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**Working Paper**

## Considerations on the monetary policy framework of the European Central Bank

CBM Working Papers, No. WP/01/2022

**Provided in Cooperation with:**

Central Bank of Malta, Valletta

*Suggested Citation:* Tosato, Andrea Giorgio (2022) : Considerations on the monetary policy framework of the European Central Bank, CBM Working Papers, No. WP/01/2022, Central Bank of Malta, Valletta

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# CENTRAL BANK OF MALTA WORKING PAPER



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# Considerations on the Monetary Policy Framework of the European Central Bank\*

Andrea Giorgio Tosato<sup>†</sup>

WP/01/2022

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\* I am indebted to John Caruana, Gabriele Galati, Aaron G. Grech, Alexander Demarco and Rita Schembri for valuable comments. All errors are my own.

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## **Abstract**

This working paper offers some considerations on the monetary policy framework of the European Central Bank. The trade-offs arising from adopting a point target configuration over a range target one are assessed in terms of their flexibility vs. inflation anchoring properties. This layout is then confronted with the policy framework in use in the euro area prior to the adoption of the new monetary strategy, which is interpreted as leaning on the side of flexibility. The increased likelihood of dis-anchoring of long-term inflation expectations experienced in the euro area since 2013, however, suggests that the policy framework could benefit from a rebalancing towards a formulation with stronger anchoring properties. The inflation aim of the ECB could thus be reformulated with the introduction of a symmetric 2%-point target. By evaluating this arrangement in terms of the price stability definition, two regions emerge where either the policy aim (symmetric 2%-point target) or the price stability definition (between 0% and 2%) are satisfied, but not both. To avoid any inconsistency in the policy framework, an inflation aim centred at 2% requires an amendment of the price stability definition.

**JEL Classification:** E42, E52, E58

**Keywords:** Inflation Targeting, European Central Bank, Inflation Expectations, Price Stability

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## 1. Introduction<sup>1</sup>

The Great Financial Crisis of 2007-8 and its subsequent reverberations created a challenging macroeconomic environment for central banks. The widespread economic disruption, especially in international trade, triggered deflationary tendencies that proved hard to counteract, exposing the limits of conventional monetary policy, forcing central banks to deploy non-standard tools in the attempt to meet their objectives. This was particularly true for monetary authorities such as the European Central Bank (ECB), whose remit enshrines the notion of price stability. Since 2013, HICP inflation in the euro area has fallen short of its target, prompting a reflection among academics and policymakers on the monetary policy framework of the ECB. Partly because of this, the ECB launched a review of its monetary policy strategy in January 2020.

An earlier version of this paper contributed to the ECB work-stream on the ECB's price stability objective in the context of the strategy review.

The first Chapter of this paper overviews the macroeconomic conditions that prompted the emergence and diffusion of the Inflation Targeting (IT) framework in monetary policy. After more than two decades of relative stability, the collapse of the Bretton Woods System and the oil-shocks of 1973 and 1979 led many central banks in the developed world to embrace a monetarist paradigm for the conduct of monetary policy in an effort to curb spiralling inflation rates. Due to the instability of the relationship between money aggregates and prices, however, the monetarist framework proved hard to implement in practice, forcing policymakers to look for alternatives. As inflation rates moderated throughout the 1980s from the highs of the previous decade, conditions were ripe for the emergence of Inflation Targeting, which made its debut in New Zealand in 1990.

The historical *excursus* of the first section gives way to a discussion of the various policy configurations that IT can take in Chapter 2. These target specifications are analysed in terms of their flexibility and in terms of their anchoring of households' and firms' inflation expectations. Preserving the anchoring of inflation expectations on target is crucial because it is evidence of the credibility of the monetary authority and thus of its capacity to deliver on price stability. It is assumed that a point target specification maximizes the anchoring of inflation expectations at the expense of a reduced flexibility, while the opposite holds for a range target specification, a point with tolerance band arrangement falling somewhere in between.<sup>2</sup> The main takeaway from this chapter is that the widespread awareness that

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<sup>1</sup> The bulk of this paper was penned in the spring of 2020 as a contribution to the ECB work-stream on the Price Stability Objective. The paper was later amended to account for the results of the 2020-21 ECB Strategy Review.

<sup>2</sup> There is no conclusive evidence that point targets deliver a stronger anchoring of long-run inflation expectations than range targets. The inherent simplicity of communicating the inflation aim via a point target coupled with the role of inflation expectations in monetary policymaking have nevertheless led central bankers to interpret the adoption of a point target as a more binding commitment to price stability, especially over longer horizons. See Orphanides and Williams (2004), Beechey and Österholm (2018) and Cecioni et al. (2021) and, for a different view, Galati et al. (2020b) and Ehrmann (2021).

inflation targets cannot be met at all times makes a point with tolerance band largely redundant compared to a simple point target design, which always comes with *implicit* tolerance bands.

In Chapter 3, the analysis is extended to another element at the heart of the monetary policy framework: the horizon to price stability. Once clarified that the length of the horizon hinges on the lags with which monetary policy transmits to the real economy, it is emphasized that a quantitative estimation of the lags suffers from substantial uncertainty, as it varies over time and jurisdictions. The choice over the length of the price stability horizon is thus recast in terms of flexibility vs. anchoring of inflation expectations, whereby a longer horizon equals more flexibility and vice-versa.

The next Chapter builds on the previous findings to set out a benchmark for the evaluation of the monetary policy framework of the ECB. In Chapter 4 it is argued that the monetary policy framework should avoid pairing specifications that feature analogous properties. For example, a range target coupled with a longer horizon would grant more than enough flexibility to the decision maker, while arguably falling short on the anchoring side. A more balanced mix entails elements of anchoring alongside elements of flexibility. The difficulties in estimating the length of the price stability horizon and the need to accommodate an escape clause seem to suggest that an escape clause most naturally fit in the targeting horizon, whose ample flexibility is thus a vital characteristic of the strategic framework.

Following the analysis outlined in the previous section, Chapter 5 examines the ECB's policy framework in this regard. Since the horizon to price stability is expressed in a way that does not bind the central bank to any considerable degree, and the formulation of the policy aim may be described as a range target with *implicit* bands, the policy framework of the ECB is interpreted as leaning on the flexibility side. However, the increasing risk of dis-anchoring of long-term inflation expectations experienced in the euro area since 2013 seems to suggest that the monetary policy framework could benefit from the adoption of an arrangement with more emphasis on the anchoring of inflation expectations.<sup>3</sup>

Chapter 6 therefore examines a potential amendment of the inflation aim of the ECB by considering a symmetric 2%-point target. While this revision would arguably strengthen the anchoring properties of the inflation aim, it could end up being inconsistent with the price stability definition adopted in 1998. For example, when HICP inflation is on target, at 2%, the definition of price stability (“a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of *below* 2%”) is not met. To avoid any inconsistency in the policy framework, an inflation aim centred at 2% requires a change in the definition of price stability, which could be amended by dropping its quantitative component.

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<sup>3</sup> Corsello et al. (2019)

Chapter 7 offers some concluding remarks.

## 2. A Brief History of the Inflation Targeting Framework

The birth of the monetary policy framework known as Inflation Targeting (IT) dates back to the 1990s, when New Zealand pioneered its adoption - soon to be followed by a number of advanced and emerging economies. As of today, many jurisdictions have adopted an inflation targeting framework in the conduct of monetary policy.<sup>4</sup> Its widespread adoption shows that IT emerged from a process of historical transformation that was global. Its roots can be traced back to the 1970s, when the demise of the Keynesian social compromise that fostered the post-WWII recovery arguably began. This section provides a brief overview of the economic developments that contributed to the emergence of this framework.

### 2.1 The crisis of the golden anchor

The suspension of the convertibility between the US dollar and gold in 1971 certified the end of the monetary regime that had been regulating international exchanges since the Savannah Conferences of 1946. The unsustainability of the gold anchor gradually emerged as the world's dollar famine of the post war years turned into the dollar flood of the subsequent decades.<sup>5</sup> Until then, foreign creditors absorbed US deficits by accumulating dollars on the presumption that they could be exchanged for gold upon request.<sup>6</sup> Eventually, however, US domestic spending in the pursuit of full employment and foreign policy interventionism widened the balance of payments deficit and made it increasingly challenging to assure the convertibility at the prescribed rate. Already in the early 1950s, the dollar price of gold began to move away from the official rate, indicating an overvaluation of the American currency.<sup>7</sup> In an attempt to put an end to the drain of gold, in 1961 Western European countries and the United States agreed to pool a share of their reserves to keep the market exchange rate between gold

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<sup>4</sup> An exact quantification of inflation targeting central banks is a tricky exercise. In practice, path dependency and national specificities pushed central banks to adopt policy frameworks that may closely resemble inflation targeting despite missing some of its features. For example, the US Federal Reserve and the European Central Bank do not consider themselves inflation targeters, although they appear to have informally adopted this approach. According to the 2018 IMF Annual Report on Exchange Arrangements and Exchange Restrictions, the number of countries directly targeting inflation is 41. See IMF (2018) <https://www.imf.org/en/Publications/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions/Issues/2019/04/24/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions-2018-46162>

<sup>5</sup> See Federal Reserve Bank of St. Louis (1961).

<sup>6</sup> The volume of gold sales did not necessarily reflect the size of the deficit: “[d]uring the period 1950-56, the United States ran deficits totalling \$10.8 billion, but gold sales amounted to only \$3.2 billion. In 1959, a deficit of \$3.8 billion was accompanied by an outflow of gold of only \$700 million.” (ibid.,3.)

<sup>7</sup> In particular, the price of gold in the London gold market, reopened in 1954, became a barometer of the credibility of the Bretton Woods’ peg between the dollar and gold.



and dollar at the prescribed value. In retrospect, these efforts to amend the Bretton Woods system proved vain. The ballooning costs of the US involvement in the Vietnam conflict aggravated the balance of payments deficit of the US, resulting in the appreciation of gold in terms of the US dollar in global markets.<sup>8</sup> Anticipated years earlier by Robert Triffin, the United States were confronted with a dilemma: raising domestic interest rates to turn its external deficit into a surplus, or suspend the dollar's convertibility.<sup>9</sup> In the end, US President Nixon declared the suspension of the dollar's convertibility in the summer of 1971, breaking the dollar free and instituting what came to be known as the "fiat money" regime. Notwithstanding some attempts to reinstate the system on more solid foundations in the following years, the "Nixon shock" can be regarded as the end of the Bretton Woods system.

## 2.2 The monetarist interregnum

The second key development of the decade came in two rounds. First in 1973 and then in 1979, the world economy was brought to its knees by the so called "oil shocks". The sudden rise in the price of oil led to high inflation and high unemployment, or stagflation, and exacerbated the crisis of Keynesianism to the point of no return. Stagflation was instrumental in showing that lower unemployment could not be traded-off for higher inflation rates anymore. The doctrines that inspired macroeconomic management in the *Trente Glorieuses* (1945-1975) were unable to cater for these unprecedented macroeconomic conditions. Unprecedented conditions demanded exceptional policy responses.

In Europe, the parities between the US dollar and major European currencies were redefined by the Smithsonian Agreement in December 1971, which allowed several currencies to fluctuate with a wider 2.25% band around central bilateral exchange rates against the dollar. While the experiment proved short-lived and was later abandoned, it shows that the need for coordination, particularly at the European level, was deeply felt. Soon after, in 1979, the European Monetary System (EMS) would be set up for the same purpose.

On the other side of the ocean, amid widespread discontent running through the fabric of American society, inflation reached double digits in the 1970s and rose to a staggering 13.5% by 1980.<sup>10</sup> In 1979,

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<sup>8</sup> See Bordo, Monnet and Naef (2019) and Eichengreen (2010).

<sup>9</sup> "...if the United States corrected its persistent balance-of-payments deficits, the growth of world reserves could not be fed adequately by gold production at \$35 an ounce, but that if the United States continued to run deficits, its foreign liabilities would inevitably come to exceed by far its ability to convert dollars into gold upon demand and would bring about a "gold and dollar crisis." In Triffin (1978:2).

<sup>10</sup> What was later dubbed *American malaise of the 1970s*, resulted from a panoply of shocks that mined Americans' confidence in the future of their country. President Carter famously addressed these issues in a televised speech in 1979: "We remember when the phrase 'sound as a dollar' was an expression of absolute dependability, until ten years of inflation began to shrink our dollar and our savings. We believed that our nation's resources were limitless until 1973, when we had to face a growing dependence on foreign oil." See Carter (1979). For further reference, Ferguson, Mayer, Manela and Sargent (2011).

the appointment of Paul Volcker as governor of the Federal Reserve System marked a turning point. With the clear priority of curbing inflationary trends, the Federal Fund Rate climbed to almost 20% in 1980 triggering a severe economic contraction. Unemployment increased to more than 10%.<sup>11</sup> While costly in terms of lost output, Volcker's aggressive policies were successful: inflation fell to 3% by 1983.<sup>12</sup> The immediate achievements of the Federal Reserve were of extraordinary importance for the US economy in taming inflation, but they had equally relevant long-term consequences for the rest of the world. Specifically, Volcker proved that central banks could effectively steer inflation.<sup>13</sup> In doing so Volcker's experiment also sanctioned the rise of monetarism, which quickly became central banks' framework of choice to conduct monetary policy in the new macroeconomic environment.

Armed with a new monetary policy framework, the West muddled through the 1970s and 1980s in search of a *modus operandi* for the non-system post-Bretton Woods.<sup>14</sup> In the meantime, academia took note of the newly acquired standing of central banks and soon important theoretical insights were produced. In a nutshell, the economic profession united against an activist approach to monetary policy. Impacting real variables with a lag, policymakers' attempt at stabilizing the economy may inadvertently aggravate its fluctuations.<sup>15</sup> Furthermore, the notion of long-run money neutrality articulated by Phelps (1967, 1968) profoundly altered the perceived trade-off between inflation and unemployment, which remained a policy lever only in the short-term. Lastly, a strand of the burgeoning literature interpreted the high inflation of those years in terms of the notion of "time-inconsistency".<sup>16</sup> This concept posits that it is rational for decision makers to deviate from their prior commitments. For example, firms and workers may agree to set nominal wages or prices based on the expectation that monetary policy will deliver an inflation rate of, say, 2%. Once these wage and price decisions have been made, however, the monetary authority has an incentive to deviate, allowing inflation to rise, for instance to push unemployment below its natural rate. Anticipating this reaction, the public would act as if inflation rates were to be higher than communicated, thereby leading to a self-fulfilling upward inflation bias.<sup>17,18</sup>

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<sup>11</sup> [https://www.federalreservehistory.org/essays/recession\\_of\\_1981\\_82](https://www.federalreservehistory.org/essays/recession_of_1981_82)

<sup>12</sup> While undoubtedly effective in bringing inflation under control, decreasing oil prices arguably contributed to disinflation just like they were partly behind the inflation spikes of the 1970s. "May I remind you that we shouldn't take too much credit for the price easing? I never thought we were totally at fault for the price increases that we suffered from OPEC and food; and I don't think the fact that OPEC and food have calmed down has a great deal to do with monetary policy per se, except in the very long run. (Teeters, N.H. FOMC meeting, July 1981, page 46)"

<sup>13</sup> Indeed, until the 1970s fiscal policy was regarded as the only tool to address what was perceived to be, in line with Keynesian theories, a demand side problem. See Thornton (2012).

