Uncertainty Shocks and Inflation: The Role of Credibility and Expectation Anchoring*

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Abstract

This paper focuses on the uncertainty effect on consumer price inflation based on a panel of 82 advanced, emerging, and developing economies studied over a sample period running from 1995 to 2022. In contrast to the previous literature, we particularly control for the role of monetary policy credibility by considering the monetary control classification of Cobham (2021) and by measuring the degree of anchoring of survey inflation expectations. We argue that the interpretation of uncertainty as a negative demand shock is appealing from a theoretical perspective but is unlikely to reflect uncertainty dynamics for countries with high inflation and/or low monetary policy credibility. We find that higher uncertainty boosts inflation. However, this effect is significantly reduced (or even eliminated) by both a strong degree of monetary control and a strong anchoring of inflation expectations, illustrating that both factors are of key importance for the propagation of uncertainty shocks.

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1 Introduction

Uncertainty is doubtless one of the greatest economic challenges of the 21st century. Therefore, the academic literature has grown considerably by a new literature strand in the recent years, which focuses on the measuring of economic uncertainty and its effect on the real economy. Several measures have been proposed, e.g. based on newspaper-coverage (Baker *et al.*, 2016), on the unpredictable component of macroeconomic time series (Jurado *et al.*, 2015), and on surveys of professional forecasters (Lahiri and Sheng, 2010). Previous studies have also established a negative uncertainty effect on the real economy while mostly focusing on economic growth and (un)employment (e.g., Bloom, 2009; Bachmann *et al.*, 2013; Jurado *et al.*, 2015; Baker *et al.*, 2016; Leduc and Liu, 2016; Basu and Bundick, 2017; Angelini and Fanelli, 2019; Carriero *et al.*, 2021; Beckmann and Czudaj, 2021; Houari, 2022).[1] However, studies also analyzing the role of uncertainty for inflation of consumer prices are more scarce, mostly limited to advanced economies such as the US, and provide mixed findings sometimes resulting in a negative effect, which is found to be weak or even insignificant despite the often raised argument that uncertainty resembles negative demand shocks (e.g., Leduc and Liu, 2016; Houari, 2022; Brianti, 2023; Beckmann and Czudaj, 2023).

Theoretically, the transmission channels running from uncertainty to inflation can be subdivided into the demand-side and the supply-side. On the demand-side negative effects can be expected due to the real-options channel, the precautionary saving channel, and the risk premium channel. The real-options channel addresses the behavior of firms, which are caused by higher uncertainty to postpone irreversible investments applying a 'wait and see' strategy (Bloom, 2009; Leduc and Liu, 2016). The precautionary saving channel refers to the behavior of households, who are expected to start

[1] For an excellent overview of the entire empirical literature studying the effect of uncertainty shocks on the business cycle we refer to Castelnuovo (2023).

building precautionary savings due to an increase in uncertainty and therefore reduce demand (Basu and Bundick, 2017). In addition, a rise in uncertainty also increases risk premia (Gilchrist *et al.*, 2014) and therefore raises investment costs as financial intermediaries demand a compensation for bearing higher risk. Overall, demand-side uncertainty effects are contractionary.

However, on the supply-side positive effects are more reasonable due to the fact that firms are forced to diversify or shift their purchases of intermediate goods. This especially refers to intermediate goods that need to be imported from abroad, which has been shown in the most recent years that have been characterized by distorted supply-chains during the COVID-19 pandemic[2] and sanctions applied by several countries due to the Russian invasion to Ukraine. Increases in import prices and/or shipping costs drive consumer price inflation (Carrière-Swallow *et al.*, 2023). In addition, firms are also found to increase their markups in times of higher uncertainty (Fernández-Villaverde *et al.*, 2015; Fratto and Uhlig, 2020; Born and Pfeifer, 2021; De Santis and Van der Veken, 2022; Castelnuovo *et al.*, 2023). Especially, in models featuring price stickiness, the presence of an uncertainty shock signifies an inclination toward an upward pricing bias. Specifically, firms establish prices at a higher level than they would in the absence of uncertainty regarding the stance of the economy and also their future profits. This preference for higher prices stems from a strategic consideration: if prices were set too low, firms would be compelled to maintain those prices to meet demand, sacrificing profits. In contrast, setting prices too high allows firms to offset lower sales volume with the increased revenue from each unit sold, resulting in a preference for an upward pricing bias. Theoretically, the question regarding the uncertainty effect on inflation cannot be fully answered as it is not clear which effect (demand-side or supply-side)

[2]It is also worth noting that many economies responded by active fiscal policies to the COVID-19 pandemic, which might have also contributed to an increase of inflation during that period (Jordà and Nechio, 2023).

outweigh the other. Therefore, the overall effect is unclear (Castelnuovo, 2023) and needs to be analyzed empirically, which is the aim of the present paper.

Recent inflation dynamics have also increased the challenge for monetary policymakers resulting in a 'two-regime view of inflation' with a low-inflation regime, in which inflation tends to be self-stabilising, and a high-inflation regime, in which an aggressive response of the central bank is needed to avoid a de-anchoring of inflation expectations (Borio *et al.*, 2023; Castelnuovo *et al.*, 2023; Goodspeed, 2024). The key issue is if and how long high inflation will prevail. Expectations play a key role in this regard since the belief that high inflation is not a temporary phenomenon can accelerate inflation dynamics and harm the credibility of monetary policy to achieve its aims. In this context, a crucial question is whether long-run inflation expectations are anchored in the sense that they correspond to the long-run target of monetary policy. If inflation expectations are well anchored, shocks should have a less persistent effect on actual inflation (Bernanke, 2007; Mishkin, 2007). De-anchoring describes a situation where long-run expectations are adjusted and deviate from the long-term target. Despite the rich literature on both uncertainty and inflation, the question whether the effect of uncertainty on inflation depends on expectation anchoring or the credibility of monetary policy has not been addressed yet.

Against this background, this study focuses on the effect of uncertainty on consumer price inflation based on a broad panel of 82 advanced, emerging, and developing economies studied over a sample period running from 1995 to 2022. In contrast to the previous literature, we particularly control for the role of monetary policy credibility by considering the monetary control classification of Cobham (2021) and by measuring the degree of anchoring of inflation expectations. In doing so, we construct an anchoring measure for each country following Bems *et al.* (2021) by relying on inflation expectations over different horizons taken from Consensus Economics and by considering several characteristics of de-anchoring. As measure of uncertainty we use the novel world uncertainty index computed by word counts in the Economist Intelligence Unit country reports provided by Ahir *et al.* (2022), which offers the largest coverage of countries across all available uncertainty indicators. Thus, we explicitly test whether the direction and the persistence of inflation depends on the degree of expectation anchoring and monetary control.

Based on Jordà (2005) type local projections, we find that higher uncertainty boosts inflation in line with the markup and the supply-chain channel. However, this effect is significantly reduced (or even eliminated) by a strong degree of monetary control and by a strong anchoring of inflation expectations. Our findings offer important implications for policymakers as they show that central bank credibility is the key to reduce or even avoid uncertainty-related inflation increases, which would require an aggressive reaction of the central bank.

The remainder of the paper is organized as follows: The next section reviews the relevant literature. Section 3 provides an in-depth description of our data set, including the construction of different measures we are considering, and of our empirical methodology. Section 4 presents and discusses our empirical findings, while Section 5 concludes.

2 Review of the Literature

Our study relates to several strands of the literature. In the following we focus on the key literature which links our work to inflation expectations and its anchoring as well as to the modelling and the effects of uncertainty. The literature on inflation expectations is enormous and can be broadly classified into the theoretical work on the role of inflation expectations, measurement of inflation expectations, and determinants of inflation expectations. In the following we review the most relevant studies, also highlighting the difference between short-run and long-run expectations.

Inflation expectations matter for monetary policy from two perspectives. On the one hand, they are an important leading indicator and potential intermediate target for monetary policymakers. On the other hand, they play a key role for monetary policy transmission (Sousa and Yetman, 2016). As an intermediate target, they can provide useful information about the potential path of actual inflation. In the context of monetary policy transmission, inflation expectations have a direct effect on wages and decision-making of consumers and firms since they affect the perceived real interest rate and wealth. If market participants view higher expected inflation as a negative signal for the economic outlook, the resulting negative income effect may dominate potential positive effects of a lower real interest rate and lead to lower levels of consumption or investment (Candia *et al.*, 2020). Via these channels, inflation expectations can affect consumption and investment.[3]

There is no unique empirical measure of inflation expectations. Inflation expectations can be proxied via surveys and financial markets. Surveys are conducted with firms, professionals, and households. Independent of the measure, the evidence suggests that expectations react to new information with a significant delay. From a theoretical perspective, this pattern can be explained by information rigidity which for example results from rational inattention (Coibion and Gorodnichenko, 2012). Rational inattention reflects the idea that market participants cannot perfectly distinguish between different kinds of news resulting in a dampened or delayed response (Mackowiak *et al.*, 2023). Such a behavior leads to substantial forecast errors, in particular for inflation expectations of households. However, even in the presence of large forecast errors,

[3]An additional strand of the literature has focused on the question if and how expectations shape behavior (Roth and Wohlfart, 2020) and how people interpret macroeconomic shocks (Geiger and Scharler, 2021).

inflation expectations are useful for monetary policymakers. In the short-run, they potentially include useful information about the direction of changes in future inflation. In the long-run, they also reflect the degree of anchoring of inflation expectations.

Anchoring of inflation expectations is important since it indicates whether monetary policy is credible in the long-run (King, 1995). If expectations are anchored, market participants believe that monetary policy will be able to achieve its long-run inflation target in the medium- and/or long-run (Kumar *et al.*, 2015; Bems *et al.*, 2021), even in the presence of shocks.

Empirical tests of anchoring are either based on prices of financial markets or surveys. In case of financial markets, tests of anchoring either correspond to the question whether inflation expectations or inflation uncertainty respond to new information (Gürkaynak *et al.*, 2005) or investigate whether changes in short-run expectations are transmitted into long-run expectations (Mehrotra and Yetman, 2018). In case of surveys, anchoring is reflected in at least two dimensions. On the one hand, it corresponds to the question whether medium- and long-run inflation expectations are in line with the official policy aim of the central bank (Coibion *et al.*, 2020). On the other hand, it is reflected in the dispersion of inflation expectations over longer horizons given that higher uncertainty about long-run inflation also indicates doubts about the ability of central banks to achieve its inflation target.

The question how anchoring can be achieved is of great importance for monetary policymakers. Recent evidence has shown that the degree of anchoring is for example determined by central bank independence and transparency regarding monetary policy instruments and objectives (Bems *et al.*, 2021). Due to the slow response of expectations to new information, de-anchoring usually requires substantial shocks. Given that uncertainty about long-run inflation depends on the variance of permanent shocks (Ball and Cecchetti, 1990), the degree of anchoring therefore also provides information whether market participants perceive shocks as permanent or temporary.

From this perspective and since we focus on the effects of uncertainty on inflation, our work also relates to the modelling of uncertainty shocks and the transmission of such shocks into the real economy. Modelling uncertainty and the resulting effects of uncertainty on macroeconomic variables has attracted great interest among researchers and policymakers. Given that there is no unique definition of uncertainty, several measures based on model predictions, volatility, surveys, and textual analysis have been proposed. Uncertainty based on model predictions reflect for example the common volatility of prediction errors (Jurado *et al.*, 2015), while financial market variables are often based on volatility itself. Survey-based measures incorporate information about the disagreement among professionals (ex-ante uncertainty) and the variance of forecast errors (ex-post uncertainty) (Lahiri and Sheng, 2010). Textual based measures for instance rely on the coverage of the term 'uncertainty' in media outlets, such as newspapers (Baker *et al.*, 2016). The uncertainty measure recently introduced by Ahir *et al.* (2022) also reflects the use of the word 'uncertainty' but is based on the quarterly Economist Intelligence Unit country reports. Major advantages are the broad coverage in terms of countries and the good comparability of the measure across countries which allows us to match country-specific uncertainty with our anchoring measure.

The focus of this study is the response of inflation to uncertainty shocks, which is not clear-cut as this effect depends to different types of opposing transmission channels: while traditional demand-sided channels (i.e., real-options channel, precautionary saving channel, and risk premium channel) imply deflationary effects, the supply-sided channels (i.e., markup channel and supply-chain channel) are in favor of inflationary effects. An important contribution is provided by Leduc and Liu (2016), who argue that uncertainty shocks are aggregate demand shocks and therefore, their response is deflationary due to frictions on the labor market. Haque and Magnusson (2021) confirm this view based on a time-varying parameter VAR model featuring stochastic volatility while Fasani and Rossi (2018) question this finding by adopting the same approach as Leduc and Liu (2016) but also account for Taylor rule-type interest rate inertia. In the latter case, uncertainty shocks turn out to be inflationary. Based on a nonlinear VAR model, Alessandri and Mumtaz (2019) provide evidence in favor of inflationary effects in 'normal times' and deflationary effects during 'financial crisis episodes'. Castelnuovo *et al.* (2023) also rely on a nonlinear stochastic volatility-in-mean VAR framework to study the effect of macroeconomic uncertainty shocks on inflation and the growth of industrial production depending on inflation being in a high or in a low regime. They basically find a substantially larger positive effect on CPI inflation and also a stronger drop in real economic activity when inflation is high (i.e., larger than 7%). They also rationalize their findings based on a nonlinear New Keynesian model and argue that the relationship between high trend inflation and the upward pricing bias of firms results in a large price dispersion, thereby intensifying the macroeconomic effects triggered by the uncertainty shock.

