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The Evolution of Inflation Targeting from the 1990s to 2020s: Developments and New Challenges

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Abstract

Since the initial launch of inflation targeting in the early 1990s in New Zealand and a few other countries, inflation targeting has become the predominant monetary policy strategy in large advanced and emerging market economies. Inflation targeting has been remarkably successful in anchoring inflation, likely owing to core elements of the framework across central banks. Its reaction process, which adjusts the monetary policy stance to ensure the return of inflation to target, allows it to flexibly incorporate a wide range of factors while limiting the discretionary biases that can contribute to excessive inflation. The emphasis on communications about the inflation outlook promotes transparency and accountability. As a result, inflation targeting central banks have, on balance, managed well the large shocks associated with the Global Financial Crisis and COVID. Even so, there are numerous challenges discussed in this paper that are associated with calibration and communications of forward guidance, quantitative easing/tightening, and financial stability.

Keywords

Inflation targeting, monetary policy, central banking, financial stability,

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1. INTRODUCTION

Inflation targeting is a monetary policy strategy that has five key elements:[1] 1) the public announcement by a central bank of medium-term numerical targets for inflation, such as 2 percent, in order to tie down inflation expectations; 2) an institutional commitment to price stability as the primary goal of monetary policy, to which other goals are subordinated; 3) a forward-looking, information inclusive strategy in which many variables, and not just monetary aggregates or the exchange rate, are used for deciding the setting of policy instruments; 4) increased transparency of the monetary policy strategy through communication with the public and the markets about the plans, objectives and decisions of the monetary authorities; and 5) increased accountability of the central bank for attaining its inflation objectives.

Since inflation targeting was first adopted by the Reserve Bank of New Zealand in 1990, inflation targeting has become the standard policy approach used by central banks in advanced economies and large emerging market economies. Table 1 shows the evolution of monetary policy regimes across selected economies as of the end of 1993, 2007, and 2023.[2] Most advanced countries had either explicitly or implicitly adopted inflation targeting prior to the global financial crisis (GFC) that started in late 2007. The adoption of inflation targeting among large emerging market economies has also been significant, albeit somewhat more gradual, and the continued trend away from exchange rate management and toward inflation targeting among emerging market economies after 2007 owes, in part, to the incorporation of some eastern European economies into the euro area. An important exception is India, which adopted inflation targeting in 2016 at levels of economic development below that typical of other inflation targeters.

[1] Bernanke and Mishkin (1997), Mishkin (2008).

[2] There is a subtle issue of when to classify the United States and the Eurozone countries as inflation targeters, since they adopted many of the features of inflation targeting prior to the global financial crisis. Although it can be argued that the Federal Reserve implicitly adopted an inflation target under the chairmanship of Ben Bernanke that started in 2006, the Federal Reserve did not formally announce an inflation target of 2 percent until 2012. We use 2012 for the adoption of inflation targeting in the United States. The ECB defined price stability as an inflation rate below 2 percent in 1999, then changed that to "below, but close to 2 percent" in 2003, and then "a symmetric 2 percent inflation target over the medium term". Similar issues arise for some other economies. For convenience, we generally adopt the classification monetary policy regimes developed in Cobham (2021) but alter the dates for the United States (to 2012) and the euro area (to 2003). We also classify Israel as an advanced economy.

TABLE 1: MONETARY POLICY REGIMES IN SELECTED ECONOMIES, 1993-2023

ADVANCED ECONOMIES			
	1993	**2007**	**2023**
DISCRETION	Greece, Japan, Norway, USA	Iceland, Japan, USA	Iceland
EXCHANGE RATE MANAGEMENT	Austria*, Belgium*, France*, Ireland, Israel, Netherlands*, Portugal*, Denmark, Hong Kong, Iceland	Denmark, Hong Kong	Denmark, Hong Kong
MONETARY AND EXCHANGE RATE TARGETS	Italy*, South Korea, Switzerland Germany*, Spain*		
INFLATION TARGET	Finland*, Australia, Canada, New Zealand, Singapore, Sweden, UK	Australia, Canada, New Zealand, Singapore, Sweden, UK, euro area, Israel, Norway, South Korea, Switzerland	Australia, Canada, New Zealand, Singapore, Sweden, UK, euro area, Israel, Japan, Norway, South Korea, Switzerland USA
EMERGING MARKET ECONOMIES			
	1993	**2007**	**2023**
DISCRETION	Brazil, India, Indonesia, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Bulgaria, China, Croatia*, Hungary, Latvia*, Lithuania*, Romania	Argentina, China, Croatia*, Egypt, India, Malaysia, Pakistan	Argentina, China, Egypt, Malaysia, Pakistan
EXCHANGE RATE MANAGEMENT	Argentina, Cyprus, Egypt, Estonia, Jordan, Morocco Czech Rep, Malta*	Bulgaria, Cyprus*, Estonia*, Jordan, Latvia*, Lithuania*, Malta*, Morocco	Bulgaria, Jordan, Morocco
INFLATION TARGET	Chile	Brazil, Chile, Czech Rep, Hungary, Indonesia, Mexico, Peru, Philippines, Poland, Romania	Brazil, Chile, Czech Rep, Hungary, India, Indonesia, Mexico, Peru, Philippines, Poland, Romania
***INDICATES THAT THE COUNTRY SUBSEQUENTLY JOINED THE EURO AREA**			

Source: David Cobham, 'A comprehensive classification of monetary policy frameworks in advanced and emerging economies', Oxford Economic Papers, January 2021, 73(1): 2-29. Data downloaded December 6, 2024, from Monetary Policy Frameworks – A comprehensive classification of monetary policy frameworks, by Prof. David Cobham of Heriot-Watt University. We elect 2012 as the date of the adoption of inflation targeting in the United States, and 2013 as the date for Japan. We also identify Isreal as an advanced, rather than emerging market, economy.

In this paper, we examine how inflation targeting developed and the challenges it faced over two periods: the initial phase from 1990 until the global financial crisis (GFC), then after the GFC through the Covid-19 pandemic of 2020. The paper concludes with a discussion of challenges facing inflation targeting in the future.

2. INFLATION TARGETING PRIOR TO THE GLOBAL FINANCIAL CRISIS

We first examine the adoption of inflation targeting in advanced economies, then the challenges this monetary policy strategy faced during this period. Then we do the same for emerging market economies.

2.1 Adoption of Inflation Targeting in Advanced Economies

The high inflation of the 1970s and 1980s led central banks in advanced countries to consider alternative monetary policy strategies to lower inflation. As Bernanke, Laubach, Mishkin and Posen (1999) have discussed, the precursor to inflation targeting was the adoption of monetary targeting by the central banks of Germany and Switzerland in late 1974, which had many key elements of inflation targeting. By working backwards from an objective for inflation to determine the targets for money growth rates, they were bringing in an inflation target through the back door to tie down inflation expectations. In addition, as practiced, monetary targeting was far from being a rigid rule, and instead was quite flexible in practice by allowing deviations from target ranges for the monetary aggregates depending on economic circumstances and by allowing short-run inflation objectives to fall gradually to a longer-run objective. The commitment to price stability was defined as an objective for inflation greater than zero. The monetary targeting regimes of both Germany and Switzerland demonstrated a strong commitment to transparent communication about achieving the inflation objective. Interestingly, when one of us asked officials at the Swiss National Bank why they had chosen to adopt monetary targets rather than inflation targets, the response was that given the influence of Milton Friedman and the monetarists at the time, they just gravitated to monetary targets as the way to communicate their monetary policy strategy.

Other advanced countries flirted with monetary targets including the United States, Canada, the United Kingdom, and Japan, but did not take them as seriously as Germany and

Switzerland (see Bernanke and Mishkin, 1992). These flirtations did not last long, likely owing in part to the instability in the relationship between monetary aggregates and inflation became so unstable that became apparent in the 1980s (Estrella and Mishkin, 1997). By the early 1990s, the emphasis on monetary targeting had waned, even in Germany and Switzerland, which had begun to focus on a set of factors, including the exchange rate, owing in part to integration across European economies. As Gerald Bouey, then Governor of the Bank of Canada, famously said, "We didn't abandon monetary aggregates, they abandoned us" (as cited by Dodge, 2006).

More generally, fears of inflation getting out of control, often after a crisis, contributed to serious concerns about economic performance, both in terms of high and variable inflation and large business cycle fluctuations, and led to government reforms. Among these reforms was the adoption of an inflation targeting strategy in four advanced economies: New Zealand, Canada, the United Kingdom and Sweden (see Mishkin and Posen, 1997 and Bernanke, Laubach, Mishkin and Posen, 1999).

In New Zealand, the government and the Reserve Bank of New Zealand adopted a Policy Target Agreement (PTA) in March 1990 in which the Reserve Bank of New Zealand would pursue an inflation target range of 0 to 2 percent. In Canada, the Governor of the Bank of Canada, John Crow, had engaged in a three-year campaign to promote price stability in the late 1980s. The implementation of a new goods and services tax (a value-added tax) starting in 1991 and the accompanying sharp rise in the price level led to an agreement between the Bank of Canada and the Canadian government to adopt formal inflation targets "for reducing inflation and establishing price stability in Canada" through 1995, with the target coming down to 2 percent on a permanent basis. In the United Kingdom and Sweden, the foreign exchange crisis in September 1992 knocked both the British pound and the Swedish krona out of their pegs to the German Deutschemark in the Exchange Rate Mechanism (ERM). This led to a search for a new nominal anchor given that the substantial depreciation of the currencies would lead to a sharp rise in the price level and a possible surge in inflation expectations. In October 1992, the Chancellor of the Exchequer (finance minister) announced an inflation target of 1 to 4 percent for the United Kingdom and then "invited" the Governor of the Bank of England to publish a quarterly *Inflation Report* that would detail the progress being made to achieve that target. The Governing Board of the Riksbank (the Swedish central bank) issued a statement that the objective for monetary policy was to "limit the annual increase in the consumer price index from 1995 onwards to 2 percent, with a tolerance up or down of 1 percentage point."

The inflation targeting regimes in these four countries were highly successful in stabilizing both inflation expectations and actual inflation.[3] These favorable outcomes then led to adoption of inflation targeting by many other advanced countries as indicated by Table 1. The Federal Reserve and the European Central Bank (ECB) came late to the game. They both waited more than ten years after its initial development to adopt inflation targeting. This is not surprising given that both central banks had adopted many elements of inflation targeting and had been successful in controlling inflation, and so did not see as pressing a need to formally adopt inflation targets.

