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JEL Classification: E52, E58, E31

Keywords: Inflation targeting, Inflation expectations, point target, tolerance band, target range

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Inflation Target Types and the Anchoring of Inflation Expectations

Michael Ehrmann[1]

March 2021

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1. Introduction

Inflation targeting (IT) has become the world's dominant monetary policy framework, to the point that Rose (2020) calls it "ubiquitous". The numbers he lists are striking – IT now covers 35 of the 36 OECD members, 97.8% of the MSCI Developed Markets Index and seventeen of the G20. This reflects the fact that IT has overall been judged a success. While there are also critics of IT (e.g. , Frankel 2012), its proponents have praised it as a framework that lowers and stabilises inflation (e.g., Angeriz and Arestis 2008; Vega and Winkelried 2005) and anchors inflation expectations (Gürkaynak et al. 2010), while at the same time providing a credible framework that helps making central banks accountable (Bernanke and Mishkin, 1997; Ball, 2010), raising output growth in response to large adverse shocks (Fratzscher et al. 2020) and even eradicating international financial crises (Rose 2020).

How IT is implemented in practice differs along several dimensions.[2] One of these, which is studied in this paper, relates to the formulation of the target. The three most common types of targets that central banks have been using are (i) point targets (whereby the central bank objective is formulated by a single number), (ii) point targets that are associated with tolerance, uncertainty or variation bands (where the target itself is still the specific number, but the central bank tolerates certain deviations around the point target, or communicates ex ante that it expects inflation to mostly vary around the target in the variation band), and (iii) target ranges (where the entire range constitutes the objective that the central bank pursues). Other types are discussed in the literature (see, e.g., Chung et al., 2020), but are rarely observed in practice, such as indifference ranges (where the central bank would not respond to deviations of inflation within that range) or operational ranges (where the central bank would want to intentionally deviate from the mid-point of the range, e.g. in the form of a make-up strategy).

How best to formulate the target has been, or is, centre stage in the recent or ongoing strategy reviews of several central banks. For instance, this question is discussed in Chung et al. (2020), a background paper for the review of the Federal Reserve. An important

[2] For an extensive review of the institutional features of IT in practice, see Niedźwiedzińska (2018).

dimension to the deliberations is whether the different types of formulating the inflation target have a bearing on how well inflation expectations are anchored. The current paper studies this question, by testing two competing hypotheses – first, that adopting an interval is *less* effective in anchoring inflation expectations, e.g. because it allows more flexibility for the central bank (the "flexibility hypothesis"); second, that adopting an interval is *more* effective in anchoring inflation expectations, e.g. because is lowers the likelihood of missing the target, thereby enhancing the credibility of the central bank (the "credibility-enhancement hypothesis"). As these are contradictory, the question ultimately remains an empirical one.

This paper employs data for 20 economies (10 of which advanced economies (AEs) and 10 of which emerging market economies (EMEs)) that have adopted different target types, covering the time between 3 years prior to the adoption of IT and February 2020. Based on these data, the paper tests how well inflation expectations are anchored under the different target types, how this compares to the period before the introduction of IT, and whether there are differences when inflation is close to target and when inflation tends to stray further from target. It does so by studying the extent to which inflation expectations depend on lagged, realised inflation, and the extent to which forecasters disagree about the future path of inflation.

Importantly, and in contrast to the (scant) literature on the topic, this paper studies the anchoring of short- to medium-term inflation expectations. Even if the different target types were to be similarly credible about the central bank wanting to achieve the mid-point of an interval or a point target in the long term, they might have very different implications for the intermediate inflation trajectory. The flexibility hypothesis is most explicit about this – even if the central bank wants to achieve the mid-point of the target, it has more flexibility to decide how fast it wants to get there, which can lead to different expectations at the short horizon.

The key finding of the paper is that target ranges, even though they could potentially be less effective in anchoring inflation expectations because they provide more flexibility to the central bank, do not appear to perform any worse than the other types – in several tests, they even come out first. At the same time, there is evidence that forecaster disagreement in EMEs with target ranges increases substantially when inflation falls outside the range. This suggests that missing a range can be particularly harmful for credibility. No such evidence is present for AEs, however – for them, we find that point targets perform relatively poorly when inflation strays far from target repeatedly, in the sense that inflation expectations become more dependent on realised inflation. This suggests that the economic context matters.

Also, while target ranges and tolerance bands perform better in several tests, none of the target types consistently outperforms the others, suggesting that while there are some benefits to adopting an interval, there are also other factors through which the central bank can aid the anchoring of inflation expectations.

This paper relates to the large literature on the effect of IT on inflation outcomes and inflation expectations. IT has been criticised –in particular after the global financial crisis – for its narrow focus on inflation. This, it has been argued, could contribute to a build-up of financial instability (Frankel 2012), or imply that the central bank cannot or will not respond sufficiently to other objectives, such as employment or output growth (Stiglitz 2008). A flexible approach to IT has therefore been proposed, e.g., by Svenson (2010).

Given the criticism that IT is too narrowly focused on inflation, one would expect that there is clear-cut evidence that IT is successful in taming inflation and lowering inflation volatility. However, the overall evidence is surprisingly inconclusive. Early studies are supportive (e.g., King 2002; Kuttner and Posen 1999), but there are several others that find similar reductions in inflation or inflation volatility for non-IT countries, for instance once they control for regression to the mean (Ball and Sheridan 2005). Indeed, the decision to adopt IT is endogenous to macroeconomic conditions, an issue which econometric analyses need to take into account (Samarina and De Haan 2014). The comparator group also matters but is unfortunately not easy to determine (Mishkin and Schmidt-Hebbel 2007). In addition, the effects of IT might be different for advanced economies than for emerging markets; several papers find stronger effects in the latter group (Alpanda and Honig 2014; Samarina, Terpstra and de Haan 2014). Yet even studies that control for endogeneity concerns and take account of the various identification issues that have been raised come to different conclusions, with Angeriz and Arestis (2008) or Vega and Winkelried (2005) providing evidence that IT is superior to other frameworks, while Willard (2012) or Lin and Ye (2007) do not find this to be the case.

In light of this, it is probably not surprising that the evidence on the effect of IT on the anchoring of inflation expectations is also not clear-cut. On the one hand, several studies suggest that IT has been superior to other frameworks. Levin et al. (2004) show that long-term inflation forecasts depend on past inflation in the control group, but not in the IT group. Gürkaynak et al. (2010) and Davis (2014) find inflation expectations to be less responsive to news in IT countries than in the respective control groups. Crowe (2010) points out that convergence to lower forecast errors is stronger in IT countries. Furthermore, Ehrmann et al. (2012) identify IT as a transparency measure that effectively reduces disagreement among inflation forecasters. On the other hand, other studies do not share these conclusions - Cecchetti and Hakkio (2010) report only small effects, and Capistran and Ramos-Francia (2010) detect them only for developing countries. Siklos (2013) concludes that the adoption of IT has had little effect on forecaster disagreement.

A succinct summary of the inconclusiveness of the evidence is provided by Blinder et al. (2008, p. 939): "Inflation targeting is one way, but certainly not the only way, to control inflation and inflationary expectations."

The question at the core of this paper is not so much whether the adoption of an inflation target in itself affects inflation expectations; it is rather whether there are differences across target types. In contrast to the vast literature on IT in general, this question has received very little attention – in particular, there are very few empirical studies on this topic. An early contribution by Castelnuovo et al. (2003) comes to the conclusion that there are no discernible differences across target types.

It might be time to review this evidence at the current juncture, for several reasons. First, more variation in target types has been observed over the years. Consider for instance the Swedish Riksbank, which started IT with a point target plus tolerance band, later abandoned the tolerance band, but then introduced a variation band couple of years afterwards. Or look at the case of South Korea, which has seen all three types of targets being implemented. Second, there is also more variation in inflation outcomes – following the global financial crisis, many central banks especially in advanced economies started undershooting inflation substantially, and for protracted periods of time. Ehrmann (2015) has shown that under these circumstances, inflation expectations behave very differently than if the central bank targets inflation "from above". Fratzscher et al. (2020) also find that the track record of IT is altered once central banks deviate from their target for a prolonged period of time. The additional time variation could therefore lead to a difference in results compared to the earlier study.

Furthermore, as already discussed, this paper differs from the existing literature in another important dimension. Castelnuovo et al. (2003) and a related paper by Grosse-Steffen (2020) – written simultaneously and independently from the current paper – focus on long-term inflation expectations. While this is an important dimension to study, evidence beyond the one on long-term inflation expectations is warranted in order to come to a comprehensive assessment.

The discussion of the different inflation target types and what they might imply for the anchoring of inflation expectations is provided in Section 2 of this paper. Section 3 explains the data underlying the empirical exercise. Section 4 presents the evidence regarding the behaviour of inflation expectations, and Section 5 concludes.

2. Target types and inflation expectations

How best to formulate an inflation target has been the subject of a long-standing debate. An early argument for target ranges has been made by Stein (1989). Under the assumption that a central bank has an incentive to pursue a time-inconsistent policy, a central bank would not be able to announce its true objective in a precise manner. After all, a precise announcement would not be credible, as the central bank would have an incentive to lie. It can be shown in a "cheap talk" model that the central bank will not have the same incentives to manipulate expectations when it makes less precise announcements, e.g.

when it announces a target range – and that it is desirable for the central bank to do so, as it provides a mechanism to communicate about its future policies, thereby affecting expectations. Carare and Stone (2006) provide some empirical evidence that is consistent with this interpretation, whereby countries with weak institutional frameworks adopt less clear and less credible inflation targets.

The subsequent debate centred on additional arguments that are laid out in Bernanke et al. (1999) and Mishkin (2000). A main argument in favour of using a target range relative to a point target has been seen in the possibility that a range provides more flexibility to the policy maker – an aspect that has become particularly relevant in light of the discussion around the merits and shortcomings of IT following the global financial crisis, where several commentators have advocated that IT should take a broader perspective and also allow for the pursuit of other objectives. A case in point is New Zealand, the first adopter of IT in 1989, which has always had a target range (even though it has emphasised the target midpoint more prominently since 2012), and within this framework recently has adopted a new dual mandate of "keeping consumer price inflation low and stable, and supporting maximum sustainable employment" (Orr 2019).

This argument has implications for the anchoring of inflation expectations. Consider a central bank that implements inflation forecast targeting in the spirit of Svensson (1997), i.e. the central bank's inflation forecast becomes an explicit intermediate target. Apel and Claussen (2017) illustrate that in such a context, a target range has very different properties than a point target. In the case of a point target, the central bank always aims at bringing inflation back to the point target over the targeting horizon, by adjusting policy rates accordingly. If the central bank releases projections that are conditioned on the central bank's own expected path for policy rates, the future path of inflation is pretty much pinned down. In contrast, with a target range, the central bank can aim for any path of inflation that keeps inflation within the range. In other words, there is a multiplicity of future paths of inflation that are all equally in line with the central bank's objective.

This leads us to a first hypothesis what the adoption of an interval implies for the anchoring of inflation expectations – let's call this the ***"flexibility hypothesis"***: target types that provide the central bank with more flexibility might be less effective in anchoring inflation expectations. Translating this for the three types under study in this paper, this hypothesis would imply that the best anchoring is achieved with point targets without tolerance bands, the least is observed under target ranges, and point targets with tolerance bands might be located somewhere in between.[3]

Note that this hypothesis relates in particular to inflation expectations at the short- to medium-term, i.e. over the typical forecast horizon of central banks. Over the long run, the posited differences might be much less pronounced or even inexistent. This is why this paper, in contrast to the existing literature, emphasises the importance of studying inflation expectations at a shorter horizon.

