Inflation Targeting and Anchored Inflation Expectations: The Role of Central Bank Credibility*

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Preliminary work, kindly do not circulate.

Abstract

This paper examines the pivotal role of central bank credibility in the effectiveness of Inflation Targeting (IT) for anchoring inflation expectations, drawing on both empirical evidence and theoretical modeling. The empirical analysis demonstrates that IT adoption leads to better-anchored inflation expectations, particularly in emerging-market economies, and that central bank credibility significantly amplifies this effect in these contexts. The results also reveal substantial heterogeneity across country groups and target types, underscoring the importance of institutional context. To further explore these dynamics, a New Keynesian model with non-rational expectations and an imperfect-credibility Phillips curve is employed. The model shows that enhanced credibility not only lowers inflation and nominal interest rates but also moderates the impact on the output gap, as well-anchored expectations help absorb inflationary shocks. Overall, the findings underscore that credibility is a fundamental driver of IT's success, especially in emerging markets, and that strengthening credibility should be a key policy priority for achieving macroeconomic stability.

Keywords: Inflation, Inflation Targeting, Inflation Expectations, Credibility

JEL classification: D84, E42, E52, E58

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1 Introduction

Central banks have experimented with a variety of monetary policy frameworks over the past several decades in pursuit of price stability and a reliable nominal anchor for their economies. Yet, many of these frameworks underperformed, often failing to consistently achieve their stated objectives.[3] This widespread underperformance prompted a global shift toward inflation targeting (IT) from the 1990s onward, establishing IT as the dominant monetary policy framework in recent decades. While IT's popularity is undisputed, its true effectiveness depends not only on the mechanical adoption of targets but, crucially, on the credibility of the central bank in the eyes of the public and market participants.

When a central bank adopts IT, it publicly announces a specific inflation target, making the achievement of this target its primary objective.[4] However, the real power of IT lies in its ability to anchor the inflation expectations of households, firms, and investors to this target. The anchoring of expectations is not automatic; it is fundamentally mediated by the credibility of the central bank. Credibility, in this context, refers to the degree of trust that economic agents place in the central bank's commitment and ability to achieve its stated inflation target (Blinder (2000)). If the central bank is credible, expectations become firmly anchored to the target, which in turn stabilizes inflation and other macroeconomic variables.

Despite the theoretical importance of anchored inflation expectations, empirical evidence on whether IT has successfully anchored expectations across economies remains limited and mixed (Capistrán and Ramos-Francia (2010), Ehrmann (2014), etc.) Even more, there is little consensus on the underlying drivers of well-anchored expectations. Among the many potential factors, this paper identifies and foregrounds central bank credibility as the decisive force in anchoring inflation expectations under IT. By focusing on credibility, this work advances the literature by directly quantifying its impact and by exploring how credibility interacts with other institutional and macroeconomic factors to shape the success of IT regimes.

This paper aims to rigorously assess the relationship between IT and the anchoring of inflation expectations, with a special emphasis on the role of credibility. Specifically, it seeks to answer three interrelated questions: First, does the adoption of IT lead to better-

[3]As a few examples of previous frameworks, the currency peg was not favored as it meant high dependency on the monetary policy of the country to which the currency was pegged. On the other hand, monetary targeting was not successful as money became unstable.

[4]Some central banks have a single objective or mandate, which is to target inflation, while others have a dual objective where they also focus on maximizing employment generation in the economy along with price stability.

anchored expectations? Second, through which channels does this effect operate, and what is the unique contribution of credibility? Third, what factors, particularly credibility, help improve the anchoring of expectations? The analysis compares advanced economies (AEs) and emerging-market economies (EMEs), providing new insights into the heterogeneity of IT outcomes across different institutional environments.

To address these questions, the paper employs both empirical and theoretical methodologies. The empirical analysis leverages panel data to examine the impact of IT on inflation and expectations, explicitly measuring how credibility mediates these effects across economies. However, to fully understand the dynamic process through which credibility influences inflation and expectations, a theoretical approach is also necessary. Therefore, I employ a New Keynesian model with non-rational expectations, explicitly incorporating a credibility parameter. This modeling framework allows for a nuanced exploration of how credibility shapes the behavior of expectations and inflation, both in economies that have already adopted IT and those considering its adoption.

Empirical results show that the adoption of IT has had a stronger effect in reducing both inflation and inflation expectations in emerging-market economies (EMEs) than in advanced economies (AEs).[5] More importantly, the degree of anchoring, measured as the alignment of expectations with the target[6], is significantly stronger in EMEs. This difference is largely explained by the evolution of central bank credibility. While credibility has improved markedly in EMEs over the past two decades, it has remained relatively stable in AEs. This credibility measure used in the paper is based on the idea that agents remain unsure about the central bank's commitment to deliver low inflation and thus update their beliefs about future inflation by comparing high and low inflation scenarios.[7] Using this measure, I find that higher credibility significantly enhances the anchoring of expectations in EMEs, but has little to no effect in AEs. This asymmetry underscores that credibility-building efforts are particularly impactful in EMEs, where improvements have translated into greater trust in central banks and more firmly anchored expectations. In contrast, in many AEs, expectations may already be anchored or are less responsive to further gains in credibility due to historical or structural factors.

The paper also explores how different types of inflation targets—such as point, range, or point-tolerance bands—interact with credibility to affect the anchoring of expectations. Results indicate that EMEs achieve better anchoring with point targets, while AEs only

[5] Capistrán and Ramos-Francia (2010) is one of the papers that also find this

[6] A similar approach is used in Kumar et al. (2015), Moessner and Takáts (2020), Bems et al. (2021), etc. Some papers measure it through the response of long-term expectations to shocks to the short-term expectations. See Buono and Formai (2016) for example.

[7] This way of expressing credibility is very similar to Barro (1986), Davis (2012a), Alichi et al. (2009).

see significant anchoring under point targets. The effectiveness of these target types is mediated by the prevailing level of credibility, suggesting that the design of IT frameworks should be tailored to the institutional context and credibility history of each central bank.

To complement the empirical analysis, I employ a New Keynesian model that explicitly incorporates central bank credibility into the formation of inflation expectations. In the model with exogenous credibility (where credibility is treated as a fixed parameter) the results show that higher credibility consistently dampens the economy's response to both technology and monetary policy shocks. As credibility increases, the output gap, inflation, and both nominal and real interest rates react less aggressively to shocks. This implies that when agents have strong confidence in the central bank's commitment to its inflation target, their expectations become more stable, contributing to greater macroeconomic resilience and more effective monetary policy transmission.

The model is further extended to allow credibility to evolve endogenously in response to economic conditions and the central bank's past performance. Here, credibility itself becomes a dynamic variable that can be reinforced or eroded by the central bank's actions and the nature of economic shocks. The results show that increases in credibility lead to better-anchored expectations and lower inflation, as agents place greater trust in the central bank's commitment. The model also considers a 'stock of credibility' shock, where a sudden improvement in credibility immediately reduces inflation and interest rates. However, this heightened credibility can also result in expectations of tighter future monetary policy, which may temporarily suppress output as agents anticipate less accommodative conditions. Together, these theoretical results underscore the central role of credibility in anchoring expectations and shaping the macroeconomic impact of IT regimes.

In sum, paper contributes to the literature by highlighting the role of central bank credibility in the analysis of IT and expectation anchoring. The findings suggest that credibility is not merely an ancillary feature, but the mainstay that determines the success or failure of IT regimes. For policymakers, especially in emerging markets, building and maintaining credibility should be a central objective, as it directly enhances the effectiveness of monetary policy and the stability of macroeconomic outcomes.

2 Literature Review

The paper contributes to the extensive literature focused on the macroeconomic implications of IT by placing special emphasis on the anchoring of expectations—a topic explored in works such as Ball and Sheridan (2004), Walsh (2009), Gonçalves and Salles (2008).

Unlike much of the earlier literature, this paper foregrounds the role of expectations anchoring as a key channel through which IT affects macroeconomic outcomes, drawing on recent advances in the measurement and interpretation of anchoring (Bems et al. (2021), etc.) Apart from this, the paper also contributes to three other strands of literature.

First, this study adds to the empirical literature on inflation expectations and IT, including works such as Levin et al. (2004), Capistrán and Ramos-Francia (2010), Gürkaynak et al. (2010), Ball and Mazumder (2011), Davis (2012b, 2014), Buono and Formai (2016), Strohsal et al. (2016), Mehrotra and Yetman (2018), Kose et al. (2019), Ehrmann (2021), Grosse-Steffen (2021), Carvalho et al. (2023), etc. While these studies examine the effects of IT on expectations, few directly compare advanced and emerging economies or explicitly analyze the role of credibility in this context. This paper fills that gap by systematically examining how the anchoring of expectations, measured as the deviation of expectations from the target, varies across IT-adopting AEs and EMEs, with a focus on the contribution of central bank credibility.

Second, the paper advances the literature on central bank credibility, building on foundational contributions such as Cukierman and Meltzer (1986), De Haan et al. (2004), Alichi et al. (2009), Davis (2012a), Binder (2017), Bordo and Siklos (2017), Neuenkirch and Tillmann (2014), de Mendonça (2018), Kalemli-Özcan and Unsal (2024). While some of these works develop new credibility indices or empirically examine credibility's macroeconomic effects, few explore its specific influence on the anchoring of expectations across different types of economies. Recent studies, such as Bems et al. (2021) and Cole et al. (2023), underscore the evolving importance of credibility for inflation anchoring in a post-pandemic world, further motivating this paper's focus. The next section provides a detailed discussion of the credibility literature, focusing on the comparison between past credibility indexes and the paper's measure of credibility.

Finally, this work contributes to the theoretical literature on expectation formation and the behavior of anchoring under IT, especially when credibility is imperfect or evolving. By employing a New Keynesian framework with non-rational expectations, the paper extends models such as Evans and Honkapohja (2001), Erceg and Levin (2003), Alichi et al. (2009), Ascari and Ropele (2009), Ascari et al. (2017). It also relates to the literature on expectation formation (Mankiw et al. (2003), Blinder et al. (2008), Coibion and Gorodnichenko (2015), Kumar et al. (2015)). Unlike prior work, this paper examines both exogenous and endogenous credibility. It explicitly compares representative AEs and EMEs to highlight how different credibility levels and institutional mandates affect the anchoring process.

3 Credibility of the Central Bank

The credibility of the central bank is an active topic of discussion in the literature and across central banks. This is not new and has been widely discussed since Blinder (2000), when he defined the central bank as being credible, as when people believe it will do what it says. This is not the only definition, and others have defined it as either a commitment to goals or as the public's belief that a policy shift has taken place (see Cukierman and Meltzer (1986) for example). It is a subjective concept for some, as it is hard to quantify, and there have been different ways the literature has measured credibility, differing according to the research context and data availability.

One strand of literature measures it in the form of deviation of actual inflation or inflation expectations from an explicit or implicit target rate of inflation or even a long-term average rate of inflation in some cases (see Svensson (2000), Cecchetti et al. (2002), Alichi et al. (2009), de Mendonça and e Souza (2009), Bordo and Siklos (2015, 2017), Levieuge et al. (2018), etc. for more). Another strand of literature measures it by the extent to which agents account for the target of inflation in forming long-run expectations (Bomfim and Rudebusch (2000), Demertzis et al. (2012), etc.) A third approach has been to use variation in other economic indicators, such as parallel market exchange rates and long-term interest rates as an indicator of monetary policy credibility (See Agenor and Taylor (1993), Goodfriend and King (2005) for example). Apart from these some papers have computed an index for independence, reputation, or transparency based on scoring schemes and use that as a proxy for credibility. These include Cukierman et al. (1992), Dincer and Eichengreen (2018), Unsal et al. (2022).

These measures of credibility however come with their own drawbacks. The first and most important is that these measures fail to account for the fact that agents lack full or symmetric information about the intent of the central banks policies. Second, not all economies are the same and this can be seen in more frequent changes in the targets of EMEs in comparison to AEs. Thus, measuring credibility as an endogenous process is crucial to understand how it is gained or lost with time. Lastly, most of the literature has measured credibility employing an ad hoc threshold that isn't suitable for all countries and all times.

To address these issues, I measure credibility based on the idea that agents remain unsure about the central bank's commitment to deliver low inflation and thus update their beliefs about future inflation by comparing high and low inflation scenarios. This measure captures the non-linear and asymmetric nature of credibility loss. Additionally, the index evolves endogenously with observed inflation outcomes, allowing for credibility to be gained or lost over time as a function of actual policy performance.