2.2 Challenges in Advanced Countries

Despite the success of inflation targeting in advanced countries, there were five challenges that this strategy of monetary policy faced during this period.

2.2.1 Delays in Signalling and Accountability

Because of the "long and variable lags of monetary policy", often referred to by Milton Friedman, inflation outcomes following monetary policy adjustments are revealed only after a substantial lag of two years or more. This is why inflation targeters such as Canada and Sweden emphasized in the initial announcements of their inflation targets that the inflation target applied only several years in the future. Later inflation targeters also emphasized that the inflation objective is a medium-term target. Thus, an inflation target does not send immediate signals that the central bank will be successful or has a strong commitment to achieving the inflation target, and an inflation-targeting central bank will need a strategy that acknowledges the medium-term nature of the inflation target and anchors inflation expectations.

The solution to this problem was provided by Svensson (1997), which argues for inflation targeting to be conducted as "inflation forecast targeting". In this approach, central banks describe their inflation targeting strategy as choosing and announcing a policy path for

[3] See Bernanke, Laubach, Mishkin and Posen (1999), Mishkin and Schmidt-Hebbel (2002, 2007), and Gurkaynak, Levin and Swanson (2010). However, as pointed out by Ball and Sheridan (2005), formal inflation targeting did not lead to substantial improvements in performance over that of the United States and the Eurozone, who did not formally adopt inflation targeting at the time, but whose central banks pursued many of the features of inflation targeting informally, including implicit inflation targets of around 2 percent.

their monetary policy instrument(s), usually the overnight policy interest rate that would forecast an inflation rate equal to the inflation target over an appropriate horizon. Then, the public, markets and the government could immediately evaluate the central bank's commitment to achieving the inflation target by assessing whether the inflation forecast is a reasonable one, thereby promoting accountability of the policymakers to the public.

Indeed, this is exactly what inflation targeting central banks have done by publishing documents such as *Inflation Reports,* that outline how the projected policy paths will lead to inflation converging to the target over time. Accountability is also encouraged by the ability of the public and the politicians to evaluate the actual performance of the central bank in achieving that target over the forecast horizon. This is why *Inflation Reports* also discuss why inflation may have deviated from the forecast target, enabling the public and politicians to evaluate whether the central bank has good explanations for target misses.

2.2.2 Too Rigid or Not Enough of a Rule

One of the potentially most severe criticisms of inflation targeting during this period was that that it could impose a rigid rule for monetary policy that would not allow enough discretion for policy to react sufficiently to unforeseen circumstances (see Friedman and Kutner, 1996). For example, policymakers in countries that adopted monetary targeting did not foresee the breakdown of the relationship between these aggregates and objectives such as inflation. With rigid adherence to a monetary policy rule, the unforeseen changes to the dynamics of the economy would have led to disastrous outcomes (see Mishkin, 2018).

An opposite criticism of inflation targeting (e.g., Calvo, 2001) is that it allows too much discretion, making monetary policy time-inconsistent, that is, monetary policymakers would have incentives to renege on an optimal policy plan to stabilize inflation and instead would pursue overly expansionary monetary policy to raise output and unemployment as in Barro and Gordon (1983). Proponents of instrument rules such as the Taylor Rule (Taylor, 1993) suggest such rules avoid the time-inconsistency problem by preventing discretionary monetary policy that would lead to inflation.

However, these criticisms stem from a confusion that has been created by the rules-versus-discretion debate. Useful policy strategies are `rule-like' in that they involve forward-looking behavior which constrains policymakers from systematically engaging in policies with

undesirable long-run consequences, thereby avoiding the time-inconsistency problem. However, they also allow for discretion and judgement in the conduct of monetary policy. Svensson (2003) has described these strategies as "target rules" and argues that in practice this describes inflation targeting. In a similar vein, Bernanke and Mishkin (1997) have described inflation targeting as "constrained discretion," which, although it allows discretion, avoids the time-inconsistency problem by keeping the central bank accountable for stabilizing inflation.

2.2.3 Possible Increased Output Fluctuations and Managing Supply Shocks

Another often-heard criticism of inflation targeting during this period was that a focus on inflation would lead to larger output and business cycle fluctuations: Monetary policy would be tightened too much when the inflation rate was above the target and would be too easy when inflation was below the target. Indeed, this is what would occur if a central bank conducted monetary policy as what Mervyn King, the Governor of the Bank of England, colorfully referred to as an "inflation nutter" (King, 1997), focused solely on stabilizing inflation with no weight in its objective function for output fluctuations.

This is not the way inflation central banks have operated. As Svensson (1997) shows, having output fluctuations in the objective function for inflation targeting central banks implies that the duration of the forecast horizon over which inflation returns to target would be lengthened if shocks drive inflation far from the target and if output falls below the natural rate of output. In practice, all inflation-targeting central banks have shown their willingness to minimize output declines by gradually lowering their inflation targets toward the long-run objective when inflation is well above the long-run objective. This, and the fact that some discretion is allowed, is why inflation targeters often characterize their monetary policy strategy as "flexible inflation targeting".

The flexible-inflation-targeting approach also addresses the tension between stabilizing inflation and output when aggregate supply shocks hit the economy. As pointed out by Blanchard and Gali (2007), aggregate demand shocks lead in New Keynesian models to a "divine coincidence", where policies to stabilize inflation also stabilize output. A key challenge to inflation targeting is when this divine coincidence does not hold because there are aggregate supply shocks, such as a surge in the price of oil, which lead to "stagflation", that is, a decline in output (increase in unemployment) at the same time as inflation is rising. In this case, the

inflation targeting central bank is faced with a tradeoff between its inflation and output objectives: if it tightens monetary policy to lower inflation back to its long-run objective, then it worsens the output decline and makes unemployment worse. The flexible-inflation-targeting approach of Svensson (1997) provides an answer as to how to handle this: When a negative supply shock occurs that drives inflation above the long-run objective, then the forecast for inflation would show a glide path toward the long-run objective, with the path being slower the more weight output fluctuations have in the central bank's objective function, thereby balancing inflation and output objectives.

In practice, central banks have pursued this type of strategy by focusing on stabilizing "core" measures of inflation, which take out items from the price index that are subject to supply shocks, such as food and energy, rather than focus on stabilizing headline inflation (Mishkin, 2007). Research has shown how such a focus on core inflation can help a central bank balance stabilization of prices and activity in response to supply shocks that have temporary effects on inflation (Bodenstein, Erceg, and Guerrieri, 2008). In essence, a central bank allows temporary rises in headline inflation above the long-run target when a negative supply shock occurs.

2.2.5 Too Low Inflation

In the 1990s, central banks were primarily concerned with reducing inflation because of the lingering inflation effects of the late 1970s and early 1980s. With the success of inflation targeting in promoting low-inflation environments, central banks began to recognize that an additional challenge would occur from deflationary risks that could lead to inflation being too low. Summers (1991) warned that monetary policy could face challenges if equilibrium real interest rates and the level of the inflation target implied low values for short-term nominal interest rates that prevented accommodation when activity declined or inflation fell. Inflation targeting central banks recognized that too low an inflation target might have deleterious effects on the economy and thus decided to set their inflation targets well above zero, gravitating to a target around 2 percent. Indeed, the Reserve Bank of New Zealand decided that its target range of 0 to 2 percent was too low and then raised it in 1996 to 0 to 3 percent in 1996.[4]

[4] Later, the Reserve Bank of New Zealand raised its target range again in 2012 to 1 to 3 percent, with a focus on the 2 percent midpoint.

Nonetheless, the developments in the 1990s and 2000s suggested that low equilibrium real interest rates and the effective lower bound (ELB) on nominal interest rates could constrain the ability of central banks to provide policy accommodation in response to below-target inflation and/or weakness in economic activity. Short-term nominal interest rates fell below 1 percent in Japan on the mid-1990s and had fallen to zero by the end of the 1990s, with only a modest—and short-lived—increase above zero on the eve of the GFC. As discussed in, for example, Ito and Mishkin (2006), the Bank of Japan adopted several approaches to nonconventional policies over this period, in an environment of great uncertainty regarding the associated transmission mechanism and quantitative effects. The long period of weak economic growth and low inflation or deflation in Japan occurred outside an inflation targeting framework and the Bank of Japan resisted suggestions to adopt an inflation targeting framework, arguing that it lacked the tools to achieve an inflation target. Inflation targeting was adopted in Japan in 2013, while inflation remained far below the new 2 percent target (Hattori et al, 2021).

Concerns about inflation and/or the equilibrium real interest rate being too low grew in the wake of the 2001-2002 recession in the United States. After stabilizing around the 2 percent level in the late 1990s, inflation fell to around the 1 percent level by 2003, well below the Federal Reserve's implicit target of 2 percent, and the unemployment rate hovered around 6 percent, well above the natural rate. During this period, the policy interest rate in the United States, the federal funds rate, was reduced to near 1 percent and there were concerns on whether further reductions in interest rates would affect financial market functioning. Partly as a result, research increasingly focused on policy actions that could mitigate adverse effects of the ELB, including forward guidance and enhanced communications and government bond purchases to lower long-term interest rates (subsequently labeled quantitative easing) (e. g., Reifschneider and Williams, 2000; Eggertsson and Woodford, 2003, Bernanke, Reinhart, and Sack, 2004). As the global economy recovered in the mid-2000s and inflation returned to, or moved modestly above, inflation targets, the near-term practical impact of this research receded from day-to-day policy debates. The onset of the GFC in 2007 would bring these issues back to the forefront.

2.3 Why Emerging Market Economies Are Different

As pointed out in Calvo and Mishkin (2003) and Mishkin (2008), there are six fundamental institutional differences between emerging market countries and advanced countries that present additional challenges for the conduct of monetary policy in emerging market countries.

1. Weak fiscal institutions.
2. Weak financial institutions, including their regulation.
3. Weak central bank governance and lack of independence.
4. Past history of high inflation, implying low credibility of monetary policy institutions to keep inflation under control.
5. Currency substitution and liability dollarization (the fact that a large percentage of debts are denominated in a foreign currency).
6. Vulnerability to sudden stops (of capital inflows).

Although advanced countries are not immune to problems with their fiscal, financial and monetary institutions, the first three items in the list above, these problems are far more severe in emerging market countries.

We will see that these institutional differences in emerging market countries make inflation targeting a more complicated exercise than in advance countries. As a result, adoption of inflation targeting in these countries had to involve dealing with the challenges resulting from these institutional differences.