Another argument in favour of formulating a target with some sort of interval also goes back to the earlier debate laid out in Bernanke et al. (1999) and Mishkin (2000). It starts from the observation that inflation is uncertain and is affected by monetary policy only with substantial transmission lags. Accordingly, a target range or a tolerance band around a point target have been seen as a useful way to signal to the public that inflation is not perfectly controllable by monetary policy. In the absence of an interval, any deviation of inflation from the point target might be interpreted as a failure, therefore potentially damaging the credibility of the target and the central bank.

This argument leads to a different hypothesis about the effect of adopting an interval on the anchoring of inflation expectations. As point targets are likely to be missed, adopting an interval increases the probability of "success", which could enhance the credibility of the inflation target and anchor inflation expectations better. Let's call this the ***"credibility-enhancement hypothesis"***. This hypothesis comes to the exact opposite conclusion than the flexibility hypothesis, as it implies that the adoption of an interval improves (rather than worsens) the anchoring of inflation expectations. Whether adopting an interval helps anchoring inflation expectations or not is therefore an open question.

[3] The "flexibility hypothesis" should be considered as a summary term for different factors that suggest a weaker anchoring of inflation expectations if targets are defined as ranges or with tolerance bands.

This argument has further relevant implications. What if the central bank decides to adopt an interval, but inflation falls outside this interval? It cannot be excluded that this possibility would lead to an even larger loss in credibility. This line of reasoning implies that when deciding on how wide an interval to adopt, the central bank has to trade off the stabilising property of providing a focal point for inflation expectations vs. the probability of "success", i.e. of realised inflation staying within the interval (Demertzis and Viegi 2009; Andersson and Jonung 2017).

For the empirical application in this paper, this means that it is worthwhile comparing the performance of the different target types in situations when inflation is close to target (or within the specified interval) to situations when inflation strays further from target.

Such a differentiated analysis of inflation being close to or further away from target can also be rationalised based on the possibility that an interval can – as Mishkin (2020, p. 16) put it – "take on a life of its own", meaning that the public discourse focuses more on whether inflation is within the interval or outside than how far it is from the midpoint of the range or the point target. This, in turn, might lead to a non-linear conduct of monetary policy, with more aggressive responses to inflation outside than to inflation within the interval (this constitutes the case of an indifference range). Such a non-linear response could be rationalised by means of a corresponding loss function by the central bank, e.g. a quadratic loss outside the range, and a near-zero loss inside the range, or corresponding nonlinearities in the short-run inflation–output trade-off (Orphanides and Wieland 2000). There are furthermore substantial implications for the conduct of monetary policy. Le Bihan et al. (2020) clarify that the Taylor principle needs to be satisfied also inside the band for the system to be determinate, yet a lower responsiveness of monetary policy comes with an unfavourable trade-off, as it requires a much larger responsiveness outside the interval.

Finally, there is another set of papers in the relevant literature which has a bearing on our empirical tests. This strand of the literature suggests that the adoption of a specific target type might depend on the central bank's preference for output vs. inflation stabilisation - Beechey and Österholm (2018) argue that target ranges lead to higher volatility of inflation, but lower volatility of the output gap. Accordingly, it is optimal to adopt a target range if the central bank has a preference for output vs. inflation stabilisation. In addition, the magnitude of shocks might matter – as shown by Cornand and M'baye (2018), in the presence of small uncorrelated shocks, a target range performs very different from a point target with a tolerance band, whereas both types exhibit a comparable performance when the economy faces large uncorrelated shocks. In light of these observations, it might be important to study AEs and EMEs separately, as their economies are subject to very different shocks, possibly leading to different outcomes.

To summarise, this paper will test two hypotheses. The "flexibility hypothesis" suggests that target ranges are relatively less successful in anchoring inflation expectations. In contrast, the "credibility-enhancement hypothesis" attributes better anchoring properties to target ranges than to point targets. Presumably, tolerance bands lie somewhere in between target ranges and point targets.

The existing literature has at least three implications for the empirical tests. First, potential differences in the anchoring properties of different target types might be most pronounced at relatively shorter forecast horizons. Second, the tests will differentiate periods when inflation is close to target (or within the interval) to those when inflation tends to stray further away. Third, it will be important to separate AEs and EMEs.

3. Data

Inflation Targets

For the empirical analysis, various different types of data are required. They were sampled in spring 2020 and are available through February 2020. First, IT countries were identified, as well as the implementation type adopted and the time periods for which IT and the respective implementation types were in place. This is done based on various information sources: central bank websites, the website of the IMF, the IMF AREAER database, and finally related academic papers (in particular, Fratzscher et al. 2020, Niedźwiedzińska 2018 and Castelnuovo et al. 2003).

For the empirical analysis, this information needs to be combined with data on inflation and inflation expectations (further described below), such that only a subset of all inflation targeters can be included into the analysis. Hence, even though there are more IT central banks, the dataset spans 20 economies, equally split into 10 AEs and 10 EMEs according to the IMF classification. The EMEs are Brazil, Chile, Colombia, Hungary, India, Indonesia, Mexico, the Philippines, Poland and Thailand. The AEs are Australia, Canada, the Czech Republic, Japan, South Korea, New Zealand, Norway, Sweden, the United Kingdom and the United States. [4]

Table A1 in the appendix provides an overview of the dataset, specifying the countries, the dates of the adoption or revision of inflation targets, the type of target and their specification in term of levels, ranges or bands and the inflation measure that is targeted. Furthermore, Table 1 reports different summary statistics on the inflation targets that were adopted, starting with an overview of the levels of the targets (for range targets, the mid-point of the range is used). The median target in the overall sample is 2.5%. In the AEs, it is slightly lower, at 2%, whereas it stands at 3% in the EMEs. There is heterogeneity – for instance, the maximum is 6% in the AEs and 15% in the EMEs – still, the two subsamples don't generally appear to be very heterogeneous.

Table 1 here

Looking at the prevalence of the various implementation schemes in Table 1, it is apparent that point targets with tolerance bands are the most frequent type – they constitute more than 50% of the sample, with point targets and ranges sharing the remaining sample broadly equally. This dominance of the point-tolerance scheme is driven by the EMEs in the sample, where they account for nearly 75% of the sample; in AEs, target ranges make up 46% of the sample.

[4] In addition, the dataset comprises the euro area and Switzerland. However, for them, comparisons will only be provided as information items in footnotes, without including them in the formal tests. While they are not officially classified as inflation targeters sensu stricto, they have quantified inflation objectives which might well provide a similar anchor for inflation expectations. The European Central Bank aims to keep inflation below, but close to, 2% over the medium term; the Swiss National Bank defines price stability as inflation of less than 2% per annum, and furthermore regards a protracted decline in the price level as inconsistent with price stability. It is difficult to characterise these definitions into one of the three target types. Given that there are only two such cases in the sample, they are too small a subgroup to warrant econometric testing.

Table 1 also provides information on the width of the tolerance bands and the target ranges. They seem broadly comparable – both have a median of 2 percentage points. At this point, a word of caution is in order –classifying targets with an interval remains somewhat ambiguous; for instance, the differences between a target range with an emphasis on the midpoint (as practised by New Zealand) might effectively not be too different from a point target with a tolerance band. The characterisation of point targets, in contrast, should be relatively more straightforward.

To understand better whether the three implementation schemes are significantly different from one another, several regressions are run where various outcome variables (such as the level of the target or the width of the band) are explained with type dummies:

$$X_{c,t} = \alpha + \beta^{type} D_{c,t}^{type} + \varepsilon_{c,t}, \qquad (1)$$

where $X_{c,t}$ denotes the outcome variable X in country c at time t and $D_{c,t}^{type}$ are dummy variables that are equal to one if the country has an inflation target of the specific type in place at a given time, and zero otherwise. We use point targets as the baseline category and introduce dummies for point targets with tolerance bands and ranges. Standard errors are clustered by country.

Table 2 reports the results. Column (1) tests whether the target levels are different, and does not find this to be the case – neither in the overall sample (panel A), nor if we look at AEs and EMEs separately (panels B and C). Also, there is no statistically significant difference in the width of the bands for tolerance bands and ranges, as can be seen in column (2).[5] However, as is apparent from column (3), there are some differences with regard to the time period when the various types were in place – on average in the AEs, ranges were in place 4 years earlier than point targets and tolerance bands, whereas in EMEs, tolerance bands were in place 5 years later than point targets and ranges. To take account of these differences, we have checked all results for robustness to the inclusion of year-fixed effects, but do not find these to make any material difference to the results.

[5] For this regression, we only use data for point-tolerance and range targets. The benchmark category is the point-tolerance type.

Table 2 here

Inflation Rates

A second type of data that is required for the analysis is actual inflation rates, sourced from Datastream. We obtain data on consumer price inflation, which is the concept referred to in the private sector forecasts. In addition, should the central bank target another inflation concept (see Appendix Table A1), we also obtain the corresponding data. All series are year-on-year inflation rates sampled at a monthly frequency.

Using these data, we can also check whether the various types of inflation targets are associated with differences in the behaviour of realised inflation (as measured by the inflation series that the central bank targets). In particular, we are interested whether the likelihood that inflation falls outside a band of ±1 percentage points around the point target differs across types. However, there might be differences especially in the early periods after the adoption of the inflation target – several central banks adopted inflation targets in order to reduce and stabilise inflation by announcing targets that were below the realised inflation rates at the time of the introduction. Others, in contrast, first brought inflation to the desired level and subsequently introduced official inflation targets. A comparison of how well the inflation targets stabilise inflation should therefore not depend on the starting conditions, but should only consider the period once inflation has been stabilised and the inflation target has had the chance to gain credibility.[6]

To account for this, we restrict the sample in these tests to periods when inflation has stabilised for some time. For that purpose, we define a dummy variable $D_{c,t}^{stable}$ that equals one as soon as average inflation over 24 months has been within a ±1 percentage point range around the point target (or the midpoint of the band), and for all subsequent periods under the same inflation target. This way, we only look at periods following a stabilisation of inflation around target, but we include subsequent periods even if inflation destabilises. If the central bank adopts a new inflation target, the dummy is reconstructed for the new regime, such that it could go back to 0 for some period of time, but need not (if inflation has

[6] In their analysis of the ECB, Goldberg and Klein (2011) also allow for some time for the newly-established central bank to gain some credibility.

already been within the new band in the 24 months prior to the adoption of the new target). By only using the periods when the stabilisation dummy is equal to one, we lose around 700 observations, i.e. around 15% of the sample. There are differences across the country groupings, though, as around 24% of observations are discarded for the EMEs, and only 7% for the AEs.[7]

Figure 1 provides a visual representation of the inflation realisations relative to target. It reports box plots of the deviation of average annual inflation from the point target (or the mid of the band for target ranges). The plots show that, overall, inflation is relatively close to target, but that each year a number of countries experience inflation outside the ±1 percentage point band. Deviations were particularly pronounced in 2008, the year of the global financial crisis and subsequently, in 2012-2016, where the AEs were subject to what has become known as the "missing inflation puzzle" (Bobeica and Jarocinski 2019; Friedrich 2016).

Figure 1 here

We furthermore test explicitly whether the likelihood that inflation falls outside a band of ±1 percentage points around the point target differs across types by means of probit models of the type

$$X_{c,t} = \begin{cases} 1 \ if \ X^*_{c,t} = \alpha + \beta^{type} D^{type}_{c,t} + \varepsilon_{c,t} > 0 \\ 0 \ otherwise \end{cases}, \quad (2)$$

As before, we cluster standard errors by country. Column (4) of Table 2 studies how often inflation is outside the ±1 percentage points band; the subsequent columns test for the likelihood that inflation is outside this band for 3, 6 or 12 consecutive months. Neither of these tests yields statistically significant differences, suggesting that the three types have broadly comparable inflation outcomes, a precondition for being able to test whether the anchoring of inflation expectations depends on the target type.[8]

[7] These numbers can be calculated from the number of observations in columns (1) and (4) of Table 2.