<sup>14</sup> On the non-system post Bretton Woods see Williamson (1977).

<sup>15</sup> Friedman (1968)

<sup>16</sup> Kydland and Prescott (1977) and Barro and Gordon (1983)

<sup>17</sup> This applies within a rational expectations framework. For an overview, see Walsh (2010).

<sup>18</sup> The former governor of the Bank of England, Mark Carney (2017), effectively summarised the issue: "The instrument that affects inflation most powerfully – monetary policy – also affects output and employment, at least in the short run. That influence tempted authorities to promise low inflation in the future, but then to renege in order to boost activity. Electoral cycles reinforced this predisposition. Firms and households began to anticipate these incentives, however, and eventually preempt them. The economy ended up in a worse equilibrium with higher inflation and unemployment. Such time-inconsistent policies contributed to excessive inflation and higher structural unemployment in the UK during the 1970s and 1980s (when inflation averaged 9.5% and unemployment over 7.5%)".

The formalization of the time-inconsistency problem by Kydland and Prescott (1977) cemented the foundations of the rule-based approach to monetary policymaking. Later, Barro and Gordon (1983) substantiated this view: once it is acknowledged that agents' expectations matter for future inflation, it was natural to conclude that a system of well-defined rules could deliver better outcomes than no rules at all. On the other hand, proponents of the discretionary approach were quick to point out that "tying the hands" of the policymakers had several limitations, including the inability to account for temporary shocks and structural changes in the economy.<sup>19</sup>

Having clarified the origins and nature of the inflation outbursts of the 1970s, the economic profession turned to "fixing the problem". One set of proposals elaborated by Barro and Gordon (1983) focused on increasing the marginal cost of inflation for the monetary authority. One way to achieve this was to select a policymaker with preferences that differed from those of the community. Rogoff (1985) showed that the appointment of a conservative central banker, someone whose utility is more negatively affected by inflation, could overcome the inflation bias problem. Alternatively, the compensation package of the policymaker could be linked to the attainment of a given policy goal. A second set of solutions took the form of checks on the performance of the central bank in terms of its monetary policy aim through new accountability mechanisms, such as enhanced communication with the public and appearances before national parliaments.

### **2.3 The early adopters and the spread of IT around the world**

The adoption of IT in New Zealand resulted from the urgency of achieving and maintaining price stability.<sup>20</sup> Over the 1970s and 1980s, on top of exogenous, global, factors, government spending in New Zealand contributed to drive inflation rates upward.<sup>21</sup> As inflation spiked to double-digit highs, monetary policy tightened and inflation fell, but remained volatile throughout. The direct involvement of the monetary authority in the financing of fiscal deficits and the instability of the demand for money function made the targeting of monetary aggregates ineffective in controlling inflation.<sup>22</sup> Finding a viable solution to this conundrum became a political priority in the mid-1980s.<sup>23</sup> The results of this institutional process were formalized in the RBNZ Act of December 1989, which redefined the mandate

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<sup>19</sup> The break-down of the monetarist doctrine in the conduct of monetary policy is often attributed to structural changes in the economy like deregulation and financial innovation.

<sup>20</sup> More precisely, the RBNZ Act of 1989 states that the goal of the RBNZ is "to formulate and implement monetary policy directed to the economic objective of achieving and maintaining stability in the general level of prices" (Section 8). See also (McDermott and Williams, 2018).

<sup>21</sup> See Alesina, Cohen and Roubini (1991, 1993) and Evans, Grimes, Wilkinson and Teece (1996).

<sup>22</sup> Mishkin and Posen (1998) report that according to "some observers", central banks' attempt to exploit the relationships between monetary aggregates and nominal income caused it to breakdown. One of such observers was Charles Goodhart, whom formulated a critique of money targeting in the UK based on the idea that "any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes". This concept is today known as Goodhart's law. See Goodhart (1984).

<sup>23</sup> See Brash (1996).

of the Reserve Bank of New Zealand (RBNZ) along four lines: (i) operational independence, (ii) transparency, (iii) single objective and (iv) single decision maker.

The Act attributed to the Governor of the RBNZ the responsibility for the attainment of price stability, while the previous, wider, list of goals (e.g., full employment) was removed to boost the credibility of the new framework.<sup>24</sup> A numerical target, between 0-2 percent, was set out to assess the performance of the institution. Drawing on the results of the academic literature on time inconsistency, the notion of operational independence was incorporated in the reformed arrangement. The Act also prescribed some checks on the central bank. Specifically, the Bank was compelled to regularly disclose its policy resolutions to the Parliament and to the Minister.<sup>25</sup> Having averaged above 10% throughout the 1970s and 1980s, inflation reached 17% in 1985 and in the years going up to the reform one-off factors brought it down to around 5%.<sup>26</sup> Once in place, the new framework quickly proved very effective in bringing inflation on target as the growth rate of prices remained at roughly 1% between 1991 and 1992.<sup>27</sup>

These accomplishments contributed to the subsequent spread of IT around the world. Equally dissatisfied with the monetarist approach, the Bank of Canada followed the lead of the RBNZ and began operating under an inflation targeting framework in February 1991.<sup>28</sup> In terms of price developments, from roughly 12% in 1981, inflation fell to around 4-5% throughout the 1980s and plunged more than 4 percentage points, to 1.5%, as the Bank switched to the new arrangement in 1991. Soon after, the breakdown of the European Monetary System in 1992 forced several European countries to find a new policy anchor. Having proved its worth in the field, IT offered an immediate and reliable alternative. Thus, in rapid succession, Sweden, the United Kingdom and Finland switched to targeting inflation alongside New Zealand and Canada.

The abrupt exit from the ERM deprived the United Kingdom of the anchor it had been seeking since the 1980s, thereby jeopardizing its pledge to price stability.<sup>29</sup> The resulting need to reaffirm this commitment was thus a key element behind the switch to IT in October 1992, weeks after the EMS experiment came to an end. All considered, then, the swing from exchange rate targeting to inflation

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<sup>24</sup> Lachler (1988).

<sup>25</sup> For example, the Board was mandated to submit to the Minister, within three months from the end of the financial year, an annual report assessing whether the Monetary Policy Committee (MPC), the Governor, the Deputy Governor and the other members of the MPC had adequately discharged their respective responsibilities and whether monetary policy was carried out in coherence with the Bank's objectives.

<sup>26</sup> RBNZ Bulletin 53, no. 1, 1990.

<sup>27</sup> It is worth pointing out that the empirical literature is ambiguous as to the extent to which inflation targeting contributed to reducing inflation. While Ball and Sheridan (2003) argued for no evidence of improved performance of inflation-targeting central banks, Hyvonen (2004) found that IT did play a positive role. Evidence is more conclusive as to IT's success in anchoring inflation expectations around the inflation target. See Orphanides and Williams (2003).

<sup>28</sup> A precondition for switching to IT is being able to forecast future inflation with sufficient precision. The high and volatile inflation of the 1980s made it very difficult to do so, thereby exposing the monetary authority to a credibility risk. This is arguably why in many countries the formal introduction of IT happened only once price developments moderated somewhat, starting from the 1990s. This was also the case for New Zealand.

<sup>29</sup> "The unwillingness of the U.K. monetary policymakers to raise interest rates to defend the currency beyond Black Wednesday [16 September 1992]—in contrast to, say, Italy or Sweden—suggests that their commitment to the ERM was not very strong." See Mishkin and Posen (1998).

targeting featured substantial elements of continuity: monetary policy still revolved around price stability. The introduction of IT, however, altered the *medium* to achieve the policy goal, as intermediate targets were abandoned or, rather, subordinated to inflation expectations. Among other advanced economies, the British case is arguably the most interesting, because the UK was the first major country to phase in the IT paradigm. Furthermore, the switch was instrumental in altering the relationship between the Bank of England and the Exchequer, eventually attributing to the Bank the responsibility to independently pursue monetary policy. Indeed, a salient feature of the British version of IT is that it did not envisage a politically independent Bank of England, whose role remained formally subordinated to that of the Exchequer. By all means the government remained responsible to set monetary policy. Gradually, however, the Bank of England overcame its ancillary position to the Treasury thanks to a transparent and effective communication strategy which engaged the wider community.<sup>30</sup> Pivoting on the public scrutiny, the Bank constrained the government from running monetary policy with short-term political considerations in mind. The low and stable inflation Britain experienced in the period up to 1997, when the Bank was granted full independence from the Treasury, testifies to the importance of the communication strategy tool within the IT framework.

Emerging economies, too, gradually turned to inflation targeting. Chile began its decade-long transition to IT as the central bank was granted autonomy in 1989.<sup>31</sup> Compared to the abovementioned group of advanced economies, Chile introduced a hybrid form of inflation targeting already in 1990, without waiting for inflation to stabilize at lower levels. At that stage, however, the new monetary policy strategy was part of a broader package that also featured a managed exchange rate and thresholds for current account deficits. Thanks to such policies, Chile went through a remarkable disinflation during the 1990s that permitted it to implement a full IT framework in 2000. In Europe, the Czech Republic became one of the first emerging countries to adopt inflation targeting. Prior to the switch in 1997-8, the Czech National Bank (CNB) counted on a combination of exchange rate peg and money targeting that stabilised inflation as the country transitioned to a market economy.<sup>32</sup> Towards the end of the decade, however, supply side rigidities widened external imbalances as price liberalisation, capital inflows and budget deficits drove up domestic demand. As a result, the national currency depreciated and the CNB switched to inflation targeting.

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<sup>30</sup> Especially through “The Inflation Report”.

<sup>31</sup> Cespedes and Soto (2006).

<sup>32</sup> Holub and Humik (2008)

## 2.4 Conceptualizing Inflation Targeting: strengths and weaknesses of the new paradigm

After countries turned to IT during the 1990s, economists reflecting on the features of the new paradigm displayed a tendency to place it in the rule-based camp.<sup>33</sup> After all, announcing an inflation target and an interval to achieve it went clearly in the direction of constraining the flexibility of the policymaker, whose failure would have harmed the credibility of the institution.

This notwithstanding, day-to-day monetary policy implementation delivered a more nuanced view of IT. While in theory exclusively focused on inflation, the complexity inherent in monetary policy transmission compelled the policymaker to put some weight on measures of economic output, particularly in the short run. Over time, observers also floated ideas for broadening the scope of IT. The widening of central banks' remits with financial stability considerations was widely discussed in the early 2000s following the crash of the dot-com bubble. At the time, however, the prospect of preemptively tightening the monetary policy stance to reabsorb imbalances was perceived as a too radical departure from the existing paradigm, thus prompting monetary authorities to focus on minimising the economic fallout from the bubble burst instead.<sup>34</sup> A decade later, however, the consensus view had shifted somewhat. Trichet (2009) criticised the pre-crisis consensus on account of its failure to prevent a marked fall in output and for having favoured moral hazard. Writing in the aftermath of the European sovereign debt crisis, Banerjee et al (2013) argued in favour of a refinement of inflation targeting frameworks to include macroeconomic and financial stability. The authors noted that throughout the period known as the "great moderation" (1985-2007), financial imbalances had been growing amidst low and stable inflation rates.<sup>35</sup> Confronted with the financial and economic havoc caused by the 2008 recession, policymakers acknowledged that in certain circumstances a deviation of inflation from target is justified if it spares the real economy from a more severe contraction. Goodhart (2021) remarked that for as long as central banks will act as lenders of last resort, "it goes with the job" to take responsibility for financial stability.<sup>36</sup> An alternative view was expressed by Bean (2011, 2013) who suggested that different policy goals are better pursued by different tools. Regulatory instruments should be entrusted with preventing build-ups of financial imbalances to avoid overburdening monetary policy.

While the orthodox view remains to this day inspired by the "Tinbergen rule", implying that financial stability should be primarily addressed by regulatory tools, over the last decade IT explicitly took a more flexible turn. Overall, then, IT is best characterized as featuring substantial elements of discretion within a rule-based framework.<sup>37</sup> While openly committing to a specific inflation rate, the policymaker

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<sup>33</sup> For example, in Friedman and Kuttner (1996)

<sup>34</sup> Borio and Lowe (2002), Greenspan (2002)

<sup>35</sup> <https://www.federalreservehistory.org/essays/great-moderation>

<sup>36</sup> Interview with "Central Banking", 22 June 2021.

<sup>37</sup> Bernanke and Mishkin (1997) and King (1997, 2005).

has margins to trade off output and inflation in the short term.<sup>38</sup> Flexibility can be gained by adopting specific targeting designs like a range target or a point target with tolerance bands, or by lengthening the price stability horizon.

While the challenges of the post-2008 macroeconomic environment were partly met by enhancing the flexibility of IT, under the latter central banks are ultimately accountable for inflation only. This is to say that objectives other than price stability cannot be fully accommodated within this framework. In this respect, the perception that post-Lehman monetary policy had lost effectiveness prompted suggestions for alternative frameworks. Among others, nominal GDP targeting (NGDP) gained traction in academic and policy circles because it put more emphasis on output growth, a particularly sought-after feature in the early 2010s.<sup>39</sup> Specifically, the rebalancing towards nominal output was seen as capable of delivering more stimulus to the real economy while preserving the commitment to price stability. Advocating this option, Frankel (2013) mentioned how NGDP would eradicate the classic short-run trade-off between inflation and output that IT faces in the case of a supply shock, supporting growth and even simplifying monetary policy communication. Alternatively, so called “make-up” approaches were laid out. For example, the adoption of Price Level Targeting (PLT) would introduce a form of path dependency in the setting the policy stance. In the event of a negative demand shock, PLT would compel the policymaker to return the price level to its pre-crisis path, thereby temporarily aiming for an inflation rate higher than the target. Entrusting the monetary authority with more responsibilities, “make-up” strategies such as PLT can in theory deliver a stronger support to the real economy. Following the pandemic shock, the US Federal Reserve turned to Flexible Average Inflation Targeting (FAIT).<sup>40</sup> Like PLT, under FAIT central banks commit to offset past undershooting (overshooting) of the target by overshooting (undershooting) it in the future so that, on average, inflation is on target. Somewhere in between, Bernanke’s (2017) proposal of a Temporary Price Level Targeting (TPLT) was conceived to overcome the effective lower-bound constraint within an inflation-targeting framework.