De Santis and Van der Veken (2022) distinguish uncertainty shocks from financial shocks using an SVAR approach and show that the former are inflationary and the latter deflationary. Similarly, Brianti (2023) uses an VAR model with sign restrictions to dissect uncertainty shocks from financial shocks by assuming that the former are deflationary while the latter are inflationary. Deflationary effects due to uncertainty shocks have also been found by Houari (2022) and Beckmann and Czudaj (2023) while inflationary effects are also shown by Carriero *et al.* (2021). Meinen and Roehe (2018) provide ambiguous findings. Overall, there is no consensus in the (empirical) literature whether the effect of an uncertainty shock is inflationary or deflationary (see also Castelnuovo (2023) for a more detailed overview of the corresponding literature) and the evidence is limited to single-country studies for advanced economies (the US and the Euro Area).[4] Therefore, the aim of the present study is to conduct a broad cross-country analysis on the response of inflation to an uncertainty shock while allowing for a potential nonlinearity due to the degree of monetary control and the anchoring of inflation expectations.

3 Data and Empirical Methodology

3.1 Data

Our data set is an unbalanced panel of 82 countries listed in Table 1 over a sample period from April 1995 to April 2022 (mostly at a biannual, partly at a quarterly frequency)[5] and consists of four different components: a measure for the degree of anchoring of inflation expectations, a proxy for uncertainty shocks, a classification of monetary policy frameworks to indicate the degree of monetary control, and finally, the consumer price index (CPI) as left-hand side variable. More details on the construction of the data set are provided in the upcoming subsections.

*** Insert Table 1 about here ***

3.1.1 Anchoring Measure

For the construction of the anchoring measure we follow Bems *et al.* (2021). It is computed based on inflation expectations provided by Consensus Economics in percent per annum for a total of 86 advanced, emerging, and developing economies over several

[4] A related strand of the literature focuses on the role of geopolitical risk, which can be considered as one source of uncertainty, for either crude oil prices or consumer prices in general and provides some evidence in favor of inflationary effects (Mignon and Saadaoui, 2024; Iacoviello *et al.*, 2024; Asadollah *et al.*, 2024).

[5] The exact coverage of countries over time is shown in Figure A.1 in the Appendix.

different forecast horizons. Surveys conducted by Consensus Economics are widely used due to their broad coverage and long history (see e.g. Dovern *et al.*, 2012; Beckmann and Czudaj, 2018; Bems *et al.*, 2021, among many others).

We basically rely on means and standard deviations of inflation forecasts among professional forecasters for horizons of four-years-ahead up to seven-years-ahead ($h = 4, \ldots, 7$).[6] We also conducted the entire analysis for shorter horizons ($h = 1, 2, 3$) for comparison, and the results tend to confirm our findings. However, we have excluded them from the paper, as the concept of anchoring inflation expectations used by central banks typically refers to the medium term, usually a five-year horizon. At lower horizons the degree of anchoring is usually quite weak as short-run inflation expectations often react to transitory shocks such as e.g. a supply shock. In such a situation it might be optimal for a central bank to let inflation (expectations) temporarily deviate from the target to limit the output cost of such a shock (Gertler *et al.*, 1999). Consequently, fluctuations of short-term inflation expectations are not an appropriate measure of a de-anchoring.[7] Thus, higher horizons of anchoring should be considered as more relevant.

The survey of professional forecasters conducted by Consensus Economics started collecting market expectations in October 1989 for the G7 economies.[8] Over the last decades this survey has been extended by several other economies. Therefore, the data set results in an unbalanced panel (see Figures A.1 and A.2 for details). For the construction of the anchoring measure we use 82 countries since the time they were

[6] Consensus Economics collects forecasts for even higher horizons. However, all forecasts for horizons higher than $h = 7$ are equal to the seven-years-ahead forecasts and are therefore omitted from the study.

[7] Therefore, Bems *et al.* (2021) only rely on inflation forecasts for three- and five-years-ahead to ensure that longer term beliefs are captured rather than the effect of transitory shocks. Brandão-Marques *et al.* (2023) solely use inflation expectations over the five years horizon to study the effect of unexpected fiscal expansions on inflation expectations. They also argue that a de-anchoring of inflation expectations is often observed due inflationary effects such as demand pressures at shorter horizons.

[8] Due to the construction of the anchoring measure by using a rolling window with a window size of 12, we lose six years of biannual data and therefore, our sample period effectively starts in April 1995.

included into the survey.[9] The survey has been conducted on a biannual frequency in April and October each year until 2013, before it has been switched to a quarterly frequency in 2014. Our sample period goes until April 2022.[10]

Following Bems *et al.* (2021), our anchoring measure is based on three subindexes:[11] First, we compute the deviation of mean inflation expectations from the inflation target:

$$\text{Metric}^h_{1,i,t} = \sqrt{\frac{1}{w}\sum_{j=t}^{t-1+w}(\pi^{e,h}_{i,j} - \pi^*_i)^2}, \tag{1}$$

where $\pi^{e,h}_{i,j}$ denotes mean inflation expectations of professionals for country i made in period j for horizon h with $h = 4, \ldots, 7$ years. π^*_i represents inflation targets, which have been proxied by the sample means of the forecast for the longest horizon as not every central banks announces a specific inflation target.[12] $w = 12$ gives the window size for the rolling window computation used in our study to account for time-variation in the anchoring of inflation expectations. The idea behind the metric given in Eq. (1) is that when inflation expectations are well anchored, they should be close to the inflation target. Therefore, any deviation represents a lower anchoring due to a lower

[9]We have solely omitted four countries from the study: three of them (Cyprus, Estonia, and Serbia) because the uncertainty measure we use (see Section 3.1.2) is not available for them and Venezuela due to the hyperinflation period. As will be outlined below, we construct several measures, which need to be re-scaled to take a mean of zero and a variance of unity. Venezuela is an enormous outlier in the data set, which would have eliminated the variation in the re-scaled anchoring measure across countries.

[10]The standard deviations for forecast horizons $h = 1, 2$ are available from 1989 as the mean forecasts, however for the higher forecast horizons that we use here the data starts in 2005 (see Figure A.2). This means that the third anchoring measure we introduce in Eq. (3) is available from 2005 on.

[11]Other anchoring measures have been recently proposed by Grishchenko *et al.* (2019), who rely on the estimation of a dynamic factor model of inflation featuring time-varying uncertainty, and by Binder *et al.* (2023), who suggest a "bounds anchoring" indicator based on the idea that long-run inflation expectations should not deviate significantly from the target of the central bank. In addition, Dovern and Kenny (2020) and Corsello *et al.* (2021) have tested for structural changes in distributional inflation forecasts provided in the ECB Survey of Professional Forecasters, which would also indicate a de-anchoring of inflation expectations. Several studies also define anchoring by the assumption that inflation expectations for longer horizons are not attached to movements in short-run expectations (e.g., Buono and Formai, 2018).

[12]The proxies are very close to the inflation targets published by some central banks and Bems *et al.* (2021) also argue that their findings are not sensitive to this choice.

central bank credibility.

Second, we calculate the variation of mean inflation expectations:

$$\text{Metric}^h_{2,i,t} = \sqrt{\frac{1}{w-1}\sum_{j=t}^{t-1+w}(\pi^{e,h}_{i,j} - \overline{\pi}^{e,h}_{i,w})^2}, \tag{2}$$

where $\overline{\pi}^{e,h}_{i,w}$ denotes the time series average of mean inflation expectations for country i over the window size w. The rationale behind this metric is that inflation expectations rarely need to be revised by market participants, if they are well anchored.

Third, we also rely on the dispersion of inflation expectations:

$$\text{Metric}^h_{3,i,t} = \frac{1}{w}\sum_{j=t}^{t-1+w}\left[\sqrt{\frac{1}{M-1}\sum_{m=1}^{M}(\pi^{e,h}_{m,i,j} - \overline{\pi}^{e,h}_{i,j})^2}\right], \tag{3}$$

where $\pi^{e,h}_{m,i,j}$ is the individual inflation forecast for forecaster m for country i made at period j for horizon h and $\overline{\pi}^{e,h}_{i,j}$ is the corresponding mean forecast across forecasters. This metric is basically a rolling window mean of the standard deviation across forecasters and is based on the idea that forecasters should not disagree a lot regarding future inflation, if inflation expectations are well anchored.

Finally, we aggregate the three anchoring metrics outlined above into one measure as they are providing complementary features characterizing the degree of anchoring. In doing so, we first of all, standardize the three individual indexes to take a mean of zero and a variance of unity and also change the sign of each measure:

$$\text{Standard Metric}^h_{n,i,t} = -\frac{\left(\text{Metric}^h_{n,i,t} - \overline{\text{Metric}}^h_n\right)}{\sigma(\text{Metric})^h_n}, \quad n = 1, 2, 3, \tag{4}$$

where $\overline{\text{Metric}}^h_n$ and $\sigma(\text{Metric})^h_n$ are the sample average and the sample standard deviation of the corresponding metric across countries i and periods t. We multiply the standardized measures by -1 to facilitate the interpretation of our anchoring measure.

A higher (lower) value refers to a higher (lower) degree of anchoring of inflation expectations. Second, we take the simple average across the three standardized metrics to compute our measure of anchoring:

$$\text{Anchor}_{i,t}^{h} = \frac{1}{3}\sum_{n=1}^{3} \text{Standard Metric}_{n,i,t}^{h}, \quad h = 4, \ldots, 7. \tag{5}$$

The constructed anchoring measure is visualized in Figure 1 for the horizon $h = 7$. Panel (a) illustrates the heterogeneity of the anchoring measure across countries by providing the average anchoring over time and sorting the countries from least to best anchored. This graph also includes the four countries we have excluded for the following analysis. Unsurprisingly, it becomes evident that Venezuela shows the lowest degree of anchoring due to the hyperinflation period that started around 2016 and therefore constitutes a clear outlier. Other countries showing a very weak anchoring over the sample period also include economies that were facing severe inflation such as Turkey, Argentina, Nigeria, Romania, and Brazil. Countries that appear in the other tail of the anchoring distribution include Canada and several European countries such as Belgium, Austria, Finland, and Denmark besides smaller economies such as Georgia.

*** Insert Figure 1 about here ***

Panel (b) shows the time series pattern of the anchoring measure. The red line gives the median across countries and the light blue area the range between the 5% and the 95% quantiles. The graph clearly shows that the degree of anchoring has strengthened globally over the sample period. It was relatively low and unstable in the late 1990s and has started accelerating in the early 2000s reaching a stable level over the recent years. This finding is supported by Figure 2, which also shows the time series pattern of the anchoring measure while distinguishing between advanced economies (Panel (a)) and emerging and developing economies (Panel (b)). The countries have been grouped according to the most recent IMF classification. Figure 2 also exhibits the improving pattern of anchoring over time for both groups of countries, although the general level of anchoring is clearly higher for advanced economies compared to the remaining ones. However, interestingly in 2022 the degree of anchoring has dropped for advanced economies due to the strong increase in realized inflation over the world.

*** Insert Figure 2 about here ***

3.1.2 Uncertainty Measure

The literature already provides a wide range of different uncertainty measures that can be considered as potential proxies. However, our aim is to conduct a broad study of the impact of uncertainty on inflation including as many countries as possible. Therefore, the world uncertainty index (WUI) recently proposed by Ahir *et al.* (2022) seems to be the best choice as it has the largest coverage including a total of 143 countries across the globe.[13] As already mentioned above, we solely lose three countries due to unavailability of the WUI (Cyprus, Estonia, and Serbia). The WUI is constructed by counting the percentage appearance of the word 'uncertain' and similar terms in the Economist Intelligence Unit country reports and is therefore based on the same source (Ahir *et al.*, 2022). A major advantage is that the corresponding measure is designed

[13]A similar and often used alternative is the economic policy uncertainty (EPU) index introduced by Baker *et al.* (2016). However, at the moment the EPU is solely available for up to 29 countries (see `https://www.policyuncertainty.com/`) with time series starting later than the WUI. This would heavily restrict our analysis as most of these countries are Advanced Economies, which do not offer enough variation in the degree of anchoring of inflation expectations to study a potential nonlinearity in the uncertainty effect depending on the level of anchoring.

to capture a wide scenario of country-specific drivers of uncertainty shocks, making it much more attractive compared to the alternative of analyzing a common uncertainty across all countries.

Figure 3 visualizes the WUI across economies and over time. Panel (a) illustrates the heterogeneity of the WUI by providing the time series average WUI for each country and sorting the countries from lowest to highest. The countries with the highest levels of uncertainty include countries that experienced severe political tension over the sample period such as South Africa, the UK, Brazil, Nigeria, and Turkey. The high level of uncertainty in the UK is clearly a result of uncertainty surrounding the Brexit since the referendum in 2016. Panel (b) shows the time series pattern of the WUI. The red line gives the median across countries and the light blue area the range between the 5% and the 95% quantiles. The level of uncertainty is quite volatile showing its highest level in 2020 – the first year of the COVID-19 pandemic.