The *'cred'* parameter indicates the extent to which the 'low' inflation scenario is observed. In the 'low' inflation case, inflation converges to the target, and the second term in the denominator becomes zero. Thus, the *cred* term converges to 1. However, in the 'high' inflation scenario, there are doubts or suspicions amongst the agents that there might be a very high inflation rate and will be higher than the target meaning that the *cred* term converges to 0. The definitions of π_t^{high} and π_t^{low} reflects how agents might form expectations about inflation under different regimes. It is designed in a way to capture inflation persistence and policy credibility dynamics by comparing recent inflation trends to historical or benchmark inflation levels. Inflation expectations adapt gradually, incorporating new data , while retaining memory of the past. The former is captured by the regime's target (π^{high} or π^{low}). Here, π^{high} and π^{low} reflect the regime-dependent anchors for inflation expectations. π^{low} represents the implicit or explicit target of inflation by central bank whereas, π^{high} represents a high-inflation regime that could arise if policy credibility erodes. This dichotomy is grounded in historical and theoretical, where inflation dynamics often exhibit regime shifts between stable (credible) and unstable (non-credible) states. [8] The θ parameter indicates the convergence rate to the steady state (high persistence implies a longer time to converge). The θ value varies across the two inflation scenarios.

$$cred_t = \frac{(\pi_t^{high} - \pi_t)^2}{(\pi_t^{high} - \pi_t)^2 + (\pi_t^{low} - \pi_t)^2} \tag{1}$$

and,

$$\pi_t^{high} = \theta_h * \pi_{t-1} + (1 - \theta_h) * \pi^{high}$$

$$\pi_t^{low} = \theta_l * \pi_{t-1} + (1 - \theta_l) * \pi^{low}$$

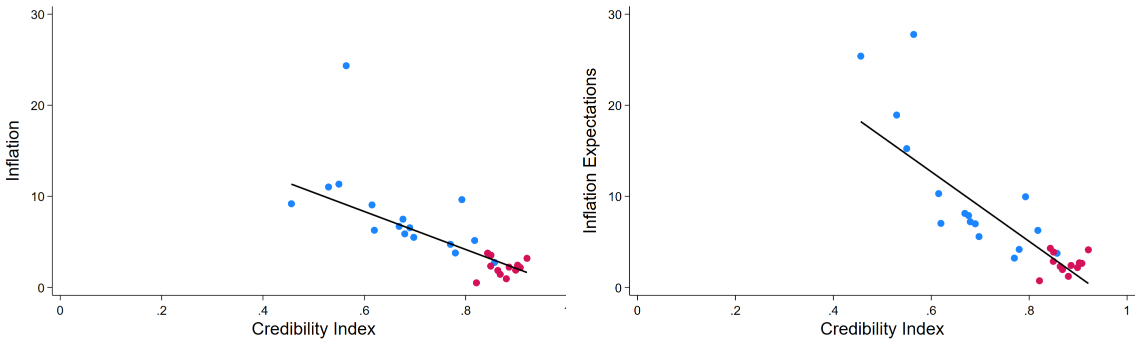
This credibility measure is negatively correlated with inflation and inflation expectations. For eg., a 0.1 increase in credibility leads to an 'x' percent decrease in inflation or inflation expectations for a particular country. As we can see from Figure 1, a negative slope indicating higher credibility and lower inflation or inflation expectations is mostly driven by EMEs.

Figure 2 on the other hand shows the distribution of credibility for 2000 and 2019.[9] As we can see, the mass has shifted to the right, for both EMEs and AEs indicating higher average credibility across countries. EMEs had a higher variance of credibility over both

[8]It is taken as 5 pp higher than the highest inflation in the particular country for the EME group and 2 pp higher for the AEs group.

[9]Year 2000 has been selected instead of 1991 to avoid the high inflation episodes in some EMEs.

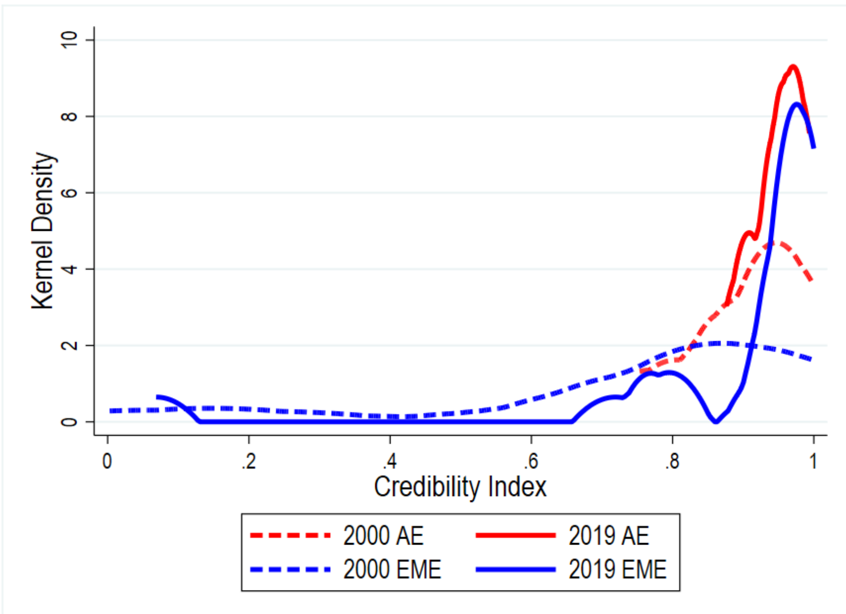
Figure 1: Inflation and Inflation Expectations



(a) Inflation (b) Inflation Expectations

Note: The scatter plot shows the regression coefficient of inflation and inflation expectations on the credibility index. The blue dots are for EMEs and the red dots are for AEs. The coefficients are plotted against the average credibility over time. The regression period for Brazil, Peru, Türkiye, Ukraine, and Uruguay have been selected to exclude hyperinflation episodes.

Figure 2: Distribution of Credibility Index



Note: The plot shows the distribution of credibility index for EMEs and AEs in 2000 and 2019.

periods and AEs on the other hand had a narrower distribution. It is also evident that although for AEs not a lot changed over time, for EMEs, we can see most of the mass towards higher credibility. [10]

[10] These results are similar to what Kalemli-Özcan and Unsal (2024) also find using the IAPOC index.

4 Data & Methodology

In this section, I document the differences in expectations and inflation after IT adoption across EMEs and AEs. I also examine the effect on the anchoring of expectations after IT adoption and explore credibility as one of the factors enhancing this anchoring across economies. The fact that central banks adopt varying target types is also taken into account while assessing the level of anchoring. In the empirical analysis, the results do not make causal claims about the anchoring and importance of credibility. For this, I model credibility in a NK model with non-rational expectations described in Section 7.

Data: The empirical estimation is conducted for 12 AE and 16 EMEs that have adopted IT.[11] The data spans 1990-2019 and is at a quarterly frequency. Inflation expectations data are from the Ifo World Economic Survey (WES), a survey of professional forecasters, which collects qualitative responses converted to numerical estimates for each period. This paper uses these numbers for estimation. The data for inflation is taken from the IMF (IFS) database. Inflation targets, types of targets and IT adoption dates are taken from the respective central bank websites, IMF, and some literature.[12]

4.1 Impact of inflation targeting

The empirical exercise is conducted in two stages. In the first stage, I assess the impact of IT adoption on inflation and expectations across AE and EMEs.

To assess the long-term effect of IT adoption, I use the Jordà local projections Jordà (2005) to estimate and infer impulse responses. This approach is helpful to estimate the dynamic causal effect of an intervention over multiple horizons. This is crucial as IT adoption is expected to influence inflation and expectations not just immediately, but over several years, with effects potentially varying across countries and over time. This approach is flexible to measure these dynamic responses and can handle staggered adoption cleanly. Thus, by providing the environment for flexible, robust estimation of dynamic, heterogeneous effects in settings with staggered, local projection approach proves to be apt for the condition present in cross-country studies of IT adoption.[13]

Since the adoption dates of inflation-targeting economies are available, I create a

[11]The list of countries with inflation levels, implementation dates, target type, and current target levels is given in Appendix A.

[12]For some economies, the IT dates have also been taken from IMF. Ehrmann (2021) and Grosse-Steffen (2021) were referred for some target type dates.

[13]Zhang and Wang (2022) also uses local projections to assess the impact of IT track record measures on growth and inflation rates.

dummy variable equal to 1 at the time of IT adoption and 0 otherwise for each country, which acts as the policy intervention variable. This local projections approach involves running the regression of the outcome variable on the independent and control variables at different horizons after time t. I use the following specification of the regression for various values of the horizon:

$$y_{i,t+h} = \beta^h IT_{it} + \sum_{k=1}^{K} \lambda_k^h IT_{i,t-k} + \sum_{k=1}^{K} \theta_k^h y_{i,t-k} + \alpha_i^h + \gamma_t^h + \varepsilon_{i,t}^h \tag{2}$$

where y_{it} is the outcome of interest i.e inflation and inflation expectations here, IT is the dummy variable for the dates of IT adoption, α_i and γ_t are country and time fixed effects, and ε_{it} is the error term. The coefficient for the dummy i.e. β for the various horizons is the estimate for the response of inflation or inflation expectations to the realization of the adoption of IT as a framework.

The underlying assumption here is that the main thing the central banks consider while introducing IT is past inflation and nothing else. The easiest way to control for that is through the θ coefficient that captures the estimate for the lagged values of the dependent variable. Apart from these lagged values, any effects from the anticipation of the IT introduction itself or any future inflation/ inflation expectations are captured by the lags of the shock itself. These are captured by the λ coefficient for each horizon. The country and time-fixed effects are also included to capture variations across countries and other global effects. I have used a value of 4 for the K in each lag. I estimate the regression for each horizon from 0 to 20 quarters ahead to examine the response of inflation and expectations up to 5 years after the adoption of the framework for both AE and EMEs.

To provide a complementary estimation framework, I also employ event study estimations to assess the short-run effects of IT adoption on inflation and inflation expectations. The event study approach is particularly well-suited for identifying immediate changes around the adoption date, allowing for a clear visualization of any discontinuities or abrupt responses in the data. In addition, this setup serves as a robustness check for the dynamic estimates obtained from local projections, helping to address concerns about model specification and the sensitivity of results to different empirical strategies (See Appendix C for details).

4.2 Anchoring of inflation expectations

As the second step of empirical estimations, I assess the effect on the anchoring of inflation expectations after IT adoption. As discussed earlier, anchoring inflation expectations has been one of the objectives for some IT-adopting central banks. Well-anchored expectations indicate that the agents in the economy believe in the central bank's motive of bringing inflation close to the target and thus form expectations close to the target themselves. Though there are different ways in which anchoring has been discussed, I assess the anchoring of inflation expectations through the deviations of expectations from the inflation target.[14] The regression captures the effect of past inflation deviation from the target on the deviation of expected inflation from the target. The deviations are considered in absolute terms as I am not focusing on any symmetries arising from overshooting and undershooting of the target.[15] This regression is as follows and is estimated for both AE and EMEs:

$$|\pi_{it}^{e} - \pi_{it}^{tar}| = \beta * |\pi_{it-1} - \pi_{it}^{tar}| + \alpha_i + \gamma_t + \varepsilon_{it} \tag{3}$$

Here, π^e is inflation expectations, π^{tar} is the target inflation announced by the central bank and π is inflation. The regression captures the anchoring through β which is a coefficient on the deviation of the past inflation from the inflation target.[16] Well-anchored expectations i.e. expectations close to the target would mean that the β should be close to zero.[17] I include country and time-fixed effects to control for unobserved country heterogeneity and capture all potential time-varying global effects, respectively. I also run another regression to capture the anchoring of expectations in level form rather than in the form of deviations from the target. This regression is discussed in detail in Appendix B.

The anchoring is examined further under the varying degrees of credibility and various target types in the next sub-sections.

4.2.1 Effect of Credibility

Furthermore, to examine if some factors help in better anchoring expectations, I introduce a measure for the central bank's credibility in the above regressions. Credibility is one of the major differentiating factors across advanced and EMEs and is considered an im-

[14]Strohsal et al. (2016) use this form in a TVP model estimation, Moessner and Takáts (2020) also use deviations of long-term expectations from the target as the dependent variable and deviations of short-term expectations from the target as the independent variable with some lags.

[15]The latter might help understand the dynamics of countries that undershoot the inflation target, for eg. Japan

[16]I have also tested the same regression for just the absolute deviation of expectations or past inflation from the target. The squared deviations are used to avoid problems with the inversion (differentiable) of the matrices for estimating β.

[17]β would be zero when expectations are perfectly anchored.

portant factor in the policy-making of any economy. To assess whether credibility affects this measure of anchoring, I use a regression with demeaned interaction term as suggested by Balli and Sørensen (2013).[18] The interaction term coefficient (β_3) captures the effect of deviation of past inflation from the target on the deviation of expectations from the target with increasing credibility. The β_1 coefficient captures the effect of past inflation deviation from the target on the deviation of expected inflation from the target when the credibility of each country at time t is equivalent to the mean across all observations (here, all EMEs and AEs) i.e. $cred_{it} = \overline{cred}$. The coefficient of the $cred$ variable i.e. β_2 captures the effect of credibility on the deviation of inflation expectations from the target inflation when $|\pi_{it-1} - \pi_{it}^{tar}| = \overline{|\pi_{t-1} - \pi^{tar}|}$. All the other terms are similar to that of Equation 3.

The regression equation I estimate is as follows:

$$|\pi_{it}^{e} - \pi_{it}^{tar}| = \beta_1 * |\pi_{it-1} - \pi_{it}^{tar}| + \beta_2 * cred_{it} + \beta_3 * (cred_{it} - \overline{cred}) * (|\pi_{it-1} - \pi_{it}^{tar}| - \overline{|\pi_{t-1} - \pi^{tar}|}) + \varepsilon_{it} \tag{4}$$

The hypothesis here is for the $\beta_1 > 0$ and $\beta_3 < 0$ which would thus mean that with credibility increasing on average, the deviation of past inflation from the target has a lower impact on the deviation of expectations from the target i.e anchoring of expectations improves with an increase in average credibility.

4.2.2 Influence of various target types

As mentioned earlier, when a central bank adopts IT, it announces a target. However, there is significant heterogeneity in the types of targets across time and countries. Broadly these targets can be categorized into three types: point target, point with tolerance, and range target. Most EMEs initially adopted point targets with tolerance, whereas AE began with point targets.[19] Over time, these countries have adjusted their target types in response to evolving economic conditions and shifts in their monetary policy stance. Figure 10 in Appendix D illustrates the distribution of the mean for different target types across sub-samples for EMEs and AEs, highlighting the heterogeneity of target type over time and between the two groups of economies. The data show that point targets with tolerance have become significantly more prevalent in EMEs, while point targets have gained popularity in AEs. In contrast, range targets have experienced a rise and subsequent decline in both groups over the sub-samples.