The next chapter reviews the importance of anchored inflation expectations for the conduct of monetary policy and surveys the pros and cons of alternative target specifications. These specifications are evaluated in terms of their anchoring of inflation expectations as against flexibility properties. This metric is chosen because it robustly encapsulates the key trade-off faced by policymakers in designing the monetary policy framework when meeting the inflation objective comes at the cost of volatility in output.

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<sup>38</sup> In the case of a supply side shock, that is.

<sup>39</sup> Among others, Sumner (2014) and Frankel (2013). See also McCallum (2011).

<sup>40</sup> <https://www.federalreserve.gov/newsevents/speech/powell20200827a.htm>

### 3. Target Specifications

#### 3.1. The role of inflation expectations in monetary policy

The relevance that policymakers attribute to inflation expectations nowadays is rooted in the evolution of economic thinking as a response to a changing world economy, as discussed in the previous section. From a monetary policy perspective, two factors deserve emphasis. First, the modelling of economic choices as inherently intertemporal brought to the fore the concept of expectations to reflect that decision making bridges the present with the future.<sup>41</sup> From academia, this model began exerting influence in monetary policy when the Bank of Japan was confronted with the hurdles of the 1990s recession. The monetary authority pushed nominal rates to their lower-bound, but reflation did not occur. The *cul de sac* faced by Japanese policymakers sparked a debate over the limits of monetary policy across the world. Among others, Krugman (1998) put forward the interpretation that central banks would endorse in the aftermath of the 2008 financial crisis. Krugman's key insight was that Japan's liquidity crisis could be interpreted as a credibility crisis: if monetary policy could convince agents that a higher inflation rate will prevail in the future, prices will increase immediately, restoring the space for conventional policy. The anchoring of long-term inflation expectations to the inflation target was thus conceived as a tool that could support the economy when nominal rates could not be lowered further.<sup>42</sup> This turned central banks' communication into a policy tool: central bankers' views about the future path of the economy could steer financing conditions today, pulling the economy away from the effective lower-bound (ELB). In other words, Krugman's 1998 paper was instrumental in turning inflation expectations into key parameters for the formulation of the monetary policy stance.<sup>43</sup> Anchored long-term inflation expectations are thus widely regarded as proxies for the credibility of the central bank's inflation goals. Dis-anchoring inflation expectations are a sign that agents do not believe that the monetary authority is willing or able to offset short-term shocks to inflation, implying that control of price dynamics has been lost. Inflation anchoring requires long-term inflation expectations to be insensitive to macroeconomic news in either direction.<sup>44</sup>

The importance that inflation expectations hold for inflation targeting central banks warrants particular importance. More specifically, this paper articulates alternative inflation target designs in terms of their inflation anchoring vs flexibility properties. While flexibility is to be understood as the relevance the policymaker attributes to variables other than inflation, chief among which are economic activity and

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<sup>41</sup> Among others, Fisher (1930), Friedman's permanent income hypothesis (1957), Modigliani's life-cycle hypothesis (1975) and Hall (1978).

<sup>42</sup> In this context, the idea of "running the economy hot" by pledging to overshoot the inflation target should support an even faster recovery. This is somewhat paradoxical for it amounts to a temporary commitment to *price instability*.

<sup>43</sup> This view thus implies that agents form their expectations in a forward-looking manner. Critics, however, have argued instead that agents extrapolate past trends into the future, thereby questioning the centrality of inflation expectations and their role as input variables in policymaking.

<sup>44</sup> Bernanke (2007)



employment, inflation anchoring should be viewed as the exclusive commitment to a specific inflation target. The stronger this commitment, the more the target design will be tilted towards anchoring inflation whatever the costs to economic activity. We contend that this heuristic clearly reveals the key trade-off policymakers face when deliberating on the appropriate policy stance.

All the above implies that the likelihood of achieving the policy objectives is higher when agents' expectations are steered in the right direction, which in turn requires the monetary authority to be credible. Such credibility can be boosted via the design of the monetary policy framework itself. For example, a point target specification attributes more importance to inflation anchoring than a range target, thus supporting the pledge of the policymaker and shaping agents' expectations. In this respect, the design of the policy framework contributes towards hitting the targets, but it is not a guarantee thereof. The inflation undershooting experienced by the euro area since mid-2013 provides a good example of this. While the framework design arguably made it harder to reverse the low inflation environment (Rostagno et al, 2021), other variables played a role. In particular, the combination of cyclical factors (e.g., oil and commodities) and protracted weakness in domestic demand had a disinflationary impact on the euro area since the early 2010s.<sup>45</sup> Moreover, the Governing Council's decision to launch the Public Sector Purchase Programme (PSPP) only in March 2015, later compared to similar moves made by the Federal Reserve (November 2008) and the Bank of England (March 2009), may have contributed to keep inflation low in the euro area.<sup>46,47</sup>

Of the above-mentioned factors, only two - the design of the framework and the implementation of policy instruments - are under the direct control of the central bank, implying that half of the policy arsenal of the monetary authority directly rests on its ability to steer inflation expectations. Whose inflation expectations, though? Throughout this note two broad categories of inflation expectations will be employed. When referring to the concept of inflation anchoring from a conceptual perspective, such as in the stylised models presented in section 2, households' and firms' expectations will be considered. Indeed, these are the expectations that matter in models of the transmission mechanism of monetary policy, for they impact prices and quantities via consumption, saving and pricing decisions. On the other hand, the lack of reliable data on households and non-financial corporates' inflation expectations has led the ECB and other central banks to rely on inflation expectations of professional economists and on financial market indicators in setting the policy stance. When assessing the long-term anchoring of inflation expectations in chapter 5, these are the metrics that will be utilised. While this is common practice across central banks, adopting inflation expectations drawn from different sources remains somewhat contentious. Indeed, households' inflation expectations one-year ahead tend to report

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<sup>45</sup> Ciccarelli and Osbat (2017)

<sup>46</sup> Conti, Neri and Nobili (2017)

<sup>47</sup> Structural factors such as demography also are behind the fall in inflation. For an overview, see Koester, List, Nickel, Osbat and Smets (2021)

considerably higher rates than professional forecasters and market-based metrics. Surveys run by De Nederlandsche Bank (DNB Household Survey) and by the European Commission (ECCS) indicate that consumers tend to overestimate inflation for a variety of reasons such as a focus on salient prices, loss aversion as well as psychological biases.<sup>48</sup> These results are at odds with the signs of a downward dis-anchoring indicated by market and professional economists.

These issues clarified, the following table ranks target specifications in terms of their anchoring of inflation expectations and flexibility properties.

<b>Target Specification</b>	<b>Anchoring of Inflation Expectations</b>	<b>Flexibility</b>
<b>Point Target</b>	High	Low
<b>Point Target with Tolerance Bands</b>	Medium	Medium
<b>Range Target</b>	Low	High

Table 1: A simplified view of target designs and of their properties

Source: author's elaboration

A glance at the table above reveals a symmetric trade-off among alternative target arrangements. The specification offering the strongest anchoring of inflation expectations comes with the lowest flexibility, and vice-versa. On the other hand, blending some of the features of point and range targets, tolerance bands fall somewhere in the middle. As this paper does not address this issue from an empirical point of view, in the following we shall examine the properties of each target design with respect to the others. We present three sketches of the policymaker's preferred trade-off between inflation and output for all inflation targeting specifications.

In the Figures below, the output gap and the inflation gap are plotted on the x- and y-axis respectively. The output gap is defined as the difference between actual and potential output, while the inflation gap measures the distance of actual inflation from the target set out by the monetary authority. In the original equilibrium,  $E^*$ , the output is at potential and inflation is at its target. We consider a supply side shock

<sup>48</sup> See Galati, Moessner and van Rooij (2021) and the European Commission Business and Consumer Survey. [https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys\\_en](https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys_en)

For an overview, see the ECB Strategy Review Workstream on Inflation Expectations and their role in Eurosystem Forecasting (2021).

that moves the Phillips Curve (PC) to the left.<sup>49,50</sup> The policymaker's preference between the volatility of output and that of inflation is reflected in the slope of the P/PT/R-line.<sup>51</sup> Once the shock that has temporarily moved the equilibrium from  $E^*$  to  $E_P/E_{PT}/E_R$  is over, the adjustment process begins, and inflation and output are gradually driven back to  $E^*$ .

### 3.2. Point Target Specification<sup>52</sup>

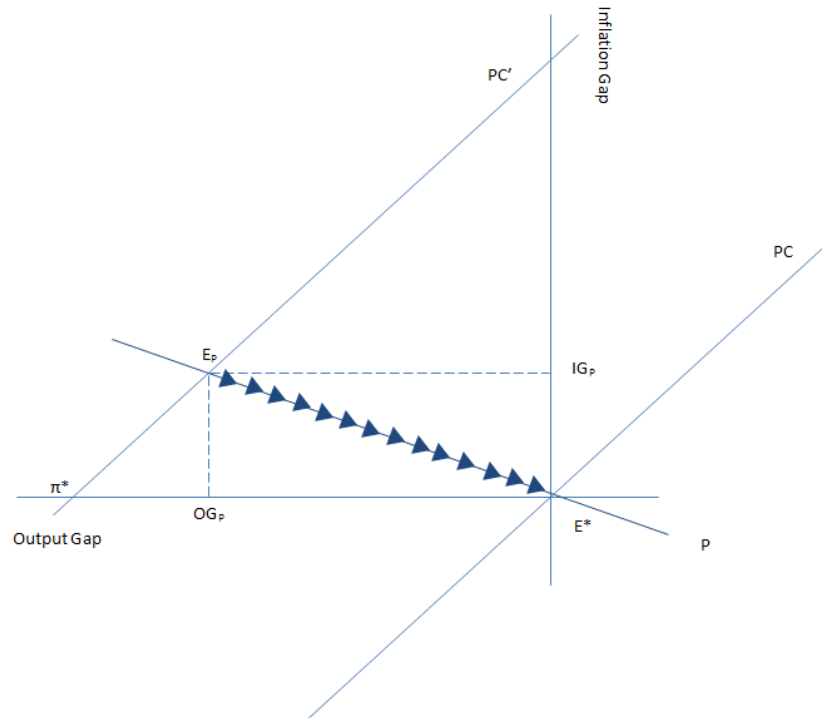


Figure 1: The policy trade-off under a point target specification

Source: author's elaboration

Figure 1 displays the main features of a point target arrangement, with the target set at  $\pi^*$ . At this stage, the price stability horizon is not accounted for. The slope of the P-curve thus only reflects the policymaker's preference between volatility of inflation and output. The preferences of the policymaker

<sup>49</sup> The slopes of the Phillips Curves and of the policymaker's preferences are illustrative only.

<sup>50</sup> Since inflation and output move in opposite directions, a supply-side shock determines a trade-off for the policymaker. The central bank can choose to have output and employment bear the cost of the adjustment while keeping inflation in check or let inflation deviate from its target to (partially) shield employment from falling to accommodate the necessary adjustment. A demand-side shock does not present this choice: this fortunate situation is sometimes called the *divine coincidence*. See Blanchard and Gali (2005).

<sup>51</sup> More precisely,  $P$  refers to a point target specification,  $PT$  to a point target with tolerance bands and  $R$  to a range target arrangement. This line is downward sloping to represent that a trade-off exists between the inflation objective and output volatility.

<sup>52</sup> This and the following charts are conceptual and not the result of model simulation exercises.

are summarised by  $E_p$ . At  $E_p$ , a point target delivers an output gap ( $OG_p$ ) which is larger than the inflation gap ( $IG_p$ ) to show that a point target design favours inflation anchoring over flexibility, as indicated in Table 1 above. More broadly, a point target specification enhances the central bank's ability to anchor inflation expectations because it is simpler to communicate and easier to understand. When the inflation target is met, the central bank's credibility is enhanced, which contributes to further anchoring inflation expectations, in a positive feedback loop. The higher precision of the point target is, however, a double-edged sword, as inflation is not fully under the control of the monetary authority and partly influenced by structural parameters and exogenous shocks.<sup>53</sup> Thus, while in theory the commitment to a point target more firmly secures the anchoring of inflation expectations, in practice it also makes it more likely that the target will be missed. In turn, misses could harm the reputation of the central bank, potentially leading to a worse anchoring than alternative specifications.

Nevertheless, it is well-known that monetary policy cannot fine tune inflation rates in the short run. Discussing the 2003 reform of the ECB's framework, Svensson argued that "[e]veryone should know that real-world inflation targeting is always in practice "flexible" medium-term inflation targeting. [...] Inflation targeting does not mean that inflation in the short run always has to be on target. ("Strict" short-term inflation targeting is only a simplifying assumption occasionally used in formal models...)" (2003:3). Precisely for these reasons, the sensitivity of economic agents to inflation rates deviating from the policy target is likely to be low. This point was reiterated by the Sveriges Riksbank in 2010, when it decided to remove the tolerance bands around the point target specification.<sup>54</sup> On that occasion, the Riksbank argued that:

"There is considerable understanding of the fact that inflation commonly deviates from the target and that [...] inflation can thus be outside of the tolerance bands without threatening the credibility of the inflation target. Such deviations have proved to be a natural part of monetary policy" (Riksbank, 2010:5).

This is to say that a point target specification comes with *unexpressed* tolerance bands, as economic agents realize that the central bank cannot fine tune inflation to ensure that inflation is on target on every point in time.<sup>55</sup>

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<sup>53</sup> For example, productivity, globalisation, digitalisation, demand for safe assets and demography.