*** Insert Figure 3 about here ***

Ahir *et al.* (2022) apply a panel VAR model including stock returns, the WUI, and GDP growth to study the effect of economic activity to an uncertainty innovation while relying on a recursive Cholesky decomposition and also show the robustness of the negative effect based on the SVAR-IV approach suggested by Plagborg-Møller and Wolf (2021) while instrumenting uncertainty innovations by exogenous elections dates. In our study, we take the first difference of the WUI denoted by $\Delta \text{WUI}_{i,t}$ as a measure of uncertainty shock since we are actually interested in the effect stemming from a change in uncertainty that might be triggered by unexpected events such as a pandemic and not from the level of uncertainty, which usually differs across economies. In addition, we also conduct a robustness check to ensure that uncertainty shocks represent unexpected changes in the level of uncertainty and are not driven by expectations regarding the business cycle or inflation or are capturing an endogenous response of uncertainty to expected changes in growth or inflation. Therefore, we rely on an approach similar to the one followed by Auerbach and Gorodnichenko (2012) and Furceri *et al.* (2018), among others, to identify fiscal policy shocks and monetary policy shocks, respectively.[14] In doing so, we use the residuals $\hat{\eta}_{i,t}$ or $\hat{\xi}_{i,t}$ from the following country-by-country regressions:

$$\Delta \mathrm{WUI}_{i,t} = \alpha_{0,i} + \alpha_{1,i} E_{i,t}(\pi_{i,t+1}) + \alpha_{2,i} E_{i,t}(g_{i,t+1}) + \eta_{i,t}, \tag{6}$$

or

$$\Delta \mathrm{WUI}_{i,t} = \alpha_{0,i} + \alpha_{1,i} \left[E_{i,t}(\pi_{i,t+7}) - E_{i,t}(\pi_{i,t+1})\right] + \alpha_{2,i} \left[E_{i,t}(g_{i,t+7}) - E_{i,t}(g_{i,t+1})\right] + \xi_{i,t}, \tag{7}$$

where the first difference of the WUI, $\Delta \mathrm{WUI}_{i,t}$, is either regressed on inflation expectations $E_{i,t}(\pi_{i,t+1})$ and GDP growth expectations $E_{i,t}(g_{i,t+1})$ made for each country i by professional forecasters in period t over an one-year-ahead horizon or on the difference between long-term and short-term expectations for both (i.e., the seven-years-ahead forecast minus the one-year-ahead forecast). In Eq. (6) we correct the changes in uncertainty for short-term inflation and GDP growth expectations made over the corresponding period and in Eq. (7) we basically correct for short-term surprises compared to long-run expectations.[15]

Theoretically, it is possible that a countries' level of uncertainty is (to some extent) determined by the stance of monetary policy and therefore by the degree of anchoring.

[14]For instance, Furceri *et al.* (2018) construct monetary policy shocks by computing forecast errors for the short-term interest rate and then taking residuals of a regression of these on the forecast errors for CPI inflation and GDP growth based on forecasts taken from the survey of professional forecasters provided by Consensus Economics.

[15]This correction also helps to allow for potential dynamic country-specific global phenomena, which may result in a heterogeneous effect on uncertainty across countries as discussed in the macro panel data literature (Giannone and Lenza, 2009).

However, our proxy for an uncertainty shock $\Delta\text{WUI}_{i,t}$ is not directly related to our anchoring measure $\text{Anchor}^h_{i,t}$. First, this is due to the fact that we rely on a very broad measure of uncertainty, which is not closely connected to the stance of monetary policy such as other concepts (see, e.g. Istrefi and Mouabbi (2018) and Husted *et al.* (2020)). Second, when comparing Figures 1 and 3, it becomes evident that the degree of anchoring has become more and more stable over time while the level of uncertainty shows quite a different pattern, which has become more and more volatile over the recent two decades. This is an intuitive finding given the generally decreasing inflation rates over this period. Finally, the simple correlation between $\Delta\text{WUI}_{i,t}$ and $\text{Anchor}^h_{i,t}$ using pooled data turns out to be roughly zero for each horizon h. When considering cross-country correlation using time series averages for each country, the correlation is a bit stronger but still relatively low lying around -0.25.

3.1.3 Classification of Monetary Policy Frameworks

To measure the response of inflation to an uncertainty shock, we allow for a potential nonlinearity due to the anchoring of inflation expectations and in addition also due to the degree of monetary control according to the classification of monetary policy frameworks proposed by Cobham (2021). Therefore, we also add to the literature studying the role of the monetary regime for inflation persistence (Benati, 2008). Cobham (2021) uses 32 different criteria and following them aggregates a large number of countries into the categories 'rudimentary', 'intermediate', 'substantial', and 'intensive' while referring to the degree of monetary control. Their classification is based on announced targets for exchange rates, monetary aggregates, and/or inflation, how well they are actually hit, and which currency regime is followed. We have applied the proposed classification and have extended it until the end of our sample period while referring to Cobham (2021) for all details and an in-depth discussion of the classification. To facilitate the interpretation of our findings while assessing a potential nonlinear uncertainty effect on inflation accounting for the degree of anchoring and the degree of monetary control, we solely distinguish between two groups of monetary control. Therefore, we aggregate the two groups of 'substantial' and 'intensive' monetary control into one and construct a dummy variable based on this classification. It is denoted as $\text{Strong}_{i,t}$ in the following and takes a value of unity for a strong monetary control and zero otherwise. Overall, we believe that this measure is better suited than a simple one dimensional de-jure classification of monetary policy which can deviate from the de-facto policy. This distinction is also useful from a broader policy perspective. Policymakers in open economies face trade-offs when making policy choices. As outlined by the classical impossible trinity, high monetary control implies the need to introduce capital controls or give up exchange rate stability given that all three objectives cannot be achieved simultaneously (Aizenman *et al.*, 2010). Some countries have therefore decided to give up monetary control in favor of fixed exchange rates to restore the credibility of monetary policy.

According to Bems *et al.* (2021) institutional characteristics and therefore, also the degree of monetary control might influence whether and how strong inflation expectations are anchored. However, our anchoring measure and the degree of monetary control differ substantially by the fact that the latter is a dummy variable only taking values of zero and unity while the former is a continuous variable. The dummy variable does not show much variation within the entire sample period. It is basically a very rough measure of monetary control distinguishing between groups of countries, which differ substantially regarding their monetary framework and their monetary policy credibility. This measure is considered to account for the possibility that the degree of anchoring might be difficult to compare across these groups of countries. However, the correlation between our anchoring measure and the degree of monetary control is very low within our sample (lies between 0.01 and 0.03 depending on the horizon of anchoring).

Therefore, we believe that it is sensible to consider these two measures simultaneously.

3.1.4 Realized Inflation

Finally, as our left-hand side variable we have downloaded quarterly data for the consumer price index (CPI) for all countries included in our study from the International Monetary Fund (IMF).[16] In the following we take natural logarithms of the CPI denoted by $p_{i,t}$ and consider the change in log prices across several horizons as a measure of inflation in our empirical approach which is outlined in the next subsection.

3.2 Empirical Methodology

We rely on Jordà (2005) type local projections to estimate the cumulative response of the change in consumer prices by the following panel regression

$$\begin{aligned} p_{i,t+s} - p_{i,t} &= \gamma_1^s \Delta \text{WUI}_{i,t-1} + \gamma_2^s \text{Anchor}_{i,t-1}^h + \gamma_3^s \text{Strong}_{i,t-1} + \gamma_4^s \text{Anchor}_{i,t-1}^h \cdot \Delta \text{WUI}_{i,t-1} \\ &+ \gamma_5^s \text{Strong}_{i,t-1} \cdot \Delta \text{WUI}_{i,t-1} + \gamma_6^s \text{Anchor}_{i,t-1}^h \cdot \text{Strong}_{i,t-1} \\ &+ \gamma_7^s \text{Anchor}_{i,t-1}^h \cdot \text{Strong}_{i,t-1} \cdot \Delta \text{WUI}_{i,t-1} + \sum_{k=1}^{K} \rho_k^s \Delta p_{i,t-k} + \mu_i^s + \nu_t^s + \varepsilon_{i,t+s}, \end{aligned} \tag{8}$$

where i is the country index, t the time index and s the horizon of the effect.[17] $p_{i,t}$ represents the natural logarithm of the CPI, $\Delta \text{WUI}_{i,t}$ denotes the change in the WUI as a proxy for an uncertainty shock, $\text{Anchor}_{i,t}^h$ gives the anchoring index, and $\text{Strong}_{i,t}$ is a binary variable measuring the degree of monetary control being equal to unity for a strong monetary control and zero otherwise. In addition, μ_i^s captures time-invariant country-specific characteristics and ν_t^s accounts for time-varying global shocks while

[16] It can also be argued that the uncertainty effects we are examining may be more pronounced in producer prices than in consumer prices, especially if these effects are primarily driven by supply factors that impact firms directly and consumers indirectly. However, as the producer price index (PPI) is not available in the IMF data set for all 82 economies included in our panel, we are solely considering the consumer price index (CPI), which should give us a conservative estimate of the effect that could be expected for the PPI.

[17] It is worth noting that s should not be confused with h – the horizon of anchoring.

$\varepsilon_{i,t+s}$ is a random error term. This approach has the benefits that it allows for nonlinearity in the impulse response and for cross-country correlation in the error term (Auerbach and Gorodnichenko, 2011; Bonciani and Ricci, 2020; Bems *et al.*, 2021).[18] In addition, we also include four lags of inflation $\Delta p_{i,t-k}$ to eliminate serial correlation. According to Montiel Olea and Plagborg-Møller (2021) a lag-augmentation avoids the need to correct standard errors for serial correlation in the residuals. However, to be on the safe side, we also use Arellano (1987) standard errors, which are robust to general forms of heteroskedasticity and serial correlation. We do not include any controls for monetary and fiscal policy as we consider the anchoring measure being a function of these following Bems *et al.* (2021).

According to Eq. (8) the conditional cumulative response of a change in consumer prices to a change in WUI is given by

$$\frac{\partial(p_{i,t+s} - p_{i,t})}{\partial \Delta \mathrm{WUI}_{i,t-1}} = \gamma_1^s + \gamma_4^s \mathrm{Anchor}_{i,t-1}^h + \gamma_5^s \mathrm{Strong}_{i,t-1} + \gamma_7^s \mathrm{Anchor}_{i,t-1}^h \cdot \mathrm{Strong}_{i,t-1}, \quad (9)$$

which illustrates a potential nonlinear effect depending on the degree of monetary control and the degree of anchoring of inflation expectations that should be assessed in the following. To compute the standard errors for hypothesis testing that involves a nonlinear function of multiple coefficients as shown in Eq. (9), we apply the Delta Method using the HAC variance-covariance matrix according to Arellano (1987).

4 Empirical Findings

In this section we present and discuss our main findings. Figure 4 illustrates the conditional cumulative response of the change in consumer prices to a change in WUI as

[18] While local projections are more preferable when aiming to compute nonlinear impulse responses compared to VAR models, according to Plagborg-Møller and Wolf (2021) the application of local projections and VAR models results in consistent impulse responses. In addition, inference for lag-augmented local projections is found to be more robust than for VAR models (Montiel Olea and Plagborg-Møller, 2021).

given in Eq. (9) for countries with a strong ($\text{Strong}_{i,t} = 1$) and weak degree of monetary control ($\text{Strong}_{i,t} = 0$):

$$\frac{\partial(p_{i,t+s} - p_{i,t})}{\partial \Delta \text{WUI}_{i,t-1}} = \gamma_1^s + \gamma_4^s \overline{\text{Anchor}}^h + \gamma_5^s \text{Strong}_{i,t-1} + \gamma_7^s \overline{\text{Anchor}}^h \cdot \text{Strong}_{i,t-1}, \quad s = 1, \ldots, 8 \tag{10}$$

where $\overline{\text{Anchor}}^h$ is the sample mean of the anchoring measure over time and across countries. The impulse response for countries with a strong (weak) degree of monetary control is shown by the red (blue) line. Pink (light blue) shadings give the corresponding 95% confidence intervals based on clustered standard errors that are robust against heteroskedasticity and serial correlation according to Arellano (1987).[19] The individual estimation results for the regression model provided in Eq. (8) that are used to construct the conditional cumulative response in Figure 4 are derived by least squares. The different plots correspond to different horizons of the anchoring measure, $h = 4, \ldots, 7$.[20]

*** Insert Figure 4 about here ***

Figure 4 clearly shows a different pattern in the response of inflation to an uncertainty shock across countries with a strong and a weak degree of monetary control. Especially, when accounting for anchoring of inflation expectations over longer horizons (five-years-ahead to seven-years-ahead), uncertainty significantly drives up con-

[19] In addition, we have also considered heteroskedasticity and autocorrelation consistent (HAC) standard errors proposed by Driscoll and Kraay (1998), which generally support our findings. The impulse responses with confidence bands constructed based on HAC standard errors by Driscoll and Kraay (1998) are provided in the Appendix for our baseline setting (see Figures A.3 and A.4).

[20] As already explained in Section 3.1.1, we solely focus on higher horizons as the concept of anchoring inflation expectations used by central banks typically refers to the medium term. For shorter horizons (one or two years) inflation expectations are usually driven by the current level of inflation, the stance of the economy, and shocks which are perceived as transitory. However, we have also conducted the entire analysis for $h = 1, 2, 3$. The results, which tend to support our conclusions, are available upon request.

sumer prices for countries with a low degree of monetary control while countries with a strong monetary control are not affected at all, i.e., the effect of the uncertainty shock is insignificant for all horizons. For countries with a weak degree of monetary control the effect size is clearly larger and turns out to be significantly positive for several horizons s, for which the 95% confidence interval does not include the zero, when considering the horizons of anchoring of $h = 5$ or higher. To a lesser extent this finding is also confirmed for lower horizons of anchoring. Thus, the result for countries with weak monetary control is in line with our hypothesis that uncertainty might also show a positive impact on consumer prices due to supply-side effects, e.g. operating through distorted supply-chains. This finding is also plausible given that countries with low monetary control tend to have higher inflation which increases the chance that the country-specific uncertainty shocks reflect accelerated inflation dynamics. In such a scenario, an interpretation of uncertainty shocks as pure negative demand shocks which lower demand and decrease inflation is unlikely to be realistic.