[18]The coefficient of the interaction term from this regression and the one without demeaned terms will give the same value. See Balli and Sørensen (2013) for more details.

[19]See Table 8 for details.

These differences in target types across time and economies lead to varying monetary policy decisions, reactions, and differences in how economic agents perceive inflation. They also highlight the target-related risks that each economy may face. Many EMEs, with their history of high inflation, higher targets, and lower credibility, may prefer a more moderate approach to setting targets, such as point targets with tolerance. This approach allows them to avoid committing to precise point targets while mitigating the risk of exceeding a specified range. In contrast, AEs, characterized by greater credibility and much more stable inflation, favor point targets.

These differences in target types may influence the degree of inflation expectations anchoring. This question has been very scarcely addressed in the literature. For example Castelnuovo et al. (2003) examined industrial economies and found that adopting a quantitative target improves anchoring but did not find any differences among the target types. Similarly, Grosse-Steffen (2021) explored the impact of different target formulations on expectations anchoring using a panel of 29 countries. Their paper, which focuses on long-term expectations and uses a smaller sample size, differs from this paper. They find that point and hybrid target formulations better anchor expectations and find consistency with models interpreting range targets as zones of less active monetary policy.

Ehrmann (2021), which distinguishes between point targets with and without tolerance and range targets is the closest study to this paper. They employ a different measure of anchoring expectations, focusing on the pass-through of past inflation to expectations, and find that the pass-through is weaker for range or tolerance band targeters. While their study is similar in using shorter forecast horizons and covering a larger period, this paper differs in several aspects. It adopts a distinct definition of expectation anchoring and, incorporates the role of credibility to examine the interaction between credibility and target types and assess how credibility influences expectations anchoring under different targeting frameworks.

This paper tests for anchoring across target types and the effect of credibility in enhancing anchoring across these target types. The first regression estimated differentiates anchoring across target types as follows:

$$|\pi_{it}^{e} - \pi_{it}^{tar}| = \beta * |\pi_{it-1} - \pi_{it}^{tar}| + \gamma * D_{it}^{type} + \delta * |\pi_{it-1} - \pi_{it}^{tar}| * D_{it}^{type} + \alpha_i + \gamma_t + \varepsilon_{it} \quad (5)$$

where D_{it}^{type} is the dummy, taking the value one for each quarter for a certain target type and zero otherwise. Thus, there are three dummies, one for each target type. The category for point target is treated as the baseline category for the regression.

The following regression captures the effect of anchoring under credibility and target types and is given as:

$$\begin{aligned}|\pi^{e}_{it} - \pi^{tar}_{it}| = \beta_1 * |\pi_{it-1} - \pi^{tar}_{it}| + \beta_2 * cred_{it} + \beta_3 * D^{type}_{it} + \\ \beta_4 * (cred_{it} - \overline{cred}) * (|\pi_{it-1} - \pi^{tar}_{it}| - \overline{|\pi_{t-1} - \pi^{tar}|}) * D^{type}_{it} + \varepsilon_{it}\end{aligned} \tag{6}$$

The coefficients of interest are β_1 and β_4, and the hypothesis is for the $\beta_1 > 0$ and $\beta_4 < 0$ which would mean that under various target types, anchoring of expectations improves with an increase in average credibility. All the other variables are as described before.

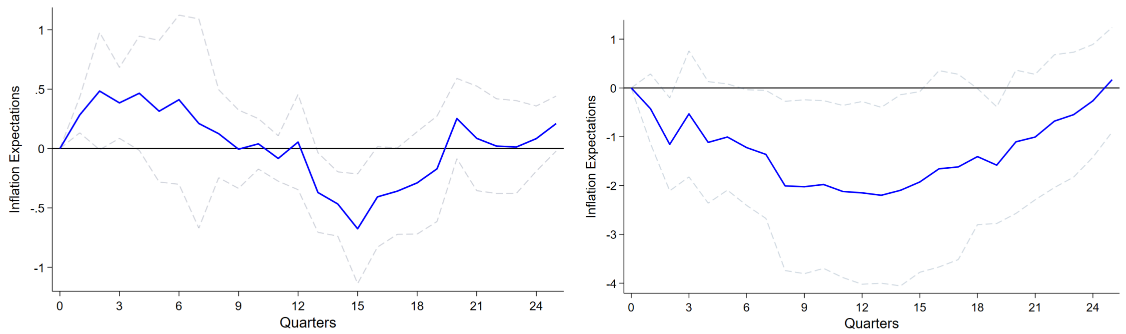
5 Results & Discussion

This section presents the results from the empirical exercises discussed above. The main findings indicate that the responses of inflation and inflation expectations to the adoption of IT differ between AEs and EMEs. The effect on the anchoring of expectations also varies across these two groups. The results suggest that expectations are better anchored in EMEs, and that central bank credibility contributes to this anchoring. Furthermore, the degree of anchoring varies by target type and across the two sets of economies, highlighting heterogeneity in the outcomes.

Figure 3 presents the results from the local projections approach used to assess the long-run impact of IT adoption on inflation expectations. The figure shows the response of expectations to IT adoption for advanced and EMEs, respectively. In the case of EMEs, expectations remain low throughout the post-adoption periods, with an upward trend emerging around 14 quarters after the shock. The maximum reduction observed is about 2 percentage points, occurring approximately three years after the adoption. The estimated impact is statistically significant at several horizons, though not consistently across all. For AEs, expectations initially increase but then begin to decline. A significant decrease of around 0.4 percentage points is observed after approximately 2.5 years. However, the response is statistically significant only at a few horizons, making it difficult to draw strong conclusions about the overall effect in AEs.

A similar exercise was conducted using inflation as the outcome variable in Equation 2, with the resulting IRFs presented in Appendix D Figure 17. The IRFs for inflation closely resemble those for inflation expectations. In the case of EMEs, inflation remains negative across all horizons and is significantly different from zero for most periods, with the maximum impact being a decline of approximately 3.5 percentage points around two years after the IT adoption shock. For AEs, the effect on inflation is not statistically significant for most horizons. However, inflation does exhibit a significantly negative response starting three years after the shock, which persists for about one year.

Figure 3: Response of inflation expectations to an IT adoption shock



(a) Advanced Economies

(b) Emerging-market Economies

Note: The solid blue line is the estimate from Equation 2 and inflation expectations as the outcome variable for horizons 0 to 24. The dotted lines are the 95% confidence interval.

The next step is to draw conclusions about the anchoring of expectations under an IT framework. Panel data regressions based on Equation 3 are presented in Table 1. As discussed in Section 4, we expect the coefficient on β to be close to zero, implying perfect anchoring, where expectations align with the inflation target. The regression results suggest that expectations are anchored in both EMEs and AEs.[20] anchoring appears to be stronger in EMEs, as indicated by a smaller coefficient compared to that in AEs. This finding is consistent with the observation that, in AEs, expectations exhibit greater persistence with past inflation than alignment with the target. These results are derived from regressions estimated in levels i.e.expectations are regressed on a weighted average of past inflation and the inflation target, as specified in Equation 26 in Appendix B.[21]

Having established evidence of anchored expectations in IT economies, the next step is to examine whether central bank credibility contributes to improved anchoring across countries. For this purpose, Equation 4 is estimated, and the regression results are presented in Table 2. The coefficient on the credibility variable (*'cred'*) is negative in both groups, indicating that greater credibility is associated with a smaller absolute deviation of expectations from the inflation target when the absolute deviation of past inflation from the target is at its mean level. This finding supports the notion that higher credibility helps bring expectations closer to the target, thereby strengthening anchoring.

[20] Davis (2014) also find that IT reduces the response of expectations to shocks in oil and inflation, Mehrotra and Yetman (2018) find expectations become more anchored across all IT adopting economies.

[21] These results are also present in Appendix B.

Table 1: Anchored Expectations

	EME	AE
$\lvert\pi_{it-1}$ - $\pi_{it}^{tar}\rvert$	.336***	.411***
	(.121)	(.051)
N	1177	877
R^2	0.75	0.69
Country FE	Y	Y
Time FE	Y	Y

Note: Clustered SE in parenthesis.
***p<0.01, **p<0.05, *p<0.1. F-value: 5.88.
The dependent variable is absolute deviation of expectations from the target. The regression results are for Equation 3.

Table 2: Anchored Expectations and Credibility

	EME	AE
$\lvert\pi_{it-1} - \pi_{it}^{tar}\rvert$	.396**	.375**
	(.059)	(.021)
$cred_{it}$	-1.41***	-.434***
	(.461)	(.158)
Interaction (β_3)	-.226**	.027
	(.092)	(.078)
N	1177	877
R^2	0.79	0.70
Country FE	Y	Y
Time FE	Y	Y

Note: Clustered SE in parenthesis.
***p<0.01, **p<0.05, *p<0.1. The dependent variable is the absolute deviation of expectations from the target. The regression results are for Equation 4.

The coefficient on the interaction term is also negative, indicating that as credibility increases, the impact of past inflation deviations from the target on expectations deviation diminishes. In other words, economic agents place less weight on past inflation and instead forecast expectations closer to the target, enhancing anchoring. This result holds primarily for EMEs, which is evident given that credibility has not changed substantially over time in AEs. As a result, further increases in credibility have little effect on anchoring in advanced economies. In contrast, as shown in Figure 2, credibility has shifted significantly in EMEs, and this variation plays a key role in improving the anchoring of expectations. This finding is consistent with theoretical predictions: as central bank credibility rises, agents place greater trust in the bank's commitment to its target and, accordingly, align their expectations more closely with that target.[22]

As discussed earlier, different types of inflation targets may have varying effects on the anchoring of expectations. Tables 3 and 4 present results from regressions based on Equations 5 and 6, respectively. The dataset used is consistent with the previous regressions, with the point target type serving as the baseline category.

The results reveal heterogeneity in the how target type influence anchoring of expectations. Table 3 shows that range and point-tolerance targets are statistically significant only in the case of EMEs. Among EMEs, point targets are most effective at anchoring expectations, followed by point-tolerance targets, while range targets are the least effective.[23] These findings are consistent with the flexibility hypothesis discussed in Ehrmann (2021) which suggests that increased flexibility in target definitions may weaken anchoring. In contrast, clearly defined targets even those with narrow tolerance bands, tend to anchor expectations more effectively.[24] For AEs, only the point target type is statistically significant. Neither range nor point-tolerance targets show a significant effect on expectation anchoring. This may be attributed to the already high levels of central bank credibility in AEs, as well as the relatively limited adoption of flexible target types such as range or point-tolerance targets in these economies.

Table 4 presents results on the anchoring of expectations in the presence of both credibility and different target types. These results further highlight heterogeneity in how target type affect anchoring across countries and credibility levels. An increase in credibility generally reduces the deviation of expectations from the target, thereby enhancing anchoring. For EMEs, under range target type and with rising credibility on average, the influence past inflation deviations on expectation deviations is significantly smaller (–0.623), indicating stronger anchoring. This effect is weaker under point-tolerance targets (–0.034). Interestingly, under point targets, increased credibility appears to worsen anchoring on average. For AEs, the results are the reversed. As credibility increases, point targets are associated with improved anchoring, while range and point-tolerance targets are linked to a deterioration in anchoring. This suggests that in AEs, where credibility is already high, further increases in credibility are more effective at anchoring expectations when the target is clearly defined, as with point targets. Central banks in these economies are viewed as more credible in meeting precise targets rather than operating within a range

[22] de Mendonça (2018), Güler (2021) also find similar results.

[23] The coefficients are also significantly different from each other according to the F-test.

[24] Their paper finds support in favor of the credibility hypothesis. Whereas, Grosse-Steffen (2021) finds better anchoring with point targets.

Table 3: Anchoring under Target Types

	EME	AE
$\lvert\pi_{it-1} - \pi_{it}^{tar}\rvert$	0.284***	0.345***
	(0.067)	(0.080)
range	-0.835	0.179
	(0.543)	(0.208)
point tolerance	-1.032***	-0.084
	(0.299)	(0.176)
range $\times$ $\lvert\pi_{it-1} - \pi_{it}^{tar}\rvert$	0.501***	0.069
	(0.128)	(0.148)
point tolerance $\times$ $\lvert\pi_{it-1} - \pi_{it}^{tar}\rvert$	0.396***	0.014
	(0.109)	(0.096)
N	1176	762
R^2	0.827	0.678
Country FE	Yes	Yes
Time FE	Yes	Yes

Note: Clustered Standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the absolute deviation of expectations from the target. The regression results are for Equation 5

or tolerance band. In contrast, for EMEs, where credibility is still being established, increases in credibility tend to strengthen anchoring only under range or point-tolerance frameworks. This may reflect the fact that agents in EMEs do not yet fully believe the central bank can consistently meet a strict point target. Instead, they perceive outcomes to fall within a broader "safe zone" defined by ranges or tolerance bands.