<sup>54</sup> Tolerance bands were subsequently reintroduced in 2017. Since then, the Sveriges Riksbank adopted a 1-3% band with a target of 2% of the Consumer Price Index with a Fixed Interest Rate (CPIF). "The variation band is intended to illustrate, in a simple way, that inflation varies and will not be exactly 2 per cent every single month. The target for monetary policy is, however, still 2 per cent. Consequently, this is not a so-called target range." See Sverige Riksbank (2017) <https://www.riksbank.se/en-gb/press-and-published/notices-and-press-releases/press-releases/2017/cpif-target-variable-for-monetary-policy/>

<sup>55</sup> See also the Chancellor of the Exchequer's letter to the Governor of the Bank of England: "...The framework is based on the recognition that the actual inflation rate will on occasions depart from its target as a result of shocks and disturbances. Attempts to keep inflation at the inflation target in these circumstances may cause undesirable volatility in output." (3 June 1998).

### 3.3. Point Target with Tolerance Bands Specification

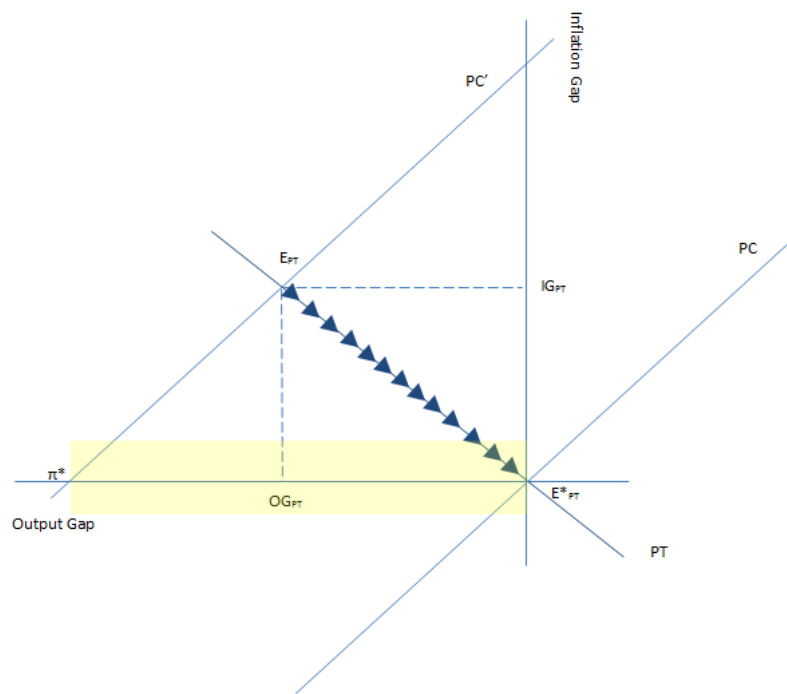


Figure 2: The policy trade-off under a point with tolerance band target specification

Source: author's elaboration

The main feature of a point target with a tolerance band is that while the policy aim remains a point, the central bank is willing to accept temporary deviations from this target, which is usually a mid-point between an upper and lower band.<sup>56</sup> Featuring both anchoring and flexibility elements, this specification does have a certain appeal and has for this reason been chosen by several central banks around the world.<sup>57</sup>

Figure 2 displays the key features of the tolerance band specification. First, a yellow shaded area representing the bands around the point target  $\pi^*$  is added to the previous chart. As the supply shock moves the Phillips Curve, the economy stands at  $E_{PT}$ . This time, however, the policymaker can exploit the additional flexibility granted by the tolerance bands and accept a combination of output and inflation

<sup>56</sup> This is not the case for a range target specification insofar as the central bank is under no obligation to converge to a specific point within the ranges. (Riksbank, 2017:2).

<sup>57</sup> For example, the central banks of the Czech Republic, Hungary and Brazil as well as Sweden.

rates on the portion of line  $P_T$  that falls within the shaded area. Nonetheless, the aim of the policymaker is to return to  $E^*_{PT}$ , as shown by the arrows.

The reader can appreciate that the width of the bands is key to precisely identify the properties of this arrangement. Wider tolerance bands would tilt the specification towards more flexibility, other things equal, while the opposite would push this arrangement closer to a point target specification. After all the difference between a point and a point with tolerance is precisely the width of the bands.<sup>58</sup>

### 3.4. Range Target Specification

Lastly, the policymaker can also adopt a range target. This reduces the likelihood of missing the inflation target. Pushing this logic to the extreme implies that a very wide range could reduce to the probability of not meeting the target to almost zero, thereby safeguarding the central bank from credibility losses and increasing its degrees of freedom in selecting the optimal combination of inflation and output volatility. This would, however, come at the cost of essentially not committing to any inflation rate, leading to a dis-anchoring of inflation expectations. Thus, also when pondering the adoption of a range target, the range's width is really what it all boils down to. In Figure 3 a range target design is conveyed by a red shaded area. The policymaker chooses how to distribute the cost of the supply shock without any obligation to converge to  $\pi^*$ , all points on the central bank's preference line in the shaded area being equally feasible. This is rendered by having the R-line cross the y-axis at the upper edge of the range,  $\pi_{\max}$ , rather than to  $\pi^*$  as in the previous two cases. The range target is therefore the arrangement that offers the highest flexibility to the policymaker.<sup>59</sup>

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<sup>58</sup> Furthermore, the charts have been constructed so that the slope of policymaker's preferences reflects the target specifications. More precisely, since the tolerance bands' specification is more flexible than the point target arrangement (shown above), the slope of the PT-curve in Fig.2 is steeper than the slope of P-curve in Fig.1. The same logic applies to the next specification, the range target, whose slope is the steepest of all as its flexibility is the highest.

<sup>59</sup> While attempts have been made to numerically establish the optimal width of either the tolerance bands or of a range specification, we shy away from an empirical approach. Forecasting and model uncertainty, as well as measurement errors, make a numerical estimate of the bands' width model-dependent. Furthermore, these errors may not be time-invariant. From the perspective of the decision maker, we contend that it is thus fruitful to rely on less sophisticated but robust metrics that clearly highlight what the policy trade-off is. Along the same line, Erceg (2002) conceives the range as an indication of how ambitious the central bank is in its quest to anchor inflation expectations.

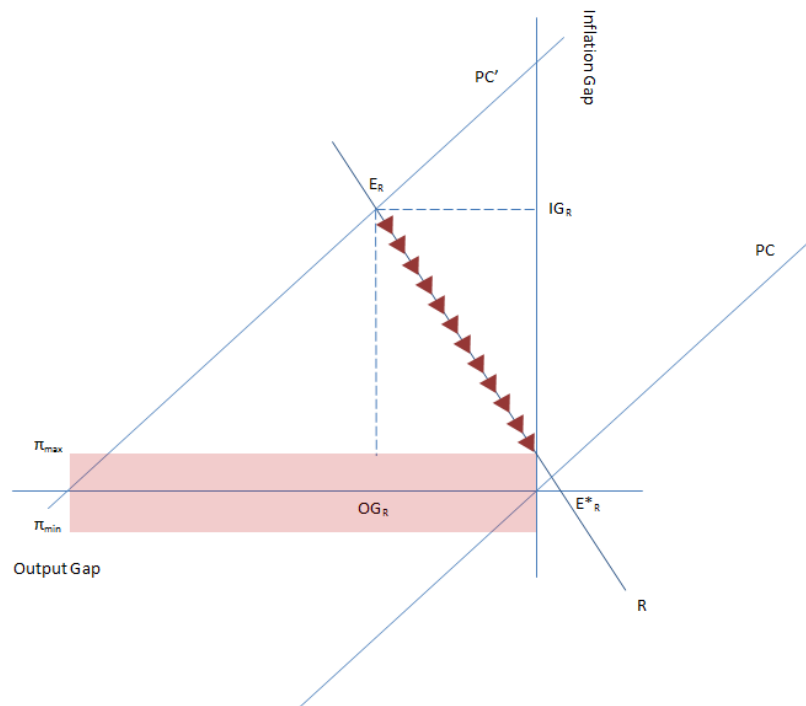


Figure 3: The policy trade-off under a range target specification

Source: author's elaboration

An additional issue closely associated with the boundaries of a point with tolerance or target range is whether they should be soft or hard. In the latter case, an aggressive monetary policy reaction is required if inflation were to move towards the edges of the band. The credibility loss determined by inflation breaking through hard edges is meaningful and could make this specification even more restrictive compared to a simple point target.<sup>60</sup> Opting for soft edges could avoid the abovementioned problems in exchange for what appears to be a limited loss in credibility. In particular, under soft edges, a deviation of inflation from the target could lead to a linear increase in the cost for the central bank. Were hard boundaries adopted instead, the reaction function of the central bank could be non-linear and much stronger to inflation rates just outside the interval, potentially triggering ampler fluctuations in output and employment. Along these lines, Medina and Valdes (2002) find that monetary policy could react more aggressively under a hard-edged target range than in the case of a point target. Furthermore, Mishkin (2000) argues that an excessive focus on the edges could lead to a central bank being more concerned with keeping inflation within such boundaries than with hitting the mid-point of the range.

<sup>60</sup> “The central bank would therefore be keener on getting inflation back to the point target quickly when there is a tolerance band with hard edges than if there is no interval” (Riksbank, 2017:93).

In conclusion, the selection of a target specification and the properties thereof is interpreted as an expression of the policymaker's preferences. By construction, a point target arrangement offers the strongest anchoring properties in exchange for the least flexibility, followed by a point with tolerance and a range target. While somewhat predictable, we contend that this ranking is a robust and reliable compass for decision makers. Some interesting features nevertheless emerge. It turns out that a point target specification comes with unexpressed tolerance bands because agents are fundamentally aware that the central bank cannot always match its inflation target. This recognition is important insofar as it breaks the symmetry of the anchoring vs. flexibility trade-off. This implies that a point target with tolerance bands is largely redundant compared to a pure point target.<sup>61</sup> Furthermore, by combining point and range target specifications with diverse horizons to price stability, we contend that the main features of a point target with tolerance bands arrangement can be replicated. In the rest of the note, then, the point target with tolerance bands specification will be disregarded.

Moving to the next section, we shall briefly consider the second element constitutive of the monetary policy strategic framework: the price stability horizon.

## **4. Price Stability Horizons**

The length of the targeting horizon is another key element of the monetary policy strategy. Above we showed how the choice between alternative target specifications hinges on the importance that the policymaker attributes to the volatility of output versus that of inflation. The same metric will be used to analyse the price stability horizon. Before getting there, the length of the transmission lags of monetary policy is addressed. Since the horizon to price stability cannot be shorter than the time it takes for a policy change to impact the relevant variables, this parameter will be conceived as a lower bound to the price stability horizon.

### **4.1. Transmission lags**

It can be argued that estimating the peak time that it takes for a monetary policy shock to transmit to the real economy is, for the purpose of devising the monetary policy strategic framework, as important as it is complex. This arguably arises from the endeavour to capture, in one single parameter, the intricacies of the interaction of monetary policy, financial markets and the real economy. Writing in the

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<sup>61</sup> Although above we hypothesised the width of the implicit bands to be the same as that of explicit ones, this assumption is not strictly speaking necessary and could be relaxed. In fact, the size of implicit and explicit bands may well differ. In other words, agents could factor in minor fluctuations around a point target specification and mostly ignore it, though if deviations were too far away from the point target, the credibility of the monetary authority may be questioned. Coherently, one could argue that a point with tolerance target could offset these concerns. But then again, so would a range target. Thus, tolerance bands remain a hybrid specification whose features could be replicated by alternative designs.



1970s, a decade characterized by wide price oscillations, Friedman (1972) remarked that lags were “long and variable”. Decades later, Welteke (2001) reiterated that “[m]onetary transmission is a complicated and permanently changing process”.<sup>62</sup> It is thus not surprising that the attempts made at empirically measuring the length of the transmission lags delivered substantially different results, suggesting that model-dependency should be added to the list of elements that make an investigation of the transmission lags particularly uncertain.<sup>63</sup> Updating Friedman’s conclusions, Batini and Nelson (2002) exploited UK and US data on money growth, inflation and interest rates from 1953 to 2001. The paper used the correlation of inflation with money growth in previous periods, while accounting for changes in money growth due to factors other than the policy stance. Overall, results confirm Friedman’s older findings: the peak impact on prices occurs more than four quarters after the policy shock. In this respect, the hypothesis that financial innovation of the 1980s and 1990s shortened the transmission lags is dismissed in favour of an alternative view that distinguishes the impact on the good market prices and on asset prices, with the latter being triggered earlier. Jarocinski (2010) argued that an elevated degree of financial development is positively and strongly associated with a slower transmission of monetary policy shocks to the price level. This is interpreted in terms of the availability of financial products that agents can use to hedge against changes in the policy stance. As less advanced financial systems do not offer these options, financial institutions must swiftly react to central banks’ decisions, thereby speeding up the transmission of the policy impulse to the real economy. Elaborating on the euro area, Welteke (2001:2) stated that monetary policy affects the non-financial sector considerably slower in low inflation jurisdictions than in high inflation ones, as the former are more reliant on short-term lending at fixed rates. On the other hand, increased competition from capital markets squeezes commercial banks’ margins, accelerating the transmission of the policy impulse to the real economy. On balance, Welteke leaned in the direction of a faster transmission of monetary policy compared to the past.<sup>64</sup> Arguing along similar lines, Haldane (1997: 90) maintained that while low inflation may be associated with quicker pass-through due to the higher credibility enjoyed by the monetary authority, the increased nominal rigidity determined by price stability is likely to prevail, lengthening the policy lags. Mojon and Peersman (2001) used VAR techniques to analyse the transmission mechanism in ten countries that were to form the core of the newly established euro area. Confirming the consensus view on the transmission mechanism, a monetary policy shock leads to a temporary fall in GDP that peaks around four quarters after the shock and to a gradual decrease in the price level. A very useful study to get around the heterogeneity in techniques, sample periods and jurisdictions is Havránek and Rusnák (2012). The authors performed a meta-analysis of the academic

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<sup>62</sup> See also Friedman (1961).

<sup>63</sup> By comparing Taylor (1993) model with Christiano, Eichenbaum and Evans (2005) and Smets and Wouters (2007) Taylor and Wieland (2010) found a “surprising” similarity in the monetary transmission mechanism. Focusing on the euro area prior to its inception (i.e. 1980-98), Smets and Peersman (2001) also reported findings that are stable over different sample periods and similar to those for the US economy using similar methodologies.