In Figure 5 we particularly distinguish the conditional cumulative response of a change in consumer prices to an uncertainty shock across countries with a strong and weak anchoring of inflation expectations. In doing so, we consider countries with a strong degree of monetary control ($\text{Strong}_{i,t} = 1$) and a strong ($\widetilde{\text{Anchor}}^{h}_{Q0.95}$) or weak degree of anchoring ($\widetilde{\text{Anchor}}^{h}_{Q0.05}$) while setting the anchoring measure equal to the 5% and 95% sample quantiles of the anchoring measure over time and across countries. The impulse response for countries with a strong (weak) degree of anchoring is shown by the red (blue) line. Again for large horizons of anchoring we see a clear difference across the groups of countries. For horizons of four-years-ahead and larger, we observe a significant increase in consumer prices after an uncertainty shock for weakly anchored economies, which is significant for nearly all horizons s, while the same effect turns out to be slightly negative but mostly insignificant for strongly anchored economies. The latter finding is in line with demand-side effects (see e.g. Leduc and Liu, 2016) due to the real-options channel, the precautionary saving channel, and the risk premium channel mentioned in the beginning while the former finding confirms the results provided in Figure 4 justifiable by supply-side effects as discussed above.

*** Insert Figure 5 about here ***

As already mentioned in Section 3.1.2, we perform two robustness checks to rule out that uncertainty shocks are capturing an endogenous response of uncertainty to expected changes in growth or inflation. Therefore, we rely on the residuals $\hat{\eta}_{i,t}$ and $\hat{\xi}_{i,t}$, respectively, from a regression of the change in WUI either on short-term expectations regarding inflation and GDP growth or on short-run surprises compared to long-run expectations according to Eqs. (6) and (7). The corresponding findings are visualized in Figures 6 to 9.

*** Insert Figures 6 to 9 about here ***

When, first of all, focusing on the response of inflation to an uncertainty shock depending on the degree of monetary control while comparing the findings represented in Figure 4 with additional results provided in Figures 6 and 8, we clearly see that the magnitude and the significance of the effect for both groups of countries is not sensitive to the considered definitions of the uncertainty shock. For countries with a strong degree of monetary control we do not see any effect while the response is positive for countries with a weak degree of monetary control. Second, considering the inflation reaction to an uncertainty shock depending on the degree of expectation anchoring, we also confirm the robustness of our findings when comparing Figure 5 with Figures 7 and 9. We observe a different pattern for economies with a weak and a strong anchoring of inflation expectations. While the inflation reaction is mostly negative and insignificant for countries with a strong anchoring, it is significantly positive for countries with a weak degree of anchoring as the 95% confidence interval lies above the zero line for most of the horizons s in Figures 7 and 9.

Overall, we provide evidence in favor of a nonlinear effect of uncertainty on inflation. This effect is clearly driven by the degree of monetary control and the degree of anchoring of inflation expectations. Uncertainty seems to transmit to an increase in inflation for countries with a weak degree of monetary control and/or a weak anchoring of inflation expectations. This finding resembles the descriptive evidence for emerging and developing countries in our sample which are characterized by lower anchoring and higher inflation compared to advanced economies.

The ambiguous findings of a negative or insignificant uncertainty effect on inflation provided in the existing literature might therefore be explained by the omission of this nonlinearity due to the degree of monetary control and the degree of anchoring found in the present study. The latter finding is the main contribution of this study and also provides important policy implications with regard to both the effect of uncertainty shocks and the role of monetary policy regimes for shock absorption and anchoring. From a theoretical point of view, well-anchored inflation expectations imply that uncertainty shocks are considered as temporary shocks since they do not affect long-run expectations. Such inattention to uncertainty shocks dampen or absorb the effects on realized inflation since inflation expectations are a key propagation mechanism of shocks. Only if inflation expectations are poorly anchored, uncertainty shocks show a significant and persistent effect. Our findings also resemble recent evidence arguing in favor of a 'two-regime view of inflation' with a low-inflation regime, in which inflation tends to be self-stabilising, and a high-inflation regime, in which an aggressive response of the central bank is needed (Borio *et al.*, 2023; Castelnuovo *et al.*, 2023).

5 Summary and Concluding Remarks

This paper has analyzed the effect of uncertainty on consumer price inflation from a new perspective. Based on an unbalanced panel of 82 economies over a period from 1995 to 2022, we have evaluated the role of expectations anchoring and the institutional setup of monetary policy for the transmission of uncertainty shocks. Our results show that a positive effect of uncertainty on inflation is significantly reduced (or even eliminated) by a strong degree of monetary control and by a strong anchoring of inflation expectations. From a theoretical point of view, well-anchored inflation expectations imply that uncertainty shocks are considered temporary which leads to weaker effects on realized inflation. This finding also reconciles theoretical evidence coming from micro price-setting models that greater volatility increases aggregate price flexibility (Vavra, 2014).

These findings confirm the importance of anchoring for a successful monetary policy in the sense that a strong anchoring can mitigate the effects of uncertainty shocks. The result that strong monetary control also complements this function is intuitive since monetary control is also positively related to the degree of anchoring and the credibility of monetary policy, confirming that our anchoring measure adequately reflects monetary policy credibility. In particular, this becomes evident for the emerging and developing countries in our sample which can be broadly characterized by a higher inflation and a lower anchoring.

The result that institutional changes in monetary policy pay off as an insurance against uncertainty shocks also has importance for the general modeling of uncertainty shocks. The interpretation of uncertainty as a negative demand shock is appealing from a theoretical perspective but is unlikely to reflect uncertainty dynamics for countries with high inflation and/or low monetary policy credibility where uncertainty shocks are not exogenous since they also reflect inflation dynamics. This implies that both different kinds of uncertainty shocks and different policy regimes can drive the nonlinear dynamics. Analyzing the resulting state dependence of uncertainty shocks surely is an important avenue for future research. In this context, recent research distinguishes perceived uncertainty shocks between an agreement and a disagreement among market participants and indicates a different response to several macro variables (Gambetti *et al.*, 2023). Finally, our results also offer potential guidance for survey-based work on inflation expectations which deals with the perception of shocks in the context of long-run expectations and anchoring.

References

Ahir H, Bloom N, Furceri D. 2022. The world uncertainty index. *NBER Working Paper* **No. 29763**.

Aizenman J, Chinn MD, Ito H. 2010. The emerging global financial architecture: Tracing and evaluating new patterns of the trilemma configuration. *Journal of International Money and Finance* **29**: 615–641.

Alessandri P, Mumtaz H. 2019. Financial regimes and uncertainty shocks. *Journal of Monetary Economics* **101**: 31–46.

Angelini G, Fanelli L. 2019. Exogenous uncertainty and the identification of structural vector autoregressions with external instruments. *Journal of Applied Econometrics* **34**: 951–971.

Arellano M. 1987. Computing robust standard errors for within-groups estimators. *Oxford Bulletin of Economics and Statistics* **49**: 431–434.

Asadollah O, Schwartz Carmy L, Hoque MR, Yilmazkuday H. 2024. Geopolitical risk, supply chains, and global inflation. *The World Economy* **47**: 3450–3486.

Auerbach A, Gorodnichenko Y. 2012. Measuring the output responses to fiscal policy. *American Economic Journal: Economic Policy* **4**: 1–27.

Auerbach AJ, Gorodnichenko Y. 2011. Fiscal multipliers in recession and expansion. *NBER Working Papers* **No. 17447**.

Bachmann R, Elstner S, Sims ER. 2013. Uncertainty and economic activity: Evidence from business survey data. *American Economic Journal: Macroeconomics* **5**: 217–249.

Baker SR, Bloom N, Davis SJ. 2016. Measuring economic policy uncertainty. *Quarterly Journal of Economics* **131**: 1593–1636.

Ball L, Cecchetti SG. 1990. Inflation and uncertainty at long and short horizons. *Brookings Papers on Economic Activity* **21**: 215–254.

Basu S, Bundick B. 2017. Uncertainty shocks in a model of effective demand. *Econometrica* **85**: 937–958.

Beckmann J, Czudaj RL. 2018. Monetary policy shocks, expectations, and information rigidities. *Economic Inquiry* **56**: 2158–2176.

Beckmann J, Czudaj RL. 2021. Fiscal policy uncertainty and its effects on the real economy: German evidence. *Oxford Economic Papers* **73**: 1516–1535.

Beckmann J, Czudaj RL. 2023. Perceived monetary policy uncertainty. *Journal of International Money and Finance* **130**: 102761.

Bems R, Caselli F, Grigoli F, Gruss B. 2021. Expectations' anchoring and inflation persistence. *Journal of International Economics* **132**: 103516.

Benati L. 2008. Investigating inflation persistence across monetary regimes. *Quarterly Journal of Economics* **123**: 1005–1060.

Bernanke BS. 2007. Inflation expectations and inflation forecasting. *Speech, Board of Governors of the Federal Reserve System* **No. 306**.

Binder C, Janson W, Verbrugge R. 2023. Out of bounds: Do SPF respondents have anchored inflation expectations? *Journal of Money, Credit and Banking* **55**: 559–576.

Bloom N. 2009. The impact of uncertainty shocks. *Econometrica* **77**: 623–685.

Bonciani D, Ricci M. 2020. The international effects of global financial uncertainty shocks. *Journal of International Money and Finance* **109**: S0261560620301923.

Borio C, Lombardi M, Yetman J, Zakrajšek E. 2023. The two-regime view of inflation. *BIS Papers* **No. 133**.

Born B, Pfeifer J. 2021. Uncertainty-driven business cycles: Assessing the markup channel. *Quantitative Economics* **12**: 587–623.

Brandão-Marques L, Casiraghi M, Gelos RG, Harrison O, Kamber G. 2023. Is high debt constraining monetary policy? Evidence from inflation expectations. *IMF Working Papers* **No. 2023/143**.

Brianti M. 2023. Financial shocks, uncertainty shocks, and monetary policy trade-offs. *Working Paper, Mimeo* **July**: https://sites.google.com/site/marcobriantieconomics/research.

Buono I, Formai S. 2018. New evidence on the evolution of the anchoring of inflation expectations. *Journal of Macroeconomics* **57**: 39–54.

Candia B, Coibion O, Gorodnichenko Y. 2020. Communication and the beliefs of economic agents. *NBER Working Papers* **No. 27800**.

Carrière-Swallow Y, Deb P, Furceri D, Jiménez D, Ostry JD. 2023. Shipping costs and inflation. *Journal of International Money and Finance* **130**: 102771.

Carriero A, Clark T, Marcellino M. 2021. Using time-varying volatility for identification in vector autoregressions: An application to endogenous uncertainty. *Journal of Econometrics* **225**: 47–73.

Castelnuovo E. 2023. Uncertainty before and during COVID-19: A survey. *Journal of Economic Surveys* **37**: 821–864.

Castelnuovo E, Pellegrino G, Særkjær LL. 2023. Uncertainty and the business cycle when inflation is high. *Mimeo* .

Cobham D. 2021. A comprehensive classification of monetary policy frameworks in advanced and emerging economies. *Oxford Economic Papers* **73**: 2–26.

Coibion O, Gorodnichenko Y. 2012. What can survey forecasts tell us about information rigidities? *Journal of Political Economy* **120**: 116–159.

Coibion O, Gorodnichenko Y, Kumar S, Pedemonte M. 2020. Inflation expectations as a policy tool? *Journal of International Economics* **124**: 103297.

Corsello F, Neri S, Tagliabracci A. 2021. Anchored or de-anchored? That is the question. *European Journal of Political Economy* **69**: S017626802100032X.

De Santis RA, Van der Veken W. 2022. Deflationary financial shocks and inflationary uncertainty shocks: An SVAR investigation. *ECB Working Paper Series* **No. 2727**.

Dovern J, Fritsche U, Slacalek J. 2012. Disagreement among forecasters in G7 countries. *Review of Economics and Statistics* **94**: 1081–1096.

Dovern J, Kenny G. 2020. Anchoring inflation expectations in unconventional times: Micro evidence for the Euro Area. *International Journal of Central Banking* **16**: 309–347.

Driscoll J, Kraay A. 1998. Consistent covariance matrix estimation with spatially dependent panel data. *Review of Economics and Statistics* **80**: 549–560.

Fasani S, Rossi L. 2018. Are uncertainty shocks aggregate demand shocks? *Economics Letters* **167**: 142–146.

Fernández-Villaverde J, Guerrón P, Kuester K, Rubio-Ramírez J. 2015. Fiscal volatility shocks and economic activity. *American Economic Review* **105**: 3352–3384.

Fratto C, Uhlig H. 2020. Accounting for post-crisis inflation: A retro analysis. *Review of Economic Dynamics* **35**: 133–153.

Furceri D, Loungani P, Zdzienicka A. 2018. The effects of monetary policy shocks on inequality. *Journal of International Money and Finance* **85**: 168–186.

Gambetti L, Tsoukalas JD, Korobilis D, Zanetti F. 2023. Agreed and disagreed uncertainty. *CESifo Working Paper* **No. 10463**.

Geiger M, Scharler J. 2021. How do people interpret macroeconomic shocks? Evidence from U.S. survey data. *Journal of Money, Credit and Banking* **53**: 813–843.

Gertler M, Galí J, Clarida R. 1999. The science of monetary policy: A new keynesian perspective. *Journal of Economic Literature* **37**: 1661–1707.

Giannone D, Lenza M. 2009. The Feldstein-Horioka fact. *NBER International Seminar on Macroeconomics* **6**: 103–117.

Gilchrist S, Sim JW, Zakrajšek E. 2014. Uncertainty, financial frictions, and investment dynamics. *NBER Working Papers* **No. 20038**.

Goodspeed T. 2024. Trust the experts? The performance of inflation expectations, 1960-2023. *International Journal of Forecasting* **forthcoming**: https://doi.org/10.1016/j.ijforecast.2024.06.006.

Grishchenko O, Mouabbi S, Renne JP. 2019. Measuring inflation anchoring and uncertainty: A U.S. and Euro Area comparison. *Journal of Money, Credit and Banking* **51**: 1053–1096.

Gürkaynak RS, Sack B, Swanson E. 2005. The sensitivity of long-term interest rates to economic news: Evidence and implications for macroeconomic models. *American Economic Review* **95**: 425–436.