Table 4: Anchoring and credibility under target types

	EME	AE
$\lvert\pi_{it-1} - \pi_{it}^{tar}\rvert$	0.376***	0.378***
	(0.054)	(0.053)
cred_{it}	-1.456***	-0.382**
	(0.319)	(0.146)
range	-0.339	0.221
	(0.322)	(0.176)
point tolerance	-0.565**	-0.077
	(0.214)	(0.093)
Interaction	0.254*	-1.299***
	(0.145)	(0.382)
range × Interaction	-0.999***	1.426*
	(0.200)	(0.428)
point tolerance × Interaction	-0.410**	1.312**
	(0.175)	(0.399)
Observations	1176	762
R^2	0.873	0.695
Country FE	Yes	Yes
Time FE	Yes	Yes

Note: Clustered Standard errors in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the absolute deviation of expectations from the target.
The regression results are for Equation 6

6 Robustness Checks

I ran some robustness checks for the empirical estimations discussed in the previous sections. In particular, I focus on the effect of any anticipation that the agents might have of adopting IT, the impact of central bank independence on the policy implications of adopting IT, and lastly, some robustness checks related to the regression for anchoring.

6.1 Anticipation of IT adoption

One of the things to check for the correct identification of the impact of IT adoption is to assess the effect of any anticipation of the adoption being done in the future. Since the expectations used in the estimation are from professional forecasters (well-informed agents in the economy), there might be a possibility of them being aware of such a policy being adopted in the future, which will impact their expectations today. To account for this, I use event study estimates to test for announcement dates having any effect on the adoption of IT. The dates for the announcements are collected from respective central banks (explicit public announcements or future monetary policy framework change hints in the meetings).[25]

The results from the event study (as in Appendix C) using announcement dates are presented in Appendix D Figures 13 and 14. They indicate no anticipation effect in the two types of economies as neither inflation nor expectations has any statistical impact. One would not expect inflation to decrease immediately after the announcement, as the policy has not been implemented, and thus the results made sense. However, one might expect inflation expectations to react. No reaction of the latter can be due to two reasons: either there wasn't much duration between announcement and implementation, or the agents did not believe the central bank and thus made no changes to the expectations.

6.2 Central bank independence and IT

There can be doubts about the response of inflation or expectations after IT adoption from the event study results because of other policies that intervened with IT adoption. One of the most discussed policies that might affect the central banks' monetary policy stance and thus inflation levels is the independence of the central banks. To examine this, I analyze the results from the event study for inflation and inflation expectations around the time the central banks gained independence.

None of the AEs in my sample had an episode of the central banks becoming independent post-IT adoption. On the other hand, about six EMEs had independent central banks post IT adoption.[26] I use the time of central bank independence as event time,

[25]For countries with no explicit announcements or hints of any future change found, I have assumed that the announcement was made in the quarter preceding the adoption implementation.

[26]These are Brazil, Chile, Mexico, Paraguay, Peru, Philippines. Thailand and Uruguay do not have an independent central bank.

and the results from event study estimations are shown in Figure 15 and Figure 16 in Appendix D. The results for AE have no change even after using the independence timing. The response for inflation is insignificant for all quarters, and expectations rise after six quarters. There is also no response to central bank independence for inflation and inflation expectations for EMEs. Thus, these results do not affect those for IT adoption in either AEs or EMEs.

6.3 Weighted regression variables

Next, I use squared deviations for both dependent and independent variables which put a large weight on large deviations.

$$|\pi^e_{it} - \pi^{tar}_{it}|^2 = \beta * |\pi_{it-1} - \pi^{tar}_{it}|^2 + \alpha_i + \gamma_t + \varepsilon_{it} \tag{7}$$

Table 5: Anchored Expectations

	EME	AE
$\lvert\pi_{it-1} - \pi^{tar}_{it}\rvert$	.268**	.320***
	(.085)	(.083)
N	1177	877
R^2	0.56	0.58
Country FE	Y	Y
Time FE	Y	Y

Note: Clustered SE in parenthesis.
***p<0.01, **p<0.05, *p<0.1. F-value: 5.88.
The dependent variable is absolute deviation of expectations from the target. The regression results are for Equation 7.

The results from weighted regression are also similar to that for Equation 3 which indicate that both the economies have anchored expectations but EMEs have better anchoring.

The same analysis was also done for the regression with credibility and the following regression was estimated, for which the results are shown in Table 6.

$$|\pi^e_{it}-\pi^{tar}_{it}|^2 = \beta_1 * |\pi_{it-1}-\pi^{tar}_{it}|^2+\beta_2 * cred_{it}+\beta_3 * (cred_{it}-\overline{cred}) * (|\pi_{it-1}-\pi^{tar}_{it}|^2-\overline{|\pi_{t-1} - \pi^{tar}|^2})+\varepsilon_{it} \tag{8}$$

The results from Table 6 are consistent with those from Table 2. The interaction term is negative only for EMEs indicating that increasing credibility improves anchoring of expectations only in EMEs and has no effect in AEs. The credibility coefficient is negative which means that as credibility increases, the squared deviation of expectations from the target reduces when the squared deviation of past inflation from the target equals its mean. In other words, with increasing credibility, even the squared expectations are closer to the squared target value.

Table 6: Anchored Expectations and Credibility

	EME	AE
$\lvert\pi_{it-1} - \pi_{it}^{tar}\rvert^2$	.284**	.268***
	(.143)	(.027)
cred_{it}	-5.31***	-1.09***
	(1.25)	(.262)
Interaction (β_3)	-1.06**	.077
	(.053)	(.073)
N	1177	877
R^2	0.72	0.69
Country FE	Y	Y
Time FE	Y	Y

Note: Clustered SE in parenthesis. ***p<0.01, **p<0.05, *p<0.1. The dependent variable is the absolute deviation of expectations from the target. The regression results are for Equation 8.

These robustness checks support the claim made in the paper that the adoption of IT had a greater effect on expectations and inflation in EMEs compared to AEs. The timing of adoption does not significantly affect the results, as the anticipation of adoption has a negligible impact. Additionally, the independence of the central bank does not alter these findings. The results for the anchoring of expectations, obtained from the weighted regression variables, are consistent with the main results of the study.

7 Model

In this section, I discuss the model I use to address the questions that the empirical estimates could not fully assess. Understanding the pace of inflation and expectations is crucial for converging to the target inflation in an IT-adopting economy after any shock. Additionally, examining the effect of different levels of credibility and scenarios in EMEs and AEs is vital for understanding the impact of IT on anchoring expectations. This analysis will also help to explore the channels through which expectations are anchored.[27] I use the NK model with non-rational expectations and imperfect credibility for an IT-adopting economy to assess the behavior of anchored expectations in such an economy. In the baseline model, I build upon the work of Alichi et al. (2009) by using different expectation formation processes. In the extended model, I introduce the signaling problem for target inflation as in Ascari et al. (2017). The three shocks in the economy-TFP, Moenatry policy, and credibility-have different implications for inflation and output. I demonstrate how a credibility shock affects expectations and, consequently, inflation. Additionally, I extend the model to include countries without an IT regime, comparing the response of economies with dual vs those with a single mandate for monetary policy.

7.1 Households

A representative infinitely lived household whose utility is given as:

$$E_0 = \sum_{t=0}^{\infty} \beta^t \left[\frac{C_t^{1-\sigma} - 1}{1-\sigma} - \frac{N_t^{1+\theta}}{1+\theta} \right] \tag{9}$$

where C_t is the consumption, N_t denotes hours worked. Parameter $\beta \in (0,1)$ is the discount factor, $\sigma \geq 0$ is the curvature of the utility of consumption and $\theta \geq 0$ is the curvature of the dis-utility of labor or the Frisch labor supply elasticity. E is the expectational operator and for simplicity, I assume that households have full information.

C_t is the consumption index and is a Dixit-Stiglitz aggregator given by:

$$C_t = \left(\int_0^1 C_t(i)^{1-\frac{1}{\epsilon}} di \right)^{\frac{\epsilon}{\epsilon-1}}$$

where C_{it} is the consumption of each variety i in period t and $\epsilon > 1$ is the elasticity of substitution between varieties. The households are subject to the following budget constraint:

$$P_t C_t + (1+i_t)^{-1} B_t \leq B_{t-1} + W_t N_t + D_t \tag{10}$$

where P_t is the price of the consumption good, W_t is the nominal hourly wage. B_t is the quantity of one-period nominal risk-less discount bond purchased in period t for the nominal interest rate of i_t. D_t represents the dividends, conditional on the households of the firms' owners.

[27] The channels here mean whether expectations are 'shock' or 'level' anchored. For details on the two kinds of anchoring, see Ball and Mazumder (2011) among others.

In addition to the consumption, labor, and savings decisions, the household has to decide how to allocate consumption across different goods. The latter is done by maximizing the consumption bundle C_t subject to the consumption budget. The demand equation for each variety i is given as:

$$C_{it} = \left(\frac{P_{it}}{P_t}\right)^{-\epsilon} C_t \tag{11}$$

for all $i \in [0,1]$, where $P_t = \left(\int_0^1 P_t(i)^{1-\epsilon} di\right)^{\frac{1}{1-\epsilon}}$ is an aggregator price index.

7.2 Firms

The final good Y_t is produced with a continuum of intermediates goods $Y_t(i)$ indexed by i $\in$ [0,1] and is given by:

$$Y_t = \left(\int_0^1 Y_t(i)^{\frac{\epsilon-1}{\epsilon}} di\right)^{\frac{\epsilon}{\epsilon-1}}$$

Intermediate inputs $Y_t(i)$ are produced using labor and technology:

$$Y_t(i) = N_t(i) \tag{12}$$

where technology, $lnA_t = a_t$, is an exogenous productivity shock which follows and AR(1) process:

$$a_t = \rho_a a_{t-1} + \sigma_a \epsilon_{a,t} \tag{13}$$

Following Rotemberg (1982), the model assumes that a monopolistic firm faces a quadratic cost of adjusting nominal prices, measured in terms of final good, given as:

$$\frac{\psi}{2}\left(\frac{P_{i,t}}{P_{i,t-1}} - 1\right)^2 Y_t \tag{14}$$

where ψ determines the degree of nominal price rigidity that accounts for the negative effects of price changes. These effects increase with the size of price change and with Y_t.

Thus, the firm maximizes the problem given as :

$$\max_{P_t^*|_0^\infty} E_t x_{t,t+j} \left(\left(\frac{P_{i,t}}{P_{i,t-1}} - \mathcal{C}_{t+j} \right) Y_{t,t+j} - \frac{\psi}{2} \left(\frac{P_{i,t}}{P_{i,t-1}} - 1 \right)^2 Y_{t+j} \right) \tag{15}$$

s.t:

$$Y_{i,t+j} = \left(\frac{P_{i,t}}{P_{i,t-1}} - 1 \right)^{-\varepsilon} Y_{t+j} \tag{16}$$

where, $x_{t,t+j}$ is the stochastic discount factor and $\mathcal{C}_{t+j}$ is the real marginal cost of the firm.

Firms can change their prices each period, subject to payment of adjustment costs. Thus, all firms face the same problem i.e. choosing the same price, thus producing the same quantity.

The rest of the optimization conditions are shown in Appendix D.

7.3 Expectations and credibility

As we saw from the empirical analysis the central banks' credibility plays an important role in an economy with IT. This makes it critical to examine how agents form expectations. For this reason, I deviate from rational expectations, assuming that agents have limitations and that they use simple rules (heuristics) to forecast the future.[28] There are many options in the non-rational expectations model however, I choose the ones explained below. The agents in the model choose from two rules, model consistent expectations or the lagged inflation expectations (naive expectations).

$$\tilde{E_{1,t}} \pi_{t+1} = E_t^M \pi_{t+1}$$

$$\tilde{E_{2,t}} \pi_{t+1} = \pi_{t-1}$$

The first rule sets expected inflation equal to the model-consistent expectations (forward-looking component) whereas, the second rule is the last period inflation (backward-looking component) that the agents have already observed. These different predictors make it possible for the agent to switch/choose and this switching generates changes in how shocks are propagated in the model.

The market expectations are a weighted average of these expectations and the weight is a measure of the stock of credibility. Thus,

$$E_t \pi_{t+1} = \mu_t * E_t^M \pi_{t+1} + (1 - \mu_t) * \pi_{t-1} \tag{17}$$

[28]Similar cases are discussed in De Grauwe (2012), Brazier et al. (2018) amongst others.

This credibility stock in the model evolves in a way where it depends on the last period's credibility stock and the credibility flow today and is given as:

$$\mu_t = \rho\mu_{t-1} + (1-\rho)cred_t + \varepsilon_{\mu,t} \tag{18}$$

An increase in $cred_t$ which means that credibility is increasing, is a situation when the agents will believe in the central bank's ability to bring inflation down and thus result in a rise in the weight of the forward-looking component. Hence, the weight on the first term. On the other hand, when credibility is low, agents will lack faith in the monetary policies' ability to match the inflation target. Consequently, agents will forecast expectations based on the previous inflation rather than model-consistent expectations.

Substituting these expectations back into the NKPC gives us the imperfect credibility NKPC :

$$\pi_t = \beta(\mu_t * E_t^M \pi_{t+1} + (1-\mu_t) * \pi_{t-1}) + \kappa\tilde{y}_t \tag{19}$$

Under perfect credibility, Equation 19 becomes the rational expectations NKPC (given by Equation 40 in the appendix).