[8] In contrast, the regressions do pick up significant differences if we were to test whether inflation falls outside the actual tolerance bands or ranges, using the ±1pp range for point targets. In this case, the regressions show a higher likelihood for inflation to be outside the range in AEs, which stems from the fact

Inflation Expectations

A third type of data that is used in this paper relates to private sector inflation expectations. These are sourced from Consensus Economics, which surveys professional forecasters at a monthly frequency. The main advantage of this data source is that the surveys are available for a relatively long history, and that they are conducted in a comparable fashion across many countries, which makes them ideal for the purpose of this paper. The same database has been used in several related studies, such as Castelnuovo et al. (2003), Crowe (2010), Davis (2014), Dovern, Fritsche and Slacalek (2012), and Ehrmann (2015).

The survey elicits forecasts for consumer price inflation, for the current and the next calendar year. Accordingly, the forecast horizon decreases over the course of a given year—by December, much of the year's data are already realised and released, making a current-calendar-year forecast much simpler than in January. In the empirical analysis, we will either only use data sampled in July, or control for the forecast horizon by including month fixed effects where relevant.

The forecasts cover a rather short horizon – for current-year forecasts, the average forecast horizon is 6 months, for next-year forecasts, it amounts to 1.5 years. This forecasting horizon matches well with the hypotheses that were developed in Section 2, whereby a major difference between target types relates to the future path of inflation that might be expected over the typical projection horizon, i.e. one to two years. The lags in monetary policy transmission are typically assumed to be in that order of magnitude[9], implying that central banks can affect inflation over this horizon, even if they might not be in a position to fully stabilise inflation in response to shocks over these horizons.

Consensus Economics also provides long-term expectations, which unsurprisingly have been found to be better anchored than shorter-term forecasts (Mehrotra and Yetman, 2018). The related paper by Grosse-Steffen (2020) uses this data. Note, however, that

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that there are several observations with a very narrow range of ±0.5pp, making it more likely that inflation falls outside this range.

[9] See, e.g., the websites of the Swedish Riksbank, which mentions a lag of 1-2 years (https://www.riksbank.se/en-gb/monetary-policy/what-is-monetary-policy/how-monetary-policy-affects-inflation/), or of the Bank of Canada, which assumes a lag of 6-8 quarters (https://www.bankofcanada.ca/core-functions/monetary-policy/).

availability of these data is more limited – the surveys are available for a smaller set of countries studied, and for a more limited time period. In addition, these surveys are conducted semi-annually, i.e. at a lower frequency, and Consensus Economics neither makes micro-data available nor provides information about the number of respondents in these surveys.

4. The anchoring of inflation expectations

This section examines to what extent inflation expectations are anchored under the different inflation target types, by means of two different tests. First, it studies to what extent inflation expectations depend on lagged, realised inflation. Second, it looks at disagreement about inflation expectations across forecasters.

Dependence on realised inflation

By announcing an inflation target, the central bank hopes to anchor inflation expectations at target. In such a case, inflation expectations would not deviate from the target level, regardless of the developments in actual inflation. In other words, inflation expectations should not (or barely) depend on realised inflation rates. This intuition makes for a straightforward test, which indeed has been implemented in various related papers (Levin et al. (2004) provide an early example). We would expect the relationship between inflation expectations and realised inflation to be stronger for short-term inflation expectations (of the type used in this paper), but even there, relatively more anchored inflation expectations should see a relatively muted relationship. A first test studies anchoring before and after the introduction of IT and is implemented as follows:

$$E_{c,t}(\pi_{c,t+h}) = \beta_0 + \beta_1 \pi_{c,t-1} + \beta_2 D_{c,t}^{IT} + \gamma_1 D_{c,t}^{IT} \pi_{c,t-1} + \varepsilon_{c,t}. \quad (3)$$

$E_{c,t}(\pi_{c,t+h})$ denotes the mean inflation expectations for country c over the forecast horizon h (i.e. the current- and next-calendar-year forecasts), collected in the Consensus Economics survey conducted in month t. $\pi_{c,t-1}$ is monthly year-on-year inflation in the month prior to the survey. $D_{c,t}^{IT}$ is a dummy variable for the IT regime. The models are estimated by ordinary least squares. To avoid overlapping observations, we estimate this model only for observations in the middle of the year, i.e. for the July forecasts. We calculate Driscoll and Kraay (1998) standard errors, which allow for heteroskedasticity, autocorrelation up to a maximum lag order of 12 and cross-sectional correlation.[10]

The sample starts 36 months before the introduction of IT in each country, implying that the start date of the sample is country-specific. In contrast, the end point is the same for all (as we have data until February 2020, but only use the July forecasts, the end point for this analysis is July 2019). Note that we only include observations under IT after inflation has stabilised, i.e. observation for which $D_{c,t}^{stable} = 1$. In other words, there is potentially a time gap between the pre-IT observations and the IT observations.

A second test differentiates across target types:

$$E_{c,t}(\pi_{c,t+h}) = \beta_0 + \beta_1\pi_{c,t-1} + \beta_2 D_{c,t}^{IT} + \beta_3 D_{c,t}^{R} + \beta_4 D_{c,t}^{T} + \gamma_1 D_{c,t}^{IT}\pi_{c,t-1} + \gamma_2 D_{c,t}^{R}\pi_{c,t-1} + \gamma_3 D_{c,t}^{T}\pi_{c,t-1} + \gamma_4 D_{c,t}^{IT} D_{c,t}^{R} + \gamma_5 D_{c,t}^{IT} D_{c,t}^{T} + \delta_1 D_{c,t}^{IT} D_{c,t}^{R}\pi_{c,t-1} + \delta_2 D_{c,t}^{IT} D_{c,t}^{T}\pi_{c,t-1} + \varepsilon_{c,t}, \quad (4)$$

Where $D_{c,t}^{R}$ and $D_{c,t}^{T}$ are dummy variables for range targets and point targets with tolerance bands, respectively. Prior to the introduction of IT, these dummies are set equal to the first target type that will be implemented in the respective country. All other variables are as described before.

The corresponding results are provided in Table 3. The odd columns report results from equation (3), i.e. do not differentiate across different target types. The first column relates to current-year expectations, the third column to next-year expectations. The table reports the relationship between realised inflation and expected inflation prior to IT (β_1) and under stable IT, where the second coefficient is given by $\beta_1 + \gamma_1$. A couple of results are worth highlighting. First, expected inflation responds more to realised inflation for the shorter horizon. Compared to the pre-IT coefficient of 0.918 for current-year expectations, the figure for next-year expectations is 30% lower and stands at 0.637. Second, the

[10] Results are robust to using panel-corrected standard errors or to clustering at the country level.

responsiveness of current-year expectations is smaller under IT, and significantly so, both for current- and next-year forecasts (tests for statistical significance over time are reported in column Δ_1). For next-year forecasts, we observe a reduction of nearly 40%, to 0.4. Third, the reduction is present for AEs and EMEs alike (as can be seen in columns 5, 7 and 11). The reduction is much stronger for the AEs, where the coefficient for current-year expectations is reduced by around 20% and the one for next-year expectations by more than 50%.

Table 3 here

The even-numbered columns in the table report results from the extended regression equation (4), which tests for differences across target types, and therefore goes to the core of this paper. As before, the table reports aggregated coefficients, i.e. the overall effect of inflation on expectations in a given regime. Column Δ_1 provides information whether the pre-IT coefficients are different from the coefficients under IT. Furthermore, column Δ_2 reports whether the coefficients within the pre-IT regime or within the IT regime are different from the point targeters, and column Δ_3 indicates whether range targeters are different from inflation targeters with tolerance bands.

The main results of interest are the coefficients for point targets, target ranges and tolerance bands under IT – the two hypotheses that are at the centre of this paper relate to these coefficients, and would either suggest that inflation expectations are less well anchored in the presence of target ranges compared to point targets (flexibility hypothesis; $\beta_1 + \gamma_1 + \gamma_2 + \delta_1 > \beta_1 + y_1$, or $\gamma_2 + \delta_1 > 0$.) or that that they are better anchored (credibility-enhancement hypothesis; $\beta_1 + \gamma_1 + \gamma_2 + \delta_1 < \beta_1 + \gamma_1$, or $\gamma_2 + \delta_1 < 0$.)

Looking at the results in column Δ_2 reveals that target ranges outperform point targets in most cases – in all cases are the estimated coefficients smaller, and in most cases is this difference statistically significant (columns 2, 4, 6 and 10). Furthermore, the results in column Δ_3 indicate that target ranges also outperform tolerance bands, and they do so in all cases. The differences are economically large: The response coefficient for next-year expectations in the sample comprising all countries is 0.220 for range targets, i.e. roughly half of the coefficients for point targets (0.449) and tolerance bands (0.406). This evidence is not compatible with the flexibility hypothesis, but is consistent with the credibility-enhancement hypothesis.

The table also contains a comparison with the situation prior to the introduction of IT. This analysis is important, not only because it allows testing whether the various target types saw different changes in the anchoring of inflation expectations, but also because we can test whether there were significant differences across countries that adopted the different types beforehand, i.e. whether the choice of target type was endogenous.

As a matter of fact, EMEs which would later adopt a target range had better anchored inflation expectations to start with (see the entries for the relevant fields under Δ_2 and Δ_3, for the upper set of coefficients) – so it might not be too surprising that these countries outperform subsequently. What is remarkable, though, is the case of the AEs. Here, range-adopters started from a position where inflation expectations were less well anchored, but then experienced particularly large improvements, such that they outperform all other types and end up with substantially better anchored inflation expectations. [11]

Following this first round of tests, which compare pre-IT to the situation under IT, we now move on to dissecting the situation under IT in more detail. In particular, we are interested in possible differences across target types if inflation is close to target or deviates more substantially from it. Recall that the likelihood that inflation deviates more substantially from target does not differ across target types. Any differences in the anchoring of inflation expectations across target types would therefore be suggestive that the target type matters for the perceptions of forecasters how monetary policy will react to larger deviations from target.

We do so by estimating the following regression equations, in analogy to the previous setup. First, we estimate a restricted model that tests whether inflation expectations respond to realised inflation in a different manner if inflation is within/outside the interval, or within/outside a band of ±1 percentage points around a point target:

[11] The corresponding coefficients for Switzerland and the euro area are estimated to be 0.813*** for current-year expectations and 0.398*** for next-year expectations, i.e. they are comparable to those in other AEs with point targets or tolerance bands, but higher than those in AEs with target ranges.

$$E_{c,t}(\pi_{c,t+h}) = \beta_0 + \beta_1\pi_{c,t-1} + \beta_2 D_{c,t}^{out} + \gamma_1 D_{c,t}^{out}\pi_{c,t-1} + \varepsilon_{c,t}, \tag{5}$$

where $D_{c,t}^{out}$ is a dummy variable that takes the value one if year-on-year inflation has been outside this band for at least 6 of the previous 12 months. This dummy variable is equal to one in 48% of all observations.

The second, extended model, tests for differences across target types:

$$\begin{aligned} E_{c,t}(\pi_{c,t+h}) = \beta_0 + \beta_1\pi_{c,t-1} + \beta_2 D_{c,t}^{out} + \beta_3 D_{c,t}^{R} + \beta_4 D_{c,t}^{T} + \\ \gamma_1 D_{c,t}^{out}\pi_{c,t-1} + \gamma_2 D_{c,t}^{R}\pi_{c,t-1} + \gamma_3 D_{c,t}^{T}\pi_{c,t-1} + \gamma_4 D_{c,t}^{out} D_{c,t}^{R} + \gamma_5 D_{c,t}^{out} D_{c,t}^{T} + \\ \delta_1 D_{c,t}^{out} D_{c,t}^{R}\pi_{c,t-1} + \delta_2 D_{c,t}^{out} D_{c,t}^{T}\pi_{c,t-1} + \varepsilon_{c,t}, \end{aligned} \tag{6}$$

Effectively, this regression replaces the IT dummy of equation (4) with the outside dummy, and is only estimated over the IT sample. The underlying hypothesis is that while inflation is close to target, there is a natural link between inflation expectations and realised inflation – as realised inflation does not stray far from the target, there is on average no reason to believe that future inflation would do so. In such a case, the estimated coefficients would point to a close relationship, i.e. would be relatively high. In contrast, once actual inflation is far from target, a credible target would imply that inflation expectations stay anchored, i.e. do not show a strong relationship with actual inflation. In other words, differentiating these periods implies for a more stringent test of the credibility of the inflation target and the corresponding anchoring of inflation expectations.