2.4 Adoption and Response to Challenges of Inflation Targeting in Emerging Market Countries

Chile was the one of the first countries to adopt an inflation target. As described in Landerretche, Morande and Schmidt-Hebbel (1999), Chile's central bank faced the challenge of a high level of inflation of around 25 percent. Hence its first announced inflation objective, in September 1990, was an inflation rate of 24 percent for the subsequent year. Key to the inflation targeting regime was its flexibility. Past high inflation and therefore low credibility of the central bank, makes it harder to hit inflation targets when the inflation rate starts at such high levels. The Central Bank

of Chile dealt with this challenge by only gradually hardening its inflation target over time, with the announced inflation objective initially interpreted more as an official inflation projection rather than a formal or "hard" target. Then as inflation declined, the inflation objective was steadily lowered until it reached a midpoint target of 3 percent in 1999, where it has been since. Only in 1994, after the central bank already had some success with disinflation, did it indicate that the inflation objective should now be considered a hard target, with the central bank accountable for meeting it.

The adoption of inflation targeting occurred after government reforms to strengthen the institutional weaknesses outlined above. After the collapse of the banking system during Chile's financial crisis in 1982, the Chilean government pursued regulatory reform, with the most important being a General Banking Act enacted in 1986 (see Cifuentes, Desormeaux, and Gonzalez, 2002) that established a Superintendency of Banks and Financial Institutions, limited lending to related parties and state guarantee of deposits and put in place strict standards and regulation for the banking system. As discussed by Caprio (1998), Chile developed banking regulation and supervisory practices that are among the best in the emerging market world and are viewed as comparable to those found in advanced countries. Legislation in 1989 (The Basic Constitutional Act of the Central Bank of Chile) made the central bank "an autonomous entity" and granted it the authority to "regulate the amount of currency and credit in circulation, the performance of credit transactions and foreign exchange". By 1990, fiscal reforms to balance the budget were put into place. Starting in 1991, the Chilean government ran budget surpluses averaging around 1 percent for the next ten years, something unheard of in Latin America.

As discussed in Mishkin (1996, 2006) and Calvo (2001), liability dollarization is a particular challenge for emerging market countries because it can lead to financial instability. If the value of the currency declines, the foreign-denominated debt rises in value, leading to a deterioration of both household and business balance sheets. Indeed, as Mishkin (1996, 2006) discuss, if the decline in the value of the currency is sharp enough, a full-fledged financial crisis can ensue, leading to a collapse of the economy. Liability dollarization thereby provides a rationale for emerging market countries to resist exchange rate depreciations. Thus, emerging market countries exhibit a "fear of floating" along the lines described by Calvo and Reinhart (2002). Chile was no exception. Until August 1999, Chile had an exchange-rate band around a crawling peg which was loosely tied to lagged domestic inflation, and when the Russian financial crisis hit in August 1998 and Chile experienced a sudden stop, along with many other

emerging market countries, the Chilean central bank narrowed its exchange-rate band, effectively fixing its exchange rate. As a result, the Central Bank of Chile could not ease monetary policy in the face of a negative aggregate demand shock, and instead had to substantially raise interest rates. The result was that the inflation target was undershot, and the economy entered a recession for the first time in the 1990s. With this policy mistake, the Chilean central bank experienced strong criticism for the first time since it adopted the inflation targeting regime in 1990, weakening support for the independence of the central bank. Recognizing the error of its ways, the Chilean central bank reversed course in September 1999, indicating that it was now focusing on its inflation target by abandoning the exchange-rate peg and easing monetary policy by lowering interest rates and allowing the peso to decline. Then in May 2000, the Central Bank of Chile formally announced that it was adopting a full-fledged inflation targeting regime, similar to those in advanced countries (see Mishkin and Savastano, 2002). This regime included deemphasizing a focus on the exchange rate, multi-year inflation targets with a long-run target of 3 percent, and publication of a Monetary Policy Report (known as iPoM in Spanish) that was similar to *Inflation Report* documents published by advanced-country inflation targeters.

The success of Chile's inflation targeting regime in lowering inflation to very low levels by Latin American standards (and the success of inflation targeting in advanced countries) led to the adoption of inflation targeting in other Latin American countries, with Brazil following in June 1999, Columbia in September 1999, Mexico in January of 2001, and Peru in January 2002.

Brazil's adoption of inflation targeting is particularly interesting because it took a different approach to the challenges of weak fiscal and monetary policy institutions than did Chile. Similarly to the United Kingdom and Sweden, Brazil adopted inflation targeting after a foreign exchange crisis. The Brazilian government appointed a new head of the central bank, Arminio Fraga, on February 2, 1999, shortly after the Brazilian foreign exchange crisis in January 1999, in which the value of the Brazilian currency, the *real*, collapsed. Fraga almost immediately announced that the Brazilian central bank would implement an inflation targeting regime shortly and put his money where his mouth was by increasing the interbank interest rate by 600 basis points to 45 percent. What was remarkable about this announcement was that many of the institutional reforms that economists thought were necessary to the success of an inflation targeting regime were not in place. The government of Brazil had not granted the Banco Central do Brasil independence from the government (and did not do so until 2021). Nor were there

government reforms to strengthen fiscal institutions. Indeed, the collapse of the real in January 1999 was prompted by a moratorium on debt payments by the governor of a Brazilian state, Minas Gerais. Furthermore, prior to Fraga's accension to the governorship of the central bank, there had been no planning for an inflation targeting regime, and thus the time frame for implementing inflation targeting was remarkably short. Indeed, one of the prominent objections to the adoption of inflation targeting in emerging market countries was that it required sufficient advance planning to prove effective.

The implementation of a full-fledged inflation targeting regime in Brazil in just four months, which was announced on June 21, 1999, by the President of Brazil, proved this objection wrong. The framework included 1) the announcement of multi-year inflation targets (with explicit numerical targets for the 12-month inflation rate in the years 1999, 2000, 2001, and a commitment to announce the targets for 2002 two years in advance; 2) assigning the National Monetary Council the responsibility for setting the inflation targets and tolerance ranges based on a proposal by the Minister of Finance (with consultation with the central bank); 3) assigning to the central bank full responsibility to implement policies to attain the inflation targets; 4) establishing procedures to increase the central bank's accountability by requiring the central bank president to issue an open letter to the Minister of Finance, explaining if the target range was breached, explaining the causes of the deviation, the measures that would be taken to eliminate it, and the time it would take to get inflation back inside the tolerance range; and 5) actions to increase the transparency of monetary policy including a quarterly *Inflation Report.*

Although Brazil had not put in place institutional reforms to improve fiscal institutions and the independence of the central bank, the inflation targeting strategy seemed to work. As in Chile, the inflation targets displayed a gradual reduction, with the announced June 1999 targets set to 8 percent for 1999, 6 percent for 2000 and 4 percent for 2001, with a tolerance range of plus or minus 2 percent. There was a remarkably small pass-through from the substantial depreciation of the *real,* which initially fell by 45 percent during the foreign exchange crisis and thereafter stabilized at 30 percent below its pre-devaluation level for several months. The inflation rate was 8.9 percent in 1999, above the 8 percent target for the year, but well within the 2 percent tolerance range. In 2000 the inflation rate continued to fall and ended the year at the 6 percent target set in June 1999. However, in 2001, the inflation rate exceeded the 4 percent inflation target by more than the 2 percent tolerance range, ending up at 7.7 percent.

The adoption of the inflation targeting regime did not lead to a sharp decline in output, and indeed economic performance was quite good considering the foreign-exchange crisis and sudden stop that occurred at the beginning of 1999. The output contraction was mild, with GDP only falling by 1 percent in 1999. Brazil continued to receive external financing and there were no major bank runs.

The weakness of the institutional framework for fiscal and monetary policy, however, did create problems for the inflation targeting regime in Brazil. In the runup to the presidential election in October 2002, the market had serious concerns that the front-runner, Lula, would weaken fiscal and monetary policy institutions. Lula made statements that suggested that once in office he would encourage highly expansionary fiscal policy and would not take steps to prevent a possible default on Brazil's sovereign debt. He also announced that he would not reappoint the highly respected and successful president of the central bank, Arminio Fraga. Lula's commitment to the independence of the central bank, price stability and the inflation target was far from clear. Given the election of Lula, not surprisingly, there was a sharp depreciation of the *real* and an upward spike in inflation to 12.5 percent, a substantial overshoot of the inflation target of 3.5 percent for 2002.

The response of the Brazilian government and the central bank to the overshoots of the inflation target shows how transparency can be used in emerging market countries to deal with the challenge of large inflation shocks, in this case from the sharp *real* depreciation of 2002. We have seen that under the presidential decree in establishing inflation targeting in Brazil in 1999, the Brazilian central bank was required to submit an open letter to the Ministry of Finance explaining the breach of the inflation target and the steps that would be taken to control inflation. This is exactly what Banco Central do Brasil did with a very high degree of transparency (see Fraga, Goldfajn and Minella, 2003). In its open letter to the Minister of Finance of January 2003, it explained why the exchange rate had overshot and provided explicit estimates of the size of the shocks and their persistence. It estimated that price shocks from the adjustment of regulated prices to be 1.7 percent and estimated the inertia from past shocks to be 4.2 percent of which the central bank accepted 2/3, resulting a further adjustment of 2.8 percent. Adding these two numbers to the previously announced target of 4 percent, provided an adjusted inflation target of 8.5 percent (=4 percent + 1.7 percent+2.8 percent). The January 2003 letter further explained that model simulations suggested that getting to the non-adjusted 4 percent target too quickly would entail large losses of output: an attempt to achieve an inflation rate of 6.5 percent in 2003 would

result in a decline of 1.6 percent of GDP, while trying to achieve the non-adjusted target of 4 percent would lead to a massive decline of GDP of 7.3 percent. The Brazilian central bank was thus in effect following the prescription of Svensson (1997) that in the face of a large inflation shock it would shoot for a path of inflation that would only gradually return to the long-run objective in order to minimize large declines of output below the natural rate of output.

The outcome from this episode was quite good. After the initial surge in inflation, it came down rapidly. From its level of 12.5 percent in 2002, the inflation rate fell to 9.3 percent by the end of 2003, which was within the tolerance range for the adjusted inflation target of 8.5 percent. Market expectations of inflation also dropped dramatically in line with the adjusted inflation targets and inflation kept falling until it was around 3 percent by the end of 2006. After a rise to 26.5 percent in June 2003, the interbank policy interest rate fell to below20 percent by the end of 2003 and below 15 percent by the end of 2006, well below the level of around 20 percent before the 2002 *real* depreciation. In addition, after the initial decline in real GDP, the Brazilian economy started growing rapidly again starting in the third quarter of 2003, with annual growth rate around 5 percent until the start of the global financial crisis.