<sup>64</sup> Welteke (2001)

literature on the length of policy lags. The review shows that estimates of the lags vary substantially across jurisdictions. The authors found that lags in transition economies are considerably shorter than in developed jurisdictions. The average number of months to the maximum change in prices hovers between 18.7 and 17.6 months in developing countries and between 51.3 and 26.6 in developed ones.<sup>65</sup> The average for the whole sample is 33.5 months. Furthermore, the variance among developed economies is considerably higher than in the other group and the average lag for the euro area is 48.4 months. While this is not too far from the estimated level for France (51.3), it is substantially longer than in Germany (33.4) and in Italy (26.6).<sup>66</sup>

All of the above implies that, in practice, the central bank will err on one side or on the other when estimating the lags. In this respect, it appears that underestimating the length of the transmission mechanism is worse than overestimating it. Haldane (1997:17) showed that a downward miscalculation of the lag reduces the central bank's ability to steer inflation, as it risks generating cycles of its own. A similar conclusion can be drawn from Rudebusch and Svensson (1999). The authors compare various combinations of the central bank's loss function and of the feedback rule in the context of the US economy showing that the broader economic costs are higher for shortest horizons (i.e., 8 quarters) and are instead reduced for longer horizons to price stability (i.e., 16 quarters).

As complex as it may be, the conduct of monetary policy does require estimates of the transmission lags. Indeed, while acting as the shortest period over which central bank's compliance with the target can be assessed, the length of the transmission mechanism in turn matters for the inflation forecasts of the monetary authority. In order to calibrate the policy response, the central bank must form a view of what conditions will prevail in the economy by the time the policy shock is transmitted.<sup>67</sup> At the onset of the Single European Currency, the Eurosystem set up a research network to study the transmission of monetary policy, the Monetary Transmission Network (MTN).<sup>68</sup> In a nutshell, contributors found that policy shocks would trigger a temporary adjustment in output that was estimated to peak in four/eight quarters, with prices to respond more slowly. Roughly a decade after, in 2010, the ECB updated these findings on account of structural changes in the euro area labour markets, which reduced nominal rigidities, financial innovation as well as the Global Financial Crisis of 2008.<sup>69</sup> Evidence was found to be ambiguous and dependent on the modelling technique utilized: VAR tools indicated a faster response of inflation and a lower response of output with respect to the period antecedent to the euro (i.e. 1980-1996); DSGE models suggested instead a more significant response of the economy to

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<sup>65</sup> Developed countries: USA, UK, Japan, France, Italy, Germany and the Euro Area. Transition economies: Slovakia, Czech Republic, Slovenia, Hungary and Poland.

<sup>66</sup> "Two general reasons may explain why the reported transmission lags vary: first, structural differences across countries may cause genuine differences in the speed of transmission. Second, characteristics of the data and other aspects of the methodology employed in the primary studies, such as specification and estimation characteristics, may have a systematic influence on the reported transmission lag." Havránek and Rusnák (2012:7).

<sup>67</sup> Indeed "inflation targeting" is also called "inflation-forecast targeting". See Svensson (1997)

<sup>68</sup> Angeloni, Kashyap, Mojon (2003).

<sup>69</sup> ECB Monthly Bulletin, May 2010.

monetary policy. All in all, absent a consensus derived from empirical analyses, policymakers seem to have settled for a rule-of-thumb of 4 to 8 quarters for the policy shock to transmit to output and inflation.

#### **4.2. The trade-off in the choice of the price stability horizon**

As with target specifications, the choice of the target horizon can be formulated in terms of a trade-off between more or less flexible designs. For example, if society did not care about price stability at all, the optimal targeting horizon would be infinite. At the other extreme, were “inflation-nutters” to prevail, the price stability horizon should be zero: whatever the output losses, inflation shall always be on target.<sup>70</sup> The optimum lies somewhere in between. As to the euro area, the statutory prominence attributed to price stability would appear to tilt the balance in favour of a combination that allows a bit more output volatility in return for more stable prices at the desired level. In and of itself this entails a shorter targeting horizon than in jurisdictions where monetary authorities have a double mandate. The figure below visualizes the trade-offs involved.

Figure 4 makes clear that a longer horizon to price stability equals more flexibility. This is rendered with a steeper preference curve, marked L, compared to a shorter horizon preference curve, marked S. The horizon component is also visible in the length of the segments  $(E^*, E_L)$  and  $(E^*, E_S)$ , with the former being longer than the latter.

Since it features the same kind of trade-off, it seems apt to evaluate the targeting horizons together with the target specifications outlined in the previous section. We shall thus examine the monetary policy framework as a whole in terms of the anchoring vs. flexibility metric.

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<sup>70</sup> At the same time, it is worth pointing out that even if the public did not care about price stability at all, central bankers would still have an informed view of why price stability matters. I am grateful to Gabriele Galati for this comment.



<b>Horizon to Price Stability</b>	<b>Specifications</b>	
	<b>Point Target</b>	<b>Range Target</b>
<b>Shorter</b>	Unbalanced	Balanced
<b>Longer</b>	Balanced	Unbalanced

Table 2: Balance and unbalanced combinations

Source: author's elaboration

Table 2 presents four different policy combinations arising from merging target specifications and horizons to price stability. A point target with a short horizon design maximizes the anchoring of inflation expectations, while, at the opposite end, a range target with a long horizon maximizes the flexibility of the framework. While both feasible in theory, these options craft a somewhat redundant, and thus unbalanced, framework. For example, a range target coupled with a longer horizon would grant more than enough flexibility to the decision maker, while arguably falling short on the anchoring side. The same logic, but in reverse, applies to a point target and a shorter horizon. The redundancy of these combinations can also be perceived by noting that the flexibility embedded, for example, in a range target design could be increased by widening the width of the bands. Thus, there is no need to achieve it by adopting a longer horizon to price stability. On the other hand, a point target with a longer horizon to price stability and a range target with a short horizon both feature elements of anchoring alongside elements of flexibility. For this reason, they are termed balanced in Table 2.

We formalize these policy specifications. The policymaker's problem can be rendered as a constrained minimization of the central bank's loss function.<sup>71</sup>

$$Loss_{CB}(\pi_t, y_t) = (\pi_t - \pi^*)^2 + \lambda(y_t - y^*)^2 \quad (1)$$

The loss function is expressed in a standard linear-quadratic form for deviations of both inflation and output from their target levels. Equation (1) is to be minimized under the Phillips Curve constraint, as we are interested only in cases where the exogenous shock determines a trade-off between inflation and output volatility. In its simplest form, the Phillips Curve can be written as:

$$(\pi_t - \pi^*) = \beta E_t (\pi_{t+1} - \pi^*) + \mu(y_t - y^*) + \epsilon_t^\pi \quad (2)$$

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<sup>71</sup> Here we follow Carney (2017).

Where,  $\mu$  is a parameter defining the slope of the Phillips Curve,  $\beta^t$  is a discount factor and  $\varepsilon_t^\pi$  represents exogenous shocks, including the supply side shock that moves the economy away from the initial equilibrium in our example. We can solve the optimization problem by setting up the Lagrangian

$$\Phi: (\pi_t - \pi^*)^2 + \lambda(y_t - y^*)^2 - \alpha_t \{(\pi_t - \pi^*) - [\beta E_t (\pi_{t+1} - \pi^*) + \mu(y_t - y^*) + \varepsilon_t^\pi]\} \quad (3)$$

and deriving the first order conditions (FOCs).

$$FOC_1: \frac{\partial \Phi}{\partial (\pi_t - \pi^*)} = 2(\pi_t - \pi^*) - \alpha_t = 0 \quad (4)$$

$$FOC_2: \frac{\partial \Phi}{\partial (y_t - y^*)} = 2\lambda(y_t - y^*) + \mu\alpha_t = 0 \quad (5)$$

We thus obtain the optimal targeting rule under discretion:

$$(\pi_t - \pi^*) = -\frac{\lambda}{\mu}(y_t - y^*) \quad (6)$$

Equation (6) shows that the trade-off between inflation and output volatility depends on the preference of the policymaker and the on the slope of the Phillips Curve. It is straightforward to see that a central bank that only cares about inflation (i.e.,  $\lambda=0$ ) will get  $(\pi_t - \pi^*) = 0$ . Hence, for unchanged  $\mu$ , the higher  $\lambda$ , the more weight is attached to output fluctuations. In terms of the three specifications outlined above,  $\lambda$  will be lowest for a point target and highest for a range target.

To make space for the price stability horizon, (1) can be tweaked with the introduction of a parameter  $\tau$ , representing the length of time it takes to the economy to move back to the original equilibrium.

We can thus rewrite (1) as:

$$LOSS_{CB}(\pi_t, y_t) = (\pi_t - \pi^*)^2 + (\lambda + \tau)(y_t - y^*)^2 \quad (7)$$

The parameter  $\tau$  acts by changing the slope of the policymaker's preferences, thereby also altering the distance between the original equilibrium point and the one prevailing after the supply shock. We obtain a slightly amended optimal targeting rule:

$$(\pi_t - \pi^*) = -\frac{(\lambda + \tau)}{\mu}(y_t - y^*) \quad (8)$$

Equation (8) shows that the longer the horizon to price stability (i.e., the higher  $\tau$ ), the wider the inflation gap. Stated differently, a long price stability horizon will, ceteris paribus, lead to the same result as a

more flexible specification, insofar as the policymaker trades off more units of inflation volatility for the same amount of output volatility. Furthermore, (8) implies that even for  $\lambda=0$ , the central bank will strike a balance between the deviation of inflation and of output, as small as this may be. In turn, this is indicative of the fact that the horizon to price stability automatically endows the policy framework with some flexibility, independently of the preferences of the policymakers captured by the parameter  $\lambda$ . Thus, depending on the magnitudes of  $\lambda$  and  $\tau$ , four cases arise, two unbalanced and two balanced. Let us begin with the former group.

### 5.1. Unbalanced specifications: Point Short and Range Long

From Table 2, the unbalanced combinations lean predominantly either on the flexibility side or on the anchoring side. The latter is represented by a Point Target with Short Horizon specification, while the former by a Range Target with Long Horizon arrangement. This is visualized in Figure 5.

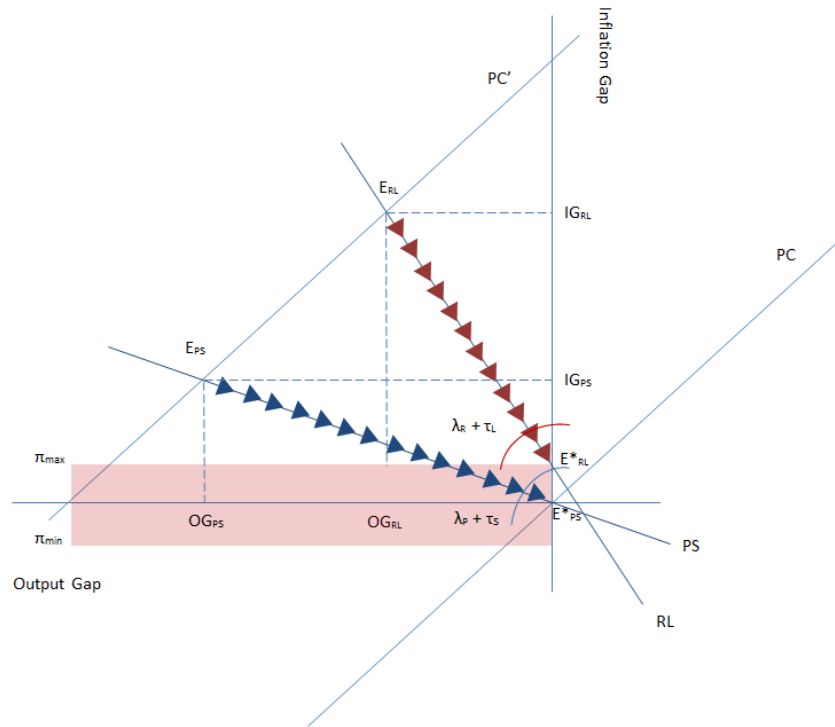


Figure 5: Unbalanced Specifications

Source: author's elaboration

The slopes of the policymaker's preferences in Fig. 5 are formally represented by this inequality:

$$(\lambda_P + \tau_S) < (\lambda_R + \tau_L) \tag{9}$$

The latter holds by construction, for  $\lambda_P < \lambda_R$  and  $\tau_S < \tau_L$ . Put differently, the left-hand side of (9) stands for a specification that leans towards a policy mix that overwhelmingly focuses on the anchoring of inflation expectations, at the expense of output volatility. The same reasoning, albeit inverted, holds for the right-hand side of (9).

In what follows we shall focus on the policy combinations that craft a balanced monetary policy framework and, as such, arguably present the most interesting trade-offs to the policymaker. These are a Point Target with a Long Horizon and a Range Target with a Short Horizon.

### 5.2. Balanced Specifications: Point Long and Range Short

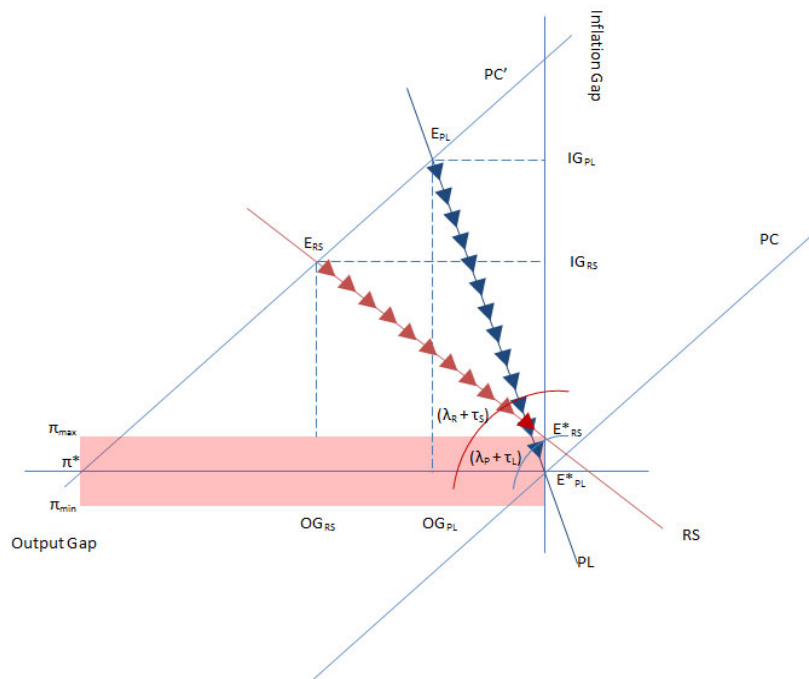


Figure 6: Balanced Specifications

Source: author's elaboration

Figure 6 represents a Point Target with a Longer Horizon to price stability (PL) and a Range Target with a Shorter Horizon (RS). In this case, the alternative frameworks have been structured to give a higher overall flexibility to PL than to RS. This is shown by the temporary equilibrium  $E_{PL}$  which presupposes a policy mix that leads to a higher inflation gap than  $E_{RS}$  ( $IG_{PL} > IG_{RS}$ ) and, conversely, a



smaller output gap than the range specification coupled with a short horizon ( $OG_{PL} < OG_{RS}$ ). This results directly from the fact that  $(\lambda_P + \tau_L)$  is larger than  $(\lambda_R + \tau_S)$ . More specifically, we have that:

$$(\lambda_P + \tau_L) > (\lambda_R + \tau_S) \quad (10)$$

$$(\tau_L - \tau_S) > (\lambda_R - \lambda_P) \quad (11)$$

Equation (10) states that the flexibility embedded in the longer horizon to price stability of the Point Target specification more than offsets the flexibility of a Range design.