Table 4 here

Table 4 reports the results from this second test. The results in the odd columns, based on equation (4), indicate that the relationship between realised inflation and inflation expectations is indeed weaker if inflation is outside the band, and more so for the longer forecast horizon. Whereas column (1) only finds a 7% reduction, it is much starker in column (3), where the difference amounts to 45% (the coefficient falls from 0.612 to 0.331). This finding is driven by the EMEs – in the sample of AEs, we get strikingly different results, with an increase in responsiveness for current-year expectations and no change for next-year expectations.

To understand why AEs are different, the even columns of Table 4 are instructive. In AEs with target ranges or tolerance bands, the responsiveness barely changes or falls when inflation is outside the interval. In contrast, it increases if inflation strays far from a point target, with coefficients increasing by 65% both for current-year and next-year expectations. This suggests that the credibility of point targets is seriously hampered if they are missed by larger margins, and repeatedly so. Specifying some sort of interval, be it ranges or tolerance bands, in contrast, seems to be helpful – if inflation falls outside these intervals, little is lost in terms of the anchoring of inflation expectations. Also this piece of evidence is supportive of the credibility-enhancement hypothesis.

The more detailed analysis in Table 4 also helps us understanding the earlier finding that target ranges provide the best anchoring. This superior performance stems from the fact that tolerance ranges perform best when inflation is outside the range. This is best seen for the case of AEs, where ranges are not distinguishable from point targets or tolerance bands if inflation is close to target, but they show much better anchoring properties when inflation often strays far from the target.

To summarise the results of this first type of test, we find that the introduction of IT has helped anchoring inflation expectations, for all types of targets. Target ranges perform substantially better than any other type, regardless of whether inflation expectations had been better anchored in those countries to start with (as in the EMEs), or whether the countries that adopted target ranges were starting from less well anchored inflation expectations (which is the case for the AEs). The superior performance of target ranges arises because for them inflation expectations are considerably better anchored when inflation strays repeatedly from target. This is in stark contrast to point targets, which in AEs tend to lose some of their credibility when inflation repeatedly strays far. This evidence refutes the flexibility hypothesis, but is in line with the credibility-enhancement hypothesis.

Forecaster disagreement

Another way to study the anchoring of inflation expectations is through forecaster disagreement. If expectations were perfectly anchored at target, there should be no disagreement. Hence, less disagreement can be taken as a signal for a better anchoring of inflation expectations. To measure disagreement, we follow the standard approach in the literature (e.g., Dovern, Fritsche and Slacalek (2012) or Mankiw, Reis and Wolfers (2003)) and use the inter-quartile range of forecasts in a given country and month. Compared to the standard deviation, this measure is insensitive to outliers, which might be important in the analysis of survey data. Note that results are qualitatively equivalent for the inter-decile range, which includes more forecasters.

The regressions are specified as follows:

$$\Omega_{c,t}(\pi_{c,t+h}) = \beta_m + \beta_1 E_{c,t}(\pi_{c,t+h}) + \beta_2 D_{c,t}^{IT} + \varepsilon_{c,t} \quad (7)$$

where $\Omega_{c,t}(\pi_{c,t+h})$ denotes the inter-quartile range of the inflation expectations for country c over the forecast horizon h, collected in the Consensus Economics survey conducted in month t. Month fixed effects β_m are included because the forecast horizon shrinks over the course of the year, such that disagreement should also be lower. The regression also includes the level of inflation expectations, to allow for the fact that higher inflation tends to be more volatile and therefore might be subject to more disagreement. As before, we estimate these regressions using simple ordinary least squares, allowing for Driscoll and Kraay (1998) standard errors.

The extended model then becomes:

$$\Omega_{c,t}(\pi_{c,t+h}) = \beta_m + \beta_1 E_{c,t}(\pi_{c,t+h}) + \beta_2 D_{c,t}^{IT} + \beta_3 D_{c,t}^{R} + \beta_4 D_{c,t}^{T} + \gamma_1 D_{c,t}^{IT} D_{c,t}^{R} + \gamma_2 D_{c,t}^{IT} D_{c,t}^{T} + \varepsilon_{c,t}. \quad (8)$$

Table 5 shows the corresponding results. At the very bottom, it also reports average disagreement pre-IT (in the odd columns – in even columns, the bottom row indicates the average disagreement pre-IT in the countries that later would adopt a point target). This number provides a benchmark against which the coefficient on the IT dummy can be compared. From there, it is clear that disagreement is substantially larger for EMEs than for AEs, and that it increases with a longer forecast horizon.

While the controls are not reported for brevity, we find (consistent with Capistran and Timmermann 2009) that disagreement is larger when inflation expectations are higher, suggesting that higher inflation rates are more difficult to forecast. We also find that disagreement monotonically declines over the year.

Table 5 here

The odd columns of Table 5 reveal that disagreement has been substantially reduced under IT - the coefficient on the IT dummy, β_2, is estimated to be negative, at high levels of statistical significance. The effect is furthermore economically important: disagreement under IT is reduced by more than 25% for current-year forecasts and by nearly 35% for next-year forecasts for the overall country sample – the reductions were even larger in EMEs, amounting to 40% and 43%, respectively.

Moving on to the differentiated estimates in the even columns, we see that the reduction in disagreement is broad-based – it shows up for most target types, is generally present for both forecast horizons, and has happened for the overall sample and in particular in the EMEs. Two results stand out in this analysis. First, the decrease was largest in the countries with target ranges and tolerance bands, i.e. those countries that started off with comparatively high levels of disagreement. To give only one example – for all countries and next-year expectations, disagreement dropped by 0.087 for point targets, i.e. much less than the reduction for target ranges (-0.505=-0.103-0.402) and tolerance bands (-0.699=-0.205-0.494). Second, speaking to our hypotheses, disagreement is generally smallest under tolerance bands (for instance, in the all-country sample it is significantly smaller than under point targets for current-year forecasts, and significantly smaller than both point targets and target ranges for next-year forecasts).

These numbers mask interesting variation across the country-subsample. For AEs, disagreement is relatively homogeneous across all target types, especially for the current-year forecasts. For next-year forecasts, target ranges and tolerance bands perform somewhat better than point targets. While this would be another piece of evidence that is supportive of the credibility-enhancement hypothesis and incompatible with the flexibility hypothesis, the differences are small economically.

In contrast, the EME sample looks very different. Here, target ranges perform substantially worse than any other type. Countries that chose to adopt target ranges had high levels of disagreement to start with, but while they saw disagreement coming down, the reduction was not stronger than under the other types, leaving target ranges as the worst performer. This result is the exception to all others in this paper, as it is in line with the flexibility hypothesis, which all other pieces of evidence have so far refuted.[12]

The next tests relate to disagreement when inflation is close to target, or when it is further away. This is done by means of the following regressions:

$$\Omega_{c,t}(\pi_{c,t+h}) = \beta_m + \beta_1 E_{c,t}(\pi_{c,t+h}) + \beta_2 D_{c,t}^{out} + \varepsilon_{c,t} \quad (9)$$

and, in the differentiated model:

$$\Omega_{c,t}(\pi_{c,t+h}) = \beta_m + \beta_1 E_{c,t}(\pi_{c,t+h}) + \beta_2 D_{c,t}^{out} + \beta_3 D_{c,t}^{R} + \beta_4 D_{c,t}^{T} + \gamma_1 D_{c,t}^{out} D_{c,t}^{R} + \gamma_2 D_{c,t}^{out} D_{c,t}^{T} + \varepsilon_{c,t}. \quad (10)$$

The results in Table 6 show that disagreement increases when inflation moves further away from target, more so for next-year expectations than for current-year expectations. Splitting these results by target type shows little difference in the all-country and the AE sample. Disagreement increases for all target types, and by similar amounts. When looking at the EME results, the earlier result of the underperformance of target ranges can be better understood: the increase in disagreement is substantially stronger for target ranges. While target ranges are not different from the other types when inflation is mostly close to target, they generate much more disagreement when inflation strays away more often.

Table 6 here

To summarise these results from the disagreement regressions, we find that IT has reduced disagreement, for all target types, but more so for tolerance bands and target ranges. This is inconsistent with the flexibility hypothesis. The level of disagreement is lowest for countries with tolerance bands. When it comes to disagreement depending on inflation outcomes, we find this to be higher if inflation strays away from target more often. Overall,

[12] The corresponding numbers for Switzerland and the euro area (where average disagreement is 0.18 and 0.32 for current-year and next-year forecasts, respectively) place them below all other AEs, regardless of the target type in these countries.

the differences across target types are relatively minor, such that this evidence does not help distinguishing the hypotheses – with one exception, namely the case of next-year forecasts in EMEs, where target ranges perform considerably worse than the other types, suggesting that the credibility enhancement of target ranges works, but that this comes at a cost in the sense that announcing an area of "permissible" target deviations implies a deterioration of the anchoring of inflation expectations once actual outcomes fall outside the range.

Robustness

Tables 7 and 8 provide results from a number of robustness tests. Table 7 reports the results for dependence on realised inflation. For brevity, it only contains the results for the all-country sample and next-year forecasts. The first panel shows results if a full set of year fixed effects is added. This robustness tests shows clearly that the reported results of the benchmark specification are not due to variations over time, e.g. because pre-IT sample by definition pre-dates the IT sample. Similarly, it does not matter that the benchmark results are only estimated for the month of July. As the second panel shows, it is possible to replicate the results using all observations, with minimal changes to the magnitude of the coefficients or their standard errors. The next robustness test generates 1-year inflation expectations to arrive at a fixed forecast horizon following the methodology of Dovern et al. (2012). Also here, results are robust. The same applies if we exclude periods where the inflation targets were on a substantial downward trend over time, as anticipation of this process might have affected inflation expectations (see the left panel in the second row of the table).[13] Furthermore, adding inflation volatility[14] as additional regressor (following Capistran and Timmermann 2009) does not alter results, nor do results change if we model realised inflation by means of a three-month average of lagged inflation instead of just one lag (to allow for stickiness in information whereby realised inflation only enters inflation expectations with longer lags (Coibion and Gorodnichenko 2015; Sheng and Wallen 2014).

Tables 7 and 8 here

[13] We exclude data for Brazil, Colombia, Mexico and Poland until December 2002, for Hungary until September 2003, for India until July 2016, and for Indonesia and the Philippines until December 2008.
[14] Defined as the 6-month rolling standard deviation of lagged inflation.

Table 8 provides the results for the disagreement regressions. Once more, adding year fixed effects does not change the results. Estimating the model only for the month of July also yields very similar findings, as does a regression with one-year fixed horizon forecasts. Furthermore, removing disinflation periods from the sample leads to qualitatively identical results, as does the addition of inflation volatility. The last robustness test uses the interdecile range rather than the interquartile range as measure of forecaster disagreement, and also leads to the same conclusions.

5. Conclusions

Inflation targets come in different shapes (much more than they come in different sizes). This paper has provided novel evidence whether the three most frequent target types – point targets, point targets with tolerance bands and target ranges – perform differently in the extent to which they succeed in anchoring inflation expectations. Compared to the earlier evidence provided in Castelnuovo (2003), which concluded that there are no major differences, this paper has identified substantial and statistically significant effects. This could be because with the course of time, there has been more variation in target types and in inflation outcomes, because this paper could draw on a larger cross-section, or a combination of all these factors.