The success of the Brazilian central bank in coping with the 2002 inflation shock provides a textbook case for how inflation-targeting central banks in emerging market countries can cope with inflation shocks. First, the Banco Central do Brasil's response to the inflation shock demonstrated very high transparency, both in articulating why the inflation target was breached and the plans to return to the long-run inflation objective. This degree of transparency helped minimize the loss of central bank credibility from the target miss and the need to adjust the short-term inflation target. Second, the Brazilian central bank recognized that not adjusting the inflation target was not credible because both the public and the markets recognized that inflation would not remain within the inflation target tolerance range. To do otherwise would have signaled to the public that the central bank could not be trusted to be transparent. Third, by discussing simulations of alternative paths for the inflation rate under different policy scenarios and why a particular path was chosen, the Banco Central do Brasil illustrated that it was not only concerned about controlling inflation, but also about minimizing output losses, thus demonstrating that it was not out of touch with the concern of the public. Demonstrating that it was not an "inflation nutter," with too much emphasis on inflation control at the expense of output fluctuations, likely helped promote public support for central bank independence.

Another lesson from this episode that is particularly important for emerging market countries is that government support for responsible fiscal policy helps inflation targeting to be successful. After his 2002 election, President Lula surprised many of his detractors by supporting measures to maintain fiscal discipline. He proposed legislation, passed in August 2003, to reform the public pension system and make it sustainable. His government also pursued conservative spending policies, which produced a primary budget surplus of 4.3 percent of GDP in 2003, in line with the 4.25 percent target requested by the IMF. Without these government fiscal actions, it is highly likely that Brazil's inflation targeting regime would not have been nearly as successful in the aftermath of the 2002 inflation shock.

The examples of Chile and Brazil illustrate that inflation targeting can be successful in emerging market countries, despite the challenges arising from their more complicated political and economic environments. The Brazilian case suggests that reforms to improve fiscal and monetary institutions do not have to be fully in place when inflation targeting is adopted for inflation targeting to be a success. However, successful inflation targeting, at a minimum still requires government support for these institutions when inflation targeting is adopted.

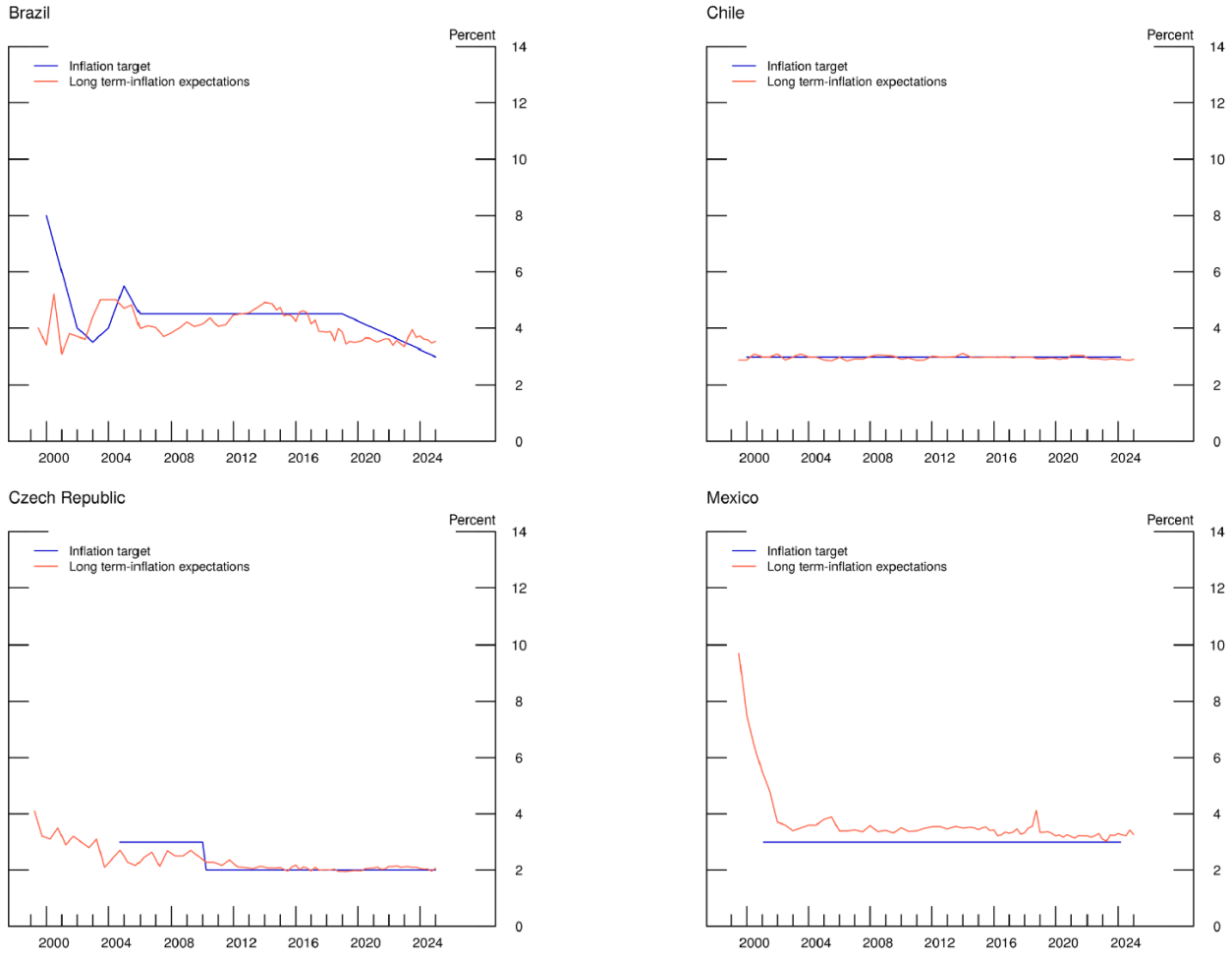
Subsequent to the adoption of inflation targeting in Chile and Brazil, many other emerging market countries have adopted inflation targeting (see Table 1). Research on inflation targeting in emerging market countries shows that it has worked to control inflation in these countries with favorable outcomes for the real economy (see Mishkin and Schmidt-Hebbel, 2002). As in advanced economies, the adoption of inflation targeting, supported by improvements in central bank independence and transparency, led to better anchoring of inflation expectations. Figure 1 illustrates these developments for Brazil and Chile, as well as the Czech Republic and Mexico. To highlight the relative degree of anchoring, the data is shown on a common scale. In all cases, long-term inflation expectations moved in line with the inflation target, generally speaking, from 1999 to the mid-2000s. After the mid-2000s and through the volatile period following the onset of COVID-19, long-term inflation expectations remained firmly anchored.[5]

In Mexico, the central bank was granted independence in 1994, but an inflation targeting regime was not in place until 2003. The combination of central bank independence and a credible

[5] de Pooter et al (2014) is an early analysis of inflation targeting and long-term inflation expectations in Latin America. Robitaille, Zhang and Weisberg (2024) demonstrate formally that inflation expectations have become better anchored in South America when inflation targets have been adopted. Al-Mashat et al (2018a) discuss inflation targeting in the Czech Republic.

inflation targeting regime anchored expectations rapidly. The firm anchoring in long-term inflation expectations in the Czech Republic occurred after 2008. This likely owed, in part, to the enhanced transparency of the central bank, which adopted a robust forecast targeting approach that included forecasted paths for the policy interest rate. However, Brazil has less well-anchored inflation expectations than the other inflation targeting countries in Latin America. This is liked the due to Brazil's weaker fiscal institutions and to the fact that Brazil's government only granted central bank independence to the Banco Central do Brasil in 2021, while grants of independence to inflation targeting central banks in Latin America were given far earlier (Chile, 1989, Columbia, 1992, Mexico, 1993 and Peru, 1993). This result illustrates the continuing importance of strengthening fiscal and monetary institutions to the success of inflation targeting in emerging market countries.

Figure 1. Long-term inflation expectations and inflation targets in selected economies



Source: Consensus Economics and announcments of the the central banks of Brazil, Chile, the Czech Republic, and Mexico.

2.4.1 Dealing with Exchange Rate Fluctuations

When there is a high amount of foreign-denominated debt (liability dollarization), as is often the case in emerging market countries, exchange rate depreciations can damage household and business balance sheets and thus lead to financial instability. In addition, the past history of high inflation, and a lower credibility to control inflation in emerging market countries, leads to a higher pass-through of exchange rate depreciations to inflation.

The potential devasting impacts of sharp currency depreciations on the financial system and bursts of inflation, suggests that benign neglect of exchange rate fluctuations is not an option for central banks in emerging market countries. Central banks in inflation targeting, emerging market economies therefore have a strong rationale to smooth exchange rate fluctuations. However, as we saw in the case of Chile in 1998 (and in Hungary in 2003, Jonas and Mishkin, 2004), there is a danger to the inflation targeting regime if the central bank focuses too much on limiting exchange rate movements. First, too strong a focus on limiting exchange rate movements runs the risk of transforming the exchange rate into a nominal anchor that takes precedence over the inflation target. Second, the appropriate monetary policy responses in an inflation targeting regime depend on the nature of the exchange rate shock. If the domestic currency depreciates because of a pure portfolio shock, inflation is like to rise and the appropriate response to keep inflation under control is for the monetary policy authorities to tighten monetary policy and raise interest rates. If, on the other hand, the exchange rate depreciates because of a terms of trade shock, which lowers the demand for exports and reduces aggregate demand, the shock is deflationary and the appropriate response is to lower interest rates to counteract the decline in aggregate demand, and not to raise interest rates.

This reasoning suggests that central banks in emerging market countries may, out of necessity, have an additional objective of smoothing exchange rate fluctuations. This can be handled in the inflation targeting framework using the insight of Svensson (1997) by allowing short-run deviations of inflation from the inflation target, while committing to gradually lowering inflation back to the long-run target. Transparency is crucial to successfully doing so, and this approach was pursued by the Brazilian central bank in 2002. The central bank can make clear that any intervention in the foreign exchange market has the purpose of only smoothing the

movement of the exchange rate and not to preventing it from reaching its market -determined level over longer horizons, and that any resulting deviation of inflation from the target will be only temporary and will gradually be eliminated over time.

3. INFLATION TARGETING AFTER THE GLOBAL FINANCIAL CRISIS

The global financial crisis from 2007 to 2009 had a major impact on the way central bankers implemented monetary policy (See Mishkin, 2011). Here we examine the developments for inflation targeting in advanced countries and then for emerging market countries.