Clearly, there is nothing preventing (10) and (11) from holding with opposite signs. The chart below thus displays the case where a Range Target with Short Horizon is more flexible than a Point Target with Long Horizon specification.

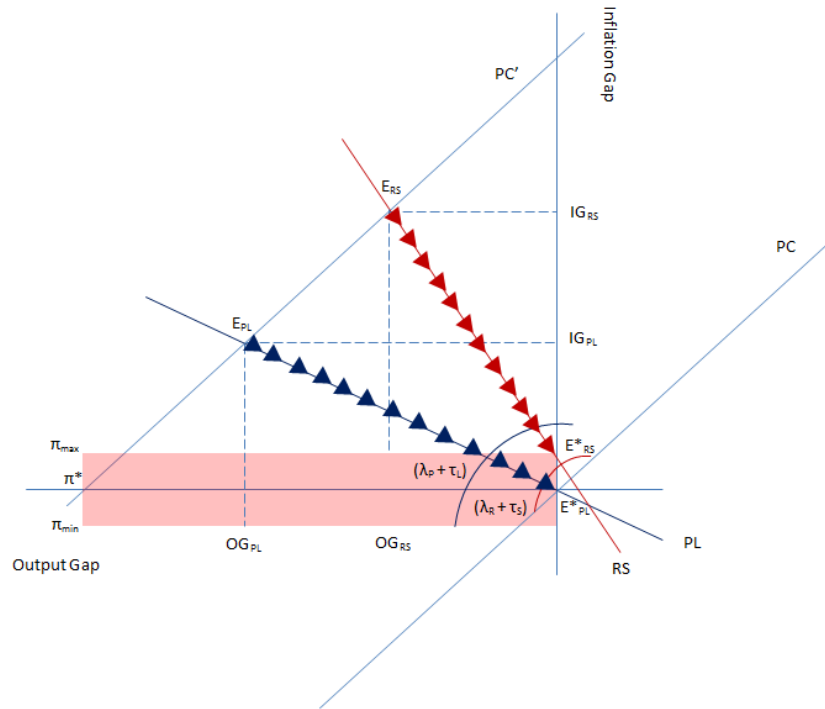


Figure 7: Balanced combinations

Source: author's elaboration

In this case we have:

$$(\lambda_R + \tau_S) > (\lambda_P + \tau_L) \quad (12)$$

$$(\lambda_R - \lambda_P) > (\tau_L - \tau_S) \quad (13)$$

Equation (13) shows that this time the flexibility embedded in the range specification more than compensates the lack of flexibility due to the short horizon.

Thereafter the adjustment process begins, shown by the arrows. While under a point target long horizon (PL) framework the economy moves towards  $E^*_{PL}$ , under range target and short horizon (RS) arrangement, a wider set of inflation rates ( $\pi^*_{max} - \pi^*_{min}$ ) is accepted. This is emphasised by the red shaded area. Once the adjustment is over and the old equilibrium is reached, inflation in PL will be lower than in RS ( $\pi^* < \pi_{max}$ ).

### 5.3. Making Room for an Escape Clause

The strategic framework should also feature an escape clause. The need for escape clauses derives from shocks that are outside the purview of monetary policy. For example, structural changes in the global economy that may impact the length of the transmission can hardly be accurately anticipated and measured and are therefore better addressed via *ad hoc* escape clauses. Within the conceptual frame presented above, such clauses could either be carved out of the target specifications (point, range) or out of the targeting horizons (long, short).

If a point target with a longer horizon design is chosen, the escape clause could only be introduced in the latter component. This is because the strengths of a point target derive from the clear-cut commitment made by the monetary authority. Were an escape clause to be introduced in the point target itself, its purpose would be blurred and largely nullified. Within this policy combination then, the escape formula would most naturally fit in the horizon over which price stability has to be maintained. Opting for a longer horizon, the central bank could leave its monetary policy instruments untouched thus temporarily letting inflation drift away, while preserving its credibility. This would grant the added flexibility needed to cope with exogenous shocks to inflation dynamics without jeopardizing the commitment to price stability implied by the point target specification. Along the same lines, had the monetary authority opted for a range target with a relatively short horizon for price stability, the escape clause would most naturally fit in the target arrangement, which already features some shock-absorption properties due to the wider price stability band.

The length of the horizon adds or removes on the flexibility side, as discussed in the previous sections. Flexibility, however, does not coincide with escape clauses, although escape clauses widen the flexibility available to the policymaker. To precisely define the horizon over which price stability must be maintained (i.e., in quantitative terms) would prevent the central bank from “evading” its commitment in case the need materialised. Thus, the monetary policy strategic framework should come with an element of ambiguity in it. In our view, the targeting horizon appears better suited to

accommodate it. The current formulation adopted by the ECB (i.e. “over the medium term”) seems to effectively balance a clear order of magnitude of the price stability horizon with the opacity needed to make room for unforeseen shocks.<sup>72</sup> The degrees of flexibility embedded in this definition are indeed quite large, for the length of the price stability horizon is not only presented in broad terms, but it is made dependent on the type of shocks that hit the economy: a fluctuating yardstick, essentially. An obvious distinction applies between demand and supply shocks. In the former case, prices and output move in the same direction and the central bank can uncompromisingly pull them back to their optimal level by altering the levers of monetary policy. In the event of a supply shock, however, the policymaker is confronted with a trade-off: to rapidly bring back inflation on a trajectory consistent with its target implies an undesirable volatility in output. All the above confirms that the choice of the optimal price stability horizon is subject to high uncertainty.<sup>73</sup> Given this uncertainty, the ample flexibility of the target horizon is a vital characteristic of the strategic framework, acting like the safety valve in a pressure cooker. The 2003 formulation of the price stability horizon could therefore be maintained.<sup>74</sup>

## 6. Amending the Monetary Policy Framework

Having suggested that a balanced framework should avoid pairing specifications that feature analogous properties, like Range Long or Point Short combinations, we now consider how the the ECB policy framework that came out of the 2003 review performs in this regard.

### 6.1. Leaning on the flexibility side and the need for an adjustment

First, as noted, the horizon to price stability is expressed in a way that does not bind the central bank to any considerable degree. We interpret this as conceding substantial flexibility to the policymaker. Furthermore, we take it that the 2003 formulation of the policy aim is best described as a range target

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<sup>72</sup> That the current definition is sufficiently ambiguous to accommodate unforeseen shocks is confirmed by a recent intervention of Isabel Schnabel. She argued that: “... the nature and properties of the shocks that have been hitting the euro area over the past few years require central banks to exercise more patience in reaching their inflation aim, in particular when approaching the effective lower bound. This implies that the medium-term horizon over which the ECB pursues the sustainable alignment of inflation with its aim is considerably longer than in the past.” See Schnabel (2020) [https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200227\\_2~301776ff2a.en.html](https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200227_2~301776ff2a.en.html)

<sup>73</sup> The ECB has not defined the medium term with reference to a predetermined horizon, but deliberately retains some flexibility with regard to the exact time frame. Several reasons underpin that choice. It is not advisable to specify *ex ante* a precise horizon for the conduct of monetary policy, since the transmission mechanism spans a variable and uncertain period of time. <https://www.ecb.europa.eu/pub/pdf/other/monetarypolicy2011en.pdf>

<sup>74</sup> “It is impossible for any central bank to keep inflation always at a specific point target or to bring it back to a desired level within a very short period of time. Consequently, monetary policy needs to act in a forward-looking manner and can only maintain price stability over longer periods of time. At the same time, to retain some flexibility, it is not advisable to specify *ex-ante* a precise horizon for the conduct of monetary policy, since the transmission mechanism spans a variable, uncertain period of time.” <https://www.ecb.europa.eu/mopo/strategy/princ/html/orientation.en.html>

with *implicit* tolerance bands.<sup>75</sup> Following the topology outlined above, this specification clearly falls into the flexibility camp. Taken together, both components of the ECB strategic framework seem to reflect a concern with not being able to hit the target, thereby seeking more flexibility, rather than a pledge to meet it, which would call for more emphasis on the anchoring side. In other words, the whole strategic framework of the ECB may be interpreted as tilted towards flexibility. The adoption of a more precise policy aim could support the ECB in hitting the inflation target.<sup>76</sup>

## 6.2. Risk of Dis-anchoring of Inflation Expectations

Evidence that this may be the direction to go is given by the increasing likelihood that euro area long-run inflation expectations may have unanchored since 2013. According to Corsello et al. (2019), the sensitivity of long-term inflation expectations to negative surprises became statistically significant after 2013-2014, when long-term inflation expectations visibly shifted downwards. Survey-based measures of long-run inflation expectations (median) fell from 2% in 2013-14 to 1.6% in Q3 2020, according to the ECB's Survey of Professional Forecasters (Figure 8).<sup>77</sup>

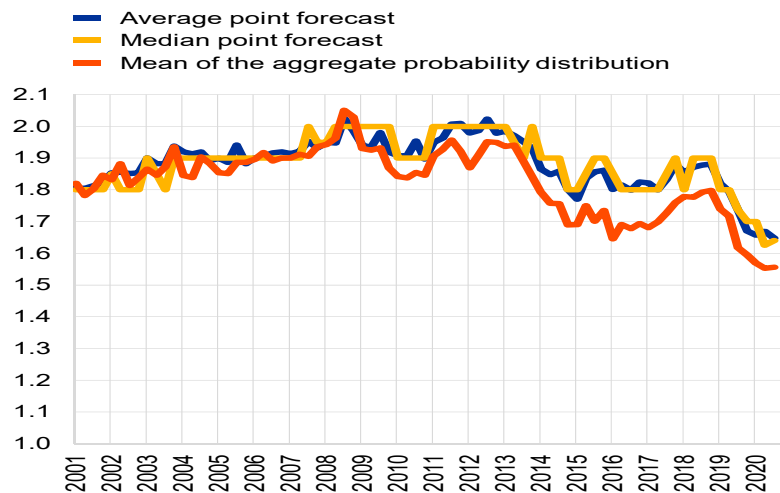


Figure 8: Expectations for Inflation in the longer term

Source: ECB's Survey of Professional Forecasters, Q3 2020

<sup>75</sup> This view is, of course, disputable. Perhaps a point target with implicit tolerance bands could be suggested instead. In our view, however, the fact that the point target is unspecified suggests that a range target with unexpressed bands is a more accurate description of the ECB policy aim.

<sup>76</sup> Especially with regards to the lower bound of the range. Nonetheless, by narrowing the target range for price stability, the 2003 clarification arguably led to a stronger anchoring of inflation expectations than in the early years of the ECB.

<sup>77</sup> It should be emphasised that also other survey-based as well as market-based measures of long-term inflation expectations declined noticeably since 2013.

Even the policy easing of March 2016, which featured cuts on all three policy rates, an upward re-calibration of the Asset Purchase Programme (APP) and a new series of targeted long-term refinancing operations, failed to fully re-anchor long-run inflation expectations towards the inflation target.<sup>78</sup> This is evidence that negative inflationary shocks in 2013-2014 had lasting effects on the inflation expectations of forecasters. In response the ECB deployed non-conventional tools to ease financial conditions, as the policy space of standard instruments approached its limits, and successfully managed to restore inflation expectations close to their long-term goal by mid-2018. Subsequently, a slowdown of growth was accompanied by a fall in long-run inflation expectations, prompting further action by the ECB in September 2019. In the first and, particularly, in the second quarter of 2020, economic activity ground to a halt following measures taken to contain the spread of Covid-19. Headline inflation plunged towards zero and downside risks to long-run inflation expectations increased. The suddenness and depth of the economic downturn triggered a wide array of policy responses. As the crisis unravelled, the ECB extended its support, most notably with the introduction of a new purchase programme, the Pandemic Emergency Purchase Programme (PEPP), and the adjustment of the parameters of the long-term refinancing operations. Up until Q3 2020, these measures had not pulled inflation expectations back in line with the “below, but close to, 2%” target that prevailed at the time. While there is no certainty as to why the monetary policy stimulus had not delivered until then, more time is arguably needed.<sup>79</sup> More important for our purposes, the performance of the last few years compares poorly to the pre-2008 record, when the ECB managed to reach its inflation aim most of the time.

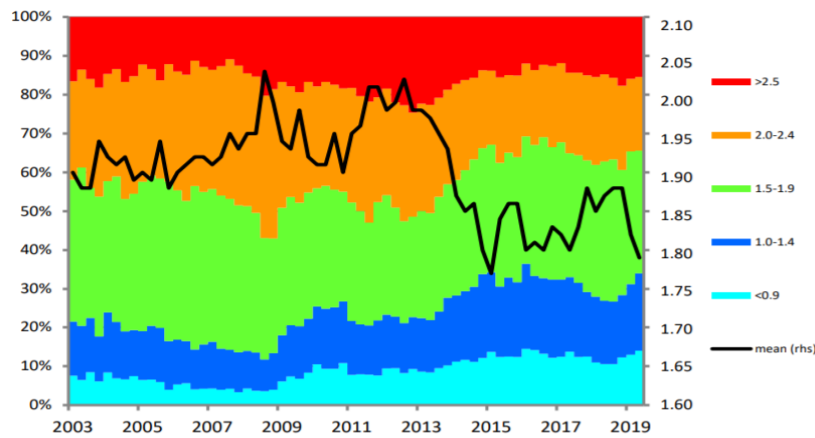


Figure 9: Distribution of long-term inflation expectations

Source: Corsello et al. 2019

<sup>78</sup> ECB Monetary Policy Decisions, 10 March 2016.

<sup>79</sup> This is likely due to the length of the transmission mechanism of monetary policy. See section 3.1.