Another reason why this paper comes to more conclusive evidence than the earlier literature could be that it focuses on expectations at a shorter horizon. The different target types have implications for the conduct of monetary policy. Target ranges allow for a multiplicity of future paths of inflation that are consistent with the central bank objective, whereas the future path of inflation should be pinned down much more in the presence of a credible point target. Accordingly, the various target types could well affect expectations over the next one to two years in a very different manner.

The paper tests two hypotheses - the flexibility hypothesis suggests that target ranges might be *less* successful in anchoring expectations, whereas the credibility-enhancement hypothesis posits that target ranges are *more* successful in anchoring expectations. Overall, the evidence reported in the paper refutes the flexibility hypothesis, but is consistent with the credibility-enhancement hypothesis. The evidence therefore favours the adoption of some sort of interval, be it in the form of a range or a tolerance band around a point target.

However, some qualifications are in order. In EMEs, target ranges generate substantially more disagreement across forecasters about the future path of inflation than point targets and – in particular – point targets with tolerance bands. This result is obtained because disagreement increases substantially if realised inflation falls outside the target range, suggesting that missing a target range is particularly damaging for credibility in EMEs. The related paper by Grosse- Steffen (2020) similarly finds that for persistent deviations of inflation from target, long-term inflation expectations are better anchored for point targets than for ranges, in the sense that point targets are associated with lower downside (upside) risk to inflation during periods of persistent undershooting (overshooting). The economic context in which inflation targets are adopted does therefore seem to matter.

Also, while target ranges and tolerance bands perform better in several tests, none of the target types consistently outperforms another, suggesting that while there are some benefits to adopting an interval, there are also other factors through which the central bank can aid the anchoring of inflation expectations.

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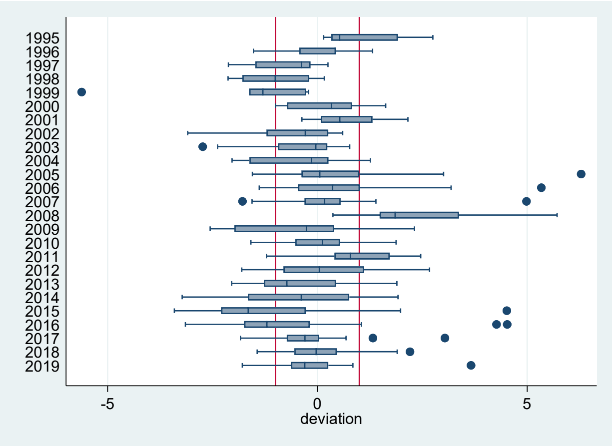
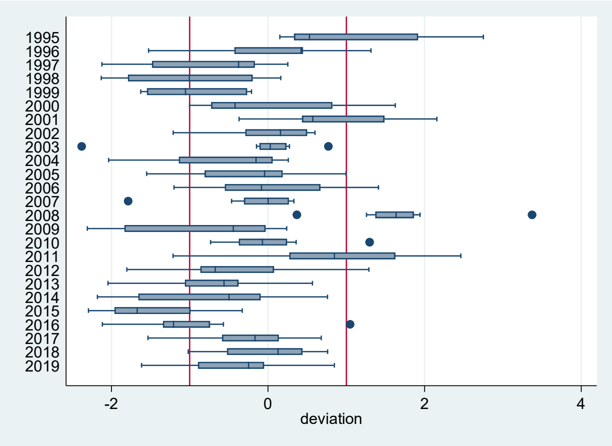
Figure 1: Deviations of inflation from target

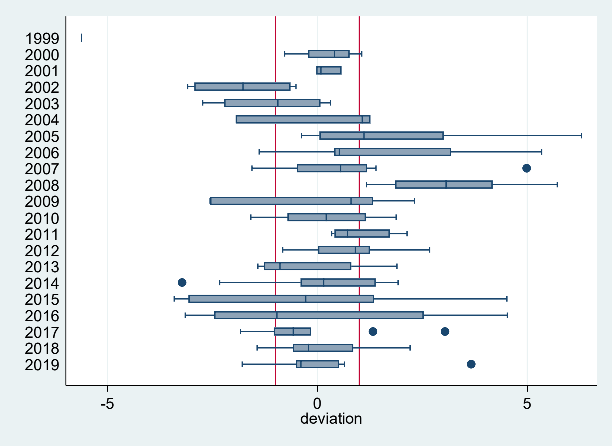
Panel A: All countries



Panel B: AEs



Panel C: EMEs



Note: The charts shows box plots for the average annual deviation of inflation from target for all countries (Panel A), AEs (Panel B) and EMEs (Panel C). The box plot reports the median (line in the box), 25th and 75th percentiles (Q1 and Q3, border of box), adjacent values (Q3+1.5(Q3-Q1) and Q1-1.5*(Q3-Q1), whiskers) and outliers (dots). The red lines indicate the ±1 percentage point band.

Table 1: Summary statistics of the inflation targets

	Target levels						Tolerance bands			Target ranges		
	All	*of which:*					All	*of which:*		All	*of which:*	
		AEs	EMEs	Point	Tolerance	Range		AEs	EMEs		AEs	EMEs
Mean	2.86	2.26	3.59	2.80	3.18	2.46	2.28	1.93	2.39	1.84	1.71	2.36
Median	2.50	2.00	3.00	2.50	3.00	2.00	2.00	2.00	2.00	2.00	2.00	2.50
Std. deviation	1.25	0.54	1.46	1.64	0.99	1.10	0.73	0.26	0.79	0.73	0.57	1.02
Min	1.00	1.00	1.75	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max	15.00	6.00	15.00	15.00	8.00	7.20	5.00	2.00	5.00	3.50	3.00	3.50
Observations	4759	2603	2156	1166	2107	1486	2107	512	1595	1486	1200	286

Notes: The table shows summary statistics of the inflation targets. All numbers are in per cent. AEs denotes advanced economies (Australia, Canada, the Czech Republic, Japan, South Korea, New Zealand, Norway, Sweden, the United Kingdom and the United States), EMEs emerging markets and developing countries (Brazil, Chile, Colombia, Hungary, India, Indonesia, Mexico, the Philippines, Poland and Thailand).

Table 2: Testing for differences across inflation targeting regimes

	(1) Target level	(2) Width of range	(3) Year	(4) Pr(outside range)	(5) Pr(outside range for 3 consecutive months)	(6) Pr(outside range for 6 consecutive months)	(7) Pr(outside range for 12 consecutive months)
Panel A: All							
Tolerance	0.375	--	0.917	0.262	0.230	0.205	0.130
	(0.429)		(1.860)	(0.247)	(0.236)	(0.231)	(0.243)
Range	-0.341	-0.441	-4.323***	0.033	0.044	0.020	-0.110
	(0.432)	(0.333)	(1.457)	(0.270)	(0.283)	(0.292)	(0.292)
Constant	2.804***	2.276***	2,009.658***	-0.269	-0.511**	-0.734***	-1.095***
	(0.345)	(0.225)	(1.423)	(0.224)	(0.210)	(0.210)	(0.223)
Observations	4,759	3,593	4,759	4,064	4,064	4,064	4,064
R-squared	0.061	0.082	0.107	--	--	--	--
Panel B: AEs							
Tolerance	0.164	--	-3.196	0.159	0.121	0.105	-0.033
	(0.235)		(3.234)	(0.246)	(0.260)	(0.248)	(0.264)
Range	0.117	-0.220	-5.358**	0.038	0.043	0.011	-0.106
	(0.212)	(0.282)	(2.011)	(0.263)	(0.288)	(0.315)	(0.345)
Constant	2.176***	1.930***	2,010.611***	-0.377*	-0.620***	-0.829***	-1.167***
	(0.086)	(0.070)	(1.997)	(0.215)	(0.195)	(0.206)	(0.253)
Observations	2,603	1,712	2,603	2,419	2,419	2,419	2,419
R-squared	0.015	0.039	0.094	--	--	--	--
Panel C: EMEs							
Tolerance	-1.393	--	5.019***	-0.270	-0.255	-0.193	-0.135
	(1.143)		(1.420)	(0.355)	(0.327)	(0.313)	(0.217)
Range	-1.661	-0.027	-0.893	-0.070	-0.024	-0.004	-0.168
	(1.563)	(0.621)	(2.078)	(0.388)	(0.385)	(0.388)	(0.282)
Constant	4.842***	2.387***	2,006.571***	0.342	0.053	-0.268	-0.754***
	(1.085)	(0.292)	(1.631)	(0.342)	(0.320)	(0.316)	(0.232)
Observations	2,156	1,881	2,156	1,645	1,645	1,645	1,645
R-squared	0.111	0.000	0.176	--	--	--	--

Notes: The table shows results for tests whether the various target types differ with regard to the level of the target (column 1), the width of the interval (column 2), the calendar year during which the target types are in place (column 3), the probability that actual inflation falls outside the target range (column 4), or does so for 3, 6 or 12 consecutive months (columns 5 to 7). With the exception of column 2, the benchmark category is point targets. In column 2, the benchmark category is tolerance bands. Results based on OLS regressions following equation (1) for columns 1, 2 and 3. Columns 4 to 7 show results from probit models following equation (2). Standard errors are clustered by country. ***/**/* denote statistical significance at the 1%/5%/10% level. Numbers in brackets are standard errors.

Table 3: Dependence on realised inflation, pre-IT vs. IT

All countries

	Current-year forecasts (1)	Δ_1	(2)	Δ_1	Δ_2	Δ_3	*Next-year forecasts* (3)	Δ_1	(4)	Δ_1	Δ_2	Δ_3
Pre-IT (β_1)	**0.918** ***		**0.934** ***				**0.637** ***		**0.695** ***			
	0.043		0.080				0.034		0.042			
Pre-range ($\beta_1+\gamma_2$)			**0.841** ***						**0.434** ***		^^^	
			0.027						0.028			
Pre-tolerance ($\beta_1+\gamma_3$)			**0.993** ***			^^^			**0.623** ***			^^^
			0.037						0.013			
IT ($\beta_1+\gamma_1$)	**0.796** ***	##	**0.880** ***				**0.400** ***	###	**0.449** ***	###		
	0.016		0.016				0.023		0.065			
IT, range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.687** ***	###	^^^				**0.220** ***	###	^^^	
			0.016						0.016			
IT, tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.799** ***	###	^^	^^^			**0.406** ***	###		^^^
			0.029						0.017			
Observations	359		359				359		359			
R-squared	0.923		0.929				0.735		0.783			
Number of groups	20		20				20		20			

AEs

	Current-year forecasts (5)	Δ_1	(6)	Δ_1	Δ_2	Δ_3	*Next-year forecasts* (7)	Δ_1	(8)	Δ_1	Δ_2	Δ_3
Pre-IT (β_1)	**0.979** ***		**0.914** ***				**0.605** ***		**0.546** ***			
	0.039		0.035				0.054		0.021			
Pre-range ($\beta_1+\gamma_2$)			**0.961** ***						**0.774** ***		^^^	
			0.022						0.002			
Pre-tolerance ($\beta_1+\gamma_3$)			**1.432** ***		^^^	^^^			**0.435** ***		^^^	^^^
			0.036						0.013			
IT ($\beta_1+\gamma_1$)	**0.773** ***	###	**0.847** ***				**0.290** ***	###	**0.317** ***	###		
	0.041		0.059				0.018		0.058			
IT, range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.698** ***	###	^^^				**0.217** ***	###		
			0.022						0.019			
IT, tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.857** ***	###		^^^			**0.356** ***	##		^^^
			0.012						0.030			
Observations	216		216				216		216			
R-squared	0.878		0.892				0.528		0.613			
Number of groups	10		10				10		10			