3.1 Developments in Advanced Economies

On the eve of the Global Financial Crisis (GFC) of 2007-9, short term policy interest rates in the United States, euro area, and the United Kingdom ranged from 3 percent to just below 6 percent. These levels were low by historical standards, but much of this decline owed to the stabilization of inflation near the 2 percent targets that were either explicitly or implicitly the objective of the respective central banks. As a result, real short-term interest rates across these economies ranged from a level somewhat below 1 percent to about 3 percent. These levels of real short-term interest rates were below the levels that prevailed in earlier decades, especially in the 1980s. Nonetheless, real short-term interest rates remained in the 2 percent area that had been viewed as a reasonable benchmark, at least in the United States, since the work on the real interest rate appropriate for a balanced economy embedded in simple rules such as Taylor (1993).

As the GFC caused a sharp weakening in economic activity, central banks lowered their policy interest rates rapidly to levels at or near their effective lower bound in 2009. Once the effective zero-lower-bound constraint became binding, central banks turned to "nonconventional" policy approaches to affect the long-term rates and broader financial conditions that influence household and business spending. These approaches included forward guidance, that is, announcement of a future path for the policy interest rate, and large-scale asset purchases or quantitative easing.

3.1.1 Forward guidance to achieve inflation targets

The increased emphasis on forward guidance following 2008 represented an evolution for inflation-targeting central banks. As noted in our description of experience before the GFC, enhanced communications and forward guidance were increasingly a part of inflation targeters' policy approach. This evolution built on research that emphasized the importance of expectations management in New-Keynesian models (e.g., Woodford, 2003). It also borrowed from insights on the ability of forecast targeting approaches to communicate a horizon over which the inflation target is expected to be achieved and how the inflation objective is balanced with objectives for economic activity and employment (e.g., Svensson, 1997).

For example, the FOMC first communicated a policy tilt or bias in 1999 and explicitly used forward guidance in its statement in the early 2000s (Rudebusch and Williams, 2008; Meade et al, 2015). Several central banks were more explicit, publishing forecasts for their policy interest rate in the years before 2008 (e.g., the Reserve Bank of New Zealand beginning in 1997 and the central banks of Norway, Sweden, and Iceland in the mid-2000s). Importantly, this type of forward guidance was primarily designed to enhance the transparency and accountability of the central bank, and the associated forward guidance or projections were expectations, not commitments.

Forward guidance during the effective lower-bound represented a shift toward a commitment to a lower-for-longer interest rate strategy. Implementation of forward guidance followed two approaches. Time-based forward guidance is an unconditional commitment by a central bank to set the policy rate at specific levels at specific calendar dates. Data-based forward guidance provides information about the monetary policy strategy by indicating the future path of the policy rate conditional on the data that is expected over the policy horizon. Such data-based guidance can imply commitments to a lower-for-longer interest rate approach, for example by outlining a strategy in which the conditions for raising interest rates above their effective lower bound are more accommodative than those associated with its policy strategy away from the effective lower bound.

Central banks deployed both types of forward guidance—and even mixed these types of forward guidance—following the GFC. Adoption was broad based and evolved over time. For example, the FOMC stated in December 2008 that "The Committee anticipates that weak economic conditions are likely to warrant exceptionally low levels of the federal funds rate for

some time.". This forward guidance was updated in March 2009, August 2011 and January 2012. At the time, there was some debate over the extent to which this guidance was a commitment or a forecast, and regarding its conditionality (e.g., see the discussion in Campbell et al, 2012 and Moessner, Jansen, and de Haan, 2017). The Bank of Canada adopted extraordinary forward guidance in April 2009, committing to hold the policy rate at its lower bound through the second quarter of 2010, conditional on the outlook for inflation, and thereby changing market expectations of the future path of interest rates to provide additional accommodation (Carney, 2012). The ECB communicated open-ended forward guidance that the policy rate would remain low in July 2013, and the Bank of England adopted state-contingent forward guidance to remain at its estimate of the effective lower bound in August 2013.

Research has generally found forward guidance to be effective (e.g., Campbell et al, 2012; Raskin, 2013; Swanson and Williams, 2014; Campbell et al, 2016), with calendar- or date-based guidance relatively less effective than state-contingent guidance, perhaps owing to limited credibility of the unconditional commitments associated with date-based guidance (Cecchetti et al, 2020).

3.1.2 Quantitative Easing

While enhanced forward guidance was extensively deployed in the aftermath of the GFC, the post-2008 monetary toolkit was arguably equally as reliant on a more novel tool—quantitative easing (QE). QE involves asset purchases by the central bank in which the central bank purchases long-term government debt through the issuance of short-term (usually overnight) central bank liabilities (reserves). QE provides economic stimulus through two channels. The first channel is a signaling channel: the act of expanding the balance sheet and communicating intentions can reinforce the central bank's communications on forward guidance and thereby signal accommodation (Bauer and Rudebusch, 2014). The second channel relies on portfolio balance/imperfect substitution effects through which asset purchases lower long-term interest rate and raises asset prices (e.g., Vayanos and Vila, 2021). For example, QE, by reducing the supply of long-duration assets held by the public while some investors have a strong preference for long-duration assets, may increase the price on such assets and lower their yields, with spillovers to the yields on other assets.

The prevalence of QE expanded notably when short-term nominal interest rates fell to near their effective lower bound in the United States and Europe. In November 2008, the Federal Reserve announced its first large-scale asset purchase (LSAP) program, a program that was quickly expanded to involve purchases "up to" $200 billion in agency debt, $300 billion in Treasury securities, and $1.25 trillion in agency MBS. Over the next four years, six additional versions of such programs, involving either asset purchases or changes in reinvestment policies, were announced (Ihrig et al, 2018). As a result of these policies, the assets of the Federal Reserve rose from just above 5 percent of GDP to 25 percent in 2014. The Bank of England similarly announced a substantial asset program when its policy rate fell to the effective lower bound in 2009. The ECB deployed quantitative easing later, launching an asset purchase program in 2015. Quantitative easing was also deployed following the onset of Covid. In 2020 and 2021, quantitative easing was used by both advanced economies and emerging market economies (Adrian et al, 2021). In many cases, the use of QE among emerging markets was focused more on market functioning than on aggregate demand management.

After a decade and a half of experience with QE, three issues remain contentious. The degree to which QE is a good substitute for conventional interest rate adjustments remains an area of debate.[6] In addition, the increase in interest rates around the world and associated mar-to-market losses on central bank holdings of long duration assets has increased discussion of the fiscal effects of QE, which we will discuss in section 4. Finally, asset purchases to aid market functioning have been deployed at the same time or in close proximity to QE—for example at the onset of the GFC and the COVID-19 pandemic—and some have called for greater clarity on actions to promote market functioning or to provide accommodation, also discussed in section 4.

3.2 Developments in Emerging Economies

The adoption of inflation targeting by the early 2000s, along with complementary strengthening in macroeconomic policy frameworks, contributed to the resilience of the adopting countries to the large global shocks associated with the GFC and the later onset of the COVID-19 pandemic. At the same time, a broader set of less developed economies adopted inflation targeting. Among

[6] For example, Borio and Zabai (2016), Kuttner (2018), Kiley (2018), and Bernanke (2020) suggest that the empirical evidence and macroeconomic model simulations point to QE as a good substitute for conventional short-term interest rate adjustments, while Greenlaw, Hamilton, Harris, and West (2018), Cecchetti et al (2020) and Krishnamurthy (2022) see the evidence as more mixed.

the major emerging market economies summarized in Table 1, the major addition to the inflation targeting ranks among less developed economies was India in 2016. As reviewed in Cobham (2021), a larger set of small emerging market economies also adopted inflation targeting between 2007 and 2023, including Armenia, Costa Rica, the Dominican Republic, Guatemala, Kenya, Mauritius, Paraguay, and Uganda. The adoption of inflation targeting in substantially smaller or less developed economies may bring new challenges.

3.2.1 Resilience to global shocks

Emerging markets were subject to a series of substantial shocks in the years around and after the GFC. In 2008 and early 2009, advanced economies reduced interest rates substantially as economic activity declined globally. Historically, such a global recession exerts pressure on emerging markets, as flight-to-safety capital flows to countries like the United States contribute to sizable depreciations of emerging market currencies. As discussed above, these dynamics have often resulted in adverse policy trade-offs in emerging markets, as the increase in inflation associated with currency depreciation and potential strains on debt servicing associated with dollarization point to efforts to limit depreciation, calling for tighter monetary policy, while the weakness in activity calls for accommodation.[7] In 2008 and 2009, major emerging markets that had adopted inflation targeting and anchored inflation expectations, such as Brazil, Chile, and Mexico (see section 2.4), were able to provide accommodation despite currency depreciation in late 2008 and early 2009 (as shown figure 2, with policy interest rates reduced in each economy).