Haque Q, Magnusson L. 2021. Uncertainty shocks and inflation dynamics in the U.S. *Economics Letters* **202**: S0165176521001026.

Houari O. 2022. Uncertainty shocks and business cycles in the US: New insights from the last three decades. *Economic Modelling* **109**: S0264999322000086.

Husted L, Rogers J, Sun B. 2020. Monetary policy uncertainty. *Journal of Monetary Economics* **115**: 20–36.

Iacoviello M, Caldara D, Penn M, Conlisk S. 2024. Do geopolitical risks raise or lower inflation? *SSRN Working Paper* **June**: http://dx.doi.org/10.2139/ssrn.4852461.

Istrefi K, Mouabbi S. 2018. Subjective interest rate uncertainty and the macroeconomy: A cross-country analysis. *Journal of International Money and Finance* **88**: 296–313.

Jordà O. 2005. Estimation and inference of impulse responses by local projections. *American Economic Review* **95**: 161–182.

Jordà O, Nechio F. 2023. Inflation and wage growth since the pandemic. *European Economic Review* **156**: 104474.

Jurado K, Ludvigson SC, Ng S. 2015. Measuring uncertainty. *American Economic Review* **105**: 1177–1216.

King M. 1995. Credibility and monetary policy: Theory and evidence. *Scottish Journal of Political Economy* **42**: 1–19.

Kumar S, Afrouzi H, Coibion O, Gorodnichenko Y. 2015. Inflation targeting does not anchor inflation expectations: Evidence from firms in New Zealand. *Brookings Papers on Economic Activity* **46**: 151–225.

Lahiri K, Sheng X. 2010. Measuring forecast uncertainty by disagreement: The missing link. *Journal of Applied Econometrics* **25**: 514–538.

Leduc S, Liu Z. 2016. Uncertainty shocks are aggregate demand shocks. *Journal of Monetary Economics* **82**: 20–35.

Mackowiak BA, Matejka F, Wiederholt M. 2023. Rational inattention: A review. *Journal of Economic Literature* **61**: 226–273.

Mehrotra A, Yetman J. 2018. Decaying expectations: What inflation forecasts tell us about the anchoring of inflation expectations. *International Journal of Central Banking* **14**: 55–101.

Meinen P, Roehe O. 2018. To sign or not to sign? On the response of prices to financial and uncertainty shocks. *Economics Letters* **171**: 189–192.

Mignon V, Saadaoui J. 2024. How do political tensions and geopolitical risks impact oil prices? *Energy Economics* **129**: 107219.

Mishkin F. 2007. Inflation dynamics. *International Finance* **10**: 317–334.

Montiel Olea JL, Plagborg-Møller M. 2021. Local projection inference is simpler and more robust than you think. *Econometrica* **89**: 1789–1823.

Plagborg-Møller M, Wolf CK. 2021. Local projections and VARs estimate the same impulse responses. *Econometrica* **89**: 955–980.

Roth C, Wohlfart J. 2020. How do expectations about the macroeconomy affect personal expectations and behavior? *Review of Economics and Statistics* **102**: 731–748.

Sousa R, Yetman J. 2016. Inflation expectations and monetary policy. In BIS (ed.) *Inflation mechanisms, expectations and monetary policy*, vol. 89 of *BIS Papers Chapters*, Bank for International Settlements, pages 41–67.

Vavra J. 2014. Inflation dynamics and time-varying volatility: New evidence and an ss interpretation. *Quarterly Journal of Economics* **129**: 215–258.

Tables and Figures

Table 1: **Countries in the sample**

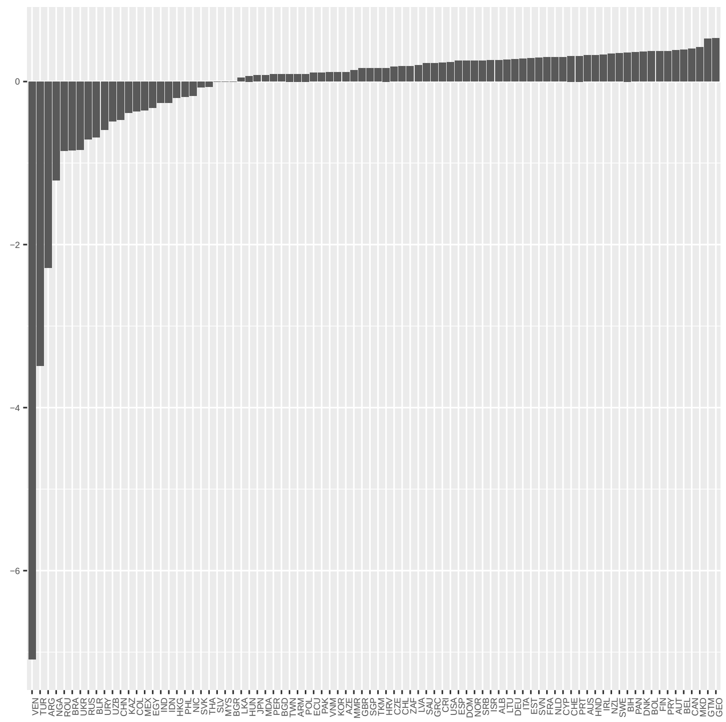
Country Group	Countries
Advanced Economies	Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Croatia (HRV), Czech Republic (CZE), Denmark (DNK), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Hong Kong (HKG), Ireland (IRL), Israel (ISR), Italy (ITA), Japan (JPN), Latvia (LVA), Lithuania (LTU), the Netherlands (NLD), New Zealand (NZL), Norway (NOR), Portugal (PRT), Singapore (SGP), Slovakia (SVK), Slovenia (SVN), South Korea (KOR), Spain (ESP), Sweden (SWE), Switzerland (CHE), Taiwan (TWN), the UK (GBR), and the United States (USA).
Emerging and Developing Economies	Albania (ALB), Argentina (ARG), Armenia (ARM), Azerbaijan (AZE), Bangladesh (BGD), Belarus (BLR), Bolivia (BOL), Bosnia and Herzegovina (BIH), Brazil (BRA), Bulgaria (BGR), Chile (CHL), China (CHN), Colombia (COL), Costa Rica (CRI), Dominican Republic (DOM), Ecuador (ECU), Egypt (EGY), El Salvador (SLV), Georgia (GEO), Guatemala (GTM), Honduras (HND), Hungary (HUN), India (IND), Indonesia (IDN), Kazakhstan (KAZ), North Macedonia (MKD), Malaysia (MYS), Mexico (MEX), Moldova (MDA), Myanmar (MMR), Nicaragua (NIC), Nigeria (NGA), Pakistan (PAK), Panama (PAN), Paraguay (PRY), Peru (PER), the Philippines (PHL), Poland (POL), Romania (ROU), Russia (RUS), Saudi Arabia (SAU), South Africa (ZAF), Sri Lanka (LKA), Thailand (THA), Turkey (TUR), Turkmenistan (TKM), Ukraine (UKR), Uruguay (URY), Uzbekistan (UZB), and Vietnam (VNM).

Note: The table provides all economies included in our study, which are grouped according to the latest classification provided by the International Monetary Fund (IMF).

Figure 1: **Anchoring measure**

Panel (a) illustrates the heterogeneity of the anchoring measure across countries by providing the average anchoring over time for horizon $h = 7$ and sorting the countries from least to best anchored. Panel (b) shows the time series pattern of the anchoring measure for horizon $h = 7$. The red line gives the median across countries and the light blue area the range between the 5% and the 95% quantiles.

Panel (a): Heterogeneity



Panel (b): Time Series Pattern

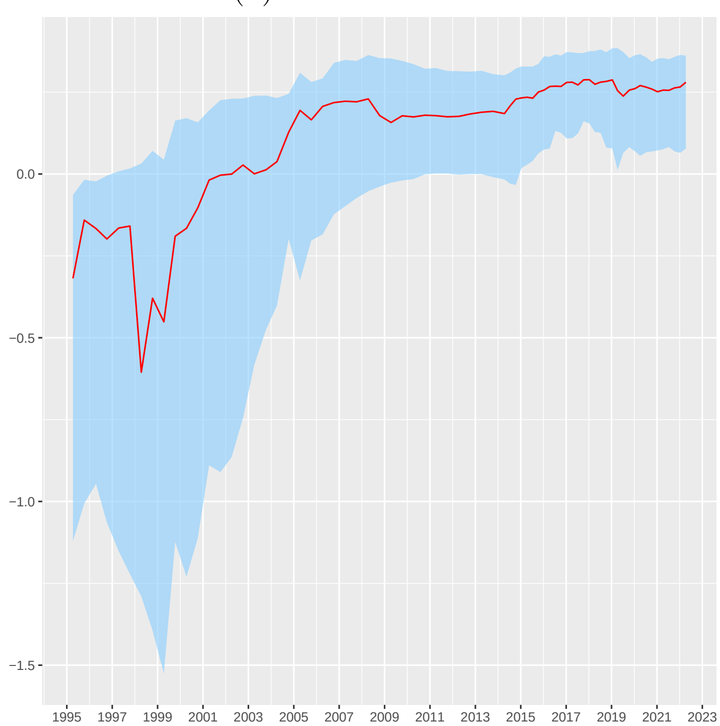
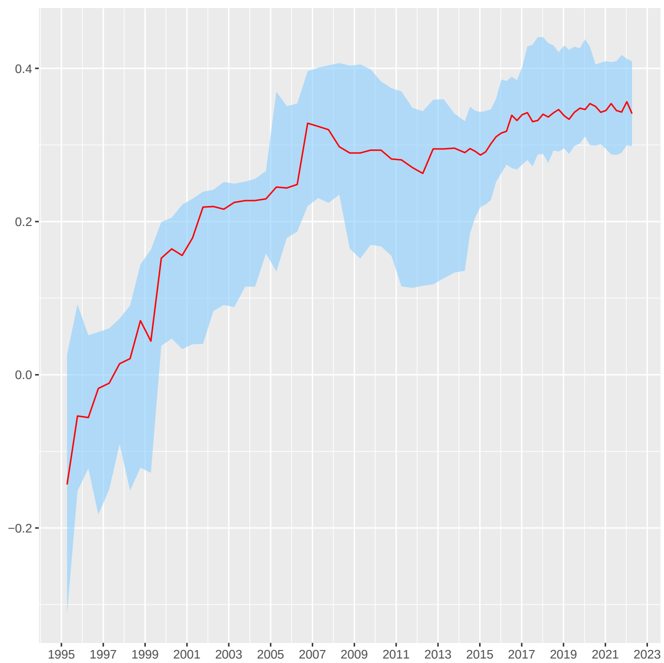


Figure 2: **Anchoring measure for groups of countries**

Panel (a) shows the time series pattern of the anchoring measure for horizon $h = 7$ for Advanced Economies according to the most recent IMF classification. Panel (b) gives the same time series for the two groups of Emerging Market Economies and Low-Income Developing Countries according to the most recent IMF classification. In both cases the red line gives the median across countries and the light blue area the range between the 5% and the 95% quantiles.

Panel (a): Advanced Economies



Panel (b): Emerging and Developing Economies

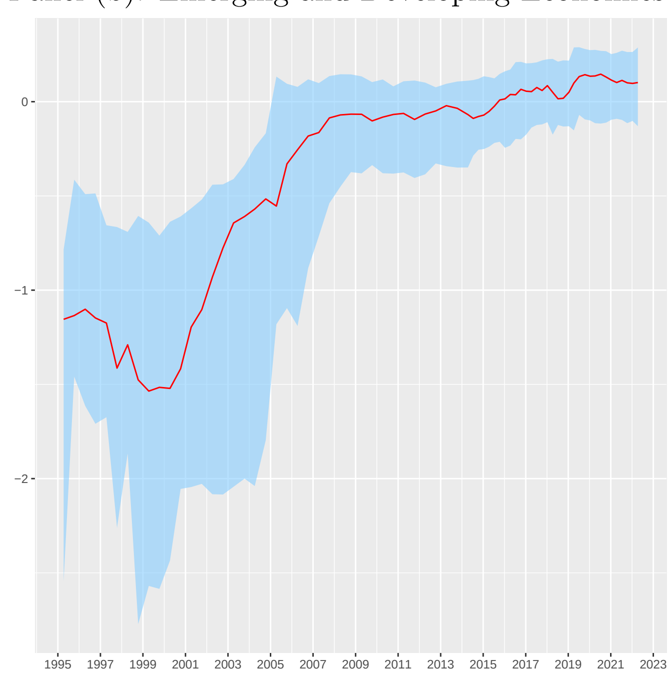
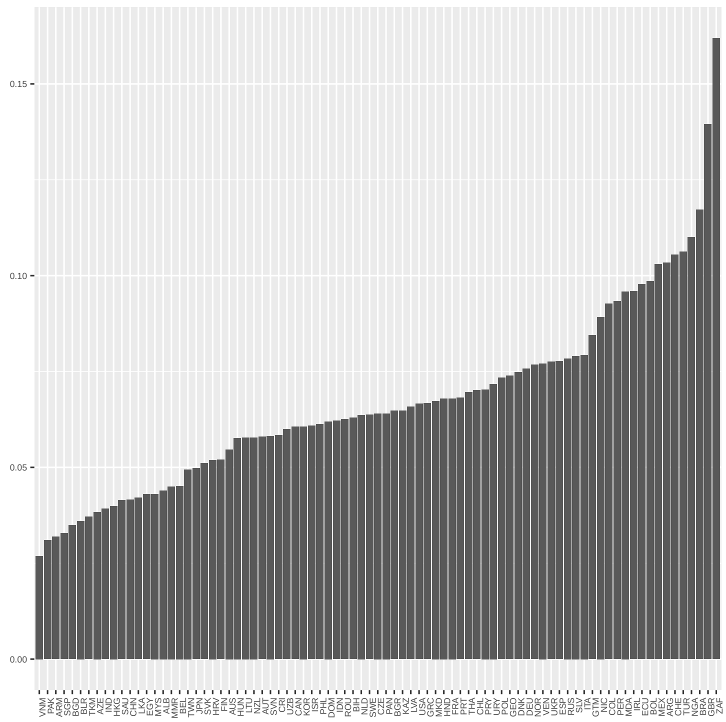


Figure 3: **Uncertainty measure**

Panel (a) illustrates the heterogeneity of the world uncertainty index (WUI) proposed by Ahir *et al.* (2022) by providing the time series average WUI for each country and sorting the countries from lowest to highest. Panel (b) shows the time series pattern of the WUI. The red line gives the median across countries and the light blue area the range between the 5% and the 95% quantiles.

