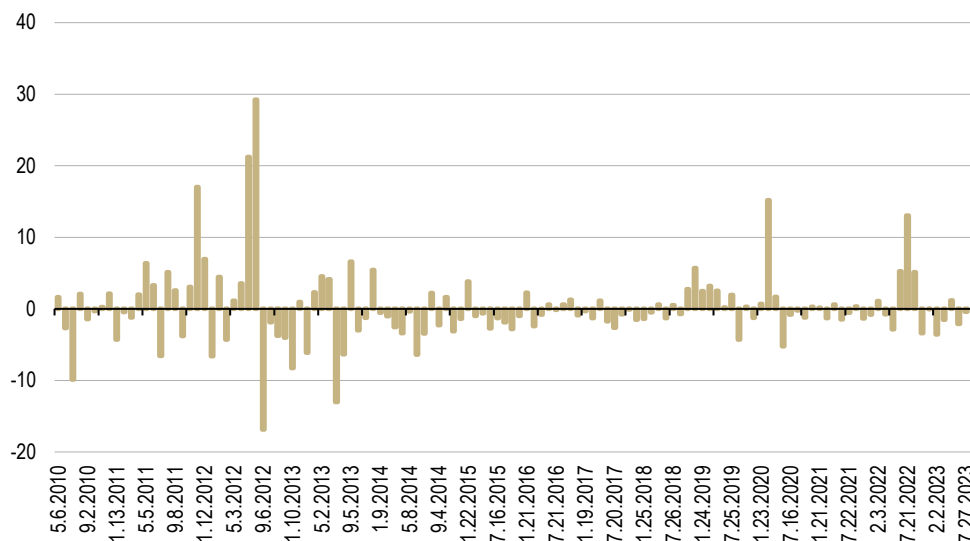
Figure A.4: Identified factor values of QE dimension across the entire sample



Source: Bloomberg, own estimates.

Note: This figure shows the estimated factors in basis points. The factor model approach, which follows a methodology by Motto and Özen (2022), decomposes high-frequency changes in sovereign and risk-free yields around press conference into QE factor. The factor is scaled such that it has a unit effect on the 10Y OIS yield. Negative values correspond to monetary easing and positive to policy tightening. The data period for estimation of factors covers Governing Council meetings from 9 January 2014 to 14 September 2023.

Figure A.5: **Identified factor values of Transmission-QE dimension across the entire sample**



Source: Bloomberg, own estimates.

Note: This figure shows the estimated factors in basis points. The factor model approach, which follows a methodology by Motto and Özen (2022), decomposes high-frequency changes in sovereign and risk-free yields around press conference into Transmission-QE factor. The factor is scaled such that it has a unit effect on the 5Y Italian sovereign bond yield. Negative values correspond to monetary easing and positive to policy tightening. The data period for estimation of factors covers Governing Council meetings from 6 May 2010 to 14 September 2023.