The equivalent imperfect credibility IS curve would be:

$$\tilde{y}_t = -\frac{1}{\sigma}(i_t - (\mu_t * E_t^M \pi_{t+1} + (1-\mu_t) * \pi_{t-1}) + r_t^n) + E_t\tilde{y}_{t+1} \tag{20}$$

7.4 Closing the model

The model is closed by the monetary policy rule set by the monetary authority which will have the following type of reaction function:

$$i_t = \bar{i}(\pi_t/\bar{\pi})^{\phi_\pi}(Y_t/\bar{Y})^{\phi_Y}\eta_t \tag{21}$$

I assume that the monetary policy shock and the credibility shock, like productivity shock, follow AR(1) processes:

$$ln\eta_t = \rho_\eta ln\eta_{t-1} + \sigma_\eta\epsilon_{\eta,t} \tag{22}$$

$$ln\mu_t = \rho_\mu ln\mu_{t-1} + \sigma_\mu\epsilon_{\mu,t} \tag{23}$$

The goods and labor market equilibrium conditions are described below. The goods market equilibrium for each variety is:

$$Y_t(i) = C_t(i) \tag{24}$$

Labor market clearing requires:

$$N_t = \int_0^1 N_t(i)di = \int_0^1 \left(\frac{y_t(i)}{A_t}\right)^{\frac{1}{1-\alpha}} di \tag{25}$$

The equations comprising the non-linear model used in the analysis are listed in Table 11 of Appendix E.

8 Quantitative Analysis

In this section, I simulate the model to generate the responses of various macro variables under different scenarios, distinguishing between different credibility levels across a representative economy. I examine the model under both exogenous and endogenous credibility scenarios. The parameters used are borrowed from the literature and are listed in Appendix E.

8.1 Exogenous credibility

As a first step in quantifying the model, I consider constant exogenous credibility. Varying levels of credibility, ranging from 0 to 1, are examined to assess the economy's response to an expansionary TFP shock and a contractionary monetary policy shock. The results discussed below pertain to a representative economy.

Figure 4 shows the response to a one percent increase in technology. The black dots represent the economy without credibility, while the yellow line represents the IRFs for the full credibility case. As discussed above, in the full credibility scenario, the imperfect-credibility NKPC aligns with the standard NKPC, and the model converges to the standard NK model. The responses from the two cases overlap because Equations 19 and 20 converge to the standard NKPC and IS curve, respectively, under full credibility. In these cases, a positive TFP shock reduces both inflation and the output gap. Although output increases with a positive TFP shock, the output gap decreases because the natural level of output also rises. The nominal interest rate decreases due to reduced inflation, affecting the central bank's response to the shock. The real rate also declines as a result of lower inflation and the reduced nominal rate.

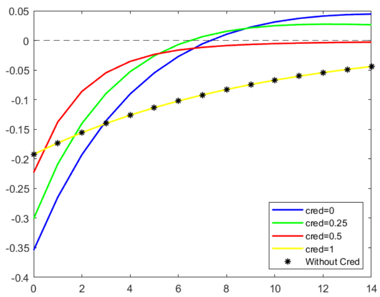
The responses for credibility levels less than one are represented by red (0.5 credibility), green (0.25 credibility), and blue (no/least credibility) respectively. There is a hump/inverted-U shape for these cases due to the spillover from the lagged inflation term in the expectations formation process that feeds into the imperfect credibility NKPC and the IS curves respectively. The overall response of the shock is the same as the standard model for these three cases, with slight changes. In the case of 50% credibility (red line), a positive TFP shock reduces the output gap; however, the output gap reduces more than the full credibility case. The convergence of the output gap to the potential is not as smooth; it increases in the short run and stays constant afterward. Inflation falls less as compared to the full credibility case in the first period but experiences a persistent reduction in the short run. Once the spillover from past inflation is negligible, inflation experiences a persistent increase. A similar pattern is observed for the nominal rate which reduces after the shock as inflation falls.

In the two cases with less than 0.5 credibility, the impacts are much smaller. The response of the output gap to the shock results in a smaller reduction than in the 0.5 credibility case, but as the shock fades, the output gap increases, even resulting in an overshoot. This is due to the lagged inflation spillover from the expectations formation process. The initial response of inflation when the shock hits is minimal due to the spillover from the lagged inflation; however, in the long run, inflation persistently falls, as indicated by green and blue lines. The scenario with the least credibility (blue line) reflects a situation where expectations are influenced by naive forecasters and thus determined solely by past inflation. In this case, the output gap decreases the most in the first period and overshoots the most in the long run, indicating excess output in low credibility scenarios. Inflation in this case doesn't decrease much initially but shows the most significant reduction in the long run. Thus, with increasing credibility, the output gap falls less, and although inflation decreases more in the short run, it rises more quickly and persistently in the long run. Nominal and real rates follow a similar pattern to inflation.

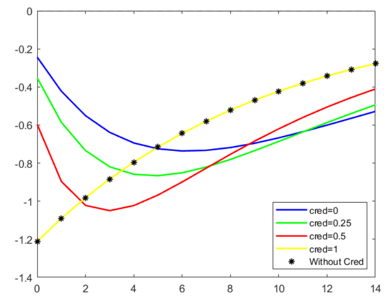
The response to a contractionary monetary policy shock (an increase of 25 basis points in the ϵ_ν) is shown in Figure 5. The response of inflation, nominal rates, and real rates are expressed in annualized terms. The responses from the case with full credibility overlap with those of the standard NK model, even for the monetary policy shock. In both cases, the shock leads to a decrease in inflation and the output gap. The nominal rate increases by less than the shock due to downward adjustment from inflation and the output gap. The real rate increases more than the nominal rate due to reduced inflation and rising nominal rate. As mentioned earlier, the responses overlap because Equation 19 and Equation 20 converge to the standard NKPC and IS, respectively, in the case of full credibility.

The responses in cases where credibility is less than one show slight differences. This

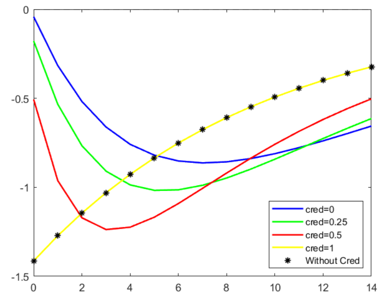
Figure 4: Response to a positive TFP shock



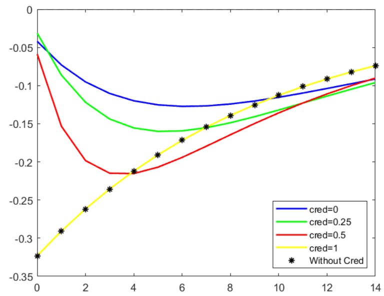
(a) Output Gap



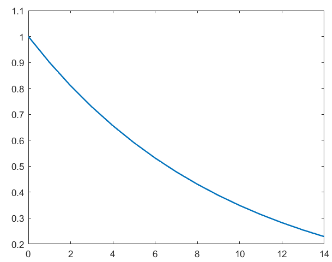
(b) Inflation



(c) Nominal Interest Rate



(d) Real Interest Rate



(e) TFP

Note: The impulse responses shown here are for different levels of credibility to a positive TFP shock. All graphs shown are in terms of percentage points. The responses of inflation, nominal, and real rates are in annualized terms.

variation arises due to the spillover from the lagged inflation term in the expectations formation process, which influences the other model equations. In the case of 50% credibility (red line), a contractionary monetary policy shock reduces the output gap less than in the full credibility case in the same period as the shock. However, the output gap eventually increases, becomes positive in the medium run, and converges to its potential in the long run. The response of inflation is negative and slightly higher than the standard model case. It continues to decline due to the influence of lagged inflation but experiences a persistent increase afterward. The nominal interest rate initially rises more than in the case of full credibility and dips below zero for some periods due to downward pressure from decreasing inflation. It eventually rises as inflation starts to increase and converges to zero. The real rate increases more than the nominal rate as inflation falls, similar to the full credibility case.

The cases with 0.25 and 0 credibility show much higher responses for inflation in the first period. As the effect of the shock persists, inflation increases but remains negative even in the long run. The output gap initially falls but becomes positive in the long run, indicating that with lower credibility, there is more output production in the economy. With the output gap increasing and falling inflation, the nominal rate decreases. There is a persistent decrease, with the rate even becoming negative due to output gap overshooting and falling inflation in the short run. The real rate increases in both cases, rising the most for the case with zero credibility.

In summary, as credibility increases, the output gap decreases more, reducing or eliminating the overproduction of output in the economy. Inflation falls sharply in the first period and continues to decline in the short run, but it rises more rapidly later. As the credibility decreases, the nominal rate increases more in the first period, eventually falling and turning negative when credibility is less than one. Conversely, the real rate rises as credibility decreases.

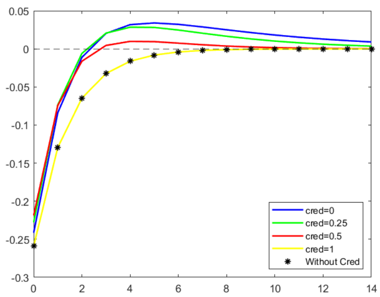
These results support the claim that central bank credibility is crucial for an economy, as evidenced by the responses under different levels of credibility. The responses would be different between AE and EME due to their distinct initial conditions for various variables.

8.2 Endogenous credibility

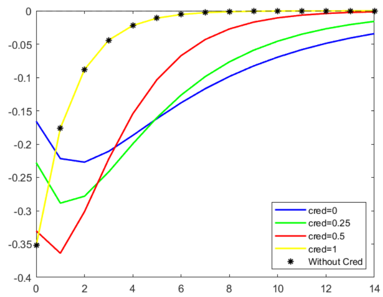
Next, I endogenize the credibility process and solve the model to track the responses of inflation expectations, the credibility parameter, and other variables to different shocks. In addition to the TFP and monetary policy shock, a shock to the credibility stock is also included in the model with endogenous credibility. The results discussed below pertain to a representative economy, with the parameter values specific to the credibility parameter and credibility stock drawn from the literature and listed in Appendix E.

Figure 6 shows the response to contractionary MP shock (50 basis points increase in ϵ_ν). In response to the shock, the credibility flow in the current period increases, reflecting agents' belief in the central banks' ability to bring down inflation. This is evident from the negative relationship between inflation and credibility. As credibility rises, expected inflation decreases, leading to a decline in actual inflation. It falls less than the actual inflation due to the lagged effect of expectation formation and also due to speculation

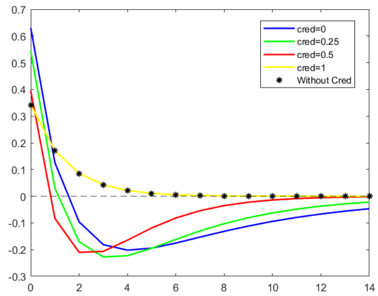
Figure 5: Response to a contractionary monetary policy shock



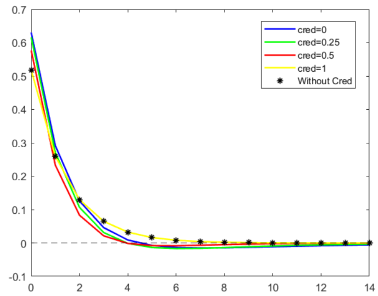
(a) Output Gap



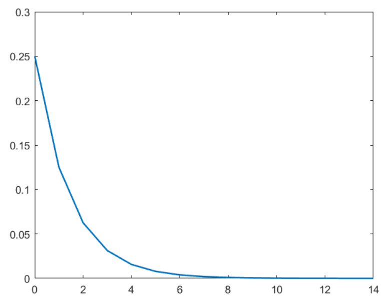
(b) Inflation



(c) Nominal Interest Rate



(d) Real Interest Rate

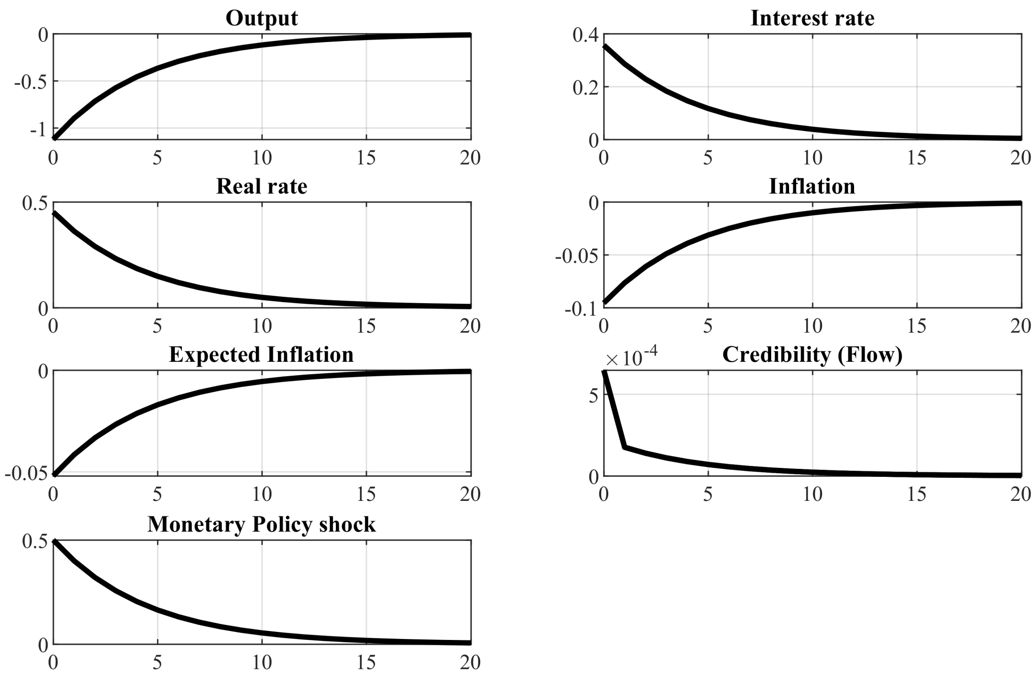


(e) ν

Note: The impulse responses shown here are for different levels of credibility to a positive TFP shock. All graphs shown are in terms of percentage points. The responses of inflation, nominal, and real rates are in annualized terms.

effects about the policy. With inflation and output decreasing after the shock, there is downward pressure on the nominal interest rate, which rises less than the shock itself. The real interest rate rises more than the nominal rate as inflation decreases and the nominal rate increases. Both inflation and output return to baseline levels rather quickly, indicating the models' ability to offset the unfavorable monetary policy with relatively little difficulty. This is the result of the agents' inflation expectations being reasonably anchored to the target, as can be inferred from the response of expected inflation to the shock.