Panel (a): Heterogeneity



Panel (b): Time Series Pattern

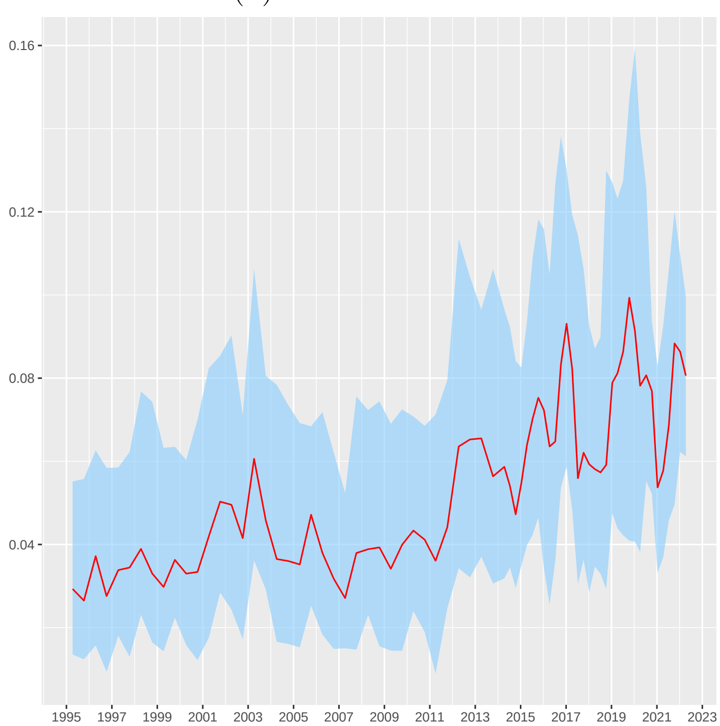


Figure 4: **Response of inflation to an uncertainty shock by monetary control**

The plots illustrate the conditional cumulative response of consumer prices to a change in WUI as given in Eq. (9)

$$\frac{\partial(p_{i,t+s} - p_{i,t})}{\partial \Delta \mathrm{WUI}_{i,t-1}} = \gamma_1^s + \gamma_4^s \overline{\mathrm{Anchor}}^h + \gamma_5^s \mathrm{Strong}_{i,t-1} + \gamma_7^s \overline{\mathrm{Anchor}}^h \cdot \mathrm{Strong}_{i,t-1}, \quad s = 1, \ldots, 8$$

for countries with a strong ($\mathrm{Strong}_{i,t-1} = 1$) and weak degree of monetary control ($\mathrm{Strong}_{i,t-1} = 0$) while $\overline{\mathrm{Anchor}}^h$ is the sample mean of the anchoring measure over time and across countries. The impulse response for countries with a strong (weak) degree of monetary control is shown by the red (blue) line. Pink (light blue) shadings give the corresponding 95% confidence intervals based on clustered standard errors proposed by Arellano (1987). The different plots correspond to different horizons of the anchoring measure, $h = 4, \ldots, 7$.

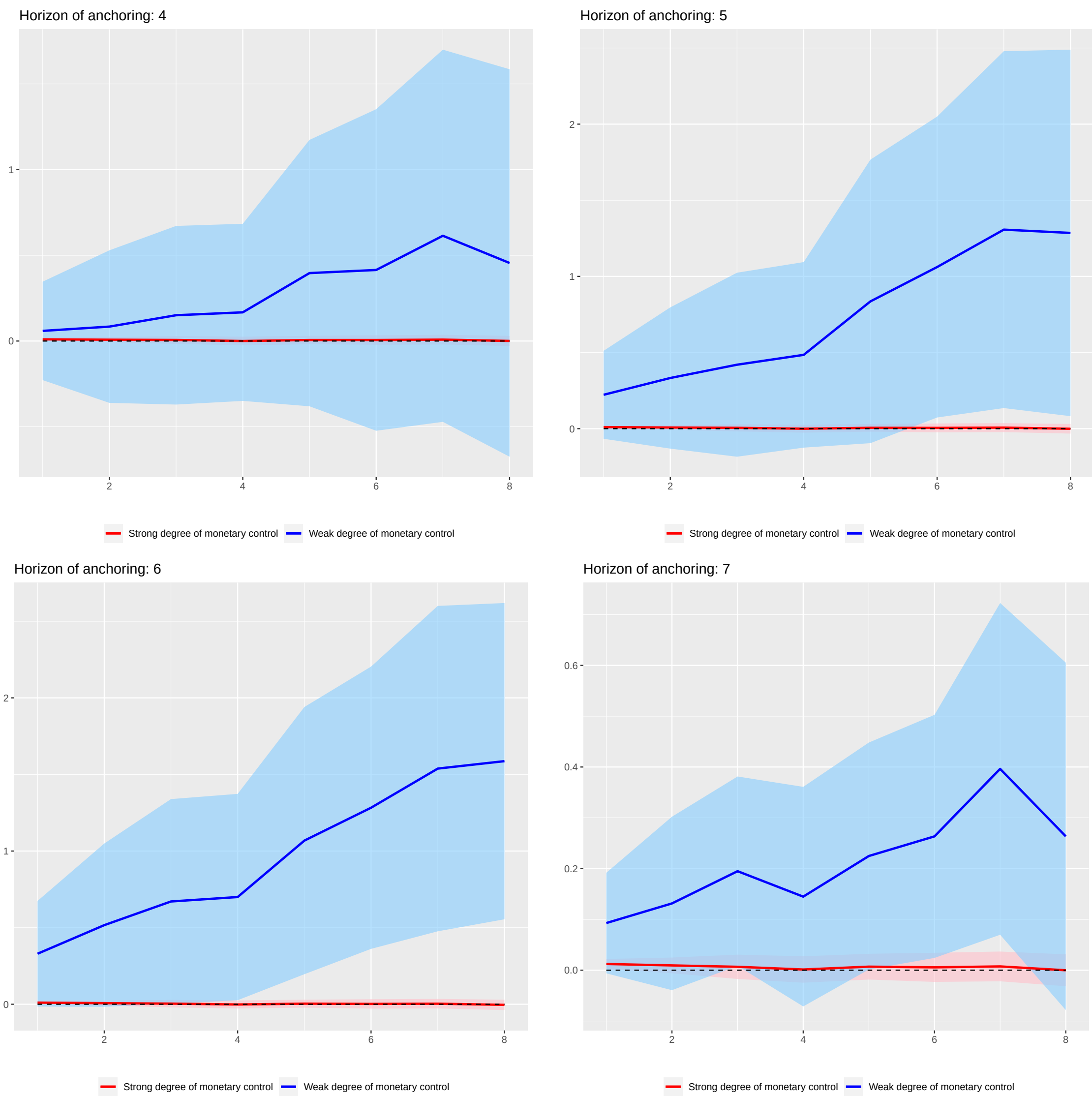


Figure 5: **Response of inflation to an uncertainty shock by anchoring**

The plots illustrate the conditional cumulative response of consumer prices to a change in WUI as given in Eq. (9)

$$\frac{\partial(p_{i,t+s} - p_{i,t})}{\partial \Delta \mathrm{WUI}_{i,t-1}} = \gamma_1^s + \gamma_4^s \widetilde{\mathrm{Anchor}}^h_{Qp} + \gamma_5^s + \gamma_7^s \widetilde{\mathrm{Anchor}}^h_{Qp}, \quad s = 1, \ldots, 8$$

for countries with a strong degree of monetary control ($\mathrm{Strong}_{i,t-1} = 1$) and a strong ($\widetilde{\mathrm{Anchor}}^h_{Q0.95}$) or weak degree of anchoring ($\widetilde{\mathrm{Anchor}}^h_{Q0.05}$). $\widetilde{\mathrm{Anchor}}^h_{Qp} = \widetilde{\mathrm{Anchor}}^h_{Q0.05}$ and $\widetilde{\mathrm{Anchor}}^h_{Q0.95}$ are the 5% and 95% sample quantiles of the anchoring measure over time and across countries. The impulse response for countries with a strong (weak) degree of anchoring is shown by the red (blue) line. Pink (light blue) shadings give the corresponding 95% confidence intervals based on clustered standard errors proposed by Arellano (1987). The different plots correspond to different horizons of the anchoring measure, $h = 4, \ldots, 7$.

Figure 6: **Robustness check 1: Response of inflation to an uncertainty shock by monetary control**

The plots illustrate the conditional cumulative response of consumer prices to an WUI shock as given in Eq. (9)

$$\frac{\partial(p_{i,t+s} - p_{i,t})}{\partial\hat{\eta}_{i,t-1}} = \gamma_1^s + \gamma_4^s\overline{\text{Anchor}}^h + \gamma_5^s\text{Strong}_{i,t-1} + \gamma_7^s\overline{\text{Anchor}}^h \cdot \text{Strong}_{i,t-1}, \quad s = 1, \ldots, 8$$

for countries with a strong ($\text{Strong}_{i,t-1} = 1$) and weak degree of monetary control ($\text{Strong}_{i,t-1} = 0$) while $\overline{\text{Anchor}}^h$ is the sample mean of the anchoring measure over time and across countries and $\hat{\eta}_{i,t-1}$ is the WUI shock according to Eq. (6). See Figure 4 for further details.

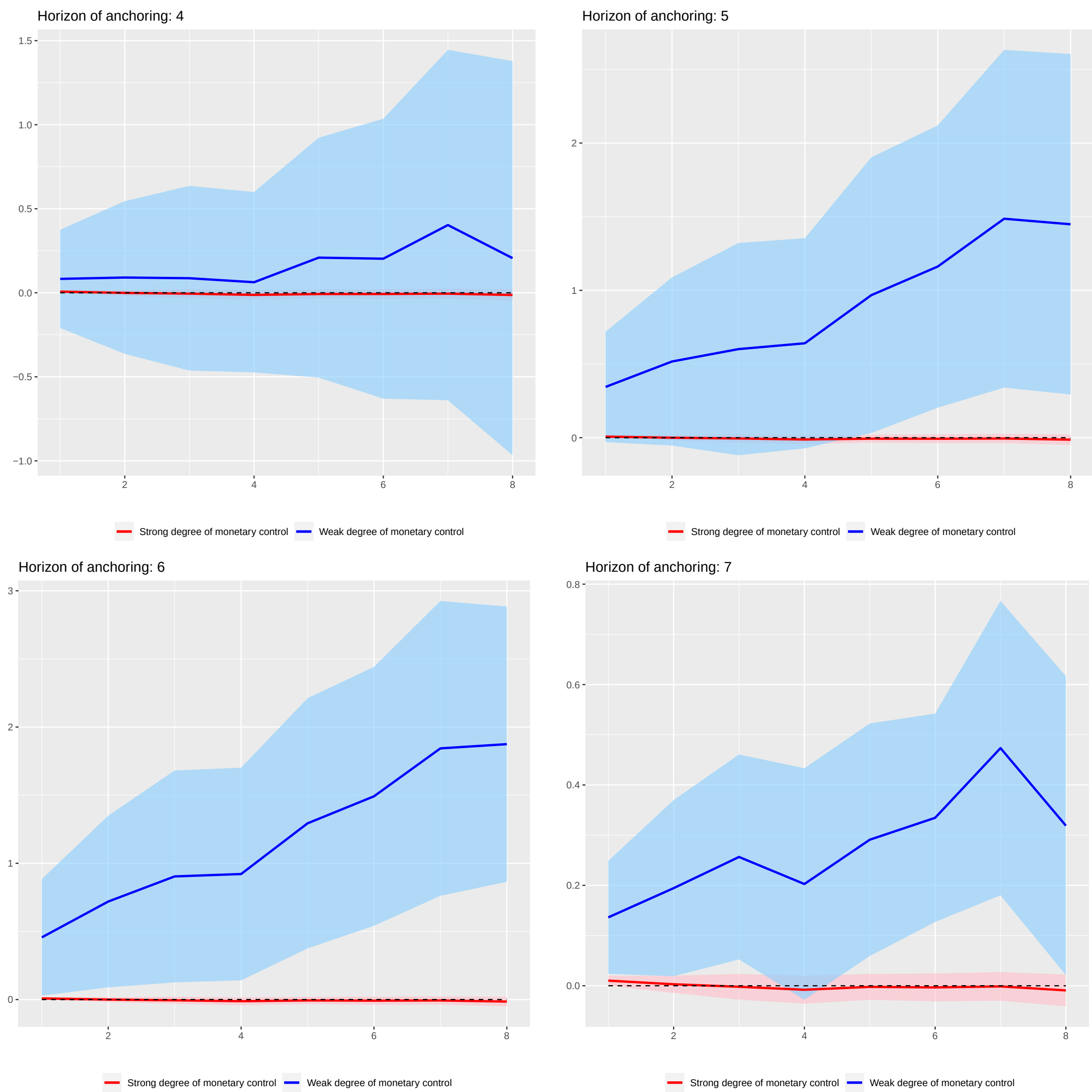


Figure 7: **Robustness check 1: Response of inflation to an uncertainty shock by anchoring**

The plots illustrate the conditional cumulative response of consumer prices to an WUI shock as given in Eq. (9)

$$\frac{\partial(p_{i,t+s} - p_{i,t})}{\partial\hat{\eta}_{i,t-1}} = \gamma_1^s + \gamma_4^s \widetilde{\text{Anchor}}^h_{Qp} + \gamma_5^s + \gamma_7^s \widetilde{\text{Anchor}}^h_{Qp}, \quad s = 1, \ldots, 8$$

for countries with a strong degree of monetary control ($\text{Strong}_{i,t-1} = 1$) and a strong ($\widetilde{\text{Anchor}}^h_{Q0.95}$) or weak degree of anchoring ($\widetilde{\text{Anchor}}^h_{Q0.05}$). $\widetilde{\text{Anchor}}^h_{Qp} = \widetilde{\text{Anchor}}^h_{Q0.05}$ and $\widetilde{\text{Anchor}}^h_{Q0.95}$ are the 5% and 95% sample quantiles of the anchoring measure over time and across countries and $\hat{\eta}_{i,t-1}$ is the WUI shock according to Eq. (6). See Figure 5 for further details.