Furthermore, the pre-crisis results were achieved with a limited use of the policy toolkit. Between 1999 and 2008, the Main Refinancing Operation (MRO), the key policy rate at the time, was altered only six times. Although the financial crisis of 2008 and the subsequent developments undoubtedly determined a challenging economic environment for the ECB to operate in, part of the blame for the unsatisfactory post-crisis performance can be attributed to the monetary policy framework itself. Rostagno et al (2021) showed that when positive shocks prevailed, the credible commitment against inflation rates above 2% embedded in the price stability definition acted as an automatic stabiliser: as inflation slid towards the upper bound, agents reacted to the expected intervention of the central bank thereby making it unnecessary. As shocks turned negative, however, the policy framework failed to deliver the same kind of adjustment: the perceived asymmetry of the price stability definition coupled with the proximity to the effective lower bound on nominal interest rates led economic agents to doubt the effectiveness of the intervention of the monetary authority, forcing it to intervene more forcefully (ibid).<sup>80</sup>

All the above seems to suggest that inflation outturns are influenced by the policy framework. While the framework design is by no means the only factor at play, it is one factor that the central bank can control directly. A revision of the strategic framework towards a formulation with stronger anchoring properties is thus warranted. A rebalancing of the strategic framework could take the form of a point target specification coupled with a relatively long price stability horizon. In particular, the latter should incorporate an element of ambiguity to act as an escape clause, as in the formulation adopted in 2003. Furthermore, a point specification should also come with the symmetry that is widely perceived to be lacking from the policy aim of the ECB that emerged in 2003.

In the next section we shall consider what the implications of a revision of the policy aim along the lines suggested above could be for the policy framework of the ECB.

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<sup>80</sup> The price stability definition of the ECB was often perceived to be asymmetric because of the way it was formulated: a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of *below* 2%. Economic agents had thus internalized that, should inflation stand above 2%, the central bank would react more than if it stood at, say, 1%, for this was within the price stability band. It should be noted, however, that, in its communications with the public, the ECB had stressed the symmetric nature of its target: “The Governing Council continues to stand ready to adjust all of its instruments, as appropriate, to ensure that inflation moves towards its aim in a sustained manner, in line with its commitment to symmetry.” See ECB Monetary Policy Decisions 16 July 2020.

## 7. Are the policy aim and the price stability definition compatible?

### 7.1. A bit of background

The Treaty on the Functioning of the European Union that established the European Central Bank enshrined the notion of price stability as the heart of the new institution. The Treaty, however, fell short of clarifying what price stability meant in practice. It was left to the Governing Council of the ECB to come up with a workable definition of the concept. On this key passage, it is worthwhile to quote Rostagno et al. (2021) in full:

“[The Governing Council] did so as early as October 1998, by formulating an objective norm that was consciously made to differ from the standard inflation targeting framework practised by some prominent central banks at the time. Rather than expressing a preference for a particular rate of inflation, a “target” that could be changed if circumstances changed, the Governing Council opted for announcing a description of state of affairs that, in its assessment, would qualify price stability unconditionally, almost *always and everywhere*: a year-on-year positive inflation rate *below 2%*”.

Soon after, a thorough review of the strategic framework was carried out. In May 2003, the ECB announced the introduction of a new conceptual anchor for monetary policy in the euro area. Under the notion of “policy aim”, the ECB committed to target an inflation rate below but close to 2% over the medium term. Thus, inflation rates closer to the upper ceiling of the price stability band (0% - 2%) were targeted. This *clarification* provided a buffer away from the Zero-Lower Bound (ZLB) that reduced the risk of a deflationary trap in a heterogeneous monetary union.<sup>81</sup> Chiefly, the decision was taken not to amend the definition of price stability on the ground of the loss of credibility that it would have brought about for the newly established institution.<sup>82</sup> This is revealing of the fact that, a few years since its institution, the definition of price stability constrained the scope of action of the monetary authority. The concept of inflation aim, only partially overlapping with that of price stability, was thus coined.

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<sup>81</sup> “...the presence of specific risks that seem intrinsic to maintaining inflation very close to zero may argue for keeping in the conduct of monetary policy a sufficient safety margin above zero for admissible rates of inflation. Such a margin should help to substantially reduce the probability of a series of negative shocks eventually leading to a situation in which monetary policy can no longer adequately respond with its policy rates because of the zero lower bound of nominal interest rates. A sufficient safety margin against the risks of deflation would also cover other reasons – such as the existence of a measurement bias and the implications of inflation differentials in the euro area – for aiming at small positive rates of inflation.” Quoted in Issing (2003).

<sup>82</sup> “...the decision taken and confirmed today was made with a strong consensus view in the Governing Council. That does not mean that there were no differing views. [...] For example, on the formula of the definition itself: maintaining price stability is defined as a rate of inflation of below 2%. There were those who pleaded for an even tighter interpretation. There were others who pleaded for a looser interpretation. In the end we all agreed that we would have a big credibility problem and would even create our own credibility problem if we were to change the definition. And so we quickly reached consensus that there was no need, and that it would even be dangerous, to change the definition. It would have been remarkable if, in a discussion involving 18 participants, we had all had our noses pointing in the same direction from the outset.” Quoted in Duisenberg (2003).

## 7.2. Credibility loss region(s)

The introduction of the inflation aim concept in 2003 gave birth to a potential tension with the price stability definition. While all inflation rates within the inflation aim are consistent with price stability, not all inflation rates falling within the price stability band are consistent with the inflation aim. Following President Duisenberg's remark on the occasion of the 2003 strategy review, we label these areas *credibility loss regions*.

It is at this stage important to highlight that the price stability definition and the inflation aim are, strictly speaking, distinct concepts. Responding to a letter by the Chairperson of the Committee on Economic and Monetary Affairs of the European Parliament in December 2001, President Duisenberg argued that the inflation target "... does not necessarily define 'price stability', but quantifies the objective with respect to price developments that monetary policy is aiming for." (Ibid: 1) He went on to explain that, historically, countries embarking in a process of dis-inflation from high levels had set inflation targets away from price stability, however defined. "Similarities – concluded Duisenberg – exist only when such inflation targets are aimed explicitly at achieving 'price stability'". (ibid.) This take was echoed in the context of the 2003 ECB strategy review. Castelnovo et al. (2003:49) wrote that:

*"...over the last decade a large number of countries have announced explicit inflation targets in the form of point targets or ranges, in the context of a general process of reform of their monetary policy framework [...] in many cases initially a clear distinction was made between the "inflation targets" and the ultimate price stability objective. In the context of the gradual process of disinflation in many countries at the beginning of the 1990s, the former was seen as instrumental for achieving the latter. As many countries have reached and announced very low inflation targets in the meantime, these are nowadays seen more as an operational definition of the ultimate objective of price stability."*

Both views make very similar points. While acknowledging a theoretical difference between the notions of price stability and of an inflation target, the authors associate such a difference with interim disinflationary episodes. In these circumstances, it is conceivable to set an inflation target that, while not in line with the price stability definition, supports the central bank in the transition towards a low inflation regime. Crucially, this condition did not apply to the ECB in its early days, nor does it apply to it today: since 1998, headline inflation remained, on average, well inside the 0-2% price stability band. Hence, the position taken in this paper is that, in the context of the euro area, the theoretical distinction between price stability and inflation aim is negligible and that the ECB inflation target *de facto* is the "... operational definition of the ultimate objective of price stability" (ibid.) which remains



the primary objective of the Eurosystem and of the single monetary policy for which it is responsible. Discrepancies between the two concepts can thus be problematic.<sup>83</sup>

The ECB has not provided any precise quantification of what below but close to 2% meant, but some extrapolations have been made. Rostagno et al. (2021) report that “statements from ECB policymakers at the time implied that inflation expectations within a narrow interval between 1.7% and 1.9% were consistent with the Governing Council’s policy inclinations”. These assessments are broadly in line with the estimation by Paloviita et al. (2017). By using real time datasets featuring the ECB staff quarterly macroeconomic projections, thereby exploiting the same information that the Governing Council had at its disposal when deliberating on the monetary policy stance, the paper characterized the policy strategy of the ECB in terms of its reaction function. Data are best fitted under two specifications: either (i) the ECB policy responses to past inflation gaps are symmetric around a target of 1.6% -1.7%, or (ii) the ECB is more concerned with inflation rates above 2% than below, thereby reflecting an asymmetric response to inflation trends. On the contrary, Hartmann and Smets (2018) found no evidence of asymmetric response to deviation of inflation from the ECB’s target. They calculate the ECB’s implied inflation aim to be symmetric between 1.7% and 1.8% (ibid: 43-44).<sup>84</sup>

Relying on these results, we present a couple of elaborations. First, we shall consider the configuration of the monetary policy framework that emerged from the 2003 strategic review, when the policy aim concept was announced. In line with Rostagno et al. (2021), the introduction of the policy aim is interpreted as having shifted upward the probability distribution of inflation rates in the euro area.<sup>85</sup> This crafted an asymmetric probability distribution that we centre at 1.8%.<sup>86</sup> Secondly, we shall examine the consequences of a hypothetical amendment of the ECB policy aim to 2%, symmetric. These conceptions are meant to highlight the inconsistencies emerging from the price stability definition and alternative configurations of the ECB’s policy aim.

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<sup>83</sup> That such inconsistencies are sources of tensions within the euro area became clear when, following the stimulus package of September 2019, a number of current and former central bankers publicly criticised the ECB on the ground that such measures surreptitiously altered the definition of price stability.  
See <https://www.hanswemersinn.de/sites/default/files/Memorand-ECB-Monetary-Policy-04102019.pdf>

<sup>84</sup> Depending on whether the specification is tested on Eurosystem projections or not.

<sup>85</sup> “...the innovation in the strategy announcement amounted to increasing the distance between the “policy aim” [...] and the deflation zone.” See Rostagno et al. (2021).

<sup>86</sup> More precisely the ECB targeted an inflation rate below, but close to, 2%. We refer to 1.8% instead to emphasise the upward shift in the inflation target determined by the 2003 clarification.

### 7.3. The 2003 amendment: asymmetric target below but close to 2%

One simple way to see how the price stability definition and the policy aim intermingle is to show the four regions that they together define.

Price Stability (0%-2%)	Inflation Aim, asymmetric (2%-Y) <sup>87</sup>	
	Satisfied	Not Satisfied
Satisfied	$2\% > \pi > Y\%$	$Y\% > \pi > 0\%$
Not Satisfied	N.A.	$\pi \geq 2\%$ $\pi < 0\%$

Table 3: Interaction of price stability definition and inflation aim (2003-amendment)

Source: author's elaboration

Let us analyse Table 3 clockwise starting from the bottom right corner. When inflation rates are above or equal to 2% or below 0%, neither the price stability definition nor the inflation aim are satisfied. Since the inflation aim is contained within the price stability band, there are no regions where the former is satisfied but the latter is not. This is shown in the bottom left corner of Table 3. Moving to the top left corner, both criteria are met when inflation lies between the price stability ceiling of 2% and a hypothetical lower bound Y% of the policy aim. Lastly, and more interestingly, the top right corner shows that there is a region where price stability is satisfied but the inflation aim is not. This happens when inflation lies between 0% and the threshold Y%. This area is what we label *credibility loss region*.

The shaded blue area in Figure 10 offers a graphical representation of the region as lying between the purple dotted line (Y%, or the lower bound of the policy aim) and the green line (0% or the lower bound of the price stability definition).

<sup>87</sup> Y is the hypothetical lower bound of the ECB inflation aim.

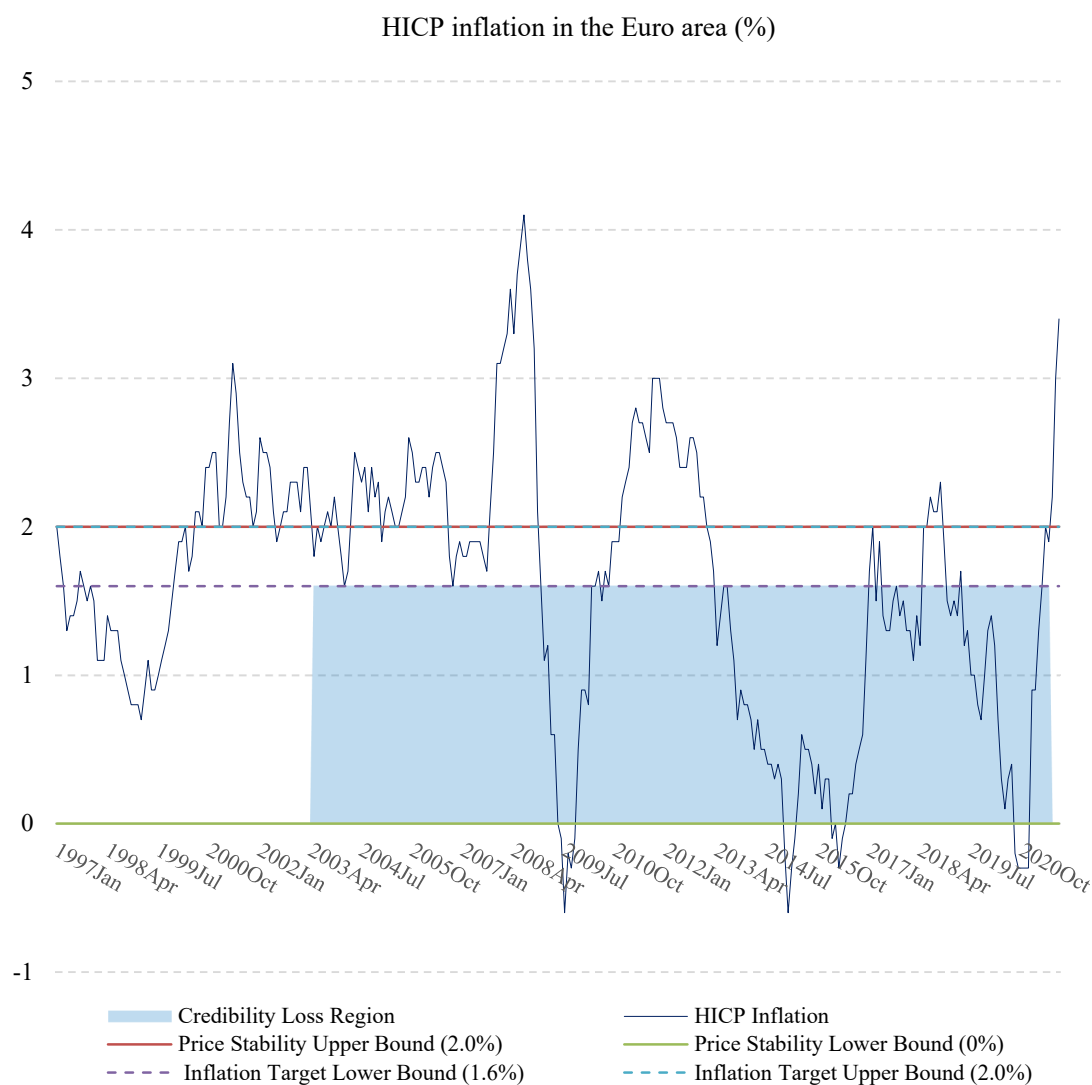


Figure 10: Inflation Target close but below 2%, asymmetric

Source: author's elaboration

Looking at monthly HICP inflation data since the strategy review was carried out in May 2003, inflation has fallen inside the credibility loss region around 48% of the time and, on four occasions - in 2008, 2014, 2015 and 2020 - turned negative.<sup>88</sup> Additionally, prior to the Great Financial Crisis, the definition of price stability was missed, in both directions, several times. The pre-crisis misses can be considered part of the normal ebbs and flows of inflation targeting: there are limits to the extent to which the central bank can steer inflation in the short term.<sup>89</sup> Considerably more problematic, however, are

<sup>88</sup> To come up with these figures we assumed that the policy aim lower bound equals 1.6, namely  $Y=1.6$ . Inflation data are monthly. Latest value: September 2021.