EMEs

	Current-year forecasts (9)	Δ_1	(10)	Δ_1	Δ_2	Δ_3	*Next-year forecasts* (11)	Δ_1	(12)	Δ_1	Δ_2	Δ_3
Pre-IT (β_1)	**0.829** ***		**1.192** ***				**0.490** ***		**0.826** ***			
	0.057		0.079				0.032		0.074			
Pre-range ($\beta_1+\gamma_2$)			**0.801** ***		^^^				**0.404** ***		^^^	
			0.006						0.018			
Pre-tolerance ($\beta_1+\gamma_3$)			**0.996** ***		^^	^^^			**0.523** ***		^^^	^^^
			0.012						0.014			
IT ($\beta_1+\gamma_1$)	**0.776** ***		**0.855** ***	###			**0.352** ***	###	**0.286** **	###		
	0.024		0.060				0.025		0.132			
IT, range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.658** ***	###	^^^				**0.200** ***	###		
			0.016						0.022			
IT, tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.777** ***	###		^^^			**0.371** ***	###		^^^
			0.031						0.018			
Observations	143		143				143		143			
R-squared	0.923		0.931				0.791		0.812			
Number of groups	10		10				10		10			

Notes: The table shows results whether inflation expectations depend on the level of actual inflation, comparing the pre-IT sample to the sample under IT, following equations (3) and (4). Non-bold numbers in the upper part of the table are Driscoll and Kraay (1998) standard errors, which allow for heteroskedasticity, autocorrelation up to a maximum lag order of 12 and cross-sectional correlation. ***/**/*, ###/##/# and ^^^/^^/^ denote statistical significance at the 1%/5%/10% level. Δ_1 tests for differences before and after IT, Δ_2 compares the coefficients relative to those estimated in the presence of point targets, Δ_3 compares the coefficients relative to those estimated in the presence of target ranges. Relevant fields for these tests are shaded.

Table 4: Dependence on realised inflation, inflation close to vs. far from target

All countries

	Current-year forecasts (1)	Δ_1	(2)	Δ_1	Δ_2	Δ_3	*Next-year forecasts* (3)	Δ_1	(4)	Δ_1	Δ_2	Δ_3
Close to (point) target (β_1)	**0.833** ***		**0.866** ***				**0.612** ***		**0.706** ***			
	0.024		0.065				0.026		0.072			
Within range ($\beta_1+\gamma_2$)			**0.649** ***		^^^				**0.327** ***		^^^	
			0.035						0.066			
Within tolerance ($\beta_1+\gamma_3$)			**0.847** ***			^^^			**0.601** ***			^^
			0.034						0.043			
Far from (point) target ($\beta_1+\gamma_1$)	**0.779** ***	##	**0.872** ***				**0.331** ***	###	**0.321** ***	###		
	0.019		0.021				0.026		0.032			
Outside range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.687** ***		^^^				**0.178** ***		^^^	
			0.015						0.029			
Outside tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.781** ***		^^	^^			**0.358** ***	###		^^^
			0.031						0.012			
Observations	325		325				325		325			
R-squared	0.89		0.899				0.595		0.64			
Number of groups	20		20				20		20			

AEs

	Current-year forecasts (5)	Δ_1	(6)	Δ_1	Δ_2	Δ_3	*Next-year forecasts* (7)	Δ_1	(8)	Δ_1	Δ_2	Δ_3
Close to (point) target (β_1)	**0.636** ***		**0.557** ***				**0.293** ***		**0.207** ***			
	0.048		0.128				0.017		0.064			
Within range ($\beta_1+\gamma_2$)			**0.645** ***						**0.334** ***			
			0.041						0.083			
Within tolerance ($\beta_1+\gamma_3$)			**0.730** ***		^^				**0.305** ***			
			0.088						0.089			
Far from (point) target ($\beta_1+\gamma_1$)	**0.810** ***	###	**0.928** ***	###			**0.289** ***		**0.342** ***	##		
	0.029		0.054				0.032		0.032			
Outside range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.714** ***		^^^				**0.146** ***		^^^	
			0.028						0.048			
Outside tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.854** ***			^^^			**0.332** ***			^^
			0.006						0.029			
Observations	196		196				196		196			
R-squared	0.836		0.852				0.307		0.355			
Number of groups	10		10				10		10			

EMEs

	Current-year forecasts (9)	Δ_1	(10)	Δ_1	Δ_2	Δ_3	*Next-year forecasts* (11)	Δ_1	(12)	Δ_1	Δ_2	Δ_3
Close to (point) target (β_1)	**0.875** ***		**0.908** ***				**0.611** ***		**0.455** ***			
	0.081		0.167				0.072		0.152			
Within range ($\beta_1+\gamma_2$)			**0.677** ***						**0.273** ***			
			0.014						0.018			
Within tolerance ($\beta_1+\gamma_3$)			**0.813** ***			^^			**0.537** ***			^^^
			0.042						0.041			
Far from (point) target ($\beta_1+\gamma_1$)	**0.748** ***		**0.816** ***				**0.293** ***	###	**0.162** ***	#		
	0.024		0.026				0.023		0.016			
Outside range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.632** ***	##	^^^				**0.171** ***	###		
			0.006						0.004			
Outside tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.759** ***			^^^			**0.330** ***	###	^^^	^^^
			0.034						0.017			
Observations	129		129				129		129			
R-squared	0.894		0.901				0.643		0.71			
Number of groups	10		10				10		10			

Notes: The table shows results whether inflation expectations depend on the level of actual inflation, comparing periods where inflation is close to target to periods where inflation is outside a range of plus/minus 1pp for point targets, or outside its interval for tolerance bands and target ranges for at least six preceding months in the previous year. The regression is conducted for the periods of stable IT regimes, following equations (5) and (6). Non-bold numbers in the upper part of the table are Driscoll and Kraay (1998) standard errors, which allow for heteroskedasticity, autocorrelation up to a maximum lag order of 12 and cross-sectional correlation. ***/**/*, ###/##/# and ^^^/^^/^ denote statistical significance at the 1%/5%/10% level. Δ_1 tests for differences when inflation is close and far from target, Δ_2 compares the coefficients relative to those estimated in the presence of point targets, Δ_3 compares the coefficients relative to those estimated in the presence of target ranges. Relevant fields for these tests are shaded.

Table 5: Disagreement, pre-IT vs. IT

	All countries									
	Current-year forecasts					*Next-year forecasts*				
	(1)	(2)				(3)	(4)			
			Δ_1	Δ_2	Δ_3			Δ_1	Δ_2	Δ_3
Pre-range (β_3)		**0.381** *		^			**0.402** *		^	
		0.200					0.224			
Pre-tolerance (β_4)		**0.311** **		^^			**0.494** *		^	
		0.157					0.272			
IT (β_2)	**-0.161** ***	**-0.036**				**-0.341** ***	**-0.087** *	#		
	0.045	0.067				0.080	0.051			
IT, range (β_2+β_3+γ_1)		**-0.010**	##	^^			**-0.103**	##		
		0.071					0.065			
IT, tolerance (β_2+β_4+γ_2)		**-0.020**	###	^			**-0.205** ***	###	^^^	^^^
		0.069					0.056			
Observations	4,311	4,311				4,311	4,311			
R-squared	0.332	0.361				0.308	0.366			
Number of groups	20	20				20	20			
Avg disagreement pre-IT	0.608	0.464				0.995	0.790			

	AEs									
	Current-year forecasts					*Next-year forecasts*				
	(5)	(6)				(7)	(8)			
			Δ_1	Δ_2	Δ_3			Δ_1	Δ_2	Δ_3
Pre-range (β_3)		**0.133** *		^			**0.036**			
		0.081					0.168			
Pre-tolerance (β_4)		**0.297**					**0.419**			
		0.188					0.533			
IT (β_2)	**-0.060** *	**0.000**				**-0.196** ***	**-0.100** *	#		
	0.031	0.027				0.074	0.059			
IT, range (β_2+β_3+γ_1)		**0.008**	#				**-0.149** **		^	
		0.032					0.074			
IT, tolerance (β_2+β_4+γ_2)		**0.008**					**-0.148** **		^^	
		0.029					0.062			
Observations	2,573	2,573				2,573	2,573			
R-squared	0.384	0.407				0.162	0.191			
Number of groups	10	10				10	10			
Avg disagreement pre-IT	0.352	0.260				0.718	0.562			

	EMEs									
	Current-year forecasts					*Next-year forecasts*				
	(9)	(10)				(11)	(12)			
			Δ_1	Δ_2	Δ_3			Δ_1	Δ_2	Δ_3
Pre-range (β_3)		**0.737** ***		^^^			**0.880** ***		^^^	
		0.243					0.154			
Pre-tolerance (β_4)		**0.366**					**0.569** **		^^	
		0.264					0.221			
IT (β_2)	**-0.357** ***	**-0.091**				**-0.565** ***	**-0.037**			
	0.076	0.162				0.124	0.087			
IT, range (β_2+β_3+γ_1)		**0.082**	###	^^^			**0.155**	###	^^^	
		0.189					0.095			
IT, tolerance (β_2+β_4+γ_2)		**-0.071**	##		^^^		**-0.185** **	###	^^^	^^^
		0.167					0.072			
Observations	1,738	1,738				1,738	1,738			
R-squared	0.304	0.364				0.4	0.521			
Number of groups	10	10				10	10			
Avg disagreement pre-IT	0.897	0.734				1.308	1.094			

Notes: The table shows results whether disagreement across inflation forecasters depends on the (type of the) inflation target, comparing the pre-IT sample to the sample under IT, following equations (7) and (8). Non-bold numbers in the upper part of the table are Driscoll and Kraay (1998) standard errors, which allow for heteroskedasticity, autocorrelation up to a maximum lag order of 12 and cross-sectional correlation. ***/**/*, ###/##/# and ^^^/^^/^ denote statistical significance at the 1%/5%/10% level. Δ_1 tests for differences before and after IT, Δ_2 compares the coefficients relative to those estimated in the presence of point targets, Δ_3 compares the coefficients relative to those estimated in the presence of target ranges. Relevant fields for these tests are shaded.