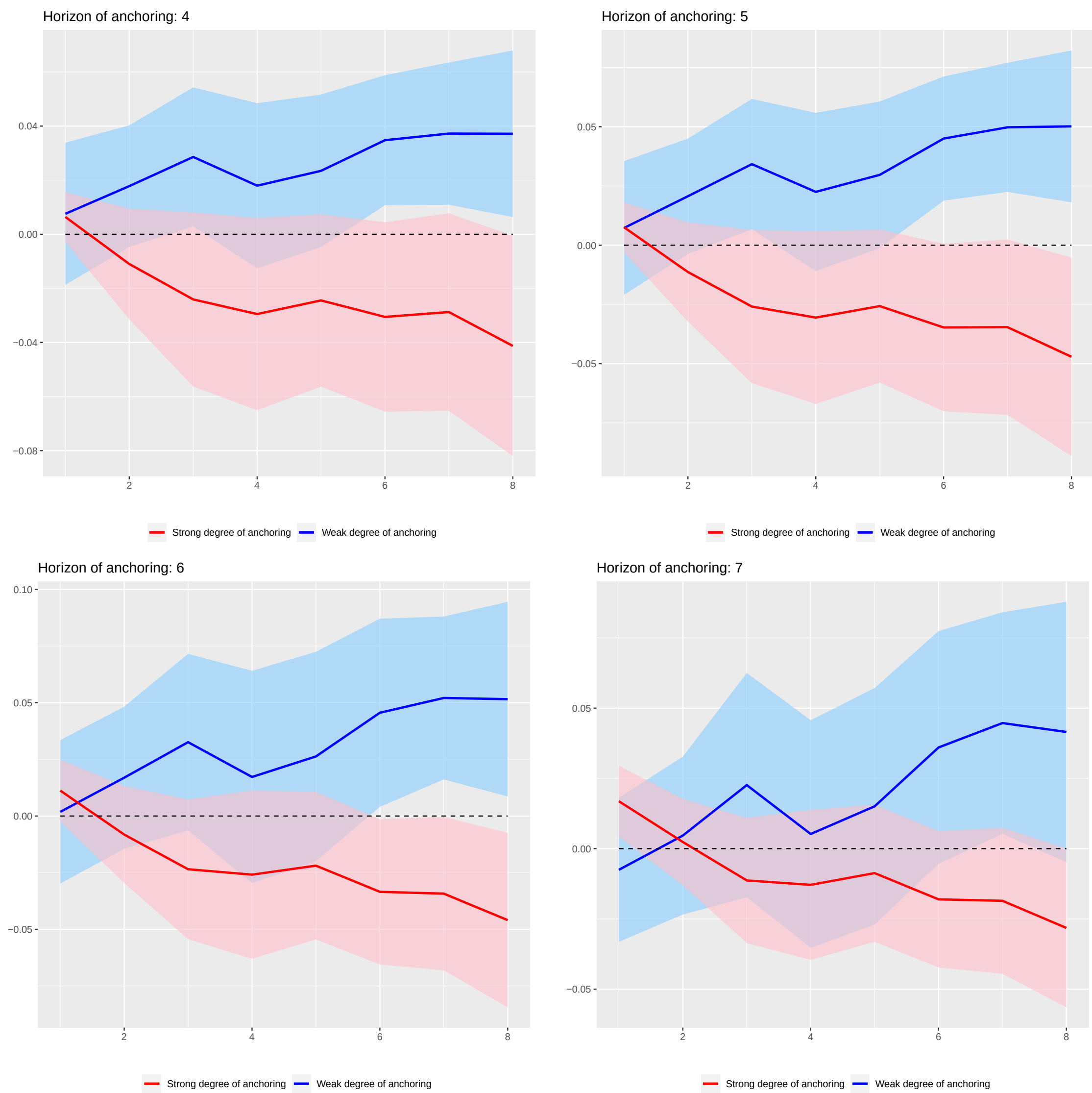


Figure 8: **Robustness check 2: Response of inflation to an uncertainty shock by monetary control**

The plots illustrate the conditional cumulative response of consumer prices to an WUI shock as given in Eq. (9)

$$\frac{\partial(p_{i,t+s}-p_{i,t})}{\partial\hat{\xi}_{i,t-1}} = \gamma_1^s + \gamma_4^s\overline{\text{Anchor}}^h + \gamma_5^s\text{Strong}_{i,t-1} + \gamma_7^s\overline{\text{Anchor}}^h\cdot\text{Strong}_{i,t-1}, \quad s=1,\ldots,8$$

for countries with a strong ($\text{Strong}_{i,t-1}=1$) and weak degree of monetary control ($\text{Strong}_{i,t-1}=0$) while $\overline{\text{Anchor}}^h$ is the sample mean of the anchoring measure over time and across countries and $\hat{\xi}_{i,t-1}$ is the WUI shock according to Eq. (7). See Figure 4 for further details.

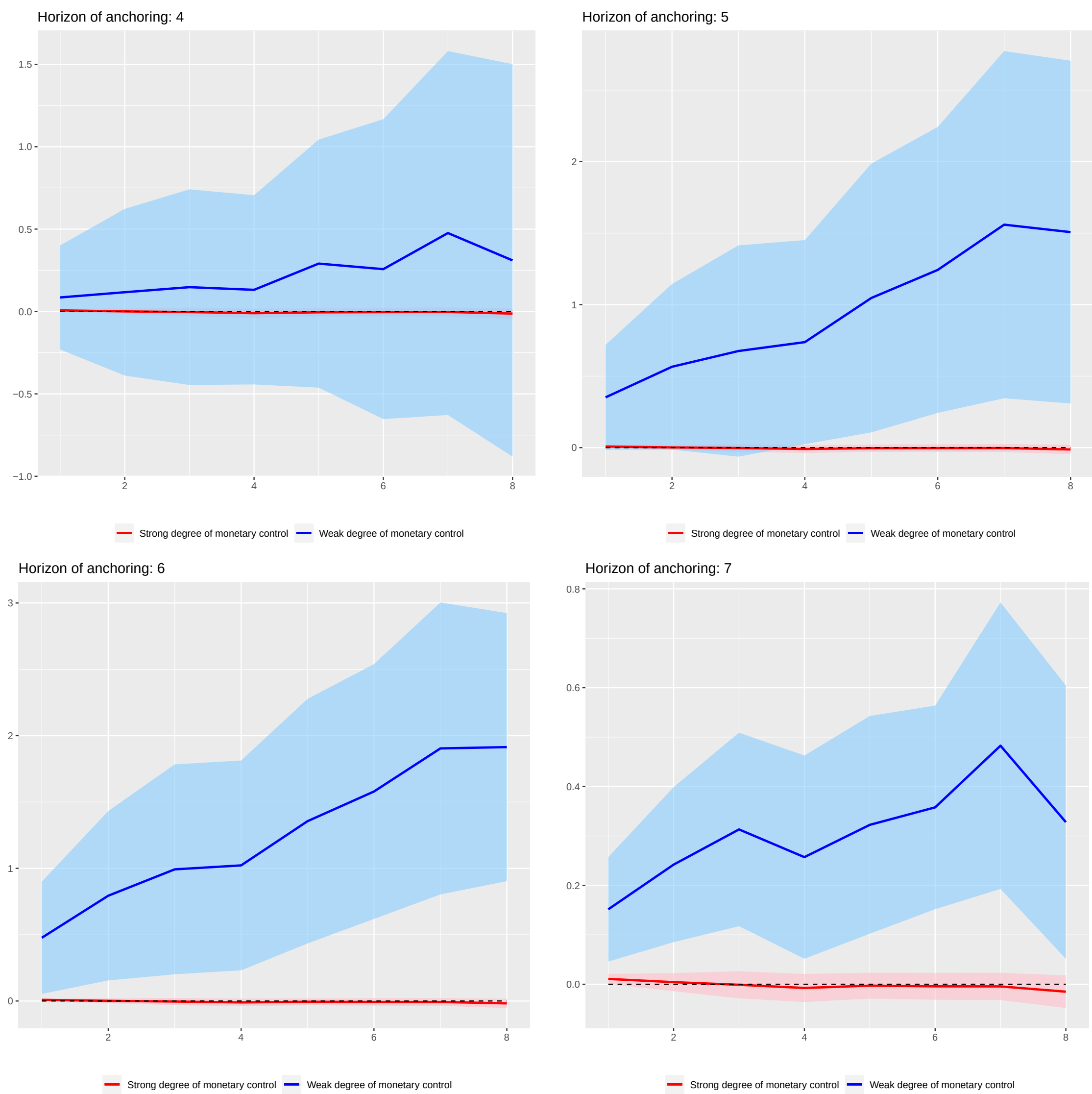
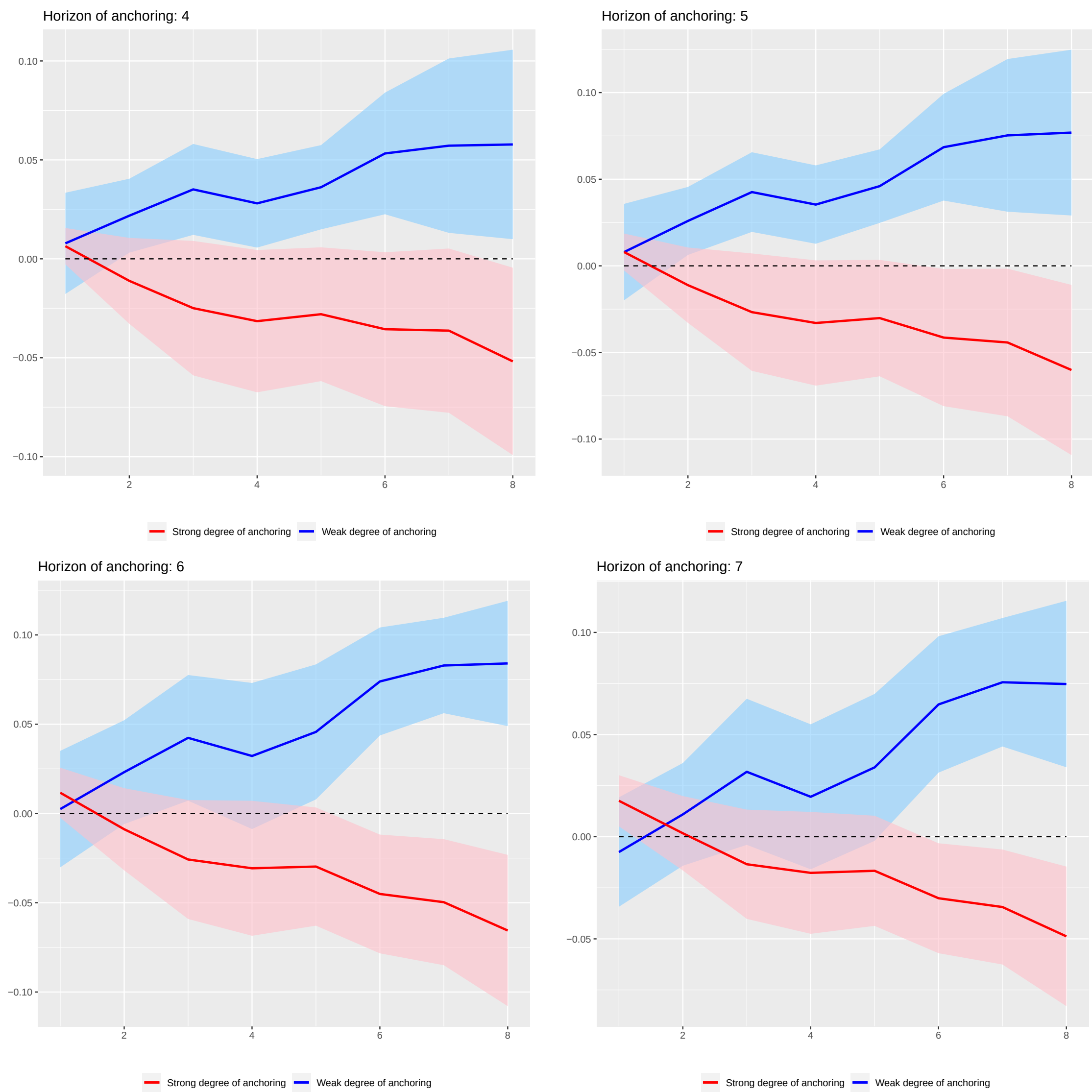


Figure 9: **Robustness check 2: Response of inflation to an uncertainty shock by anchoring**

The plots illustrate the conditional cumulative response of consumer prices to an WUI shock as given in Eq. (9)

$$\frac{\partial(p_{i,t+s}-p_{i,t})}{\partial\hat{\xi}_{i,t-1}} = \gamma_1^s + \gamma_4^s \widetilde{\text{Anchor}}^h_{Qp} + \gamma_5^s + \gamma_7^s \widetilde{\text{Anchor}}^h_{Qp}, \quad s = 1, \dots, 8$$

for countries with a strong degree of monetary control ($\text{Strong}_{i,t-1} = 1$) and a strong ($\widetilde{\text{Anchor}}^h_{Q0.95}$) or weak degree of anchoring ($\widetilde{\text{Anchor}}^h_{Q0.05}$). $\widetilde{\text{Anchor}}^h_{Qp} = \widetilde{\text{Anchor}}^h_{Q0.05}$ and $\widetilde{\text{Anchor}}^h_{Q0.95}$ are the 5% and 95% sample quantiles of the anchoring measure over time and across countries and $\hat{\xi}_{i,t-1}$ is the WUI shock according to Eq. (7). See Figure 5 for further details.