Figure 6: Response to a contractionary MP shock

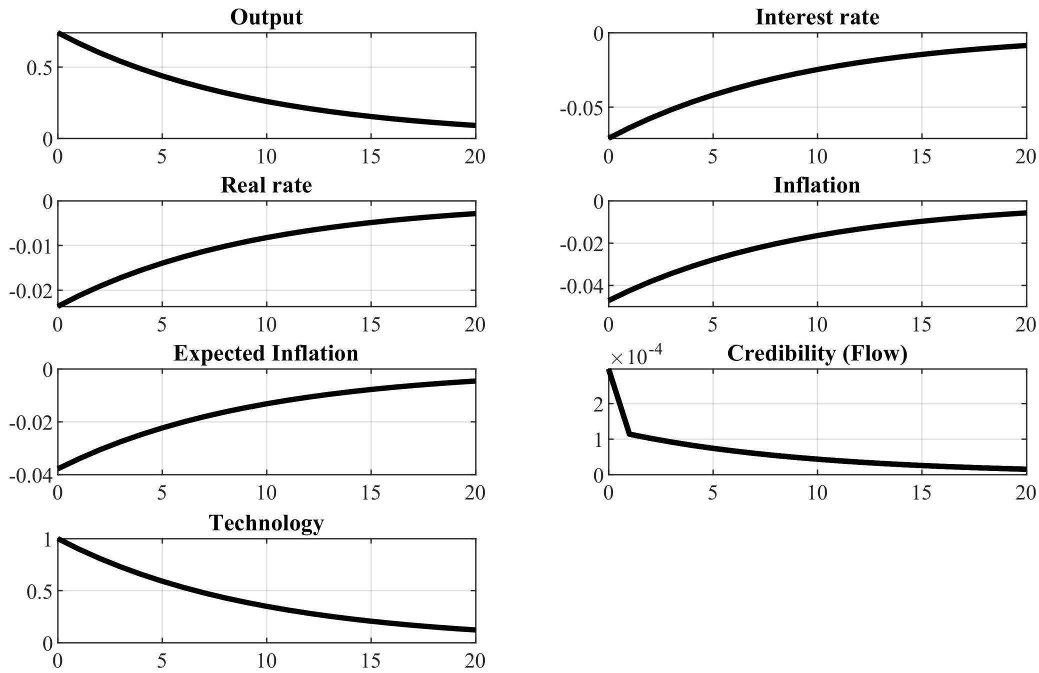


Note: The impulse responses shown here are from the model with endogenous credibility for a contractionary MP shock. All graphs shown are in terms of percentage points.

The responses to a positive technology shock are also consistent with the theory, as shown in Figure 7. The shock increases output and decreases inflation expectations and inflation. The nominal interest rates decrease due to reduced inflation. Lower inflation and nominal interest rates also lead to a decline in the real rate. In response to the positive technology shock, the credibility flow increases slightly, reflecting agents' belief in the central banks' ability to boost growth in the economy without bringing in slackness through higher inflation. Expected inflation falls as credibility in the economy increases with the shock. However, the expectations anchoring is lower than in the case of MP shock, as the model does not offset the response of inflation and output as quickly. This is because agents take time to anchor their expectations to the target as seen from the response of expected inflation.

The responses to a 50 basis point increase in the stock of credibility are shown in Figure 8. Expected inflation in the model falls as the stock of credibility increases, but the increase is smaller than the shock itself due to the influence of past inflation. With a higher stock of

Figure 7: Response to a positive TFP shock

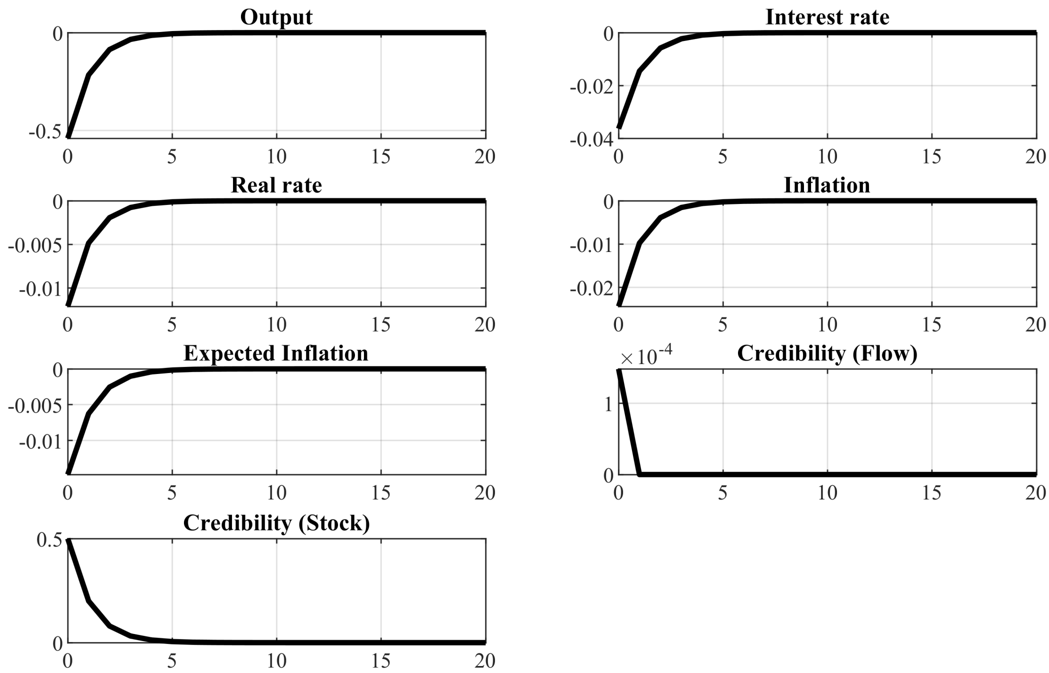


Note: The impulse responses shown here are from the model with endogenous credibility for a positive TFP shock. All graphs shown are in terms of percentage points.

credibility in the economy, agents' expectations are most strongly anchored to the target, and thus inflation and output return to baseline levels rather quickly. This indicates the ease with which an economy with higher credibility to offset the impact of the shock. Inflation decreases in response to the shock, leading to a decrease in the nominal interest rate. This also reflects that with a higher stock of credibility in the economy, central banks do not need to raise nominal interest rates to maintain stable inflation. As both inflation and the nominal rate fall, the real interest rate also declines. As inflation falls, agents' belief in the central bank's intentions is strengthened, resulting in an increase in credibility in the current period. The inverse relationship between credibility and inflation is observed even with this shock. An increase in the stock of credibility suggests a strong image of the central bank and thus the trust in them to control inflation. The lower inflation and inflation expectations lead agents to speculate lower nominal wage growth in the future, thus reducing spending today to save more. This leads to less demand and thus the output in the economy falls.

"This sub-section is incomplete. More work in progress."

Figure 8: Response to a positive credibility shock



Note: The impulse responses shown here are from the model with endogenous credibility for a positive credibility shock. All graphs shown are in terms of percentage points.

9 Conclusion

This paper provides new evidence on the effectiveness of IT in anchoring inflation expectations, with a particular focus on the pivotal role of central bank credibility. The analysis, which combines empirical evidence and theoretical modeling, shows that IT has been especially effective in lowering and anchoring inflation expectations in EMEs, while its impact is more muted in AEs. Importantly, the results reveal that enhanced central bank credibility substantially strengthens the anchoring of expectations in EMEs, but has limited additional effect in AEs, where agents tend to rely more on past inflation than on the announced target when forming expectations. These findings suggest that credibility is a more critical lever for policy effectiveness in less mature monetary regimes.

Theoretical results further indicate that different levels of credibility elicit distinct responses to identical shocks, underscoring the endogenous and dynamic nature of credibility in monetary policy transmission. The negative relationship between credibility and inflation highlights its central role in achieving and maintaining low inflation, primarily by anchoring expectations more closely to the target, as shown by the impulse response functions.

From a policy perspective, these insights emphasize that central banks in EMEs should prioritize building and maintaining credibility to maximize the benefits of IT and stabilize inflation. For AEs, the challenge lies in shifting expectations from a backward-looking to a more target-oriented framework.

As for the next steps, the research will extend the model to further distinguish between AEs and EMEs, explore the prerequisites for successful IT adoption in non-IT economies, and compare the macroeconomic implications of single versus dual central bank mandates. Ultimately, this research underscores that credibility is not only central to the success of IT but also a key factor in achieving broader macroeconomic stability.

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Appendices

A Data

Table 7: Countries and data description

Country	Implementation year	Inflation 3 years before IT adoption	Inflation 1 year before IT adoption	Inflation 1 year after IT adoption	Inflation 3 years after IT adoption
Advanced Economies					
Australia	April 1993	7.73	1.84	1.18	3.09
Canada	February 1991	4.08	5.42	1.58	0.54
Czech Republic	January 1998	9.32	7.16	3.07	4.04
Israel	January 1992	20.66	18.34	11.09	13.10
Japan	January 2013	-0.85	0.31	1.52	0.03
New Zealand	March 1990	18.29	4.01	4.52	0.96
Norway	March 2001	2.15	2.89	1.03	-1.42
South Korea	January 1998	4.75	4.69	0.70	3.69
Sweden	January 1995	3.38	1.64	1.44	0.54
Switzerland	January 2000	0.73	0.27	1.01	1.01
United Kingdom	October 1992	5.82	6.44	2.52	3.01
United States	January 2012	-0.04	2.14	1.68	-0.06
Emerging Market Economies					
Brazil	June 1999	17.61	3.73	6.58	7.80
Chile	January 1991	18.96	23.41	18.67	13.35
Colombia	September 1999	21.09	19.00	9.19	6.03
Hungary	June 2001	15.30	9.16	5.47	7.33
India	October 2016	10.57	5.33	4.55	5.86
Mexico	January 2001	15.29	10.54	4.74	4.32
Paraguay	May 2011	12.28	4.77	3.67	6.58
Peru	January 2002	7.74	3.68	2.82	2.91
Philippines	January 2002	7.39	5.83	2.10	7.24
Poland	January 1999	20.57	13.57	10.06	3.56
Russia	January 2015	3.86	6.38	8.34	2.25
South Africa	February 2000	9.61	8.46	7.42	8.28
Thailand	April 2000	4.29	-0.44	2.48	1.67
Türkiye	January 2001	99.27	68.82	70.32	26.53
Ukraine	January 2016	-0.47	36.35	13.93	8.86
Uruguay	June 2007	29.22	6.44	7.57	6.87

Note: Full Period - 1980Q1: 2023Q2. Classification of countries is done according to the IMF.
Source: IMF and Central Bank websites.

Table 8: Countries, Targets and Target Types

Country	Target Type	Point Target	Lower Band	Upper Band
Advanced Economies				
Australia	Range		2	3
Canada	Point Tolerance	2	1	3
Czech Republic	Point Tolerance	2	1	3
Israel	Range		1	3
Japan	Point	2		
New Zealand	Range		1	3
Norway	Point	2		
South Korea	Point	2		
Sweden	Point	2		
Switzerland	Range		-	2
United Kingdom	Point	2		
United States	Point	2		
Emerging Market Economies				
Brazil	Point Tolerance	4.25	2.75	5.75
Chile	Point	3		
Colombia	Point Tolerance	3	2	4
Hungary	Point Tolerance	3	2	4
India	Point Tolerance	4	2	6
Mexico	Point Tolerance	3	2	4
Paraguay	Point Tolerance	4	2	6
Peru	Point Tolerance	2	1	3
Philippines	Point Tolerance	3	2	4
Poland	Point Tolerance	2.5	1.5	3.5
Russia	Point	4		
South Africa	Point Tolerance	4.5	3	6
Thailand	Range		1	3
Türkiye	Point Tolerance	5	3	7
Ukraine	Point	5		
Uruguay	Point Tolerance	5	3	7

Note: Classification of countries is done according to the IMF. The target is from the first implementation period. Source: IMF, Central Bank websites, Ehrmann (2021) and Grosse-Steffen (2021).

B Anchoring in level terms

I also test for anchored inflation expectations in levels using Equation 26. Here, I follow Bomfim and Rudebusch (2000) approach, in which expectations are modeled as a weighted average of lagged inflation and the target. This differs from Equation 3, as the latter captures anchoring in deviations from the target, while the former does so in level terms. The β coefficient in Equation 3 indicates the anchoring effect, while the corresponding coefficient is α in Equation 26.

$$\pi_{it}^{e} = \alpha * (\pi_{it}^{Tar}) + (1 - \alpha) * \pi_{it-1} + \alpha_i + \gamma_t + \varepsilon_{it} \tag{26}$$

Here, π^e is inflation expectations, π^{tar} is the target inflation announced by the central bank and π is inflation. The country and time-fixed effects are also included and are similar to those in Equation 3. The regression results from the analysis of anchoring expectations in level terms are given in Table 9. These results indicate that the forecasters judge their expectations based on central bank targets and are less affected by the backward-looking component in the case of EME. [29] A higher weight assigned to the inflation target suggests that agents in EME are more concerned about matching the target than past inflation, leading them to form expectations closer to the target. However, in the case of AE, the agents have more stickiness to the past inflation than that for the target inflation. This supports the results found in Table 1. Results from both tables point towards better anchoring in EMEs compared to AEs.