<sup>89</sup> On this, see the section discussing the properties of various target specifications.

inconsistencies within the strategic framework itself, where the central bank retains full control. Looking at the figure above, the worsening macroeconomic conditions following the Great Financial Crisis revealed an incoherence in the strategic framework of the ECB.<sup>90</sup>

#### 7.4. 2020 Strategy Review: the case of a symmetric 2% inflation aim

Among other specifications, one way the ECB could reform its framework is by re-defining its inflation aim to be symmetric at 2%. This specification prevails across other major central banks around the world such as the Federal Reserve, the Bank of England and the Bank of Japan. In the following we evaluate this scenario while holding on to the assumption that the price stability definition will not change. First, let us have a look at Table 4 below.

Price Stability (0%-2%)	Inflation Target, symmetric 2% <sup>91</sup>	
	Satisfied	Not Satisfied
Satisfied	$2\% > \pi > Z\%$	$Z\% > \pi > 0\%$
Not Satisfied	$S\% > \pi > 2\%$	$\pi > S\%$ $\pi < 0\%$

Table 4: Symmetric Inflation Aim at 2%

Source: author's elaboration

First, let us define  $S$  as the inflation aim upper bound under the new inflation target symmetrical at 2%. The lower bound of the new inflation aim would be shifted upward as well. This is now indicated by  $Z$ .<sup>92</sup>

Leaving aside the two cases where both the inflation aim and the price stability definition are met (top-left corner) and rejected (bottom-right corner), *two* credibility loss regions can be identified in Table 4 and in Figure 11, below. In the top-right corner, the space where the inflation aim is not satisfied while

<sup>90</sup> Notwithstanding in the early years of the ECB headline inflation trended below the Y-threshold, at the time the notion of policy aim had not been conceptualized yet.

<sup>91</sup>  $S$  and  $Z$  are the inflation target upper bound and the inflation target lower bound, respectively.

<sup>92</sup>  $S$  and  $Z$  are set equal to 2.2% and 1.8% for analytical purposes. The width of the confidence interval in thus unchanged compared to the previous case.

the price stability objective is met is wider compared to the previous case.<sup>93</sup> Moreover, a *second credibility loss region* can be identified between the price stability upper ceiling (2%) and the upper ceiling (S%) of the new inflation aim centred at 2%. Lying above the definition of price stability, inflation outcomes in this region imply that a revision of monetary policy strategy centred on a symmetric 2% inflation target would lead to inflation rates that are not consistent with the former definition of price stability.

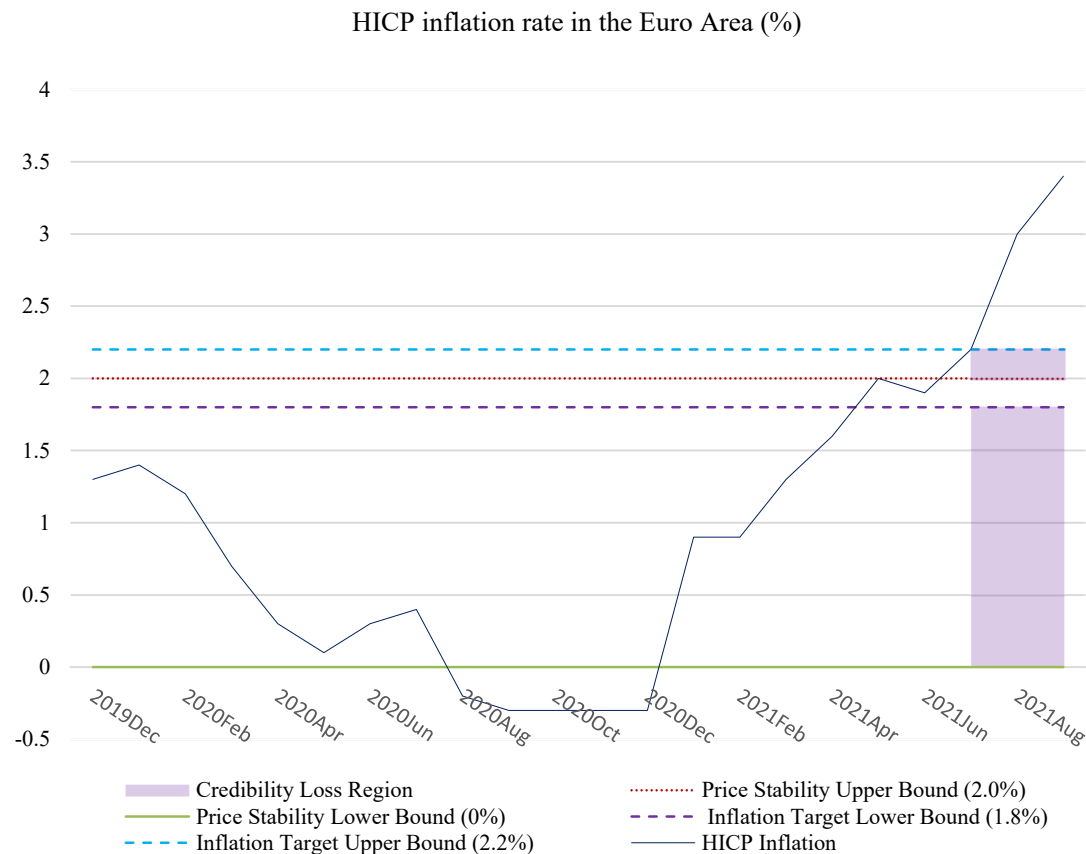


Figure 11: Inflation Target at 2%, symmetric

Source: author's elaboration

Figure 11 displays headline inflation in the euro area since December 2019. Had the ECB adopted a symmetric 2% target while preserving the quantitative definition of price stability at the conclusion of the review in July 2021, the monetary policy framework would have been inconsistent whenever

<sup>93</sup> This happens because the new inflation target (symmetric at 2%) lower bound  $Z$  is higher than the old inflation target lower bound  $Y$ . Thus  $(Z-0) > (Y-0)$ .

inflation drifted in the purple area in Fig.11. For example, a revision of the monetary policy strategy along the lines presented above could have led the Eurosystem to be inconsistent either with its inflation aim or with its definition of price stability around 67% of the time from May 2003 to September 2021.<sup>94</sup>

Furthermore, the credibility loss region arising from the Eurosystem meeting the inflation aim but not meeting the price stability definition is likely to be more contentious than the other, because price stability is pre-eminent to the policy aim. In this respect, the definition of price stability adopted by the ECB appears particularly binding with regards to the potential alteration of the policy target. In turn, this implies that the adoption of a symmetric inflation target centred at 2% should be accompanied by a revision of the definition of price stability set out in 1998. While such revision would likely come at a cost in terms of credibility, maintaining a plain inconsistency in the formulation of the monetary policy strategy is arguably more detrimental to the authority of the central bank. The question then becomes whether the definition of price stability should be amended or dropped altogether.

The latter option would undoubtedly represent a departure from the principles upon which the European Monetary Union has been established. On the other hand, many central banks around the world successfully go by without a quantitative definition of price stability.<sup>95</sup> Furthermore, dropping any reference to a definition of price stability would remove the ambiguity that has characterized the policy framework of the ECB since its inception.

Alternatively, the price stability definition could be reformulated by removing its quantitative element. After all, the notion of price stability is not problematic per se: a reference to stable prices simply formalizes a commitment which is undisputed. At the source of the inconsistency outlined above lies instead the *quantification* of the price stability objective and the constraints this imposes. Moreover, dropping the numerical component from the definition of price stability would leave only the policy aim to quantify the goal of the central bank and to anchor the expectations of economic agents, thereby simplifying the rather obscure two-step policy framework introduced in 2003.<sup>96</sup>

Amending the definition along these lines would widen considerably the degrees of freedom enjoyed by the monetary authority. If deemed necessary, the inflation aim could be set above 2%, or past inflation shortfalls could be offset with a temporary overshooting of the target. On the other hand, this

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<sup>94</sup> This figure should be regarded only in terms of orders of magnitude. Indeed, the adoption of a 2% symmetric target back in 2003 would have arguably impacted inflation expectations and thus inflation outturns.

<sup>95</sup> Although the peculiar institutional architecture of the EMU cautions against the adoption of arrangements specific to other jurisdictions and calls instead for *ad hoc* solutions.

<sup>96</sup> “The two-step definition of price stability may have obscured what the inflation aim of the ECB is, and its theoretical rationale is unclear. The de facto inflation aim of the ECB has been interpreted in various ways both inside and outside the ECB. In particular, the expression ‘below, but close to 2%’ has some feel of asymmetry even though the ECB’s communication stresses symmetry in its monetary policy making. Ambiguity of the price stability definition may hamper internal work of the GC and can lead to policy mistakes.” Paloviita et al. (2020:2)

enhanced flexibility does come with some drawbacks. Over the long run average inflation could hover well above 2%, outside what is *currently* viewed as stable prices.

### **7.5. The outcome of the strategy review**<sup>97</sup>

At the inception of 2020, the ECB launched a thorough review of its monetary policy strategy for the first time since 2003. The exercise was initially set to be concluded by the end of 2020, but the pandemic emergency delayed the announcement of the outcome to the summer of 2021. The purpose of this section is to present the results of the strategy review in light of the arguments brought forward in this paper. The focus will therefore be only on the price stability objective.

Speaking on 8 July 2021, President Lagarde explained the amendments to the price stability objective. As anticipated, the rate of inflation targeted by the ECB was set at 2% over the medium term. The symmetry of the target was emphasised to dispel any doubt that more leniency towards undershooting of the target applied. Indeed, the previous definition of the inflation aim - below but close to 2% - was frequently interpreted to have implied just that. Broadly speaking, the move to a 2% symmetric target rests on two elements. First, the fall in the real natural interest rate ( $r^*$ ) experienced over the last seventeen years. Leading to an increased likelihood that nominal rates will be constrained by the effective lower bound, a lower  $r^*$  calls for a higher inflation target. At the same time, the commitment to a higher target presupposes additional monetary interventions, the more so the higher the target, which burden the monetary authority. In a balancing act, the Governing Council thus opted for a slight upward revision of the inflation target.

The second element that prompted the adoption of a 2% target is its simplicity. The previous double-key formulation of the price stability objective, involving a vaguely defined inflation aim and a quantitative definition of price stability, was wholly revised. First of all, the 2% target embodies a clear mark that would contribute to a better anchoring of agents' inflation expectations; secondly, the quantitative characterization of price stability was dropped altogether. The quantification of price stability arguably reflected the conditions in place in the early days of the monetary union, when the newly founded ECB had yet to build a credible reputation as a central bank. As this commitment is nowadays undisputed and its credibility well established, the quantitative definition has become redundant.

The medium-term horizon of the price stability mandate was maintained. The common awareness that monetary policy cannot fine tune inflation in the short-term required the flexibility to look-through temporary shocks to the price level. The Governing Council considered that these needs had been duly

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<sup>97</sup> <https://www.ecb.europa.eu/home/search/review/html/index.en.html>

fulfilled by the medium-term price stability horizon, which was therefore retained in the new monetary policy framework.

Overall, the three elements discussed in this paper – the target specifications, the price stability horizons and the potential conflict between the new inflation target and the numerical definition of price stability – have all been amended by the new strategy review along the lines articulated above.

## **8. Conclusion**

After an overview devoted to the history and to the key features of the IT paradigm in central banking, this paper assessed some of the trade-offs that arise from selecting one configuration of the monetary policy targeting framework over another. The three policy specifications (point target, point target with tolerance bands and range target) and the two policy horizons (short and long term) were analysed in terms of their flexibility vs. inflation anchoring properties. This layout was then confronted with the policy framework adopted in 2003. The ECB's targeting of a hybrid specification combining a quantitative definition of price stability with an ambiguous inflation aim of below but close to 2% has been described as a range target with implicit bands. Coupled with an indeterminate horizon to price stability, the monetary policy framework of the ECB has been interpreted as leaning on the side of flexibility. The dis-anchoring of long-term inflation expectations experienced since 2013, however, suggests that the policy framework could benefit from a rebalancing towards a formulation with stronger anchoring properties.

A more balanced framework maximizing the anchoring of inflation expectations – in line with the mandate of the European Central Bank – while preserving some degrees of flexibility to cope with exogenous shocks to prices is thus envisaged. Given the far-reaching benefits stemming from a flexible horizon to price stability (“a safety valve”), we argued that a balanced framework could be achieved by a point target specification with a relatively long target horizon.

The inflation aim of the ECB could be reformed along these lines with the introduction of a symmetric 2% target over the medium term. By evaluating this arrangement with the definition of price stability, it turns out that two credibility loss regions emerge where either the policy aim (symmetric 2%-point target) or price stability (between 0% and 2%) are satisfied, but not both. The credibility loss region arising from the Eurosystem meeting the inflation aim but not meeting the price stability band is likely to be much more contentious than the other, because price stability dominates the policy aim.

To avoid any inconsistency in the policy framework, then, an inflation aim centred at 2% requires a change in the definition of price stability, which could be amended by dropping the numerical



component, thereby maintaining a generic reference to the primary goal of monetary policy in the strategic framework of the ECB.

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