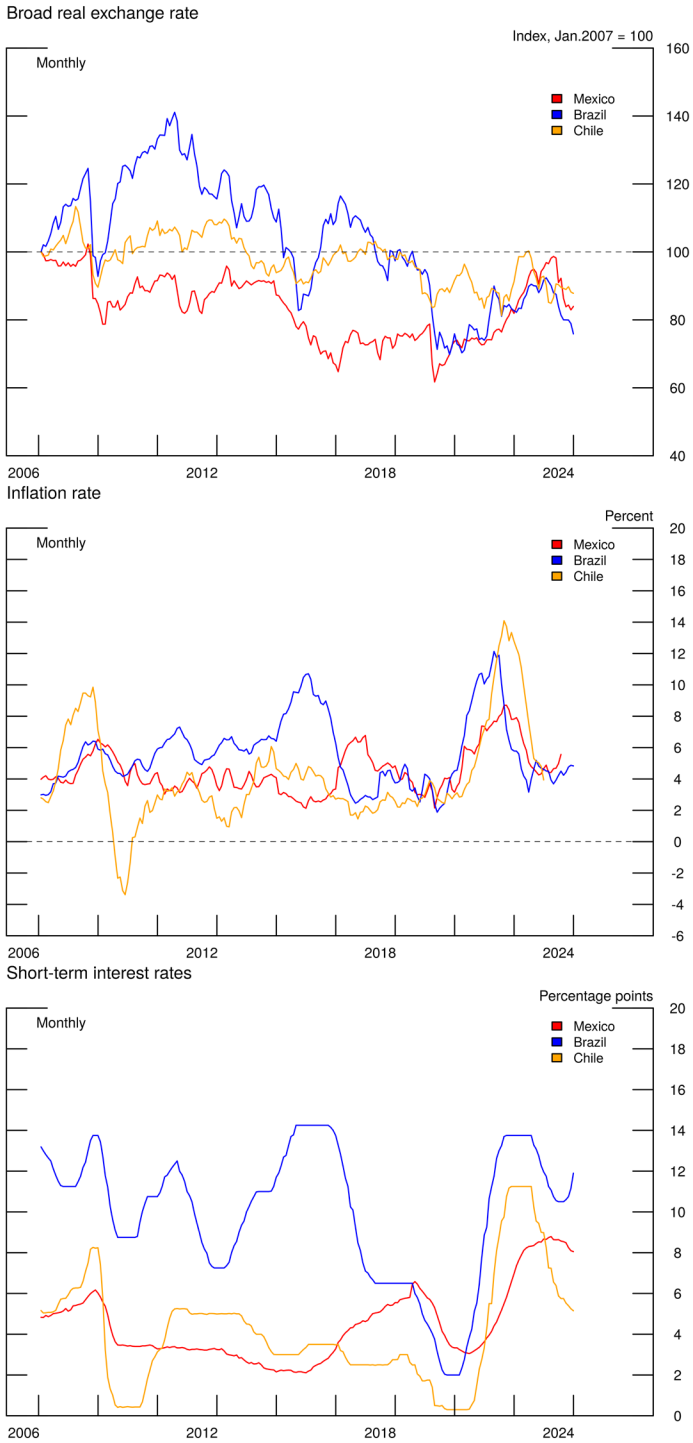
These benefits were apparent over the 2010s. During the European debt crisis of 2011, the taper tantrum of 2013, and the increase in trade tensions and tightening of U.S. monetary policy in 2018, emerging market currencies depreciated, including those of Brazil, Chile, and Mexico. Nonetheless, these central banks were able to stay the course, with little adjustment in their short-term policy interest rate, as inflation remained contained. Brazil saw a sizable depreciation around the global growth slowdown of late 2014-2016, with a large runup in inflation and policy tightening.

[7] For example, research has discussed how some emerging market economies saw large capital outflows and exchange rate depreciations (e.g., Eichengreen and Gupta 2015 and Aizenman, Binici, and Hutchison 2016). Similarly, the sharp tightening in monetary policy in advanced economies following 2021 raised concerns of significant strains in emerging market economies (e.g., Obstfeld, 2022).

Research has found that strong policy regimes, including inflation targeting and the associated anchoring of inflation expectations, has provided some insulation from such shocks to emerging markets. Lopez-Villavicencip and Pourray (2022) show that countries with flexible exchange rates, an inflation target, and highly credible central banks were better able to absorb external shocks during the taper-tantrum period. Ahmed, Akinci, and Queralto (2024) show that strong fundamentals, including well-anchored inflation expectations, have historically insulated emerging markets from foreign monetary policy shifts.

The period around the COVID-19 pandemic raised similar challenges. With the collapse in activity, emerging markets saw sharp depreciation in their currencies. The combination of over two decades of inflation targeting and anchored inflation expectations contributed to the ability of central banks like those of Brazil, Mexico, and Chile to reduce their short-term policy interest rates to support economic activity in the first half of 2020. As inflation picked up in 2021 and 2022, emerging market economies tightened policy earlier than advanced economies (e.g., the experience of the three countries in figure 2). Ahmed, Akinci, and Queralto (2024) find that strong frameworks like inflation targeting likely mitigated the consequences of the 2022 U.S. tightening cycle on emerging markets. The authors also find that maintaining the favorable inflation performance, on balance, of the previous two decades may have motivated strong monetary policy tightening during the 2022 cycle, and Kamin and Kearns (2022) show that emerging market economies with strong institutional frameworks pursued such preemptive tightening.

Figure 2: Real Exchange Rate, Inflation, and Short-term Interest Rates in Brazil, Mexico, and Chile



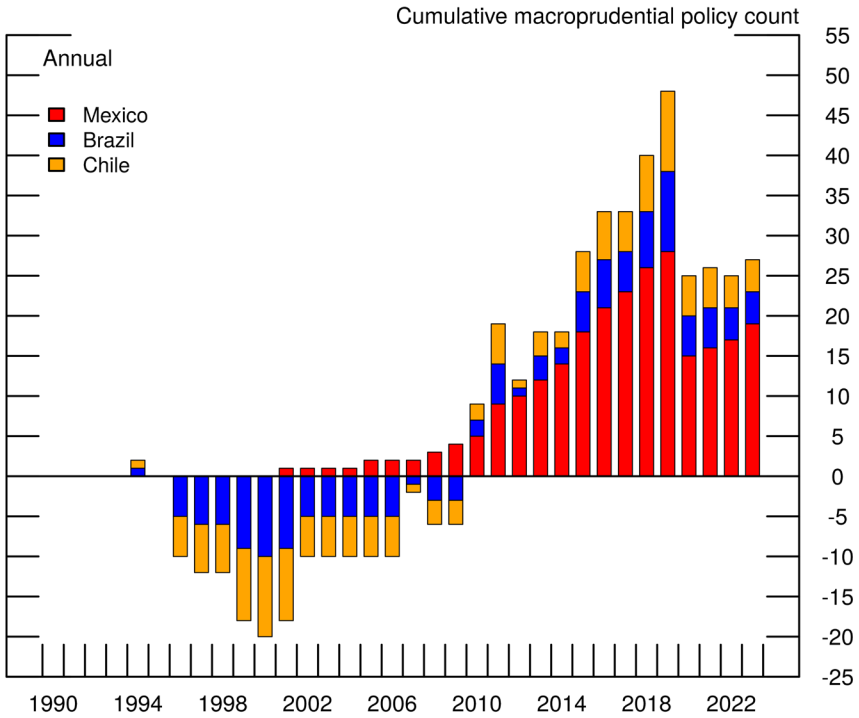
Source: All retrieved from FRED, Federal Reserve Bank of St. Louis. on February 14, 2025 (mnemonics in parentheses). Real exchange rate -- Bank for International Settlements (Brazil, RBBRBIS; Mexico, RBMXBIS; Chile, RBCLBIS); Inflation rate – Organization for Economic Cooperation & Development (OECD) (Brazil, CPALTT01BRM659N; Mexico. MEXCPALTT01CTGYM; Chile, CPALTT01CLM657N); Short-term interest rate (call money rate) – OECD (Brazil, IRSTCI01BRM156N; Mexico, IRSTCI01MXM156N;, Chile, IRSTCI01CLM156N).

3.2.2 Increased use of macroprudential policies

Part of the continued success of inflation targeting owes to development of a broader set of policies to achieve economic and financial stability goals, with the period after the GFC seeing substantial growth in the use of macroprudential policies. The global financial crisis (GFC) made it clear that traditional economic policies may not be enough to keep both financial systems and the broader economy stable. Even though inflation was low and economic growth seemed steady, hidden financial risks were building up. This challenged the idea—widely accepted before the crisis—that keeping inflation low and the economy running close to full capacity was enough to ensure overall stability. In response, policymakers introduced new tools aimed at reducing financial risks and creating buffers to absorb economic shocks. This allowed traditional policies—like setting interest rates and regulating individual banks—to stay focused on their usual roles. Macroprudential policies emerged to fill this important gap.

Some of these policies had been used before the GFC, especially in emerging markets, but their use became much more common after the crisis. Figure 3 presents the cumulative use of macroprudential measures in Brazil, Chile, and Mexico since 1990, showing a sharp increase after the GFC. For example, Brazil tightened macroprudential policies (related to capital flows) from 2011 through 2012. These measures combined with policy rate hikes in Brazil to curb inflation but also tempered the rapid expansion of credit. More generally, research has shown that macroprudential policies have proved effective in limiting credit growth and related risks to financial stability (e.g., Cerutti, Claessens, and Laeven, 2017). This evidence suggests that these new tools have been effective at targeting specific financial vulnerabilities while allowing traditional policy levers, including monetary policy, to focus on their traditional roles (Biljanovska et al, 2023).

Figure 3: Macroprudential policies in Brazil, Chile, and Mexico



Note: Cumulative count of policy actions, with an initiation of a policy action contributed +1 and a reversal contributing -1 to the sum. Source: International Monetary Fund Macroprudential Policy Survey (https://www.elibrary-areaer.imf.org/Macroprudential/Pages/iMaPPDatabase.aspx)

3.2.3 Inflation targeting in India

With its success across advanced economies and major emerging market economies, inflation targeting has increasingly been adopted by smaller and less developed economies. Such countries confront many of the same challenges as larger emerging market economies, such as the important influence of the exchange rate on domestic financial conditions and inflation.

India's Reserve Bank implemented inflation targeting in 2016, aiming for 4 percent inflation with a ±2 percent band. This shift is notable, as India is the most populous country in the world and significantly less developed than other countries that have adopted inflation targeting. To date, experience has been judged as favorable (IMF, 2025). Nonetheless, inflation targeting in India highlights challenges of inflation targeting in less developed economies. For example, food and energy make up more than half of the consumption basket in India. Prices for such items are subject to substantial supply shocks, challenging efforts to stabilize inflation to a degree that is outsized relative to experience in emerging markets that have previously adopted

inflation targeting. Moreover, the monetary policy transmission mechanism is very different in India, which has relatively undeveloped financial markets. Al-Mashat et al (2018b) review these challenges, and the experience in India will provide information on the suitability of inflation targeting for less developed economies.

3.3 Returning inflation to target after the early 2020s surge across advanced and emerging market economies

While inflation has declined globally since 2022, it remained above target across many economies. This is apparent in figure 2 for the selected emerging markets, but was true more generally in the United States, United Kingdom, and euro area as well. Research has shown that much of the increase and subsequent decline in inflation from 2021-2024 across the globe owed to extraordinary supply factors, including the disruptions to supply chains triggered by the COVID-19 pandemic and the effects of Russia's war on Ukraine on energy and agricultural markets (e.g., Bernanke and Blanchard, 2024). Even so, the role of monetary policy remains an area of debate.