Table 9: Regression in Level Terms

	EME	AE
π_t^{Tar}	0.54***	0.44***
	(0.06)	(0.03)
π_{t-1}	0.45**	0.55***
	(.06)	(.03)
N	1244	873
R-squared	0.75	0.76
Country FE	Y	Y
Time FE	Y	Y

Note: Country-level clustered SE in parentheses; ***p<0.01, **p<0.05, *p<0.1

C Event Study Estimation

To provide a complementary estimation framework, I also employ event study estimations to assess the short-run effects of IT adoption on inflation and inflation expectations. I use the specification of the following form for this:

$$y_{it} = \sum_{j=2}^{J} \beta_j * Lag(j)_{it} + \sum_{k=0}^{K} \gamma_k * Lead(k)_{it} + \mu_i + \lambda_t + \epsilon_{it} \tag{27}$$

where y_{it} is the outcome of interest i.e inflation and inflation expectations here, μ_i and λ_t are country and time fixed effects, and ϵ_{it} is the error term. *Lag(j)* is the dummy indicating that a given country was j quarters away from adopting IT and *Lead(k)* similarly. The reference period here is taken as 1 quarter before IT adoption i.e. the first lag (j=1). The estimation window considered in this paper is such that *J=8* and *K=16*.

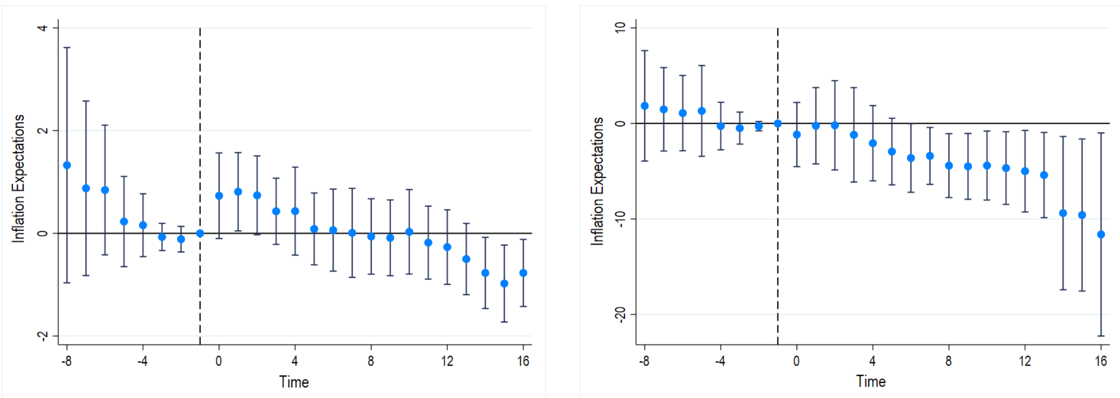
This is a staggered event study estimation and only includes countries that have

[29] Łyziak and Paloviita (2017) find a similar result for the Euro Area.

adopted IT; thus, there are no never-treated units. In this case, the control group comprises all the countries that have not yet adopted IT (the non-yet-treated group).

The results from event study estimations are shown in Figure 9, where the *'Time'* axis is the event time, with each number representing a quarter, and '0' here indicates the event time (IT adoption time). The dotted vertical line one period before the event date denotes the reference period used in event study estimation. The pre-trends assumption is not violated in either of the cases. The results indicate that, after IT adoption, inflation expectations decrease persistently in EMEs after about 7 quarters (almost 2 years) of adoption. In advanced economies, there is a slight increase in inflation expectations in the second quarter post-adoption however this increase is weakly significant and does not strongly support the case.[30] Reducing inflation expectations in advanced economies takes more time (more than 3 years) compared to EMEs. Results for inflation responses around IT adoption, as shown in Appendix D Figure 11, display similar trends. Thus, inflation and inflation expectations decrease more quickly and significantly in EMEs than in AEs. The full sample (all countries) results also indicate that inflation expectations and inflation generally fall within about a year, with significant reductions observable even after 4 years. In contrast, inflation did not show a notable decrease (see Appendix D, Figure 12).

Figure 9: Impact of IT adoption on inflation expectations



(a) Advanced Economies

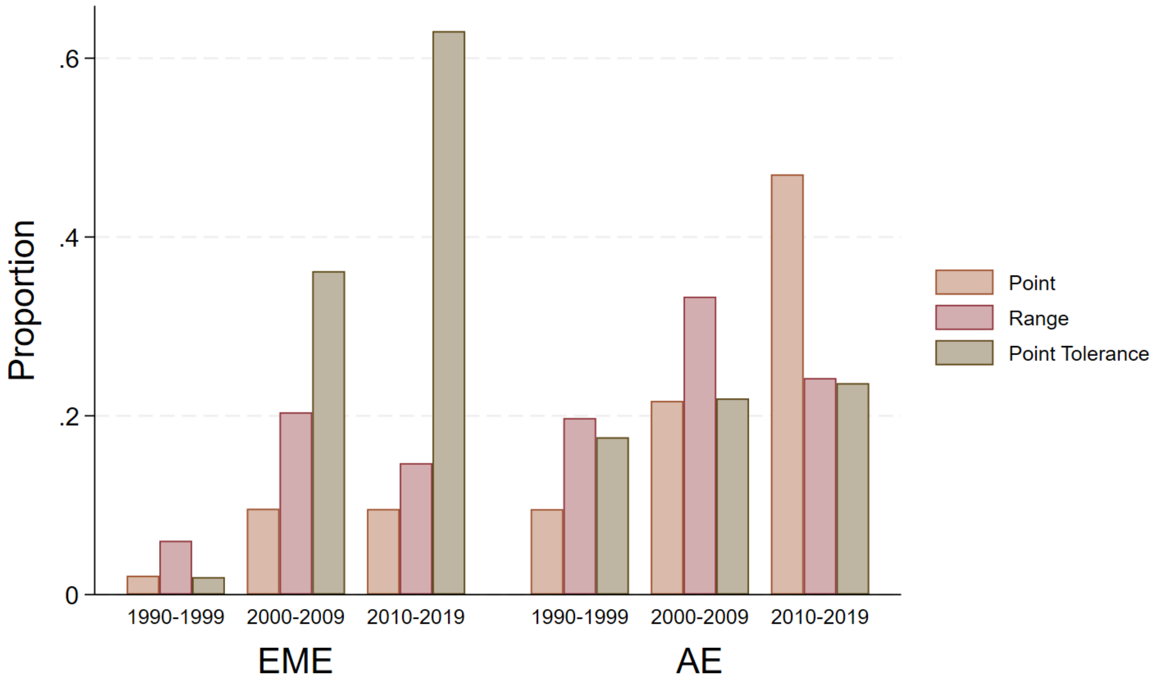
(b) Emerging-market Economies

Note: The blue dots are the event study coefficients from Equation 27 for inflation expectations as the outcome variable. Estimates are relative to the quarter before adopting IT, indicated by the dotted vertical line. The bars around each estimate indicate a 95% confidence interval.

[30]This result is consistent with Capistrán and Ramos-Francia (2010) where they find that IT affects the dispersion of expectations only in EMEs.

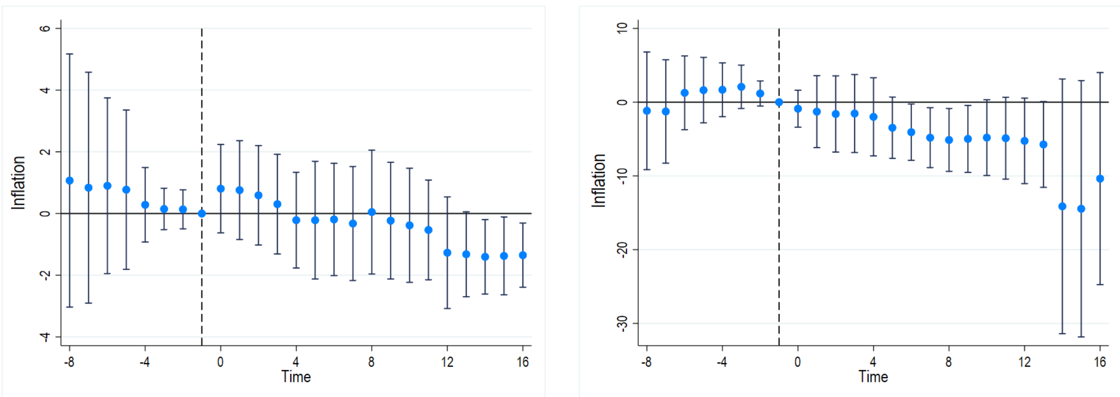
D Figures

Figure 10: Target Types Across Time for EME and AE



Note: The graph shows the mean of the target types across time and countries for the two sets of economies. Source: IMF, Central Bank websites, Ehrmann (2021) and Grosse-Steffen (2021).

Figure 11: Impact of IT adoption on inflation

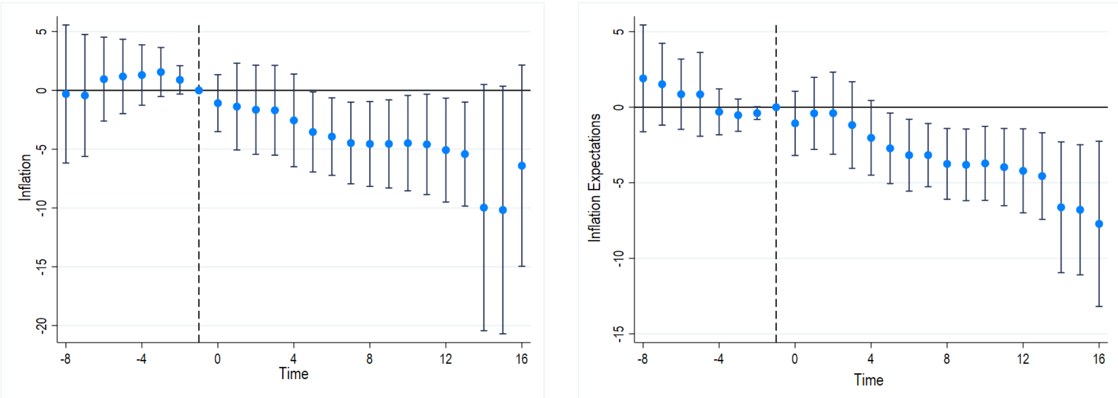


(a) Advanced Economies

(b) Emerging-market Economies

Note: The blue dots are the event study coefficients from Equation 27 for inflation as the outcome variable. Estimates are relative to a quarter before adopting IT indicated by the dotted vertical line. The bars around each estimate indicate a 95% confidence interval.

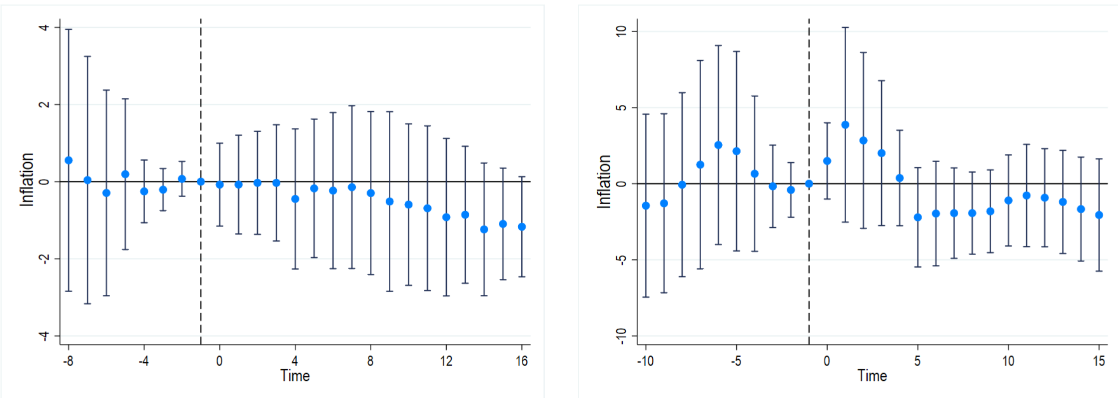
Figure 12: Impact of IT adoption for all countries



(a) Inflation (b) Inflation Expectations

Note: The blue dots are the event study coefficients from Equation 27 for (a) inflation and (b) inflation expectations as the outcome variable. Estimates are relative to a quarter before adopting IT indicated by the dotted vertical line. The bars around each estimate indicate a 95% confidence interval.