Table 6: Disagreement, inflation close to vs. far from target

All countries

	Current-year forecasts (1)	(2)	Δ_1	Δ_2	Δ_3	*Next-year forecasts* (3)	(4)	Δ_1	Δ_2	Δ_3
Within range (β_3)		**0.024**					**-0.035**			
		0.017					0.029			
Within tolerance (β_4)		**0.033** **		^^			**-0.120** ***		^^^	^^^
		0.015					0.030			
Far from (point) target (β_2)	**0.031** **	**0.041** **	##			**0.070** ***	**0.067** **	##		
	0.016	0.017				0.018	0.030			
Outside range (β_2+β_3+γ_1)		**0.053** ***					**0.054** *	###		
		0.020					0.028			
Outside tolerance (β_2+β_4+γ_2)		**0.058** ***					**-0.049** **	###	^^^	^^^
		0.018					0.024			
Observations	3819	3819				3,819	3,819			
R-squared	0.356	0.358				0.088	0.132			
Number of groups	20	20				20	20			
Avg disagreement inside	0.287	0.258				0.422	0.463			

AEs

	Current-year forecasts (5)	(6)	Δ_1	Δ_2	Δ_3	*Next-year forecasts* (7)	(8)	Δ_1	Δ_2	Δ_3
Within range (β_3)		**0.006**					**-0.062** **		^^	
		0.017					0.029			
Within tolerance (β_4)		**0.007**					**-0.063** *		^	
		0.020					0.033			
Far from (point) target (β_2)	**0.025** *	**0.030**				**0.073** ***	**0.077** **	##		
	0.013	0.019				0.020	0.031			
Outside range (β_2+β_3+γ_1)		**0.028**					**0.016**	###	^	
		0.018					0.032			
Outside tolerance (β_2+β_4+γ_2)		**0.029**					**0.024**	#		
		0.027					0.035			
Observations	2,309	2,309				2,309	2,309			
R-squared	0.42	0.421				0.085	0.102			
Number of groups	10	10				10	10			
Avg disagreement inside	0.255	0.252				0.406	0.446			

EMEs

	Current-year forecasts (9)	(10)	Δ_1	Δ_2	Δ_3	*Next-year forecasts* (11)	(12)	Δ_1	Δ_2	Δ_3
Within range (β_3)		**0.069**					**0.133**			
		0.072					0.084			
Within tolerance (β_4)		**-0.021**			^^		**-0.159** **		^^	^^^
		0.058					0.081			
Far from (point) target (β_2)	**0.028**	**0.003**				**0.075** ***	**0.043**			
	0.027	0.066				0.028	0.087			
Outside range (β_2+β_3+γ_1)		**0.168** *		^^			**0.282** ***		^^	
		0.091					0.086			
Outside tolerance (β_2+β_4+γ_2)		**0.002**			^^		**-0.093**	###	^^^	^^^
		0.063					0.084			
Observations	1,510	1,510				1,510	1,510			
R-squared	0.272	0.305				0.102	0.268			
Number of groups	10	10				10	10			
Avg disagreement inside	0.342	0.348				0.448	0.734			

Notes: The table shows results whether disagreement across inflation forecasters depends on the (type of the) inflation target, comparing periods where inflation is close to target to periods where inflation is outside a range of plus/minus 1pp for point targets, or outside its interval for tolerance bands and target ranges for at least six preceding months in the previous year. The regression is conducted for the periods of stable IT regimes, following equations (9) and (10). Non-bold numbers in the upper part of the table are Driscoll and Kraay (1998) standard errors, which allow for heteroskedasticity, autocorrelation up to a maximum lag order of 12 and cross-sectional correlation. ***/**/*, ###/##/# and ^^^/^^/^ denote statistical significance at the 1%/5%/10% level. Δ_1 tests for differences when inflation is close and far from target, Δ_2 compares the coefficients relative to those estimated in the presence of point targets, Δ_3 compares the coefficients relative to those estimated in the presence of target ranges. Relevant fields for these tests are shaded.

Table 7: Robustness, dependence on realised inflation

All countries, next-year forecasts, with year f.e.	pre-IT vs IT						Close to vs. far from target					
	(1)	Δ_1	(2)	Δ_1	Δ_2	Δ_3	(3)	Δ_1	(4)	Δ_1	Δ_2	Δ_3
Pre-IT (β_1)	**0.643** ***		**0.701** ***				**0.656** ***		**0.767** ***			
	0.037		0.047				0.016		0.085			
Pre-range ($\beta_1+\gamma_2$)			**0.407** ***		^^^				**0.406** ***		^^^	
			0.024						0.088			
Pre-tolerance ($\beta_1+\gamma_3$)			**0.627** ***			^^^			**0.575** ***		^	
			0.026						0.044			
IT ($\beta_1+\gamma_1$)	**0.429** ***	###	**0.457** ***	###			**0.345** ***	###	**0.307** ***	###		
	0.024		0.073				0.029		0.028			
IT, range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.245** ***	###	^^^				**0.185** ***	#	^^^	
			0.023						0.033			
IT, tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.415** ***	###		^^^			**0.361** ***	###	^	^^^
			0.019						0.013			
Observations	359		359				325		325			
R-squared	0.751		0.797				0.633		0.675			
Number of groups	20		20				20		20			

All countries, next-year forecasts, all monthly observations	pre-IT vs IT						Close to vs. far from target					
	(5)	Δ_1	(6)	Δ_1	Δ_2	Δ_3	(7)	Δ_1	(8)	Δ_1	Δ_2	Δ_3
Pre-IT (β_1)	**0.703** ***		**0.756** ***				**0.562** ***		**0.577** ***			
	0.036		0.037				0.033		0.095			
Pre-range ($\beta_1+\gamma_2$)			**0.531** ***		^^^				**0.301** ***		^^^	
			0.061						0.037			
Pre-tolerance ($\beta_1+\gamma_3$)			**0.575** ***		^^				**0.544** ***			^^^
			0.077						0.038			
IT ($\beta_1+\gamma_1$)	**0.409** ***	###	**0.413** ***	###			**0.350** ***	###	**0.325** ***	###		
	0.025		0.051				0.024		0.030			
IT, range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.243** ***	###	^^^				**0.217** ***	#	^^^	
			0.025						0.031			
IT, tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.405** ***	##		^^^			**0.366** ***	###		^^^
			0.028						0.028			
Observations	4,278		4,278				3,817		3,817			
R-squared	0.775		0.81				0.584		0.63			
Number of groups	20		20				20		20			

All countries, 1-year average forecasts	pre-IT vs IT						Close to vs. far from target					
	(9)	Δ_1	(10)	Δ_1	Δ_2	Δ_3	(11)	Δ_1	(12)	Δ_1	Δ_2	Δ_3
Pre-IT (β_1)	**0.777** ***		**0.815** ***				**0.723** ***		**0.786** ***			
	0.022		0.060				0.024		0.067			
Pre-range ($\beta_1+\gamma_2$)			**0.638** ***		^^				**0.494** ***		^^^	
			0.025						0.041			
Pre-tolerance ($\beta_1+\gamma_3$)			**0.808** ***			^^^			**0.707** ***			^^^
			0.023						0.038			
IT ($\beta_1+\gamma_1$)	**0.598** ***	###	**0.664** ***	###			**0.555** ***	###	**0.596** ***	##		
	0.012		0.038				0.014		0.025			
IT, range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.453** ***	###	^^^				**0.443** ***		^^^	
			0.014						0.023			
IT, tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.603** ***	###		^^^			**0.567** ***	###		^^^
			0.017						0.016			
Observations	359		359				325		325			
R-squared	0.88		0.899				0.82		0.839			
Number of groups	20		20				20		20			

All countries, next-year forecasts, no disinflation	pre-IT vs IT						Close to vs. far from target					
	(13)	Δ_1	(14)	Δ_1	Δ_2	Δ_3	(15)	Δ_1	(16)	Δ_1	Δ_2	Δ_3
Pre-IT (β_1)	**0.571** ***		**0.546** ***				**0.573** ***		**0.505** ***			
	0.070		0.021				0.061		0.069			
Pre-range ($\beta_1+\gamma_2$)			**0.434** ***		^^^				**0.333** ***			
			0.028						0.059			
Pre-tolerance ($\beta_1+\gamma_3$)			**0.435** ***		^^^				**0.583** ***			^^
			0.013						0.043			
IT ($\beta_1+\gamma_1$)	**0.386** ***	##	**0.362** ***	###			**0.328** ***	###	**0.321** ***	###		
	0.035		0.050				0.033		0.032			
IT, range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.220** ***	###	^^^				**0.188** ***		^^^	
			0.016						0.032			
IT, tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.419** ***			^^^			**0.365** ***	###		^^^
			0.021						0.015			
Observations	345		345				321		321			
R-squared	0.575		0.664				0.559		0.608			
Number of groups	20		20				20		20			

All countries, next-year forecasts, plus inflation volatility	pre-IT vs IT						Close to vs. far from target					
	(17)	Δ_1	(18)	Δ_1	Δ_2	Δ_3	(19)	Δ_1	(20)	Δ_1	Δ_2	Δ_3
Pre-IT (β_1)	**0.605** ***		**0.666** ***				**0.584** ***		**0.506** ***			
	0.047		0.033				0.048		0.067			
Pre-range ($\beta_1+\gamma_2$)			**0.429** ***		^^^				**0.328** ***			
			0.032						0.065			
Pre-tolerance ($\beta_1+\gamma_3$)			**0.642** ***			^^			**0.608** ***			^^^
			0.087						0.031			
IT ($\beta_1+\gamma_1$)	**0.385** ***	###	**0.363** ***	###			**0.331** ***	###	**0.321** ***	###		
	0.027		0.049				0.021		0.031			
IT, range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.222** ***	###	^^				**0.188** ***		^^^	
			0.018						0.031			
IT, tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.408** ***	##		^^^			**0.358** ***	###		^^^
			0.017						0.012			
Observations	355		355				321		321			
R-squared	0.697		0.755				0.583		0.631			
Number of groups	20		20				20		20			

All countries, next-year forecasts, 3-month lagged inflation	pre-IT vs IT						Close to vs. far from target					
	(21)	Δ_1	(22)	Δ_1	Δ_2	Δ_3	(23)	Δ_1	(24)	Δ_1	Δ_2	Δ_3
Pre-IT (β_1)	**0.625** ***		**0.669** ***				**0.645** ***		**0.715** ***			
	0.047		0.015				0.031		0.065			
Pre-range ($\beta_1+\gamma_2$)			**0.461** ***		^^^				**0.367** ***		^^^	
			0.020						0.054			
Pre-tolerance ($\beta_1+\gamma_3$)			**0.521** ***		^				**0.627** ***			^^^
			0.079						0.042			
IT ($\beta_1+\gamma_1$)	**0.400** ***	###	**0.344** ***	###			**0.342** ***	###	**0.316** ***	###		
	0.030		0.056				0.026		0.029			
IT, range ($\beta_1+\gamma_1+\gamma_2+\delta_1$)			**0.237** ***	###	^				**0.199** ***	#	^^	
			0.019						0.047			
IT, tolerance ($\beta_1+\gamma_1+\gamma_3+\delta_2$)			**0.417** ***			^^^			**0.364** ***	###	^	^^^
			0.016						0.010			
Observations	352		352				325		325			
R-squared	0.719		0.77				0.609		0.647			
Number of groups	20		20				20		20			

Notes: The table shows robustness tests relative to Tables 3 and 4. For more details, see the notes to these tables.

Table 8: Robustness, disagreement

	All countries, next-year forecasts, year f.e.									
	Pre-IT vs. IT					*Close to vs. far from target*				
	(1)	(2)	Δ_1	Δ_2	Δ_3	(3)	(4)	Δ_1	Δ_2	Δ_3
Pre-range (β_3)		**0.509** **		^^			**-0.035**			
		0.212					0.028			
Pre-tolerance (β_4)		**0.533** *		^			**-0.089** ***		^^^	^^
		0.288					0.026			
IT (β_2)	**-0.281** ***	**-0.027**				**0.051** ***	**0.086** ***	###		
	0.068	0.062				0.016	0.026			
IT, range ($\beta_2+\beta_3+\gamma_1$)		**-0.066**	###	^			**0.017**	#	^^	
		0.075					0.025			
IT, tolerance ($\beta_2+\beta_4+\gamma_2$)		**-0.136** *	##	^^^	^^^		**-0.043** *	##	^^^	^^^
		0.070					0.025			
Observations	4311	4311				3,819	3,819			
R-squared	0.386	0.444				0.207	0.236			
Number of groups	20	20				20	20			
Avg disagreement pre-IT	0.995	0.790				0.422	0.463			

	All countries, next-year forecasts, only July									
	Pre-IT vs. IT					*Close to vs. far from target*				
	(5)	(6)	Δ_1	Δ_2	Δ_3	(7)	(8)	Δ_1	Δ_2	Δ_3
Pre-range (β_3)		**0.338**					**-0.054**			
		0.240					0.035			
Pre-tolerance (β_4)		**0.503** **		^^			**-0.141** ***		^^^	^^^
		0.193					0.027			
IT (β_2)	**-0.290** ***	**-0.055**				**0.080** ***	**0.067**			
	0.067	0.128				0.019	0.041			
IT, range ($\beta_2+\beta_3+\gamma_1$)		**-0.092**	##				**0.031**	###		
		0.157					0.024			
IT, tolerance ($\beta_2+\beta_4+\gamma_2$)		**-0.179**	###	^^^	^^		**-0.038**	###	^^	^^
		0.137					0.026			
Observations	362	362				325	325			
R-squared	0.353	0.413				0.141	0.186			
Number of groups	20	20				20	20			
Avg disagreement pre-IT	0.952	0.740				0.415	0.476			