Kiley and Mishkin (2024) discuss these developments in advanced economies, including the U.S. experience. Inflation remained subdued at the end of 2020 in the United States and FOMC participants expected inflation to remain below 2 percent. Moreover, the unemployment rate remained relatively high. As a result, FOMC communications at the time anticipated a prolonged period of policy accommodation because inflation was not expected to be persistent and because the FOMC's 2020 framework did not emphasize preemption in response to low levels of the unemployment rate. In addition, the FOMC's 2020 framework adopted temporary average inflation targeting, but was ambiguous with respect to a period over which inflation shortfalls would be computed and used in the determination of overshooting. In the event, the FOMC pivoted to rapidly remove accommodation when it realized the persistence of inflation, raising the target range for the federal funds rate at a very rapid clip in 2022: with a 50 basis point increase at the May FOMC meeting and then unprecedented string of 75 basis point increases in June, July, September and November, with a further 50 basis point increase in December. It would continue to raise the federal funds rate into the summer of 2023 and then hold the federal funds rate just above 5¼ percent for a year before lowering it beginning in

September 2024. At the end of 2024, inflation in the United States remained just below 3 percent, significantly below its 2022 peak but still notably above the 2 percent target.

The literature assessing the 2020s episode and its relationship to policy frameworks is growing. Two factors have been central in these discussions. First, the challenges associated with disentangling the role and persistence of supply and demand factors led to sizable forecasting errors. Second, these forecast errors and a reduced role for preemptive policy tightening and tolerance for inflation overshooting led to an initially slow response to high inflation in advanced economies—but not emerging-market economies—that was subsequently reversed when the forecast error was realized. For example, Evans (2024), Eggertsson and Kohn (2023), and English and Sack (2024) all emphasize that the Fed's response was shaped by its expectation that inflation would be transitory, leading to a delay in tightening policy. Moreover, these authors suggest that forward guidance and asset purchases introduced additional inertia, constraining the Fed from responding swiftly (Eggertsson and Kohn, 2023; English and Sack, 2024). Romer and Romer (2024) argue that the Fed's emphasis on addressing shortfalls in employment and its adoption of flexible average inflation targeting (FAIT) contributed to a slow policy reaction when inflation began to rise.

Emerging markets had not experienced the period of too-low inflation in the 2010s and remained focused on anchoring inflation expectations. As a result, they tended to move pre-emptively, with policy rates rising earlier than in advanced economies (as was shown for selected economies in figure 2). Even so, inflation generally remains above target. For example, Brazil reversed course and began raising its policy interest rate again in 2024 when its central bank saw insufficient progress toward its 3 percent inflation objective. While inflation has made substantial progress toward objective, returning inflation to target remains a challenge across advanced and emerging market economies as of early 2025.

4. Future Challenges

Inflation targeting has been successful in both advanced and emerging market countries, evolving to meet numerous challenges over time. Here we conclude by discussing possible future challenges.

4.1 Distinguishing Real from Perceived Challenges: Structural Changes and the Resilience of the Nominal Anchor

Inflation targeting has proven to be a robust and flexible framework, capable of adjusting to a wide range of macroeconomic trends while maintaining price stability. The framework is designed to account for structural changes by allowing monetary policy to adjust in response to evolving economic conditions, ensuring that inflation expectations remain well-anchored. A number of secular trends have been emphasized as potential challenges to macroeconomic policy, and this section examines some of these and discusses why inflation targeting is well placed to incorporate such considerations.

Recent shifts in global trade patterns, including increased trade restrictions, reshoring initiatives, and supply chain restructuring, have raised concerns about their potential impact on inflation dynamics. Even before COVID and rising geopolitical tensions in the early 2020s, Goodhart and Pradhan (2020) argued that globalization's disinflationary influence may be reversing, leading to structural inflationary pressures. Since then, trade and geopolitical fragmentation has been a focus in the global outlook for activity and inflation (e.g., IMF, 2024). Nonetheless, while trade fragmentation can shift relative prices—raising costs in some sectors while reducing others—it does not inherently compromise the effectiveness of an inflation-targeting regime. Central banks can consider the implications of shifting trade patterns, distinguish between transitory supply shocks and persistent inflationary pressures, and adjust their policy stance accordingly. This is clear within, for example, Svensson's (1997) forecast-targeting approach, which ensures that central banks set policy based on projected inflation paths, responding flexibly to shocks.

Other trends can be accounted for similarly. Aging populations, declining labor force growth, and changing savings-investment balances have long-term implications for economic growth and interest rate dynamics. Goodhart and Pradhan (2020) highlight that demographic shifts—such as the declining labor supply in advanced economies and rising dependency ratios—could exert inflationary pressures through wage growth and reduced savings. Ascari and Fosse (2024) document such medium-term forces have influenced inflation.

Technological change, particularly advances in artificial intelligence (AI) and automation, are another set of forces likely to evolve in coming years, with many researchers focused on artificial intelligence. The emergence of new technologies is nothing new—it has

been a constant source of growth. Acemoglu and Restrepo (2019) and Benzell et al. (2015) highlight how technologies have always, and will likely in the future, alter labor market dynamics. Recent developments in generative AI have intensified debates regarding its macroeconomic impact. Acemoglu (2024) contends that the macroeconomic effects of generative AI may not be as substantial as some proponents suggest, positing that its influence could mirror that of previous technological advancements. In contrast, analyses by McKinsey & Company (2023) project that generative AI could significantly boost labor productivity. These divergent perspectives underscore the uncertainty surrounding AI's potential to disrupt labor markets and influence wage dynamics. For inflation-targeting central banks, the key challenge lies in discerning the net effects of AI on productivity, employment and inflation. Should AI-driven productivity enhancements outpace the economy's capacity to adjust, central banks might face deflationary pressures due to suppressed wage growth. Alternatively, if AI leads to substantial job displacement without commensurate job creation, reduced consumer spending could dampen demand-pull inflation. While AI-induced technological shocks may change the structure of the economy, they do not undermine the fundamental effectiveness of inflation targeting, as central banks can adjust policy rates to balance the evolving trade-offs between inflation and employment.

4.2 The Risks of Fiscal and Financial Dominance

The interactions between fiscal and financial sector challenges and monetary policy can pose issues for central banks if fiscal and financial sector policies are set in a manner that constrains the ability of a central bank to pursue price stability. Emerging markets have long faced constraints on monetary policy due to external debt and macroeconomic volatility, but the sharp increase in sovereign debt burdens in advanced economies in recent years has raised similar concerns. The levels of fiscal debt have risen substantially in many countries, including the largest advanced economies. These increases have generally posed few concerns over the 2010s and early 2020s, as nominal interest rates were low. More recently, nominal interest rates have risen with higher inflation and relatively strong economic activity, leading to higher interest expenses.

The expansion of central bank balance sheets has also had fiscal implications. In the early years of QE, these policies increased remittances from central banks to fiscal authorities. Even

before inflation and nominal interest rates rose post-2021, analyses emphasized that the expansion of central bank holdings of long-duration government debt implied that a shift to higher interest rates would lead to losses on central bank balance sheets, with associated potential implications for central bank independence (e.g., Allen, Chadha, and Turner, 2021). Moreover, some fiscal authorities noted concerns about the interaction of a tightening in monetary policy and fiscal sustainability. For example, the UK's Office of Budget Responsibility (OBR) highlighted how a rise in interest rates would put upward pressure on the fiscal debt-to-GDP ratio and even, under some scenarios, lead to an unsustainable fiscal trajectory (OBR, 2021a and 2021b). In the event, the sharp rise in interest rates since the early 2020s has led to substantial mark-to-market losses on central bank asset holdings in advanced economies (Bell et al., 2023). While such losses do not directly impair a central bank's ability to conduct monetary policy, they present communication challenges and have amplified discussions of how fiscal effects may erode public support for central bank independence (Rajan, 2023; Brunnermeier, 2023).

The UK's 2022 liability-driven investment (LDI) crisis illustrates how fiscal and monetary interactions can shape financial stability risks and, potentially, monetary policy decisions, even in advanced economies. In the fall of 2022, the announcement of unfunded tax cuts by the UK government led to a sharp rise in gilt yields, which in turn triggered liquidity strains among pension funds with large LDI positions. These funds, which relied on leverage to enhance returns, faced margin calls, exacerbating market dysfunction and prompting the Bank of England to intervene with emergency gilt purchases to stabilize financial conditions (Bank of England, 2022). The episode highlighted the potential for fiscal actions to induce financial market stress, necessitating central bank intervention even as inflation remained a pressing concern. One aspect of the institutional structure in the United Kingdom helped clarify the distinction between monetary policy actions and macroprudential policy actions by the central bank: the separation of macroprudential policy and monetary policy through the responsibility of the Bank of England's Financial Policy Committee (FPC) (rather than the Monetary Policy Committee) for macroprudential policy. The FPC took the steps to stabilize markets in the fall of 2022. This financial stability intervention, together with a reversal of the fiscal policy announcements that precipitated the crisis, restored orderly market conditions.

While the UK LDI episode was precipitated by fiscal concerns, it owed to excessive leverage and liquidity risks among the pension funds that relied on the LDI strategy. As a result,

it also provides an example of concerns over financial dominance—where monetary policy is constrained by financial stability concerns. Other recent financial market disruptions have renewed concerns about the interplay between monetary tightening and financial instability. In March 2023, several U.S. banks failed due to excessive interest rate risk exposures, with another large bank collapse following in May. The distress at a global systemically important bank in Switzerland, which resulted in losses for convertible debt holders, further underscored financial fragilities. These events have sparked renewed debate on whether monetary policy actions, particularly those aimed at curbing inflation, may be constrained by financial stability concerns—raising the specter of financial dominance (Rajan, 2023; Brunnermeier, 2023).

An important development mitigating risks of financial dominance is the increased use of macroprudential tools, as in the LDI episode. As we noted earlier, increased use of macroprudential tools is a component of the overall improvement in policymaking and institutions. A robust institutional framework can support an inflation targeting regime by ensuring that a range of government policies are aimed at multiple objectives, thereby not burdening monetary policy with objectives inconsistent with its inflation target. This approach aligns with Tinbergen's (1939) separation principle, which posits that achieving multiple policy objectives—such as price stability, economic stability, and financial stability—requires distinct policy instruments. Overall, inflation targeting has proven robust to a range of challenges. The continued efficacy of inflation targeting depends on the set of government policies, as other government policies inconsistent with prices stability affect the ability of a central bank to achieve its objectives in the long run.[8]

4.3 Risks to Central Bank Independence from Expanding Mandates

Inflation-targeting central banks necessarily have a mandate for price stability, but this mandate is often accompanied by a mandate to promote economic stability, which implies a focus on financial stability. In recent years central banks have come under pressure to pursue other objectives, such as reducing climate change and income inequality. Although these objectives may be highly worthy, a focus on them could lead to central banks taking their eye off the ball on achieving price and economic stability and thus could lead to poorer central bank performance

[8] The literature on the fiscal theory of the price level is an example of the tensions between other government policies and price stability related to fiscal issues (e.g., Cochrane, 2023).

on achieving these goals. In addition, additional goals may not be achievable with monetary tools: achievement of a set of goals requires a set of policy tools sufficient to jointly meet all the goals; the absence of sufficient policy instruments implies that a central bank may not be able to achieve multiple goals (Tinbergen, 1939). Expanding the goals of a central bank by assigning it more policy instruments, may overburden a central bank or lead to challenges in prioritizing goals and policy actions. If central banks pursue additional goals, the risk of disagreements over goals and policies is higher, potentially affecting support for central bank independence in monetary policy.