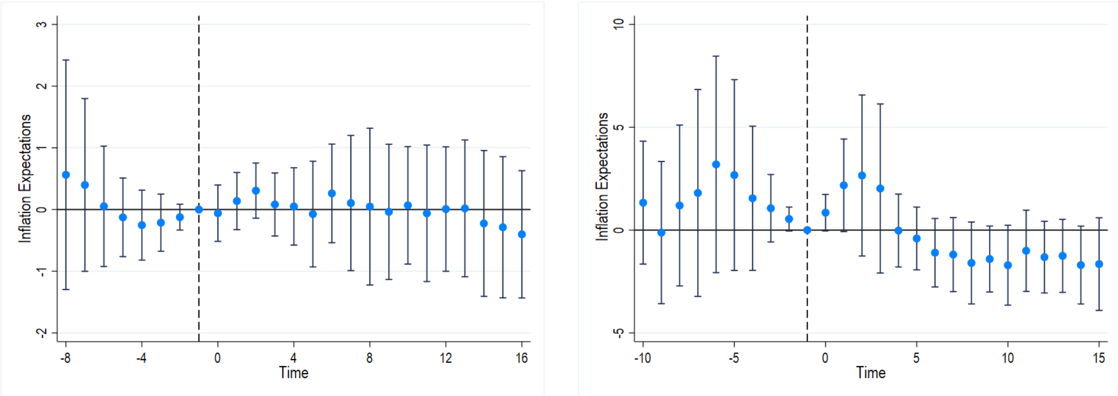
Figure 13: Impact of IT announcement on inflation



(a) Advanced Economies (b) Emerging-market Economies

Note: The blue dots are the event study coefficients estimated from an event study for the impact of IT announcement on inflation. Estimates are relative to a quarter before announcing IT indicated by the solid vertical line. The bars around each estimate indicate a 95% confidence interval.

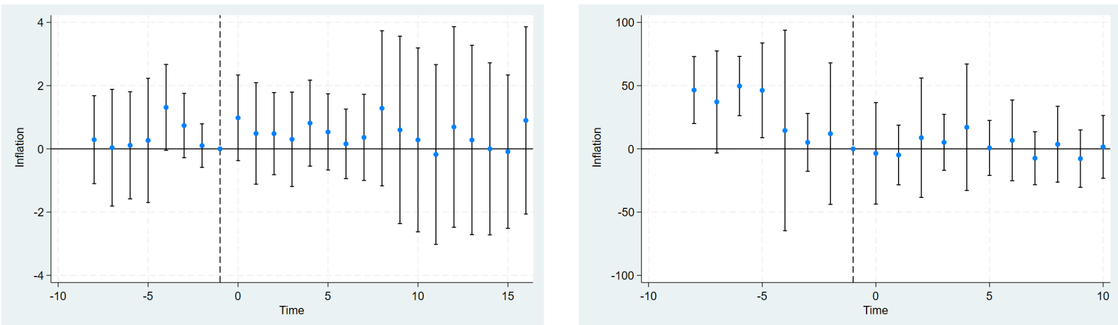
Figure 14: Impact of IT announcement on inflation expectations



(a) Advanced Economies (b) Emerging-market Economies

Note: The blue dots are the event study coefficients estimated from an event study for the impact of IT announcement on inflation expectations. Estimates are relative to a quarter before announcing IT indicated by the solid vertical line. The bars around each estimate indicate a 95% confidence interval.

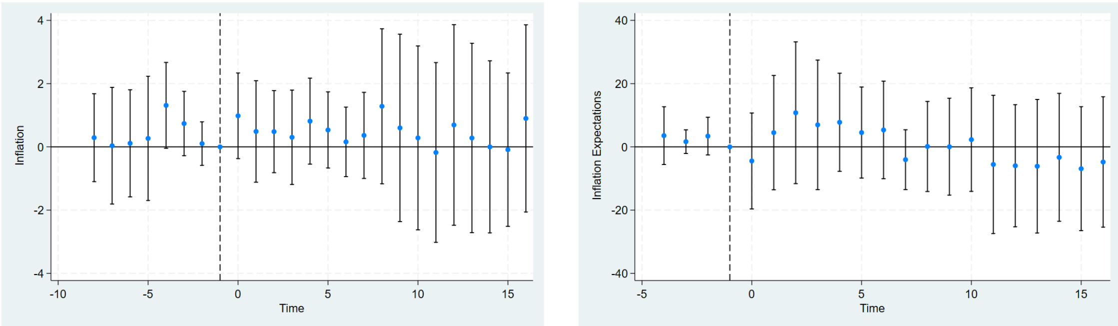
Figure 15: Impact of central bank independence on inflation



(a) Advanced Economies (b) Emerging-market Economies

Note: The blue dots are the event study coefficients estimated from an event study for the impact of central bank independence timing on inflation. Estimates are relative to a quarter before independence was attained indicated by the solid vertical line. The bars around each estimate indicate a 95% confidence interval.

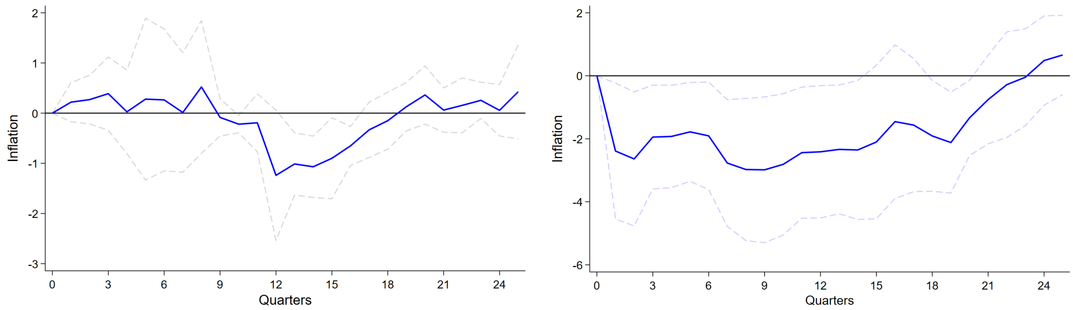
Figure 16: Impact of central bank independence on inflation expectations



(a) Advanced Economies (b) Emerging-market Economies

Note: The blue dots are the event study coefficients estimated from an event study for the impact of central bank independence timing on inflation expectations. Estimates are relative to a quarter before independence was attained, indicated by the solid vertical line. The bars around each estimate indicate a 95% confidence interval.

Figure 17: Response of Inflation to an IT Adoption Shock



(a) Advanced Economies (b) Emerging-market Economies

Note: The solid blue line is the estimate from Equation 2 and inflation as the outcome variable for horizons 0 to 24. The dotted lines are the 95% confidence interval.

E Model Equations

On the household side, the FOCs are given as:

$$1 = \beta E_t \left[\left(\frac{U'_{c,t+1}}{U'_{c,t}} \right) * \frac{P_t}{P_{t+1}} (1 + i_t) \right]$$

$$\left(\frac{U'_C}{U'_N} \right) = \frac{P_t}{W_t}$$

The log-linearised version of these FOCs is then given as:

$$\hat{C}_t = E_t(\hat{C}_{t+1}) - \frac{1}{\sigma}(i_t - E_t(\hat{\pi}_{t+1})) \tag{28}$$

$$\hat{W}_t - \hat{P}_t = \sigma \hat{C}_t + \theta \hat{N}_t \tag{29}$$

The firm FOC after imposing the symmetric equilibrium gives the optimality condition as:

$$\psi \left(\hat{\pi}_t - 1 \right) \hat{\pi}_t = (1 - \varepsilon) + \varepsilon \hat{\mathcal{C}}_t + \psi E_t \left[\hat{x}_{t+1} \left(\hat{\pi}_{t+1} - 1 \right) \frac{\hat{Y}_{t+1}}{\hat{Y}_t} \left(\hat{\pi}_{t+1} \right) \right] \tag{30}$$

The aggregate production function is given by

$$Y_t = A_t N_t$$

The log-linearized form is:

$$\hat{Y}_t = \hat{N}_t + \hat{A}_t \tag{31}$$

The aggregate resource constraint takes adjustment cost into account such that:

$$Y_t = C_t + \frac{\psi}{2}(\pi_t - 1)^2 Y_t, \tag{32}$$

$$C_t = (1 - \frac{\psi}{2}(\pi_t - 1)^2) Y_t$$

The log-linearization of the resource contraint is:

$$\hat{C}_t = \hat{Y}_t - \left(\frac{\psi(\bar{\pi}-1)\bar{\pi}}{1-\frac{\psi}{2}(\bar{\pi}-1)^2}\right)\hat{\pi}_t \tag{33}$$

NKPC & IS curve

Combining Equations 33 and 31, we can re-write Equations 28 and 29 as:

$$\hat{Y}_t = E_t(\hat{Y}_{t+1}) - \left(\frac{\psi(\bar{\pi}-1)\bar{\pi}}{1-\frac{\psi}{2}(\bar{\pi}-1)^2}\right)E_t(\Delta\hat{\pi}_{t+1}) - \frac{1}{\rho}E_t(i_t - E_t(\hat{\pi}_{t+1})) \tag{34}$$

$$\hat{W}_t = (\sigma+\psi)\hat{Y}_t - \theta A_t - \left(\frac{\sigma\psi(\bar{\pi}-1)\bar{\pi}}{1-\frac{\psi}{2}(\bar{\pi}-1)^2}\right)\hat{\pi}_t \tag{35}$$

Equation 34 for the model with log-linearization around the zero trend inflation will result in the standard NK model IS curve:

$$\hat{Y}_t = E_t(\hat{Y}_{t+1}) - \frac{1}{\rho}E_t(i_t - \hat{\pi}_{t+1}) \tag{36}$$

The firms' marginal cost can be expressed as real wage divided by the marginal product of labor. In logs, we get:

$$\hat{W}_t = \hat{MC}_t + \hat{A}_t \tag{37}$$

Imposing labor market equilibrium, the log-linear real marginal costs' is given by:

$$\hat{MC}_t = (\sigma+\psi)\hat{Y}_t - (1+\theta)A_t - \left(\frac{\sigma\psi(\bar{\pi}-1)\bar{\pi}}{1-\frac{\psi}{2}(\bar{\pi}-1)^2}\right)\hat{\pi}_t \tag{38}$$

From Equation 33 and log-linearizing Equation 30. we get the following NKPC:

$$\hat{\pi}_t = \gamma_1\beta E_t\hat{\pi}_{t+1} + \gamma_2\beta(1-\sigma)E_t\Delta\hat{Y}_{t+1} + \gamma_3\hat{MC}_t \tag{39}$$

where,

$$\gamma_1 = \frac{(2\bar{\pi}^2-\bar{\pi})(C/Y) + [(\bar{\pi}-1)\bar{\pi}]^2\sigma\psi}{\chi}$$

$$\gamma_2 = \frac{(\bar{\pi}^2-\bar{\pi})(C/Y)}{\chi}$$

$$\gamma_3 = \frac{[\varepsilon - 1 + \psi(\bar{\pi}^2-\bar{\pi})(1-\beta)](C/Y)}{\theta\chi}$$

$$\chi = (2\bar{\pi}^2 - \bar{\pi})(C/Y) + [(\bar{\pi} - 1)\bar{\pi}]^2 \sigma\psi\psi$$

Equation 39 for the model with log-linearization around the zero trend inflation will result in the standard NK model PC curve:

$$\hat{\pi}_t = \beta E_t \hat{\pi}_{t+1} + \kappa \hat{MC}_t \tag{40}$$

where,

$$\kappa = \frac{(1-\theta)(1-\beta\theta)}{\theta}$$

F Model Parameters

Table 10: Parameter Values

Variable	Parameter	Value
Discount Factor	β	0.99
Coefficient of risk aversion	σ	1
Frisch Elasticity	θ	6
Inflation feedback Taylor rule	ϕ_π	1.5
Output feedback Taylor rule	ϕ_y	0.125
Elasticity of money demand	η	1
Demand Elasticity	ε	9
Adjustment Cost	ψ	80
Convergence rate (high state)	θ_h	0.8
Convergence rate (low state)	θ_l	0.5
TFP shock	ρ_a	0.9
MP shock	ρ_ν	0.5
Credibility stock shock	ρ_μ	0.7

Table 11: Non-linear Equations of the model

$\text{cred}_t = \frac{(\pi_t - \pi_t^{high})^2}{(\pi_t - \pi_t^{high})^2 + (\pi_t - \pi_t^{low})^2}$
$\pi_t^{high} = \theta_h * \pi_{t-1} + (1-\theta_h) * \pi^{high}$
$\pi_t^{low} = \theta_l * \pi_{t-1} + (1-\theta_l) * \pi^{low}$
$\mu_t = \rho\mu_{t-1} + (1-\rho) cred_t + \varepsilon_{\mu,t}$
$\text{E}_t\pi_{t+1} = \mu_t E_t \pi_{t+1}^M + (1-\mu_t)\pi_{t-1}$
$\text{x}_{t+1} = \beta(c_t/c_{t+1})^\sigma$
$\text{w}_t = \chi n_t^\eta c_t^\sigma$
$1 = \text{E}_t\left(\frac{x_{t+1} r_t}{\pi_{t+1}}\right)$
$\text{c}_t = \left(1 - \frac{\psi}{2}\left(\frac{\pi_t}{\bar{\pi}} - 1\right)^\sigma\right) y_t$
$\text{y}_t = a_t n_t$
$\text{w}_t = a_t mc_t$
$\psi\left(\frac{\pi_t}{\bar{\pi}} - 1\right)\frac{\pi_t}{\bar{\pi}} = (1-\theta) + \theta mc_t + \psi E_t\left[x_{t+1}\left(\frac{\pi_{t+1}}{\bar{\pi}} - 1\right)\frac{y_{t+1}}{y_t}\left(\frac{\pi_{t+1}}{\bar{\pi}}\right)\right]$
$\text{r}_t = \bar{r}(\pi_t/\bar{\pi})^{\phi_\pi}(y_t/\bar{y})^{\phi_y}\nu_t$
$\ln\,\nu_t = \rho_\nu ln\nu_{t-1} + \sigma_\nu\varepsilon_{\nu,t}$
$\ln\,\text{a}_t = \rho_a ln a_{t-1} + \sigma_a\varepsilon_{a,t}$