	All countries, 1-year average forecasts									
	Pre-IT vs. IT					*Close to vs. far from target*				
	(9)	(10)	Δ_1	Δ_2	Δ_3	(11)	(12)	Δ_1	Δ_2	Δ_3
Pre-range (β_3)		**0.429** **		^^			**-0.001**			
		0.216					0.023			
Pre-tolerance (β_4)		**0.441** *		^			**-0.032**			^
		0.241					0.022			
IT (β_2)	**-0.223** ***	**-0.022**				**0.054** ***	**0.058** ***	###		
	0.062	0.066				0.018	0.022			
IT, range ($\beta_2+\beta_3+\gamma_1$)		**-0.012**	##				**0.061** **	##		
		0.074					0.025			
IT, tolerance ($\beta_2+\beta_4+\gamma_2$)		**-0.070**	##	^^^	^^^		**0.019**	##	^^	^^
		0.069					0.021			
Observations	4311	4311				3,819	3,819			
R-squared	0.304	0.351				0.12	0.128			
Number of groups	20	20				20	20			
Avg disagreement pre-IT	0.829	0.638				0.397	0.397			

	All countries, next-year forecasts, no disinflation									
	Pre-IT vs. IT					*Close to vs. far from target*				
	(13)	(14)	Δ_1	Δ_2	Δ_3	(15)	(16)	Δ_1	Δ_2	Δ_3
Pre-range (β_3)		**0.454** *		^			**-0.035**			
		0.241					0.031			
Pre-tolerance (β_4)		**0.473**					**-0.121** ***		^^^	^^^
		0.522					0.032			
IT (β_2)	**-0.313** ***	**-0.064**				**0.071** ***	**0.068** **	##		
	0.091	0.060				0.018	0.031			
IT, range ($\beta_2+\beta_3+\gamma_1$)		**-0.079**	###				**0.053** *	###		
		0.072					0.029			
IT, tolerance ($\beta_2+\beta_4+\gamma_2$)		**-0.178** ***		^^^	^^^		**-0.049** *	###	^^^	^^^
		0.067					0.025			
Observations	4112	4112				3,777	3,777			
R-squared	0.173	0.239				0.075	0.118			
Number of groups	20	20				20	20			
Avg disagreement pre-IT	0.824	0.548				0.438	0.470			

	All countries, next-year forecasts, plus inflation volatility									
	Pre-IT vs. IT					*Close to vs. far from target*				
	(17)	(18)	Δ_1	Δ_2	Δ_3	(19)	(20)	Δ_1	Δ_2	Δ_3
Pre-range (β_3)		**0.405** **		^^			**-0.034**			
		0.201					0.029			
Pre-tolerance (β_4)		**0.466** *		^			**-0.118** ***		^^^	^^^
		0.269					0.029			
IT (β_2)	**-0.327** ***	**-0.073**				**0.060** ***	**0.059** **	##		
	0.078	0.046				0.016	0.030			
IT, range ($\beta_2+\beta_3+\gamma_1$)		**-0.086**	###				**0.049** *	###		
		0.057					0.027			
IT, tolerance ($\beta_2+\beta_4+\gamma_2$)		**-0.197** ***	##	^^^	^^^		**-0.062** **	###	^^^	^^^
		0.047					0.025			
Observations	4252	4252				3,781	3,781			
R-squared	0.334	0.392				0.1	0.146			
Number of groups	20	20				20	20			
Avg disagreement pre-IT	0.995	0.790				0.422	0.463			

	All countries, next-year forecasts, interdecile range									
	Pre-IT vs. IT					*Close to vs. far from target*				
	(21)	(22)	Δ_1	Δ_2	Δ_3	(23)	(24)	Δ_1	Δ_2	Δ_3
Pre-range (β_3)		**0.993** *		^			**-0.098** **		^^	
		0.568					0.049			
Pre-tolerance (β_4)		**0.913** *		^			**-0.235** ***		^^^	^^^
		0.533					0.053			
IT (β_2)	**-0.633** ***	**-0.121**				**0.133** ***	**0.079**			
	0.152	0.113				0.035	0.049			
IT, range ($\beta_2+\beta_3+\gamma_1$)		**-0.153**	##				**0.091** *	###		
		0.134					0.051			
IT, tolerance ($\beta_2+\beta_4+\gamma_2$)		**-0.329** ***	##	^^^	^^^		**-0.088** *	###	^^^	^^^
		0.113					0.049			
Observations	4311	4311				3,819	3,819			
R-squared	0.311	0.364				0.126	0.167			
Number of groups	20	20				20	20			
Avg disagreement pre-IT	1.992	1.558				0.856	0.942			

Notes: The table shows robustness tests relative to Tables 5 and 6. For more details, see the notes to these tables.

Appendix Table 1: Classification of inflation targeting regimes

Country	Date	Target type	Targeted inflation	Point target	Lower bound	Upper bound	Country classification
Australia	1993m4	range	CPI inflation	--	2	3	AE
Brazil	1999m6	point-tolerance	IPCA inflation	8	6	10	EME
	2000m1	point-tolerance	IPCA inflation	6	4	8	
	2001m1	point-tolerance	IPCA inflation	4	2	6	
	2002m1	point-tolerance	IPCA inflation	3.5	1.5	5.5	
	2003m1	point-tolerance	IPCA inflation	3.25	1.25	5.25	
	2004m1	point-tolerance	IPCA inflation	5.5	3	8	
	2005m1	point-tolerance	IPCA inflation	4.5	2	7	
	2006m1	point-tolerance	IPCA inflation	4.5	2.5	6.5	
	2017m1	point-tolerance	IPCA inflation	4.5	3	6	
	2018m1	point-tolerance	IPCA inflation	4.25	2.75	5.75	
	2020m1	point-tolerance	IPCA inflation	4	2.5	5.5	
Canada	1991m1	range	CPI inflation	3	2	4	AE
	1992m1	range	CPI inflation	2.5	1.5	3.5	
	1993m12	range	CPI inflation	2	1	3	
Chile	2000m1	point	CPI inflation	3.5	--	--	EME
	2001m1	point-tolerance	CPI inflation	3	2	4	
Colombia	1999m9	point	CPI inflation	15	--	--	EME
	2000m1	point	CPI inflation	10	--	--	
	2001m1	point	CPI inflation	8	--	--	
	2002m1	point	CPI inflation	6	--	--	
	2003m1	point-tolerance	CPI inflation	3	2	4	
Czech Republic	1998m1	range	CPI inflation	--	5.5	6.5	AE
	1999m1	range	CPI inflation	--	4	5	
	2000m1	range	CPI inflation	--	3.5	5.5	
	2001m1	range	CPI inflation	--	2	4	
	2002m1	range	CPI inflation	--	1.5	3.5	
	2005m1	range	CPI inflation	--	1	3	
	2006m1	point-tolerance	CPI inflation	3	2	4	
	2010m1	point-tolerance	CPI inflation	2	1	3	
Euro Area	1999m1	?	HICP inflation	<2	--	--	AE
Hungary	2001m6	point	CPI inflation	7	--	--	EME
	2001m12	point	CPI inflation	7	--	--	
	2003m10	point	CPI inflation	3.5	--	--	
	2004m11	point	CPI inflation	3.5	--	--	
	2007m1	point	CPI inflation	3	--	--	
	2015m3	point-tolerance	CPI inflation	3	2	4	
India	2014m1	point	CPI inflation	8	--	--	EME
	2015m1	point	CPI inflation	6	--	--	
	2016m8	point-tolerance	CPI inflation	4	2	6	
Indonesia	2005m6	point-tolerance	CPI inflation	6	5	7	EME
	2006m1	point-tolerance	CPI inflation	8	7	9	
	2007m1	point-tolerance	CPI inflation	6	5	7	
	2008m1	point-tolerance	CPI inflation	5	4	6	
	2009m1	point-tolerance	CPI inflation	4.5	3.5	5.5	
	2010m1	point-tolerance	CPI inflation	5	4	6	
	2012m1	point-tolerance	CPI inflation	4.5	3.5	5.5	
	2015m1	point-tolerance	CPI inflation	4	3	5	
	2018m1	point-tolerance	CPI inflation	3.5	2.5	4.5	

Appendix Table 1 (continued): Classification of inflation targeting regimes

Country	Date	Target type	Targeted inflation	Point target	Lower bound	Upper bound	Country classification
Japan	2012m2	point	CPI inflation	1	--	--	AE
	2013m1	point	CPI inflation	2	--	--	
Korea	1999m1	point-tolerance	CPI inflation	3	2	4	AE
	2000m1	point-tolerance	CPI (excl. oil/agric.) inflation	2.5	1.5	3.5	
	2001m1	point-tolerance	CPI (excl. oil/agric.) inflation	3	2	4	
	2004m1	range	CPI (excl. oil/agric.) inflation	--	2.5	3.5	
	2007m1	point-tolerance	CPI inflation	3	2.5	3.5	
	2010m1	point-tolerance	CPI inflation	3	2	4	
	2013m1	range	CPI inflation	--	2.5	3.5	
	2016m1	point	CPI inflation	2	--	--	
Mexico	2001m1	point	CPI inflation	6.5	--	--	EME
	2002m1	point	CPI inflation	4.5	--	--	
	2003m1	point-tolerance	CPI inflation	3	2	4	
New Zealand	1990m4	range	CPI inflation	--	3	5	AE
	1990m12	range	CPI inflation	--	2.5	4.5	
	1991m12	range	CPI inflation	--	1.5	3.5	
	1992m12	range	CPI inflation	--	0	2	
	1996m12	range	CPI inflation	--	0	3	
	2002m11	range	CPI inflation	--	1	3	
Norway	2001m3	point	CPI inflation	2.5	--	--	AE
	2018m3	point	CPI inflation	2	--	--	
Philippines	2002m1	range	CPI inflation	--	5	6	EME
	2003m1	range	CPI inflation	--	4.5	5.5	
	2004m1	range	CPI inflation	--	4	5	
	2005m1	range	CPI inflation	--	5	6	
	2006m1	range	CPI inflation	--	4	5	
	2008m1	point-tolerance	CPI inflation	4	3	5	
	2009m1	point-tolerance	CPI inflation	3.5	2.5	4.5	
	2010m1	point-tolerance	CPI inflation	4.5	3.5	5.5	
	2011m1	point-tolerance	CPI inflation	4	3	5	
	2015m1	point-tolerance	CPI inflation	3	2	4	
Poland	1998m10	point	CPI inflation	9.5	--	--	EME
	1999m1	range	CPI inflation	--	6.6	7.8	
	2000m1	range	CPI inflation	--	5.4	6.8	
	2001m1	range	CPI inflation	--	6	8	
	2002m1	point-tolerance	CPI inflation	5	4	6	
	2003m1	point-tolerance	CPI inflation	2.5	2	3	
	2004m1	point-tolerance	CPI inflation	2.5	1.5	3.5	
Sweden	1995m1	point-tolerance	CPI inflation	2	1	3	AE
	2010m1	point	CPI inflation	2	--	--	
	2017m9	point-tolerance	CPIF inflation	2	1	3	
Switzerland	2000m1	?	CPI inflation	<2	--	--	AE
Thailand	2000m5	range	CPI inflation	--	0	3.5	EME
	2009m1	range	CPI inflation	--	0.5	3	
	2015m1	point-tolerance	CPI inflation	2.5	1	4	
	2020m1	range	CPI inflation	--	1	3	
United Kingdom	1993m1	point	RPIX inflation	2.5	--	--	AE
	2003m12	point	CPI inflation	2	--	--	
United States	2012m1	point	CPI inflation	2	--	--	AE