Appendix

Figure A.1: **Data coverage of inflation expectations**

The plot shows the coverage of inflation forecasts in the survey of professional forecasters conducted by Consensus Economics per country for the five-years-ahead horizon. The vertical axis shows the abbreviations of countries and the horizontal axis provides the time period. The survey has been carried out biannual until 2013 and quarterly thereafter.

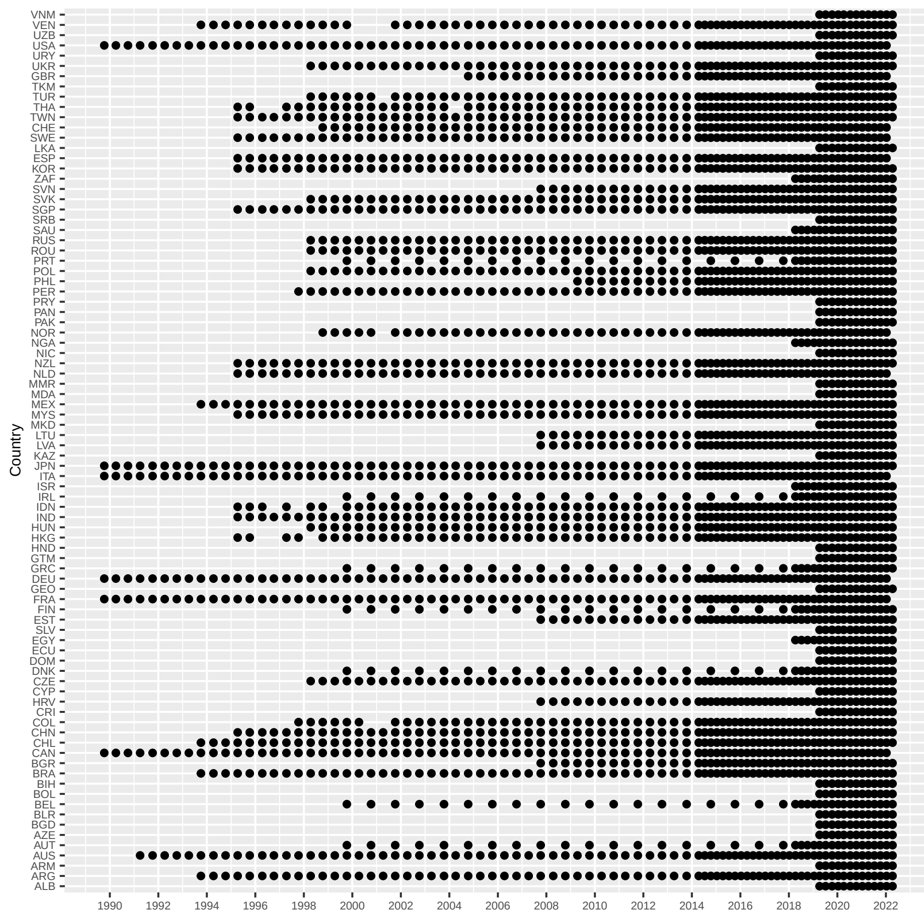


Figure A.2: **Data coverage of inflation disagreements**

The plot shows the coverage of the cross-sectional standard deviation of inflation forecasts across forecasters in the survey of professional forecasters conducted by Consensus Economics per country for the five-years-ahead horizon. The vertical axis shows the abbreviations of countries and the horizontal axis provides the time period. The survey has been carried out biannual until 2013 and quarterly thereafter. The standard deviations for forecast horizons $h = 1, 2$ are available from 1989 as the mean forecasts, however for higher forecast horizons the data starts in 2005.

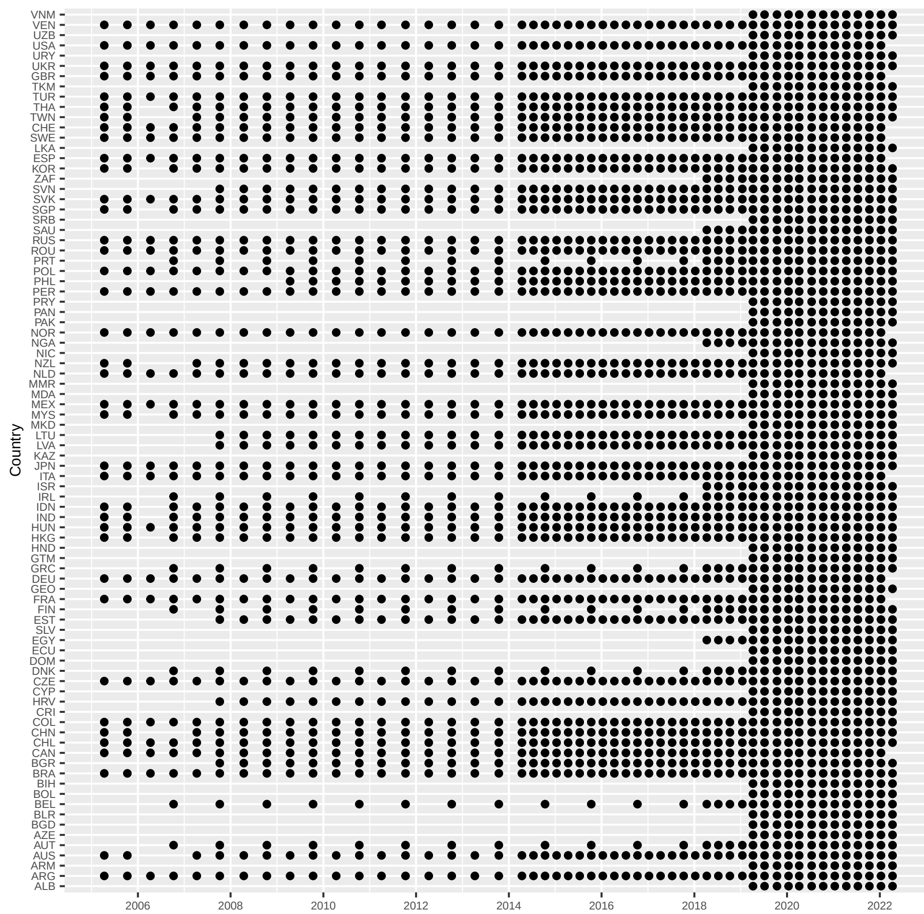


Figure A.3: **Response of inflation to an uncertainty shock by monetary control**

The plots illustrate the conditional cumulative response of consumer prices to a change in WUI as given in Eq. (9)

$$\frac{\partial(p_{i,t+s} - p_{i,t})}{\partial \Delta \mathrm{WUI}_{i,t-1}} = \gamma_1^s + \gamma_4^s \overline{\mathrm{Anchor}}^h + \gamma_5^s \mathrm{Strong}_{i,t-1} + \gamma_7^s \overline{\mathrm{Anchor}}^h \cdot \mathrm{Strong}_{i,t-1}, \quad s = 1, \ldots, 8$$

for countries with a strong ($\mathrm{Strong}_{i,t-1} = 1$) and weak degree of monetary control ($\mathrm{Strong}_{i,t-1} = 0$) while $\overline{\mathrm{Anchor}}^h$ is the sample mean of the anchoring measure over time and across countries. The impulse response for countries with a strong (weak) degree of monetary control is shown by the red (blue) line. Pink (light blue) shadings give the corresponding 95% confidence intervals based on clustered standard errors proposed by Driscoll and Kraay (1998). The different plots correspond to different horizons of the anchoring measure, $h = 4, \ldots, 7$.

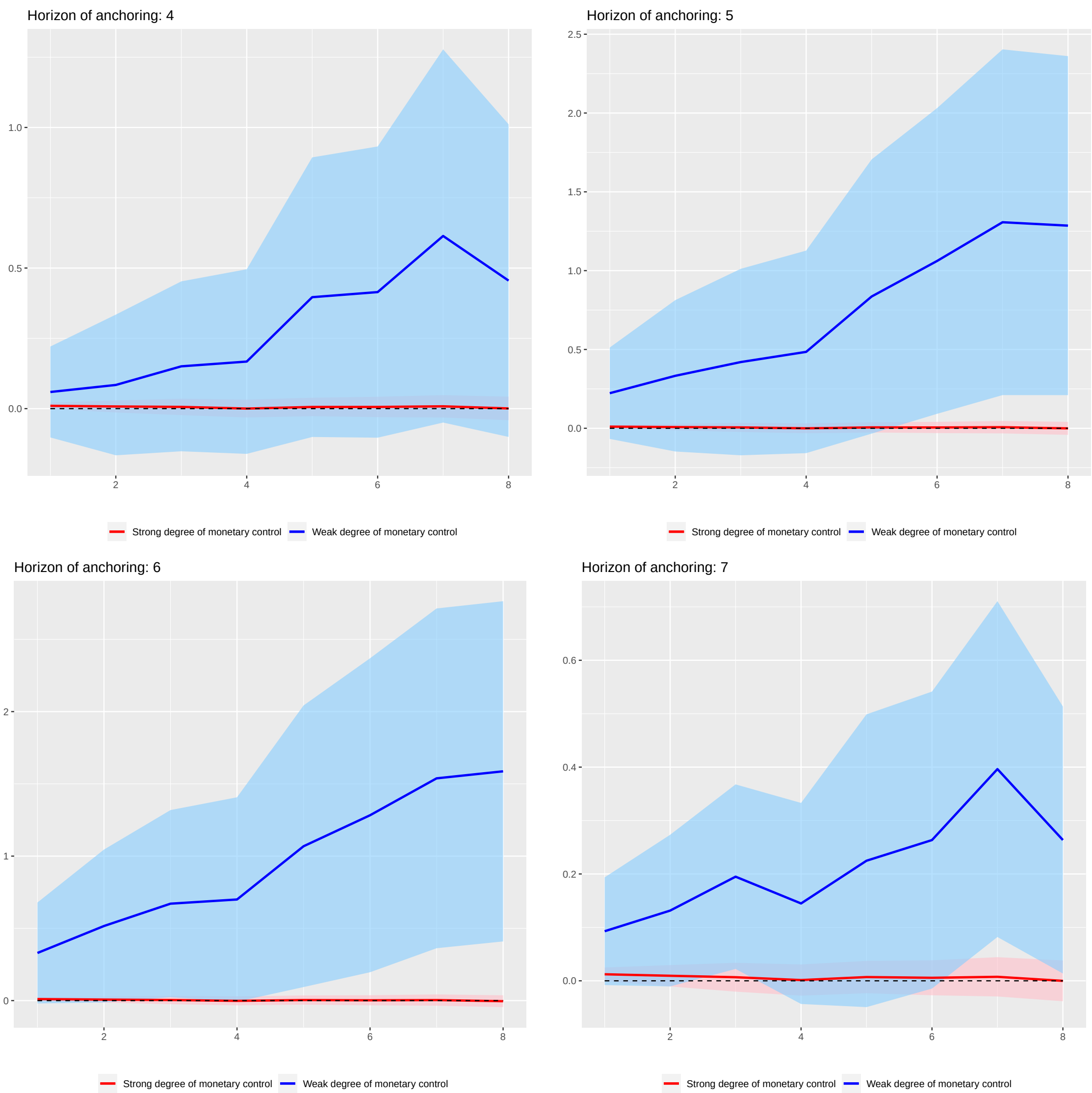


Figure A.4: **Response of inflation to an uncertainty shock by anchoring**

The plots illustrate the conditional cumulative response of consumer prices to a change in WUI as given in Eq. (9)

$$\frac{\partial(p_{i,t+s}-p_{i,t})}{\partial \Delta \mathrm{WUI}_{i,t-1}} = \gamma_1^s + \gamma_4^s \widetilde{\mathrm{Anchor}}^h_{Qp} + \gamma_5^s + \gamma_7^s \widetilde{\mathrm{Anchor}}^h_{Qp}, \quad s = 1, \ldots, 8$$

for countries with a strong degree of monetary control ($\mathrm{Strong}_{i,t-1} = 1$) and a strong ($\widetilde{\mathrm{Anchor}}^h_{Q0.95}$) or weak degree of anchoring ($\widetilde{\mathrm{Anchor}}^h_{Q0.05}$). $\widetilde{\mathrm{Anchor}}^h_{Qp} = \widetilde{\mathrm{Anchor}}^h_{Q0.05}$ and $\widetilde{\mathrm{Anchor}}^h_{Q0.95}$ are the 5% and 95% sample quantiles of the anchoring measure over time and across countries. The impulse response for countries with a strong (weak) degree of anchoring is shown by the red (blue) line. Pink (light blue) shadings give the corresponding 95% confidence intervals based on clustered standard errors proposed by Driscoll and Kraay (1998). The different plots correspond to different horizons of the anchoring measure, $h = 4, \ldots, 7$.