For example, central banks have been taking somewhat different approaches to issues such as climate change. In general, central banks have noted that climate change may affect economic and financial developments in a manner that may affect price and economic stability mandates. Some central banks make it clear that their work on climate change is limited to this area.[9] Other central banks have gone further, emphasizing work promoting the development of sustainable finance and creating incentives for a greener financial system.[10] Researchers have highlighted how additional mandates could compromise central bank independence in the longer run and divert central banks' focus on core mandates (e.g., Hansen, 2022, Brunnermeier and Landau, 2022).

Regarding income inequality, discussions have emphasized several issues: central banks are aware, and have concerns about, the consequences of their actions on income and wealth distribution over shorter horizons relevant for their stability mandates. At the same time, central banks do not have the necessary tools to achieve distributional outcomes, and high inflation and recessions can be extremely costly for inequality, suggesting that a focus on core mandates is how central banks can limit adverse distributional outcomes (e.g., Carstens, 2021 and Rajan, 2023).

These observations highlight how discussions regarding new mandates for central banks appear to suggest caution, reflecting the challenges an organization faces when executing to achieve multiple goals, a lack of policy levers relevant for addressing new mandates, and

[9] For example, the Norges Bank emphasized that its monetary policy analysis related to climate change is focused on the implications for the Bank's core tasks. See Climate and the economy, accessed February 26, 2025.
[10] For example, the ECB. See Climate change and the ECB, accessed February 26, 2025.

concerns over an expansion in responsibilities that may lower independence and hence undermine price stability.

4.4 Quantitative Easing and Tightening

The role of balance sheet policies in monetary policy implementation has expanded significantly over the past two decades, yet their deployment has raised challenges regarding calibration, communication, and integration with inflation-targeting frameworks. Eggertsson and Kohn (2023), English and Sack (2024), and Kohn (2025) point to the experience of the 2020s, particularly in response to the inflation surge following the COVID-19 pandemic, as underscoring the desirability of enhanced integration of such tools in the monetary and financial stability toolkit, along with improvements in communications.

The Federal Reserve's post-2020 QE program illustrates these ideas. English and Sack (2024) argue that the Fed's decision to maintain asset purchases into late 2021, despite rising inflation and falling unemployment, reflected, in part, areas of the policy approach that were not as fully developed as possible. For example, QE was initially justified as a tool for market stabilization, but later shifted to use for demand stimulation. While QE can be used for both purposes, deployment of the same tool for multiple purposes complicates achieving objectives (as the Tinbergen, 1939, principle points to separate tools for separate objectives). Multiple purposes also create communication issues, with limited clarity and public understanding on how balance sheet runoff proceeds or how it interacts with policy rate adjustments. In this regard, both English and Sack (2024) and Eggertsson and Kohn (2023) identify exit strategy rigidity as a challenge in recent years. The Fed's decision to tie rate hikes to the completion of tapering (Eggertsson & Kohn, 2023) may have created inertia in 2021, delaying the policy response to inflation.

Stepping back from 2020s experience, central bank purchases of private assets, such as corporate bonds or mortgage-backed securities (MBS), introduce distinct challenges beyond those associated with government bond acquisitions. One set of concern is the potential for these interventions to blur the line between monetary policy and credit allocation, which can weaken support for central bank independence and spur moral hazard (Domanski et al, 2014), For example, by supporting specific sectors, such as housing through MBS purchases, central banks may be perceived as favoring particular industries, raising questions about distributional effects

and market distortions. Additionally, these interventions can contribute to moral hazard, as investors may come to expect central bank backstops, encouraging excessive risk-taking in financial markets. The debate over these policies underscores arguments for balancing financial stability objectives with maintaining central bank independence and credibility.

Both critiques provide a rationale for future QE/QT policies to embody conditional and flexible communications. Such a flexible approach to QE/QT would include enhanced guidance and transparency, differentiation between asset purchases for market stabilization and aggregate demand management, and appropriate clauses for adjusting balance sheet policies in real time. Communications regarding asset purchases other than government debt could describe the factors that make such actions appropriate, whether for market stabilization or other objectives, and thereby contribute to transparency and accountability. Furthermore, concerns about moral hazard and credit allocation raised by quantitative easing when it involves purchases of private assets, can be assuaged by central bank communication that such actions would only be pursued under highly unusual and rare circumstances. For example, Clouse and Small (2004), in their analysis of Federal Reserve authorities, note that "having the Federal Reserve directly involved in the evaluation of credit risk and influencing the allocation of credit across sectors of the economy would involve its own problems." (page 37).

4.5 Forward Guidance, the Reaction Process and Scenario Analysis

Earlier we discussed how inflation-targeting central banks have used forward guidance as a nonconventional policy tools, especially when policy rates hit the effective lower bound (ELB). Here we discuss the communication challenges that have accompanied forward guidance.

As was mentioned earlier, forward guidance is of two types: time-based and data-based. Feroli et. al. (2017) argue that data-based forward guidance has substantial advantages over time-based forward guidance. To understand this argument, consider what happens when there is a negative shock to aggregate demand when both the inflation gap and the output gap are at zero. When forward guidance is time-based, the central bank indicates that the policy rate will be set to particular values at particular date, so there is no change in the expected policy path when the negative aggregate demand shock occurs even though this shock would lead to a decline in expected inflation. The result is then that the expected path of future *real* interest rates, policy interest rates minus expected inflation, now rises, which is an effective tightening of monetary

policy, the opposite to what would be an optimal effective monetary policy response. of monetary policy, the opposite to what would be an optimal effective monetary policy response given that both inflation and output gaps will be negative. (This the same problem discussed in Eggertsson and Woodford, 2003, where negative inflation shocks lead to an adverse feedback loop when the policy interest rate does not respond to these shocks, in their case because of the effective lower bound on interest rates.)

In contrast, data-based forward guidance can act as an automatic stabilizer, where the markets do some of the work for the central bank. In this case, when the negative aggregate demand shock leads to both the inflation and output gaps turning negative in the future, an optimal monetary policy reaction process would indicate that the federal funds rate path would be lowered.

Note that we use the term monetary reaction *process* rather than monetary reaction *function.* A function is a mathematical construct that generates an output from quantifiable inputs, yet successful conduct of monetary policy involves judgment which is often not quantifiable. Thus, a description of monetary policy reactions to evolving economic circumstances is better described as a reaction process rather than a reaction function. If the central bank's reaction process is well understood by the public, then without the central bank's taking any actions, expectations of the future policy rate would decline, which would result in lower longer-term interest rates and stimulate the economy. The result would then be an immediate offset to the negative aggregate demand shock which would help stabilize the economy.

Although the markets can glean some information about the policy reaction process by seeing how actual monetary policy actions react to the incoming data, as the evidence in Feroli et al. (2017) suggests, the monetary authorities can provide even more information about their policy reaction process through scenario analysis. They can publish different scenarios showing how the policy instruments would change as economic circumstances change and then explain how the current setting of their policy instruments is consistent with this policy reaction process. Then as the economy evolves, the public and the markets can better assess how the economy is evolving relative to potential alternatives and the resulting implications for monetary policy as it adjusts to achieve the inflation target. This sort of approach can be used to highlight the conditionality of forward guidance. It could also be used to highlight the interaction between

forward guidance and quantitative easing and/or tightening as, for example, scenarios could describe the size and sequencing of changes in central bank balance sheets and policy interest rates in different scenarios. More prosaically, alternative scenarios could illustrate central bank's assessment of salient risks, as discussed in Bordo, Levin, and Levy (2020). Bernanke (2024) discusses the use of alternative scenarios and recommends their use in his review of the Bank of England's forecasting and related communications. To date, central banks have only presented alternative scenarios to a limited extent, often in qualitative terms and primarily as a means of highlighting salient risks. The ECB and Riksbank have included alternative scenarios since 2020, and the Reserve Bank of Australia began including them in 2024. The Riksbank provides considerable detail in its alternative scenarios, reporting quantitative information on the paths of economic activity, inflation, and the policy interest rate.

Providing more information about the policy reaction process can also help increase credibility and accountability, which may not be strong enough because of the long lags of monetary policy to inflation outcomes. If markets and the public have a better understanding of the policy reaction process, they can evaluate whether the current setting of the policy instruments is consistent with achieving the inflation target, thus increasing the credibility and accountability of the monetary policy authorities for achieving this target. Research has suggested that recent experience points to the potential for improvements in communications regarding forward guidance. For example, Kohn (2025) argues that it is likely that poor communications about forward guidance might have delayed interest rate lift-off by when inflation surged in 2021 by at least several months and perhaps by as much as half a year. Romer and Romer (2024) come to a similar conclusion. While this assessment is not universally shared, it points to challenges in communication around forward guidance.

One natural vehicle for communicating information about forward guidance, scenarios and the policy reaction process is *Inflation Report* type documents. There are substantial differences across central banks in the monetary policy documents that are released to the public. Most central banks provide relatively detailed narratives and forecasts in a quarterly *Inflation Report*. The Federal Reserve is an outlier: the FOMC releases a Summary of Economic Projections (SEP) quarterly, but the information provided is sparse and the SEP is a collection of the individual projections of FOMC participants, not a Committee outlook. Central banks also differ in how the policy interest rate used in their projections is determined. Some, such as the

Bank of England, infer a path for the policy interest rate from financial market futures. This approach may not provide as much information as possible on how the central bank reacts to changes in the outlook, as it relies on how financial market participants assess likely reactions. Some central banks, including those of New Zealand, Norway, and Sweden, condition their projections on an interest rate path they deem consistent with the achievement of their objectives, as envisioned in the forecast targeting approach of Svensson (1997). The Riksbank arguably provides the most information: it publishes a detailed inflation report that includes a projection for the policy interest rate and alternative scenarios for the economy, with associated potential policy paths. In contrast, the Federal Reserve publishes relatively little information related to its outlook and associated policy settings.

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